



# Project Administration Memorandum

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Project Number: 36304  
Loan Number: 2283-VIE(SF)  
Approved on 11 December 2006

## Loan 2283–VIE(SF): Agriculture Science and Technology Project

The project administration memorandum (PAM) is an active document, progressively updated and revised as necessary, particularly following any changes in project costs, scope, or implementation arrangements. This document, however, may not reflect the latest project changes. This PAM shall be read along with the Report and Recommendations of the President and Loan Agreement. This PAM incorporates agreements reached between SEAE and Executing Agency as of 11 May 2007. In case of discrepancy, the Loan Agreement shall prevail.

Asian Development Bank

## **CURRENCY EQUIVALENTS**

(as of 18 April 2007)

Currency Unit	–	dong (D)
D1,000	=	\$0.0624
\$1.00	=	D16,037

## **ABBREVIATIONS**

ADB	–	Asian Development Bank
AMIS	–	agricultural market information system
ASDP	–	Agriculture Sector Development Program
AST	–	agriculture science and technology
CPMU	–	central project management unit
M&E	–	monitoring and evaluation
MARD	–	Ministry of Agriculture and Rural Development
MPI	–	Ministry of Planning and Investment
NAEC	–	National Agricultural Extension Center
NGO	–	nongovernment organization
PAEC	–	provincial agricultural extension center
PPMU	–	provincial project management unit
PSC	–	project steering committee
TA	–	technical assistance

## **NOTE**

In this report, "\$" refers to US dollars.

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## **LOAN PROCESSING HISTORY**

<b>Processing Events</b>	<b>Dates</b>
Approval of Project Preparatory Technical Assistance (TA 4194)	9 October 2003
Loan Fact-finding	29 August – 9 September 2005
Management Review Meeting	3 March 2006
Loan Appraisal	15–28 March 2006
Staff Review Committee Meeting	23 June 2006
Loan Negotiations	6–8 November 2006
Board Circulation	20 November 2006
Board Consideration and Approval	11 December 2006
Loan Agreement Signing	14 March 2007
Loan Effectiveness	13 June 2007
Physical Completion Date	31 December 2011
Loan Closing Date (Closing of Loan Accounts Date)	30 June 2012



## DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
<b>Impact</b> Sustainable and equitable agricultural growth achieved	<ul style="list-style-type: none"> <li>Aggregate value added and exports of the agriculture sector to increase at about 3.0–3.2% and 12.3–14.3% respectively per annum during 2006–2010 in line with the 5-Year Socioeconomic Development Plan</li> <li>Poverty incidence in rural areas decreased from 45% (2003)</li> </ul>	<ul style="list-style-type: none"> <li>National accounts</li> <li>National agricultural statistics (annual yields, production volume and value, varieties of crops and other products, and other relevant data)</li> <li>Poverty assessments</li> <li>Monitoring by the Ministry of Agriculture and Rural Development (MARD), and Ministry of Planning and Investment (MPI)</li> </ul>	<b>Assumptions</b> <ul style="list-style-type: none"> <li>Macroeconomic stability maintained during the project period</li> <li>The country's agriculture sector continues to be effectively integrated into international markets</li> <li>Sustainable use of on-farm and off-farm natural resources</li> </ul>
<b>Outcome</b> National system of agriculture science and technology (AST) strengthened	<ul style="list-style-type: none"> <li>Client-oriented AST system in place with improved and more effective mechanisms for technology dissemination</li> <li>Closer linkages established between research and extension activities</li> <li>Multiple extension services in place, involving various service providers</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring by MARD and MPI</li> <li>Project review missions of the Asian Development Bank (ADB)</li> <li>Project monitoring system and progress reports</li> <li>Regular dialogue with key stakeholders involved in the national AST system, including extension centers and research institutes</li> </ul>	<b>Assumptions</b> <ul style="list-style-type: none"> <li>Continued Government commitment to the market-oriented agriculture sector in line with the national socioeconomic development plans</li> <li>Continued Government policies and actions to streamline AST institutions to respond to the national development goals</li> <li>Agriculture market information systems effectively implemented</li> </ul>
<b>Outputs</b> 1. Capacity of physical and human resources for agricultural research improved	<ul style="list-style-type: none"> <li>Efficiency and usage of laboratory equipment increased substantially</li> <li>Research staff with relevant postgraduate qualification increased from 20% in 2003 to 30% in 2008 in line with the human resource development plan for agricultural research</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring by MARD and MPI</li> <li>ADB review missions</li> <li>Project monitoring system and progress reports, including inventories of equipment and staff lists</li> <li>Midterm and completion reviews of the Project</li> <li>Regular dialogue with key stakeholders involved in the national AST system</li> </ul>	<b>Assumptions</b> <ul style="list-style-type: none"> <li>The Government's plan for research institute reorganization implemented</li> <li>Skilled staff retained in the national AST system</li> <li>Adequate financial resources for proper operation and maintenance</li> </ul> <b>Risk</b> <ul style="list-style-type: none"> <li>Inappropriate intervention into procurement and selection of trainees</li> </ul>

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
2. Agricultural research activities made more responsive to client needs	<ul style="list-style-type: none"> <li>• Research and technology transfer contracts undertaken in provinces of different agroecological regions</li> <li>• Not less than 40% of the value of research contracts addressing needs of upland or remote communities</li> </ul>	<ul style="list-style-type: none"> <li>• Monitoring by MARD and MPI</li> <li>• ADB review missions</li> <li>• Project monitoring system and progress reports, including contract awards</li> <li>• Midterm and completion reviews of the Project</li> <li>• Regular dialogue with key stakeholders involved in the national AST system</li> </ul>	<b>Assumptions</b> <ul style="list-style-type: none"> <li>• Government procedures and regulations improved for the client-oriented AST system of the country</li> <li>• Increased awareness among the stakeholder agencies about the need for client-oriented agricultural research activities</li> </ul>
3. Farmers' access to participatory and pro-poor agricultural extension improved	<ul style="list-style-type: none"> <li>• Needs-based provincial planning systems for agricultural extension established</li> <li>• Project extension activities implemented in upland and remote areas of the five project provinces</li> <li>• Not less than 40% of the value of extension contracts addressing needs of upland or remote communities</li> </ul>	<ul style="list-style-type: none"> <li>• Monitoring by MARD and MPI</li> <li>• ADB review missions</li> <li>• Project monitoring system and progress reports, including assessment of poverty incidence and evaluation of training and seminar programs conducted under the Project</li> <li>• Midterm and completion reviews of the Project</li> <li>• Regular dialogue with key stakeholders involved in the national AST system</li> </ul>	<b>Assumptions</b> <ul style="list-style-type: none"> <li>• Active participation of key stakeholders in local communities in planning and implementation of grassroots extension services</li> <li>• Effective linkage between research and extension maintained</li> </ul> <b>Risk</b> <ul style="list-style-type: none"> <li>• Inadequate finance made available for the extension services</li> </ul>
4. Improved linkage of agricultural extension services with research strengthened	<ul style="list-style-type: none"> <li>• Participation of provincial extension centers in regional research activities, including provincial research programs and field research trials</li> <li>• Practical linkages between farmer groups, extension service providers, and research institutes formalized</li> <li>• Effective mechanisms for increased stakeholder participation in extension services established</li> </ul>	<ul style="list-style-type: none"> <li>• Monitoring by MARD and MPI</li> <li>• ADB review missions</li> <li>• Project monitoring system and progress reports</li> <li>• Midterm and completion reviews of the Project</li> <li>• Regular dialogue with key stakeholders involved in the national AST system</li> </ul>	<b>Assumptions</b> <ul style="list-style-type: none"> <li>• Government procedures and regulations improved for effective linkages between research and extension</li> <li>• Increased awareness among local extension workers about the need to strengthen linkages with research activities</li> </ul>

<b>Design Summary</b>	<b>Performance Targets/Indicators</b>	<b>Data Sources/Reporting Mechanisms</b>	<b>Assumptions and Risks</b>
5. Rural-based technical and vocational training made more responsive to national sector goals	<ul style="list-style-type: none"> <li>• Effective systems to link between schools and industries in place</li> <li>• Appropriate curriculum guidelines introduced to reflect national sector goals</li> </ul>	<ul style="list-style-type: none"> <li>• Monitoring by MARD and MPI</li> <li>• ADB review missions</li> <li>• Project monitoring system and progress reports</li> <li>• Midterm and completion reviews of the Project</li> <li>• Regular dialogue with key stakeholders involved in the national AST system</li> </ul>	<b>Assumptions</b> <ul style="list-style-type: none"> <li>• National curriculum guides developed in line with the national sector goals</li> <li>• School-industry councils provide effective guidance to schools</li> <li>• Labor market information effectively communicated to technical and vocational schools</li> </ul>
6. Capacity of rural-based technical and vocational training strengthened	<ul style="list-style-type: none"> <li>• Average usage of school and laboratory equipment in the schools selected under the Project increased substantially</li> <li>• Average of about 90% of the graduates of the targeted schools enter into full-time employment</li> </ul>	<ul style="list-style-type: none"> <li>• Monitoring by MARD and MPI</li> <li>• ADB review missions</li> <li>• Project monitoring system and progress reports</li> <li>• Midterm and completion reviews of the Project</li> <li>• Regular dialogue with key stakeholders involved in the national AST system</li> </ul>	<b>Assumptions</b> <ul style="list-style-type: none"> <li>• Adequate financial resources provided for operation and maintenance of upgraded equipment and facilities</li> </ul>
<b>Activities with Milestones</b> <p>1.1 Provision of laboratory facilities and equipment for research</p> <p>1.2 Provision of training programs for staff and researchers of research institutes</p> <p>1.3 Provision of the agricultural research fund</p> <p>2.1 Establishment of formal linkages between farmer groups, extension service providers, and research institutes</p> <p>2.2. Provision of training facilities and equipment for provinces and districts</p> <p>2.3 Development of national and provincial extension contract systems with local service providers</p> <p>3.1 Provision of school facilities and equipment</p> <p>3.2 Revision of school curriculum guidelines</p>		<p>Procurement commenced by December 2007</p> <p>Training programs to be initiated by December 2007</p> <p>Establishment of the fund by December 2007</p> <p>Issuance of circulars by June 2007</p> <p>Procurement commenced by September 2007</p> <p>Systems developed by December 2007</p> <p>Procurement commenced by December 2007</p> <p>Revisions to be completed by December 2008</p>	<b>Inputs</b> <ul style="list-style-type: none"> <li>• ADB \$30.0 million</li> <li>• Government \$10.0 million</li> </ul>

## I. PROJECT DESCRIPTION

### A. Project Area and Location

1. The project activities related to extension will mainly cover upland or remote areas in five provinces, including Dac Nong,<sup>1</sup> Nghe An, Ninh Thuan, Quang Nam, and Thanh Hoa, while other project components have nationwide coverage.

### B. Impact and Outcome

2. The Project aims to strengthen the national agriculture science and technology (AST) system in Viet Nam, thereby contributing to the sustainable and equitable growth of the agriculture sector and ultimately to reduced rural poverty. The Project will address critical issues involved in AST development, including the low level of linkages among the key AST areas (agricultural research, extension, and rural-based training), and the gap in the capacity of physical and human resources for the national AST system. Specific project outcomes will include (i) improved capacity of physical and human resources for agricultural research, (ii) increased responsiveness of agricultural research activities to client needs, (iii) improved farmer access to participatory and pro-poor agricultural extension services, (iv) strengthened linkages between agricultural research and extension, (v) increased responsiveness of rural-based technical and vocational training to national sector goals, and (vi) strengthened capacity of rural-based agricultural training.

### C. Outputs

#### 1. Client-oriented Agricultural Research and Capacity Strengthening

2. This component will support (i) client-oriented research programs, (ii) training and post-graduate programs for the staff involved in agricultural research, and (iii) upgrading of laboratory equipment of selected agricultural research institutes.

3. **Client-oriented research programs.** The Project will promote agricultural research programs and timely application of research results to clients' practical uses. Prior to start-up of this activity, MARD, the Executing Agency (EA) for the Project, will establish a committee to examine and select research proposals for project funding on a competitive basis. The committee is proposed to have a total of 11 members, representing MARD's Science and Technology Council (STC), other relevant government and non-government agencies, including agro-enterprises and rural associations.

4. The research proposals to be funded under the Project need to be mainly focused on knowledge, information and technologies relevant to the agro-ecological regions serviced by regional research institutes, and must be clearly in line with the selection criteria to reflect client needs, strategic relevance and sustainability. The selection criteria will include: (a) appropriateness to the local client needs through the results of participatory rural assessments; (b) relevance to the national sector goals, strategies, and priorities; (c) technical and financial viability and sustainability; (d) linkage with agricultural extension and effective mechanisms for participatory technology development and dissemination; and (e) compliance with social and environmental requirements. A scoring system to emphasize social and pro-poor aspects, and

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<sup>1</sup> The Government of Denmark is currently formulating a follow-up project to the ongoing Agriculture Sector Programme Support in several provinces including Dac Nong Province, whose activities are expected to have a strong synergy with the proposed Project.

promotion of environmentally sustainable agricultural and natural resource management systems, will be adopted.

5. Although research subjects on upland and remote areas will be covered mainly by public institutes, private sector institutions can also apply for the program. The proposals need to involve at least one provincial agricultural extension center (PAEC) or extension advisory council as a co-applicant to ensure a linkage between research and extension.<sup>2</sup> The maximum amount of a research proposal will be \$100,000. Reasonable laboratory or office equipment to undertake the proposed research can be included in the proposal. This activity is complementary to the ongoing Collaboration for Agriculture and Rural Development Program financed by the Government of Australia, which delivers large-scale and advanced agricultural research programs through a competitive bidding system. Coordination through the committee established for the Project will avoid the selection of repetitive and duplicative research proposals.

6. **Training of research staff.** To address the shortage of qualified research staff, the Project will provide on-the-job training and postgraduate and post-doctoral study programs for the staff of agricultural research institutes and other institutions of the national AST system. The purpose of the on-the-job training is to effectively utilize the existing and proposed laboratory equipment and facilities, and improve the staff knowledge and skills to manage sophisticated facilities. During the first year of the Project, the Project's consultant will conduct a needs assessment for on-the-job training. The assessment will build on the inventory of existing equipment and facilities compiled during project formulation under the project preparatory TA,<sup>3</sup> MARD's 2003 equipment utilization survey, and additional questionnaires to be given to selected institutions. Based on the results of the assessment, MARD will identify the subjects and formulate proposals for the type and duration of the on-the-job training programs.

7. The Project will finance overseas study programs in the key areas of agricultural research, including agricultural biotechnology, postharvest technology, product preservation for fruits and vegetables, economic policy and marketing, and natural resources management. No specific quota will be assigned to any of these subject areas or institutes. The overseas study programs will support 20 trainees for doctoral courses for 3 years, 15 trainees for master's courses for 2 years, and 20 trainees for post-doctoral programs for 1 year. At least 10% of the total trainees will be women. The application and selection processes will follow the existing procedures of MARD. The selection criteria of the applicants is in Appendix 1.

8. **Upgrading of laboratory equipment.** The Project will provide and upgrade essential research and laboratory equipment of selected MARD agricultural research institutes to fill critical gaps in research due to outdated equipment. Institutes to be covered under the Project are indicated in Appendix 4 of the RRP. The equipment to be covered under the Project mainly constitutes the basic equipment urgently required for the institutes' research programs. This project component will not establish any new institutes or facilities, but will mainly support upgrading of existing equipment and facilities as prioritized in consultation with MARD and concerned institutes to minimize necessary incremental costs and ensure financial sustainability. Small-scale civil works included under this component (a green house and an experimental tea garden) will not require land acquisition or resettlement. Based on the list of

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<sup>2</sup> The field survey carried out during project formulation indicated farmers' strong demand for reliable information on agricultural research results and improved technology from regional and central research institutes and extension services.

<sup>3</sup> ADB. 2005. *Technical Assistance to the Socialist Republic of Viet Nam for Preparing the Agriculture Science and Technology Project*. Manila (TA 4194-VIE)

equipment prepared during project formulation, MARD will conduct a detailed examination of the proposed procurement with assistance from project implementation consultants. MARD will ensure that adequate knowledge and skills exist at the institutes for utilization of the procured equipment.<sup>4</sup>

## 2. Grassroots Agricultural Extension Improvement

9. The Project will improve farmers' access to participatory and pro-poor extension services, and strengthen linkages between agricultural research and extension services. Project activities for agricultural extension will be implemented in five project provinces based on selection criteria that include (i) a focus on the central region, where incidence of rural poverty is high, and synergy with other ADB-financed projects;<sup>5</sup> (ii) existence or planned establishment of a provincial advisory council for agricultural extension, which includes as its members representatives of PAEC, regional research institutes, civil society organizations, farmer groups, and mass organizations; (iii) possible operational linkage with regional research institutes; (iv) high poverty incidence in the upland or remote districts in the province; and (v) willingness to participate in project activities. In the five provinces, the Project will promote decentralized agricultural extension systems based on a stakeholder participatory process through provincial advisory councils. Based on the performance of the project activities during the first 2 years of implementation, the Government and ADB may consider implementing extension activities under the Project in other provinces at the time of the midterm review. Under this component, the Project will support (i) strengthening of pro-poor provincial agricultural extension services; and (ii) promotion of agricultural extension services.

10. **Pro-poor provincial agricultural extension services.** The first activity to be implemented under this subcomponent will be the development of provincial plans for agricultural extension. PAECs will select priority districts in upland or remote areas, conduct farmers' needs assessments, and identify necessary training activities and potential local service providers through workshops and consultation meetings with national and local stakeholders. The individual provincial plan will be tailored to the situation and condition of each province, and will provide a firm basis for the implementation of subsequent activities. The plan will have special sections for women and ethnic minorities to ensure their active participation.

11. Based on the needs assessments and the outcome of stakeholder consultations, the PAECs will prepare appropriate training programs for provincial extension staff and grassroots extension service providers with assistance of project implementation consultants. Priority subjects of the training programs identified during project formulation include (i) skills for farmers' business development and financial management; (ii) advanced agricultural science and technology; (iii) participatory and farmer-centered extension methodology and community organization, including experiences and lessons learned under the farmer field school approach; (iv) integrated pest management and other environmental concerns; and (v) awareness on gender mainstreaming and ethnic minority concerns.

12. The training programs for trainers will cover a total of 40 extension staff from the five project provinces. The number of staff from each province will be proportional to the size of the

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<sup>4</sup> The proposed implementation arrangements will not be affected by Decree No.115 issued in September 2005, which requires all the research institutes of the Government to become financially autonomous by the end of December 2009. However, if different implementation arrangements are required in future, the Government and ADB will consider revision of the proposed implementation arrangements, as required.

<sup>5</sup> Including the proposed Sustainable Livelihood and Rural Infrastructure Project in the Central Region proposed for a loan from ADB.

province. Two workshops for 20 staff each will be organized for 10 days under the Project, and promote the formation of 20 two-person teams of provincial trainers at completion of the workshops. The teams of trainers will work with resource persons and facilitate the training programs for grassroots district and commune extension service providers. These programs will require about 5 days and commence at the end of the first year of the Project. A total of about 270 programs will be organized during the project period; about 6,000 people are expected to participate in these programs, including at least 100 provincial extension staff, 400 district staff, and 5,500 commune service providers. The lessons learned and feedback from other relevant projects, including the ADB project financed under the Japan Fund for Poverty Reduction, will be fully taken into consideration for planning and implementation of this project component.<sup>6</sup>

13. In addition, the Project will support ongoing technical training programs organized by the PAECs for local extension staff and farmer groups on other priority subjects identified during the formulation of provincial plans. Training for farmers in poverty-stricken upland and remote areas will include an emphasis on food security and nutrition, particularly as an entry point for poor farmers to participate in the training programs. One overseas study tour for about 10 people to a country in Southeast Asia and a total of 34 in-country visits will be organized under the Project. The participants will be selected from the national, provincial, and district extension staff; selection will reflect the need for increased participation of women and ethnic minority population in consultation with NAEC and PAECs. The selection of participants in the overseas study tour is subject to ADB approval.

14. To enhance the impact of extension services, the information and communication capacity and networks of NAEC, PAECs, and district stations for agricultural extension in the project provinces will be strengthened under the Project through the procurement of basic equipment and provision of support for incremental operating costs during the first 2 years. The Project will also finance the national mass media programs on subjects related to AST; this is an important part of the agricultural extension strategy to improve farmers' awareness, knowledge, and information on production and marketing. This will be implemented through contractual arrangements with radio and television stations with nationwide coverage.

15. **Promotion of extension contracts.** The Project will finance on-farm demonstration trials in the project provinces through contractual arrangements with regional or national research institutes to strengthen the provincial link between research and extension. Past efforts for these trials in each province should be fully considered to avoid overlapping and duplicating activities. Each contract will cover the fees for institutes, extension materials, and travel and accommodation costs. The Project will promote local contractual extension services to mobilize the trained grassroots extension service providers as a source of nongovernment extension services. These contracts will (i) cost up to the maximum of \$10,000, (ii) need to be in line with the provincial plan for agricultural extension of the respective project province; and (iii) focus on the priority subjects included in the plan for improved knowledge and technology related to crop and livestock production and marketing.

16. To ensure pro-poor and gender-equal service delivery, the demonstration trials and extension services need to be implemented in the communes where at least 30% of households are classified as poor households in line with the national average for poverty incidence in rural areas and at least 40% of beneficiaries of these services are women. They will include efforts for community organization. The contracts to be awarded in the final year of project

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<sup>6</sup> ADB. 2005. *Grant Assistance to the Socialist Republic of Viet Nam for Community-based Agricultural Extension and Training in Mountainous Districts*. Manila. (JFPR 9071–VIE)

implementation need to ensure that at least 50% of beneficiaries are women farmers. The awarded contracts also need to specify that special considerations will be given to the participation and practices of ethnic minority population. A project-specific committee for the selection of extension proposals for funding will be established under the Project.

### **3. Rural-based Technical and Vocational Training**

17. Capacity of rural-based technical and vocational training schools will be strengthened by (i) improving technical knowledge, teaching and managerial skills of teachers and administrators, and curricula ; and (ii) upgrading library and laboratory equipment and materials, teaching and laboratory facilities, and office equipment for school administration. Related civil works will be done on the existing compounds and will not require land acquisition and resettlement. Ten technical and vocational schools of MARD specialized in food processing technology, postharvest operations, and irrigation management have been selected based on the consultations with MARD and criteria that include (i) activities focused on rural worker training in the agriculture sector, (ii) no substantial investment for rehabilitation in the past or high budgetary allocations, and (iii) no overlaps with the Vocational and Technical Education Project financed by ADB.<sup>7</sup> Appendix 5 of the RRP summarizes the training schools selected for the Project. The selected schools have significant student enrolments in agro-based technical training, post-harvest, food processing, and mechanical engineering related to agriculture. Schools with student enrolments mainly in subjects like accounting and bookkeeping, and other trades, which are not directly related to agro-based technical and vocational training, have not been selected for the Project.

18. To ensure that these training schools are geared towards national sector goals and priorities, necessary training programs and workshops will be provided for the teaching and administrative staff in close consultation with other relevant agencies, including the Ministry of Labor, Invalids, and Social Affairs; and the Ministry of Education and Training. The subjects of these programs include (i) partnership between training institutions and agro-based industries; (ii) school planning and management; (iii) curriculum development and learner-centered teaching methods; (iv) development of teaching and learning resources, including biological demonstration models and audio-visual materials; and (v) mainstreaming of gender and ethnic minority issues. Under this component, the Project aims to improve teachers' ability to shift to learner-centered teaching methods and strengthen their technical competency and knowledge.

19. In accordance with the new curriculum guides developed under the Project, necessary equipment and materials as teaching resources and for library and laboratory purposes will be provided to the selected MARD training schools. These will include (i) textbooks and other teaching materials, (ii) audio-visual equipment and materials, (iii) computer hardware and software, (iv) laboratory equipment and testing materials, and (v) food processing machines and equipment. Small-scale civil works costing less than \$500,000 per contract for renovation of classrooms, libraries and laboratories will be carried out. These will not include buildings for school administration, student accommodation, and other facilities not directly related to teaching and learning purposes.

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<sup>7</sup> ADB. 1998. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Socialist Republic of Viet Nam for the Vocational and Technical Education Project*. Manila. (Loan 1655–VIE) This loan provides support for only one school managed by MARD, Bac Giang Agricultural Secondary Technical School.

#### 4. Project Management Support

20. Ministry of Agriculture and Rural Development (MARD) is responsible for overall project implementation through its central project management unit (CPMU) established in its Agricultural Projects Management Board (APMB). Support for project management will be provided for the CPMU and provincial project management units (PPMUs) in the five project provinces, and to strengthen coordination between CPMU and PPMUs. Appendix 2 shows the organization chart of the Project.

#### D. Special Features

21. **Linkage with policy and institutional reforms under ASDP.** The Project was formulated in line with the national development priorities in the agriculture sector to strengthen capacity of the national AST system. It will build on the Government's past and ongoing achievements in its policy and institutional reform measures implemented under ASDP. The Project will fully consider appropriate feedback from the outcome of these ongoing reforms under ASDP during the project period.

22. **Provision of research and extension funds on a competitive basis.** The Project will support agricultural research and extension activities based on the selection of competitive proposals to ensure the implementation of client-oriented activities based on improved linkages between research and extension. This funding mechanism is relatively new for regional research activities and extension, although MARD does provide competitive grant funds for agricultural research programs. To minimize the implementation risk, TA 4619 will strengthen the capacity of AST management for improving the project readiness in the national AST system. A series of consultation meetings were carried out with key stakeholders in the national AST system to solicit views and suggestions on the proposed competitive funding system, and to disseminate the project scope and design. Provision of contractual grassroots extension services aims to promote participatory and farmer-centered services based on the new Decree No. 56 introduced under ASDP. The field survey conducted during project formulation identified strong demand for access to improved knowledge and technology among farmers, and their willingness to pay.<sup>8</sup>

23. **Measures to ensure sustainability of project impact.** The Project will not establish any new public institutions, and staff numbers and other incremental costs will not increase significantly. The Government has assured ADB that adequate counterpart funds will be provided after project completion for operation and maintenance of the equipment and facilities of research institutes, and technical and vocational schools to be upgraded under the Project. New equipment will require consumable materials for which the Project includes provisions for initial stocks of supplies equivalent to 10% of the value of the equipment. These stocks are expected to sustain operations during the project period and allow demonstration of effective utility of the upgraded equipment and facilities to support increased budget provision and funding through cost-recovery research contracts. The ongoing TA 4619 aims to strengthen the managerial capacity, and strategy and business plan development of the research institutes, thereby enhancing the aspect of project sustainability.

24. **Land acquisition and resettlement.** The upgrading of facilities to be financed under the Project will be carried out on the existing compound of research institutes and training schools.

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<sup>8</sup> Community veterinary workers currently provide fee-based extension services for small-scale livestock. This initiative is partly supported by the International Fund for Agricultural Development.

Some new classrooms and laboratories will be constructed for the training schools. Such construction will have a maximum of about 1,200 square meters on the existing compounds and will not require land acquisition and resettlement.

25. **Social considerations.** The component for grassroots agricultural extension will be implemented in the five project provinces where the incidence of rural poverty is high and ethnic minority groups constitute a high proportion of population in upland or remote districts. Individual provincial agricultural extension plans will be formulated at project inception through consultations with a wide range of key stakeholders in the provinces. Action plans have been prepared under the Project for gender mainstreaming and indigenous people's development during project formulation; their recommendations will be adopted in the project activities.

## II. COST ESTIMATES AND FINANCING PLAN

### A. Detailed Cost Estimates

26. The project investment cost is estimated at \$40.0 million equivalent, including taxes and duties of \$0.62 million (Table 1). A summary of cost estimates by expenditure category is given in Appendix 3.

Table 1: Project Investment Plan

Item	Amount <sup>a</sup>
<b>A. Base cost<sup>b</sup></b>	
1. Client-Oriented Agriculture Research and Capacity Strengthening	15.74
2. Grassroots Agricultural Extension Improvement	7.80
3. Rural-Based Technical and Vocational Training	9.04
4. Project Management Support	3.24
<b>Subtotal (A)</b>	<b>35.82</b>
<b>B. Contingencies<sup>c</sup></b>	<b>3.56</b>
<b>C. Financing Charges during Implementation<sup>d</sup></b>	<b>0.62</b>
<b>Total (A + B + C)</b>	<b>40.00</b>

<sup>a</sup> Inclusive of taxes and duties to be financed by the Government, amounting to \$2.62 million.

<sup>b</sup> In mid 2005 prices.

<sup>c</sup> Physical contingencies computed at 10% of the base cost for civil works, materials, training, and operating costs. No price contingency for foreign exchange costs is considered for 2006–2008 and about 0.6% per year for 2009–2010. Price increase of 5% per year is assumed for local currency costs during the project period.

<sup>d</sup> Including interest during project implementation.

Sources: Asian Development Bank. 2005. *Technical Assistance to the Socialist Republic of Viet Nam for Preparing the Agriculture Science and Technology Project*. Manila (TA 4194–VIE); and Asian Development Bank estimates.

### B. Financing Plan

27. The Government has requested that ADB provide a project loan of \$30.0 million equivalent (75% of the total project cost) from ADB's Special Funds resources to help finance the Project. The loan will have a 32-year term, including a grace period of 8 years, and an interest charge of 1.0% per annum during the grace period and 1.5% thereafter. The Borrower will be the Socialist Republic of Viet Nam. The balance of \$10.0 million will be financed by the Government for salaries of project staff, other operating costs, part of training costs, and taxes and duties. The loan will be used over 5 years.

28. For project funds, CPMU and Institute Project Management Units (IPMU) will submit their budget plans to MARD, while the PPMUs to their respective PPCs, for approval. The counterpart funds will be funded through the MARD and PPC annual budgets.

### **C. Allocation of Loan Proceeds**

29. The allocation of loan proceeds and the basis for withdrawal from the ADB loan is summarized in Appendix 4.

## **III. IMPLEMENTATION ARRANGEMENTS**

### **A. Executing Agency**

30. MARD is the executing agency (EA) and is responsible for overall project implementation. The CPMU, established in its APMB, will oversee the day-to-day project implementation, and ensure inter-departmental coordination within MARD at the central level under appropriate technical guidance of (i) the Department of Science and Technology for the client-oriented agricultural research and capacity strengthening component, (ii) National Agriculture Extension Center (NAEC) for the grassroots agricultural extension improvement component, and (iii) the Department of Organization and Personnel for the rural-based technical and vocational training component. CPMU will also be primarily responsible for central-level procurement, consultant recruitment, fund disbursements, and provision of support for PPMUs.

31. The PPMU will be responsible for overall management and supervision of the project activities related to agricultural extension in the province, including contractual arrangements for service delivery, finance and project accounting, procurement, monitoring and evaluation, and reporting. The PPMU will maintain effective provincial coordination among the relevant provincial departments, PAEC, regional research institutes, and other key stakeholders. Each PPMU will have a meeting with CPMU at least once every other month to ensure proper management of project activities according to the agreed implementation schedule. A project implementation unit may be established at the district level as required under the supervision of PPMU and assist PPMU to identify and select qualified commune-level extension service providers.

32. Ten research institutes and ten agricultural colleges and vocational schools will participate in the Project. In line with the Government's decentralization policy, and for project implementation and management, and based on assessment and recommendation by the TA 4619-VIE, MARD will establish an Institute Project Management Unit (IPMU) in each of the 20 participating institutions.

33. ADB foresees a need to further assess the capacity of the individual institutes and the economy in the establishment of the IPMUs. This is also in view of the ongoing merger and integration process of AST system under ASDP. TA 4619 will provide technical support to the IPMUs, once established, to (i) provide necessary guidelines for the operations and management of the Project, and (ii) familiarize the IPMUs with ADB's procedures on procurement, disbursements, and other project management and administration.

34. The project steering committee (PSC) will facilitate interministerial coordination and provide overall policy guidance. The PSC is headed by the vice minister of MARD in charge of science and technology matters, and include the representatives of concerned MARD departments, Ministry of Education and Training, Ministry of Finance, Ministry of Planning and

Investment, Ministry of Science and Technology, State Bank of Viet Nam, and the project provinces. The representatives of farmers' associations and other stakeholders will participate in the PSC meetings as required. Annual project work plans and budget need to be endorsed by the PSC. ADB recommends that the PSC meets at least twice a year. The first PSC meeting should be held within 3 months from Loan effectiveness.

## **B. Implementation Schedule**

35. The Project will be implemented over a period of 5 years from January 2007 to December 2011. Planning for the training programs for agricultural research and extension staff, formulation of provincial plans for pro-poor extension services, and preparation of documents for procurement and staff recruitment will be initiated immediately after loan effectiveness. Appendix 5 presents a bar chart for the project implementation schedule.

## **IV. PROCUREMENT**

36. Procurement of civil works, equipment, and materials will be mainly carried out by the CPMU in accordance with ADB's *Procurement Guidelines* and the procurement plan as agreed and amended from time to time, and will follow the relevant procedures and regulations of the Government. Except as ADB may otherwise agree, goods and works shall only be procured on the basis of the methods of procurement set forth below:

- (i) National Competitive Bidding
- (ii) Shopping
- (iii) Direct Contracting

37. The project procurement plan is in Appendix 6 and final details will be determined during project implementation as appropriate. CPMU will be responsible for formulating contract packages, preparing bid documents, evaluating bids, and awarding contracts satisfactory to the Government and ADB.

38. Civil works are expected to be in small packages costing less than \$500,000, and procured under national competitive bidding procedures satisfactory to ADB. Selection and engagement of contractors will be subject to ADB's prior approval. These civil works will not require resettlement or land acquisition. An indicative flowchart of procurement under national competitive bidding is presented in Appendix 6.

39. Contract packages for equipment and materials are likely to be less than \$500,000. Supply contracts that are likely to exceed \$100,000 but less than \$500,000, will be procured through national competitive bidding or shopping procedures.

40. Universities and other specialized institutions will be directly contracted for the overseas study programs as there will be a limited number of institutions to provide post-graduate courses on the relevant specialized subjects.

41. Selection of research and extension contracts will be done by the respective selection committees to be established under the Project and assisted by the CPMU for regional research contracts, and by the PPMUs for provincial research and extension contracts. MARD will submit the evaluation reports on the selection of research and extension contracts costing more than \$50,000 to ADB for approval.

42. The methods of procurement are subject to, among other things, the detailed arrangement and threshold values set forth in the Procurement Plan in Appendix 6. The Borrower may only modify the methods of procurement or threshold values with the prior agreement of ADB, and modifications must be set out in the updates to the Procurement Plan.

43. For project management support (Output 4), the Project will finance (i) incremental operational costs for the project staff, office utilities and supplies, vehicle operating costs and travel expenses; (ii) project implementation consulting services; (iii) equipment for office computers, photocopiers, and communications; and (iv) one service vehicle for the CPMU. MARD will allocate its two existing vehicles to the Project, and provincial administrations will also assign their existing vehicles to the project activities. CPMU will provide the detailed procurement plan for Output 4 to ADB. No civil works will be undertaken for project management purposes.

44. PPMUs and IPMUs will carry out procurement of office facilities under their respective subprojects and will sign service contracts. CPMU will provide detailed guidelines on the procedures, financing, and quantity of the equipment to be procured.

## **V. CONSULTING SERVICES**

45. The Project will require a team of consultants, including 29 person-months of international and 96 person-months of national consultants. Except as ADB may otherwise agree, the Borrower shall apply quality- and cost-based selection method and simplified technical proposals in engaging consulting services. The (i) fields of expertise and detailed terms of reference, (ii) steps in selection process and submission requirements, and (iii) model narrative evaluation criteria are provided in Appendix 7a-c respectively. ADB's reference documents on consulting services can be downloaded from <http://www.adb.org/Consulting/documents.asp>.

46. A bid evaluation group (BEG) has been formed, headed by one staff of the CPMU, to review technical and financial proposals of the shortlisted firms. The Project Director will sign off on the bid evaluation group's recommendations.

47. A template on the indicative staffing schedule for the consultants is provided for completion and submission to ADB as soon as possible (Appendix 7d).

## **VI. DISBURSEMENT PROCEDURES**

48. After loan effectiveness, and as soon as approval from SBV is received, the CPMU will open the first generation imprest account for the Project with VBARD. The second generation imprest accounts will be created in following the establishment of the PPMUs and the IPMUs. Loan proceeds will be made available from the central project account to the PPMU and IPMU accounts. The imprest accounts will be established, managed, replenished and liquidated in accordance with ADB's *Loan Disbursement Handbook* and the financial regulations of the Government.

49. The provincial imprest accounts are required for locally purchased equipment and materials, contractual services and small-scale training activities at geographically dispersed locations in the five project provinces, and will be managed by the PPMUs. Each PPMU's expenditures are subject to endorsement by the respective provincial treasury. The accounts

will be liquidated and replenished according to ADB's statement of expenditures procedures for payments below \$50,000 based on withdrawal applications submitted to ADB from time to time.

50. CPMU will develop a guideline on financing mechanism and submit to ADB and MOF/MARD for review and approval. First-level accounts will be established in CPMU: one ADB loan imprest account amounting to the equivalent of 6 months expenditure or \$1.0 million (whichever is lower), one counterpart imprest account, and two interest accounts for such above-mentioned funds). The second-level accounts will be established for the PPMUs and IPMUs: one imprest account for receiving ADB funds from CPMU with an amount equivalent to 6 months estimated expenditure and not exceeding \$0.05 million, one counterpart account under PPMU and IPMU established by PPC and MARD respectively, and two interest accounts for such above funds. A funds flow chart is provided in Appendix 8a.

51. ADB may use the direct payment procedure or the commitment procedure for eligible project-related expenditures that will involve big contract amounts. Reference to the ADB's *Loan Disbursement Handbook* should be made for other disbursement matters not covered in the PAM. Disbursement modalities adopted for the Project are described in Appendix 8b.

## **VII. PROJECT MONITORING AND EVALUATION**

52. The CPMU will be responsible for setting up an appropriate system to monitor and evaluate project performance and impact as part of MARD's management information system with assistance from project implementation consultants. Some baseline data and information on environmental and social aspects of the five project provinces have been developed through detailed field surveys during project formulation and will be used to develop the monitoring system. The social impact indicators developed and used for the Japan Fund for Poverty Reduction project will be fully taken into account. These data and indicators will be disaggregated by gender and ethnicity as required. ADB's Project Performance Report (PPR) showing the targets to be monitored is provided in Appendix 9.

## **VIII. REPORTING REQUIREMENTS**

53. The CPMU will prepare quarterly progress reports on overall project implementation, services provided, implementation issues, and recommended measures for improvement, and submit them to the PSC and ADB within 30 days after the end of each quarter. An indicative reporting format is provided as Appendix 10.<sup>9</sup> The quarterly progress reports will be used by ADB to update the PPR. The Government will also prepare and furnish to ADB a midterm review report at the end of the second year of project implementation and a project completion report (also in Appendix 10)<sup>10</sup> within 3 months of project completion. These reports will be in a form and have details satisfactory to ADB.

## **IX. AUDITING REQUIREMENTS**

54. ADB, by its Charter, is required to ensure that the proceeds of any loans made, guaranteed, or participated in by ADB are used for the purposes for which the loan was

<sup>9</sup> This appendix describes a suggested outline of the quarterly progress and impact report. The final format and detailed procedures need to be determined by the EA in consultation with ADB and also in conjunction with the project performance and monitoring system to be established for the project and linked to the overall monitoring system of the EA.

<sup>10</sup> This section describes the standard outline of the Government's project completion report. The final report format and detailed procedures should be determined and agreed between the Government and ADB.

approved. ADB requires accurate and timely financial information from its borrowers to be assured that expenditure was for the purposes stated in the loan agreement.

55. For this particular loan, the requirements are stipulated in the relevant sections of the Loan Agreement for the Agriculture Science and Technology Project. The EA will maintain separate project accounts and records exclusively for the Project to ensure that the loan funds were used only for the objectives set out in the Loan Agreement.

56. The accounts should be audited annually by auditors acceptable to ADB and in accordance with sound auditing principles. The Sample Audit Letter showing the details of financial and auditing requirements is provided in Appendix 11. It is required that certified copies of the audited reports be submitted to ADB, in English, within 6 months after the end of each fiscal year. ADB shall impose the following measures should APMB fail to submit within the due date:

**Within 6 months after the due date:** Processing of requests for new contract awards and disbursement such as replenishment of imprest accounts, processing of new reimbursement, and issuance of new commitment letters will be put on hold.

**Within 12 months after the due date:** Disbursement shall be suspended.

57. The external auditor engaged by the borrower express an opinion on whether the financial report has been prepared using international or local generally accepted accounting standards and whether they have been applied consistently. ADB prefers project accounts to use international accounting standards prescribed by the International Accounting Standards Committee. The external auditor should comment on the impact of any deviations, by the project executing agency from international accounting standards.

58. The borrower is requested to ensure that the external auditor specifies in the Auditor's Report the appropriate auditing standards they use, and direct the auditor to expand the scope of the paragraph in the Auditor's Report by disclosing the key audit procedures followed. The external auditor is also to state whether the same audit procedures were followed for all supplementary financial statements submitted.

59. ADB wishes that auditors conform to the international auditing standards issued by the International Federation of Accountants. In cases where other auditing standards are used, the external auditor needs to indicate in the Auditor's Report the extent of any differences and their impact on the audit.

60. The external auditor's opinion is also required on whether (i) the proceeds of the ADB's loan have been utilized only for the project as stated in the Loan Agreement; (ii) the financial information contains data specifically agreed upon between the Government and ADB to be included in the financial statements; (iii) the financial information complies with relevant regulations and statutory requirements; and (iv) compliance has been met with all the financial covenants contained in the Loan Agreement.

61. The Auditor's Report needs to clearly state the reasons in case any opinions are qualified, adverse, or disclaimers. Actions on deficiencies disclosed by the external auditor in its report should be resolved by the borrower or MARD within a reasonable time. The external auditor is to comment in the subsequent Auditor's Report on the adequacy of the corrective measures taken, and the outcome, if any.

62. The auditing services will be provided for CPMU, PPMUs, and IPMUs. CPMU will organize the bidding for auditing services proposed under the Project.

63. Compliance with these auditing requirements will be monitored by review missions of ADB and during normal project supervision, and followed up regularly with all concerned, including the external auditor.

## **X. PROJECT REVIEW**

64. The Government and ADB will jointly conduct reviews of project implementation, generally on a semiannual basis. The CPMU will organize PSC meetings in conjunction with the project review. Based on the field review and consultations with the relevant agencies of the Government and key stakeholders, the Government and ADB will identify critical issues in project implementation and agree on necessary measures to resolve such implementation issues. In addition to regular project review, the Government and ADB will jointly undertake a comprehensive midterm review on project performance and impact during the third year of project implementation. The project completion review will be carried out upon project completion based on the terms of reference to be agreed between the Government and ADB.

## **XI. ANTICORRUPTION**

65. ADB's *Anticorruption Policy* (1998) was explained to and discussed with the Executing Agency. Consistent with its commitment to good governance, accountability and transparency, ADB reserves the right to investigate, directly or through its agents, any alleged corrupt, fraudulent, collusive, or coercive practices relating to the Project. To support these efforts, relevant provisions of ADB's *Anticorruption Policy* are included in the loan regulations and the bidding documents for the Project. In particular, all contracts financed by ADB in connection with the Project will include provisions specifying the right of ADB to audit and examine the records and accounts of the Executing Agency and all contractors, suppliers, consultants, and other service providers as they relate to the Project. The subsidiary records of fixed assets and stocks will be kept up to date and reconciled with control accounts. Periodic physical inventories of fixed assets and stocks will be conducted. Except for vehicles, other assets will not be sufficiently covered by insurance policies. The Project will establish controls and procedures for flow of funds, financial information, accountability, and audits to ensure that information among the different offices flows in an accurate and timely manner. It will also ensure that periodic reconciliations will be performed among the different offices. The Project will also advise employees, beneficiaries, and other recipients to whom to report if they suspect fraud, waste, or misuse of project resources or property.

## **XII. PROJECT BENEFITS, IMPACTS, ASSUMPTIONS, AND RISKS**

### **A. Benefits**

66. In addition to the strategic importance of AST for the sustainable and equitable growth of the agriculture sector, the Project is expected to generate two distinct streams of economic benefits to the sector through (i) more client-oriented agricultural research and extension services, and (ii) improved capacity of rural-based technical and vocational training. Direct beneficiaries will be farmers and the selected institutions involved in the AST activities, including agricultural research institutes, extension centers, and rural-based technical and vocational training schools.

67. The Project will provide incremental and replacement equipment and facilities that will be used in combination by researchers and other users. Since the Project will strengthen the overall capacity of the research and extension services, and does not support specific research and extension programs, attempts to disaggregate the benefit and cost streams to individual financing sources would be arbitrary. The nature of AST activities and the required time lag for the generation of benefits need to be taken into account in estimating the overall economic impact of investment for improved AST activities. Past studies indicate high returns to AST investment with a median value of 37%.<sup>11</sup> Other studies based on adaptive research and extension activities in Viet Nam and in other countries also indicate that average rates of return range from 30% to 50%. Although the quantitative estimation of direct economic benefits is difficult, highly positive economic benefits are expected from improving the national AST system with its potential economic rate of return in the range of 30–50% estimated based on a comparative and empirically grounded approach. At present, public financing is critical to promote more sustainable AST activities, such as fee-based research and extension services. Long-term sustainability of these services will depend on the demonstration and dissemination of benefits so that farmer groups, local governments, or others develop ways to fund them.

68. Under the component for rural-based technical and vocational training, the Project aims to improve the quality of graduates from 10 selected rural-based technical and vocational schools of MARD, which have substantial student enrolments in courses on agro-based technical training, postharvest operations, and agribusiness. The economic benefits of this training to society as a whole can be approximated by the private income streams received by trainees. This approach to economic analysis is the same as for the ongoing Vocational and Technical Education Project of ADB and for other education projects. On the basis of assumptions about the number of new and existing graduates from the 10 institutions, their employment rates, and levels of remuneration, the economic internal rate of return for the component is estimated at 31% for the base case scenario. Sensitivity and quantitative riskbased analyses confirm that these returns are robust under a range of adverse circumstances in which costs may increase or benefits decrease.

69. The distributional aspects of the Project also need to be considered qualitatively. During project formulation, the need for special measures to incorporate poverty focus and pro-poor AST mechanisms into the project design was fully considered. The five project provinces selected for the agricultural extension activities have a high incidence of poverty and high proportions of ethnic minority population in upland and remote districts. However, that poverty focus is accomplished by more than simply selecting areas with a high incidence of poverty. Based on ADB's dialogue with key stakeholders during project formulation and in relation to the ongoing ASDP, provision of pro-poor mechanisms through the use of participatory planning approaches and strengthening of grassroots extension services has been incorporated so that the national AST system will become more responsive to farmers' demands than a simple, topdown distribution of knowledge. The project components for agricultural research and grassroots extension improvement incorporate these factors into the design. In addition, provision of a new framework for pro-poor extension services under the ongoing ASDP is expected to enhance the positive project impact on poverty reduction.

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<sup>11</sup> ADB. 2000. *Special Evaluation Study on the Policy Implementation and Impact of Agriculture and Natural Resources Research*. Manila (SST: STU 2000-17).

## **B. Impacts**

70. A social assessment was conducted, based on existing study reports and rapid rural appraisals undertaken from December 2004 to February 2005 in the five project provinces, to examine the livelihood and farming conditions of rural households. During the rural appraisals, special attention was given to analyzing the situation of ethnic minorities and operations of local extension services. All the data and information were gathered through focus group discussions and interviews with key stakeholders in agricultural extension and village leaders.

71. Traditional farming knowledge does not always allow people to move away from chronic poverty and vulnerability. The effective use of AST knowledge and skills can play a crucial role in promoting farming practices that will help smallholder farmers ensure food security and increase their household cash income. The selection criteria for the research and extension proposals to be funded under the Project will ensure inclusive social development by selecting proposals that address the needs of the poor and disadvantaged groups of farmers in upland or remote areas. In line with the Government's Decree No. 56 issued in 2005, the Project will promote the concept of decentralized extension services and decision making for effective service delivery in upland and remote communities.

72. While women constitute half of the total agricultural labor force, the situation of women in the sector is often characterized by imbalances in the regulation of civil transactions, provision of credit, and delivery of agricultural support services. Despite the important role that women play in the agriculture sector, various disparities exist in women's access to services and productive resources. While women work in most agricultural activities, they represent about 25% of the participants in training programs for animal husbandry and 10% of those for cultivation. Women extension workers constitute about 30% of all workers. The project impact on women is expected to be positive with a gender action plan to increase awareness of gender issues and to promote women's AST knowledge and skills. The project performance and social impact will be monitored through the monitoring and evaluation system based on gender- and ethnicity-disaggregated data and information, and regularly assessed every year.

73. In Viet Nam, more than 50 ethnic minority groups can be identified, and they have a high degree of diversity in terms of language, lifestyle, kinship, belief, and farming practices. The five project provinces covered under the grassroots agricultural extension improvement component have about 15 ethnic minority groups, including Thai, Tho, H'mong, and Cham. They constitute 7–20% of the total provincial population, but make up a higher proportion in upland and remote districts. Specific measures have been identified and will be fully taken into account in each project component to ensure that the needs and practices of the ethnic minority population will be fully considered under project activities.

74. An initial environmental examination was carried out for the Project in accordance with the guidelines of the Government and ADB for environmental assessments. The environmental screening revealed that the environmental impact of any single activity is generally minor. To address any possible adverse environmental impact, the Project will ensure that environmental assessments will be carried out in line with Government regulations for the relevant categories of civil works during the design phase, and an environmental monitoring plan will be implemented. A summary environmental analysis is in Appendix 12 of the RRP.

## **C. Risks**

75. ADB's study (footnote 19) notes legitimate concerns that research-led technological advances in agriculture may benefit wealthy farmers at the expense of poor farmers. Wealthier farmers may in fact have more resources to apply new technologies. In this context, special measures must be included to identify farmers' needs in poor communities. Under the Project, the selection criteria for research and extension contracts and demonstration trials will have proper elements to reflect local farmers' needs, and give priority to socially sensitive activities in the provincial agricultural extension plans with regard to participation of women and ethnic minority groups.

76. Other project risks include (i) inadequate provision of counterpart resources for operation and maintenance of equipment and facilities upgraded under the Project, (ii) weak linkages between agricultural research and extension, and (iii) inadequate stakeholder participation in planning and implementing AST activities under the Project. The Government has assured ADB that it will provide adequate incremental budget to maintain sustainability of project impact. ADB will continue its dialogue with the Government to ensure adequate financial resources for the upgraded equipment and facilities.

77. To strengthen the linkage between research and extension, the selection criteria for agricultural research proposals will require the inclusion of either the PAEC or provincial advisory council for agricultural extension so that relevant local stakeholders are involved in the planning and implementation of the research activities. This will ensure that local demand is reflected in the proposed research and extension contracts. Similarly, inclusion of provincial advisory councils in the formulation of provincial agricultural extension plans will facilitate the process of stakeholder consultations in the project activities.

## **XIII. MAJOR LOAN COVENANTS**

78. In addition to the standard assurances, the Government has also given assurances for project implementation as summarized in Appendix 12. These loan covenants will be closely monitored and their compliance status will be submitted to ADB with the quarterly progress reports. In addition, the indicators in the Project's Framework are to be monitored regularly as well.

## **XIV. KEY PERSONS INVOLVED IN THE PROJECT**

79. To facilitate communication and coordination of project activities, the names and contact addresses of key persons involved in the implementation of the Project are given below.

### **A. State Bank of Viet Nam**

Personnel:	Mr. Le Van Minh, Director General, International Cooperation Department (ICD) Ms. Dau Thi Bich Hong, Manager, ICD
Address:	State Bank of Viet Nam 47-49 Ly Thai To Street, Hanoi Viet Nam
Telephone:	(84-4) 934-3364/6997
Facsimile:	(84-4) 825-0612

**B. Ministry of Agriculture and Rural Development**

Personnel: Dr. Duong Van Xanh, Director General  
Agricultural Projects Management Board  
Address: Ministry of Agriculture and Rural Development  
No.1-A Nguyen Cong Tru Street, Hanoi  
Viet Nam  
Telephone: (84-4) 972-4174  
Facsimile: (84-4) 972-4180

**C. Asian Development Bank**

Project Director: Urooj Malik, Director  
Agriculture, Environment and Natural Resources Division (SEAE)  
Southeast Asia Department  
Project Officer: Mahfuzuddin Ahmed, SEAE  
Counsel: Shinsuke Kawazu, OGC  
Control Officer: Francis Emmanuel, CTL

## **SELECTION CRITERIA FOR APPLICANTS OF OVERSEAS STUDY PROGRAMS**

Agriculture Science and Technology Project (AST), ADB loan No 2283-VIE (SF) will provide scholarships for overseas post-graduate study (Master, Doctor, and Post-doctor) in agricultural research fields as below:

- (i) Technologies in post-harvest preservation, vegetable and fruit preservation; seed production technology; livestock selection and evaluation; vaccine production.
- (ii) Economic and marketing policies, marketing, WTO Integration.
- (iii) Natural resources management, risk evaluation and analysis of flood and storm
- (iv) Management of natural disaster forecasting and epidemics.

This project will support trainees, including 20 for doctoral degree (3 years); 15 for Master degree (2 years) and 20 for post-doc position (1 year), At least 10% of these trainees are women. The government and ADB will select the countries of instruction for trainees, including USA, Holland, India, Switzerland, Canada, South Korea, Thailand, Singapore, and Philippines.

### **1. Selection Criteria**

#### **1.1 Condition of Selection**

- (i) Science and technology staffs, who are regular members or working at least 12 months and with social insurance in universities, institutes, major laboratories, advanced technology centers, administration offices under HARD and 5 of DARD participating in AST project;
- (ii) Master and doctoral candidates being involved in national training programs are not allow to pursuit their master under this project; and
- (iii) First year doctoral candidates are eligible to attend the selection process for overseas study program under this project.

#### **1.2. General Requirements**

- (i) Honest, ethical and excellent in profession;
- (ii) Medical examination result is qualified for overseas study (evaluated by Agriculture Hospital);
- (iii) Agree to complete the training program, return to the original agency, and work for the Government upon the completion of the program. If the trainees do not complete the program or do not return to the original country, they will have to make a full payment of the training expenses. The trainee's agreement will be kept in the original agency; and
- (iv) Applicants who studied overseas under the governmental scholarships or other projects have to spend at least 2 years working in the original country upon the completion of the program before registering for the training program under this project unless they transfer into doctoral program.

#### **1.3. Specific Requirements and Criteria for Post-doc Program**

- (i) Staffs who are working in the agencies stated in item 1.1;
- (ii) At least 60-month professional experience in the registered field;
- (iii) No older than 50 (by 2008);
- (iv) Have at least one article (in the registered field) published in scientific journals or international conferences; or participate in State's research projects with assessment review;

- (v) Holder of a PhD degree relevant to the registered field;
- (vi) Participate in training a Master candidate (who successfully completed her/his program) or a doctoral candidate;
- (vii) Detailed research proposal accepted by the potential University/Institution;
- (viii) Proficiency in language of instruction in the potential University/Institution;
- (ix) Official Dispatch approved by the original agency; and
- (x) Priority for staffs from regional institutions and project beneficial agencies.

#### **1.4. Specific Requirements and Criteria for Doctor Program**

- (i) Staffs working in the agencies stated in item 1.1;
- (ii) 24-month professional experience in the registered field (excluding the official training period with a minimum of 1 year);
- (iii) No older than 40 years old (by 2008);
- (iv) Author of a minimum of 1 paper published in scientific journal or presenter at a University or institutional scientific conferences with abstract written in the abstract book; or participate in an institutional research project which was completed;
- (v) Holder of a Master's degree in a scientific program which you register for in the doctoral program;
- (vi) Eligibility of language proficiency to study in the registered country, the exam score is 500 for TOEFL or 5,0 for IELTS or 65 for iBT;
- (vii) Official dispatch approved by the original agency; and
- (viii) Priority for staffs from regional institutions and project beneficial agencies.

#### **1.5. Specific Requirements and Criteria for Master Program**

- (i) Staffs who are working in the agencies as stated in item 1;
- (ii) 12-month professional experience in the registered field after undergraduate graduation, holder of labor contract;
- (iii) No older than 35 years old (by 2008);
- (iv) Holder of a bachelor degree from the program relevant to the registered Master program, minimum grade of average in the period of 5 years is 6.5 (good or excellent graduation grade is preferable);
- (v) Meet university language proficiency requirement; TOEFL with a minimum score of 550, IELTS with a minimum score of 5.0 or iBT with a minimum requirement of 65;
- (vi) Official Dispatch approved by the original agency; and
- (vii) Priority for staffs from regional institutions and project beneficial agencies.

### **2. Application Documents**

- (i) Application form signed by director board of the original agency;
- (ii) 2 photos (4x6);
- (iii) A notified copy of certificate of birth;
- (iv) A notified copy of bachelor certificate and transcript, Master's degree (if registered for PhD program), Doctoral degree (if registered for post-doc program);
- (v) Official Dispatch from the original agency;
- (vi) For PhD program applicants: a list of published scientific work and a copy of this work (papers, scientific reports: complete paper, cover, list of content, abstract book; projects: project registration and assessment review);
- (vii) A notified copy of all labor contracts and a notified copy of insurance signed by insurance company;

- (viii) A notified copy of English certificate;
- (ix) Project proposal;
- (x) Resume (CV) approved by director of the original agency;
- (xi) All documents and copies of certificates and degrees are A4 portrait, in an envelop (23cm X 34cm), list of all enclosed papers is written on the envelope34cm), list of all enclosed papers is written on the envelop;
- (xii) Incomplete application is ineligible; and
- (xiii) False statement in the application is a crime conviction.

### 3. Examination Process

- (i) Competitors to a post-doc program will have to defend their project proposal approved by the Selection Committee and the Scientific Council;
- (ii) Competitors to a PhD program will be tested on their major subjects and have to defend their project proposal approved by the Selection Committee and Scientific Council;
- (iii) Competitors to a Master program will be tested on the basic and principal subjects;
- (iv) English language examination: All competitors will be tested on their language proficiency (TOEFL, IELTS/IET). The competitors who are qualified and meet the TOEFL/IELTS requirements will be eligible for the selection process. If competitors are excellent in their profession but do not meet the language requirement, they will be eligible to participate in a 3 month English course in order to obtain required TOEFL/IELTS score;
- (v) Examination time is scheduled in Sept 2007.

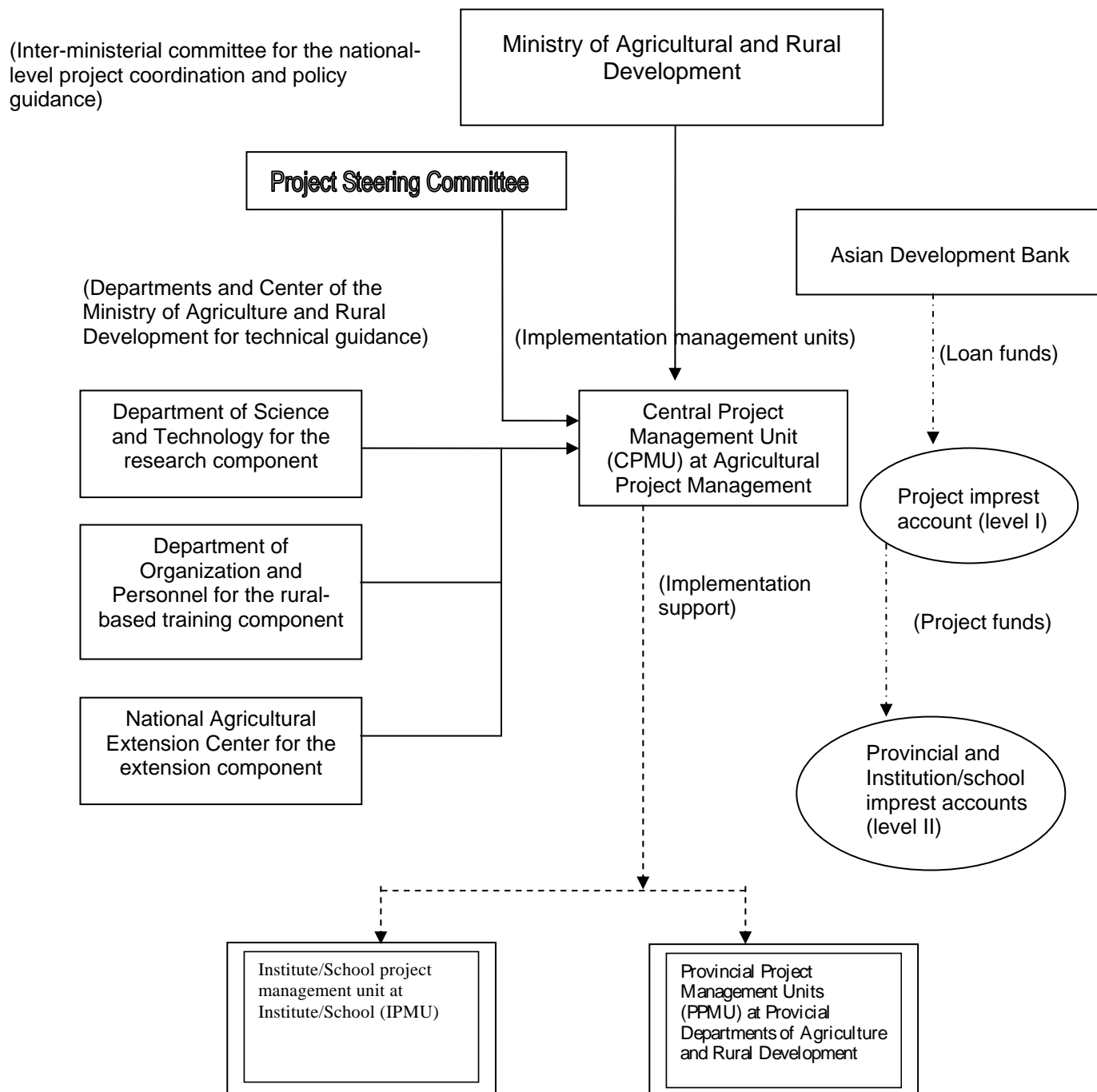
#### Competitors who can be waived from taking the English language exam:

- (i) Holders of overseas bachelor, master, or PhD degree. Primary language of instruction in previous study must be the language intended to use in the pursuing program;
- (ii) Holders of an international TOEFL certificate with a minimum score of 550, IELTS certificate with a minimum score of 5.0 or IBT with a minimum score of 65;
- (iii) Foreign language certificates are only valid within 12 months.

### 4. Selection Process

- (i) Competitors must have a minimum score of 7 (on a 10-point scale) for all tested subjects, must defend their project proposal, and must meet the language requirements;
- (ii) The selection committee has responsibility to select a suitable number of successful competitors for each field of study (especially priority fields). The competitors will be assessed basing on their total score of all tested subjects (basic, principle, and major subject). The competitors with highest total score will be selected. Competitors to the post-doc and PhD program will also be assessed basing on the quality of their scientific work by the Selection Committee;
- (iii) Upon the completion of the process, the Selection Committee will transfer the result to the leader of MARD and ADB for review and approval; and
- (iv) The date for publicizing the results is estimated in October; 2007 and sending candidates for overseas training program is scheduled in March 2008.

## PROJECT ORGANIZATION CHART



## SUMMARY COST ESTIMATES BY EXPENDITURE CATEGORY

(\$'000)

Item	Client-Oriented Agricultural Research and Capacity Strengthening	Grassroot Agricultural Extension Improvement	Rural- based Technical and Vocational Training	Project Management Support	Total
<b>A. Investment Costs</b>					
Civil Works	53	0	1,549	0	1,602
Equipment	3,380	221	6,338	151	10,090
Vehicles	0	0	0	72	72
Materials	1,811	142	843	33	2,829
Training	4,994	2,814	315	0	8,123
Research and Extension Contracts	5,500	4,582	0	0	10,082
Consulting Services	0	0	0	982	982
<b>Subtotal (A)</b>	<b>15,738</b>	<b>7,759</b>	<b>9,045</b>	<b>1,238</b>	<b>33,780</b>
<b>B. Recurrent Costs</b>					
Incremental Staff	0	17	0	1,140	1,157
Operating Costs	0	19	0	865	884
<b>Subtotal (B)</b>	<b>0</b>	<b>36</b>	<b>0</b>	<b>2,005</b>	<b>2,041</b>
<b>Total Base Cost</b>	<b>15,738</b>	<b>7,795</b>	<b>9,045</b>	<b>3,243</b>	<b>35,821</b>
<b>C. Contingencies</b>					
Physical Contingencies	785	757	271	204	2,017
Price Contingencies	345	400	529	272	1,546
<b>Subtotal (C)</b>	<b>1,130</b>	<b>1,157</b>	<b>800</b>	<b>476</b>	<b>3,563</b>
<b>D. Financing Charge during Implementation</b>	0	0	0	616	616
<b>Total Project Costs</b>	<b>16,868</b>	<b>8,952</b>	<b>9,845</b>	<b>4,335</b>	<b>40,000</b>

Source: Asian Development Bank (ADB). 2003. *Technical Assistance to the Socialist Republic of Viet Nam for Preparing the Agriculture Science and Technology Project* (Financed by the Japan Special Fund). Manila (TA 4194-VIE); and ADB estimates.

# ALLOCATION OF LOAN PROCEEDS

13

Attachment to Schedule 3

TABLE

ALLOCATION AND WITHDRAWAL OF LOAN PROCEEDS (Agriculture Science and Technology Project)				
Number	Item	Amount Allocated SDR		ADB FINANCING
		Category	Subcategory	Percentage and Basis for Withdrawal From the Loan Account
1	Civil Works	809,000		75% of total expenditure
2	Equipment	5,123,000		75% of total expenditure
3	Vehicles	24,000		50% of total expenditure
4	Materials	1,429,000		75% of total expenditure
5	Training	4,276,000		78% of total expenditure
6	Research/Extension Contracts	5,315,000		78% of total expenditure
7	Consulting Services	661,000		100% of total expenditure*
8	Incremental Operating Costs	446,000		75% of total expenditure
9	Interest Charge	415,000		100% of amount due
10	Unallocated	1,700,000		100% of amount due
Total		20,198,000		

\*Exclusive of local taxes

## PROJECT IMPLEMENTATION SCHEDULE

Item	2007				2008				2009				2010				2011			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>A. Client-oriented Agricultural Research and Capacity Strengthening</b>																				
Client-oriented agricultural research programs																				
- Identification of research needs																				
- Procurement of needed materials and equipment																				
- Use of research funds for selected programs																				
Training and post-graduate programs																				
- Preparation of programs																				
- Application and selection																				
- Program implementation																				
Upgrading of equipment																				
- Equipment specification and tendering																				
- Procurement and installation																				
- Training for equipment use and maintenance																				
<b>B. Grassroots Agricultural Extension Improvement</b>																				
Provincial plans for pro-poor agricultural extension services																				
Training programs for trainers, extension staff, and grassroots service providers																				
- Extension module development																				
- Preparation of programs																				
- Application and selection																				
- Program implementation																				
Provision of on-farm demonstration trials																				
Contractual agricultural extension services																				
- Establishment of a contractual management system																				
- Extension contracts																				
Capacity strengthening of local extension centers																				
- Equipment specification and tendering																				
- Procurement and installation																				
<b>C. Rural-based Technical and Vocational Training</b>																				
Training programs for teaching and administrative staff																				
- Preparation of programs																				
- Application and selection																				
- Program implementation																				
- Support for developing curriculum guides																				
Upgrading of library and laboratory facilities																				
- Equipment specification and tendering																				
- Procurement and installation																				
- Training for equipment use and maintenance																				
<b>D. Project Management Support</b>																				
Establishment of provincial project management units																				
Recruitment of implementation consultants																				
Procurement of vehicles and equipment																				
Appointment of incremental project staff																				
Establishment of a project steering committee																				
Monitoring of project activities																				
Financial auditing																				
Quarterly progress reporting																				
Midterm review																				
Project completion review																				

■ Timing of project activities.

■ Intermittent or continuous activities.

Source: ADB. 2003. *Technical Assistance to the Socialist Republic of Viet Nam for Preparing the Agriculture Science and Technology Project* (Financed by the Japan Special Fund). Manila (TA 4194-VIE); and ADB estimates.

## PROCUREMENT PLAN

### Project Information

Country	Viet Nam
Name of Borrower	Socialist Republic of Viet Nam
Project Name	Agriculture Science and Technology Project
Loan or TA Reference	To be determined (tbd)
Date of Effectiveness	tbd
Amount \$ (total from all financiers):	\$40 million
Of which Committed, \$	\$30 million
Executing Agency	Ministry of Agriculture and Rural Development
Approval Date of Original Procurement Plan	tbd
Approval of Most Recent Procurement Plan	tbd
Publication for Local Advertisement <sup>a</sup>	tbd
Period Covered by this Plan	2006 – 2011

### Procurement Thresholds, Goods & Related Services, Works and Supply & Install

Procurement Methods	To be used above/below (\$)
ICB works	At least \$1,000,000
ICB goods	At least \$500,000
NCB works	Less than \$1,000,000 but more than \$100,000
NCB goods	Less than \$500,000 but more than \$100,000
Shopping Works	Less than \$100,000
Shopping Goods	Less than \$100,000

### Procurement Thresholds, Consultants Services

Procurement Methods	To be used above/below (\$)
Quality- and Cost-Based Selection (QCBS)	At least \$200,000
Consultants Qualifications Selection (CQS)	Less than \$200,000
Least Cost Selection (LCS)	Less than \$100,000

### List of Major Contract Packages, Goods, Works and Consulting Services

Ref	Contract Description	Estimated Costs (\$)	Procurement Methods	Expected Date of First Advertisement	Prior Review Y/N	Comments
<b>Client-Oriented Agricultural Research and Capacity Strengthening</b>						
1	Equipment and Materials <sup>b</sup>	6,955,000 (100 packages)	NCB/SP	4th Quarter 07	Y	Financed by ADB
2	Research Contracts	5,500,000 (80 packages)	NCB	1st Quarter 08	Y	Financed by ADB
3	Training – University <sup>c</sup>	3,555,000 (90 packages)	DC	4th Quarter 07	Y	Financed by ADB
4	Training – Non-university <sup>c</sup>	440,000 (20 packages)	DC	1st Quarter 09	Y	Financed by ADB

<b>Grassroots Agricultural Extension Improvement</b>						
5	Equipment and Materials	349,000 (15 packages)	NCB/SP	3rd Quarter 07	Y	Financed by ADB
6	Extension Service Contracts	4,175,000 (1,338 packages)	NCB	2nd Quarter 08	Y	Financed by ADB
<b>Rural-Based Technical and Vocational Training</b>						
7	Civil Works <sup>d</sup>	1,333,000 (10 packages)	NCB	1st Quarter 08	Y	Financed by ADB
8	Equipment and Materials <sup>e</sup>	6,289,000 (31 packages)	NCB	4th Quarter 07	Y	Financed by ADB
<b>Project Management Support</b>						
9	Equipment, Materials and Vehicle	178,000 (6 packages)	NCB/SP	3rd Quarter 07	Y	Financed by ADB
10	Consulting Services	982,000	QCBS	2nd Quarter 07	Y	Financed by ADB

DC = direct contracting; NCB = national competitive bidding; QCBS = quality- and cost-based selection; SP = shopping.

<sup>a</sup> General procurement notice, invitations to pre-qualify and to bid, calls for expressions of interest.

<sup>b</sup> The total of over 500 line items, often with multiple units and types of specialized equipment, are assumed to be combined into about 100 packages at an average value about \$70,000.

<sup>c</sup> Training activities include overseas postgraduate study and post-doctoral programs.

<sup>d</sup> Assumes one contract per school, some over 3 years.

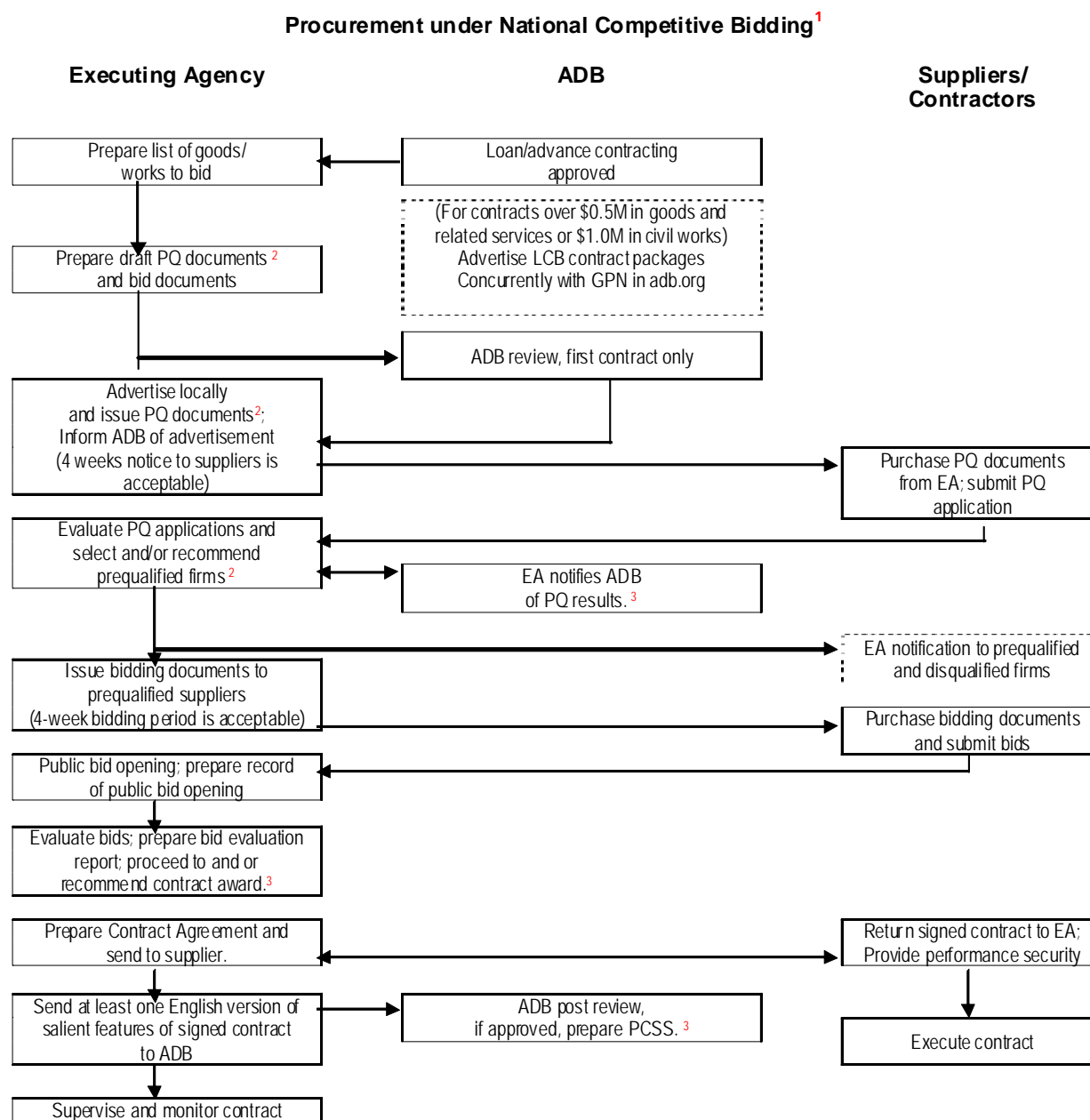
<sup>e</sup> Assumes one initial contract for office equipment, and then three contracts per school for laboratory equipment, processing machinery, and library materials.

Source: ADB. 2003. *Technical Assistance to the Socialist Republic of Viet Nam for Preparing the Agriculture Science and Technology Project* (Financed by the Japan Special Fund). Manila (TA 4194–VIE); and ADB estimates.

### **Procurement Procedures**

1. Goods and Works to be financed by ADB will be procured in accordance with the "Procurement Guidelines" dated April 2006, as amended from time.
2. The EA shall revise and update the initial Procurement Plan in accordance with the Procurement Guidelines and the Consulting Guidelines as needed through out the implementation of the Project, so that each such subsequent Procurement Plan is provided to ADB upon each anniversary of the Effective Date.
3. ADB and the EA agreed to use procedures and their thresholds set forth in the following articles of the IRR for procurement of goods and works in this Project:
  - Article 4 (Public Bidding)
  - Article 5 (Limited Bidding)
  - Article 6 (Price Comparison)
  - Article 7 (Direct Contracting)
  - Article 13 (Threshold Values)
4. Even though prequalification is discouraged for NCB in ADB projects, it is agreed that the same application of Article 10 (Pre-qualification of the Bidders) in IRR will be adopted to this Project.
5. Based on the Procurement Plan, the procurement package list of Goods and Works will be created and submitted to ADB for approval.
6. The first draft English language version of the procurement documents (prequalification and bidding documents) for the initial package shall be submitted to ADB for its review and approval. The ADB-approved procurement documents will then be used as a model for all procurement in this Project and further review is not necessary for subsequent packages.
7. For prequalification and bidding exercises, notification/advertisement shall be conducted in accordance with Article 14 (Notification/Announcement) of the IRR.
8. When prequalification is conducted, (i) copy of newspaper advertisement, (ii) prequalification evaluation report (PQER), and (iii) recommended prequalified firms will be submitted to ADB for approval before issuing bidding documents to prequalified bidders.
9. After bidding, (i) copy of newspaper advertisement (in case of no prequalification exercise), (ii) bid opening record, (iii) bid evaluation report (BER), (iii) proposed contract award, and (iv) draft contract agreement will be submitted to ADB for approval before signing the contract with selected supplier/contractor.
10. Signed contract agreement shall be submitted to ADB for preparation of PCSS.
11. A flowchart showing the main steps for procurement under NCB (Appendix 1 of PAI 3.04) is attached for reference.

**Figure A1: Indicative Flowchart of Procurement under National Competitive Bidding<sup>1</sup>**



<sup>1</sup> While NCB procedures are not required to be identical with ADB's ICB procedures, they must reflect the underlying principles and not contravene ADB's *Procurement Guidelines*.

<sup>2</sup> Prequalification is discouraged for NCB. DMCs may have a register of suppliers. The processing mission should ensure that the registration system is acceptable to ADB (e.g., it reflects the underlying principles of ADB's *Procurement Guidelines*); and where acceptable, a PQ may not be required.

<sup>3</sup> If the prequalification or procurement requires prior consideration of the procurement committee, in accordance with PAI 3.11, the EA must be advised not to notify prequalified firms or award contract prior to the committee's deliberations and subsequent ADB approval.

## OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

1. The Project requires a team of consultants (Table A9). The consultants will carry out their tasks under the general supervision of the central project management unit (CPMU) of the Ministry of Agriculture and Rural Development (MARD). The team leader will be the international agricultural research management specialist.

**Table A9: Breakdown of Consultant Inputs**  
(person-months)

Consultant	International	National	Total
Agricultural Research Management	16	34	50
Agricultural Extension Management	5	22	27
Agricultural Vocational Training	1	11	12
Social Development	2	6	8
Environmental Assessment	2	11	13
Financial Management	1	8	9
Monitoring and Evaluation	2	4	6
<b>Total</b>	<b>29</b>	<b>96</b>	<b>125</b>

Sources: Asian Development Bank. 2003. *Technical Assistance to the Socialist Republic of Viet Nam for Preparing the Agriculture Science and Technology Project* (Financed by the Japan Special Fund). Manila. (TA 4194-VIE); Ministry of Agriculture and Rural Development, the Government of Viet Nam.

### A. Agricultural Research Management and Team Leadership

2. The agricultural research management specialists should have an advanced degree in the fields related to agriculture science and technology (AST) with extensive experience in the management and organization of competitive research funding systems, and preferably familiarity with agricultural research in Viet Nam. The specialists will undertake the following:

- (i) Provide necessary technical and management support to MARD for effective project implementation.
- (ii) Develop a detailed work plan for project implementation in consultation with the relevant departments of MARD, including the Department of Science and Technology, National Agricultural Extension Center, Department of Organization and Personnel, Department of Agriculture, and other key stakeholders.
- (iii) Help develop, establish, and institutionalize a mechanism for competitive research funding by leading the consultant team in view of the lessons learned and experiences in Viet Nam and other countries in East and Southeast Asia.
- (iv) Assist in ensuring coordination among the relevant central, provincial, and district agencies; regional research institutes; and other stakeholders for the implementation of the competitive research funding system under the Project.
- (v) Assist in establishing an appropriate project management and monitoring system.
- (vi) Carry out a training needs assessment for researchers during the first year of the Project, and formulate detailed in-country on-the-job training and overseas study programs in consultation with the Department of Science and Technology and Department of Organization and Personnel, and based on MARD's approved human resource development plan for agricultural research.
- (vii) Help establish a detailed mechanism for the selection of trainees and candidates.

- (viii) Examine the priority needs for upgrading equipment and facilities based on the list prepared during project formulation, and help prepare detailed technical specifications through consultation with the relevant institutes and the Department of Science and Technology of MARD.
- (ix) Provide or arrange for necessary training on the knowledge and skills for the use of existing sophisticated equipment installed at research institutes.
- (x) Assist in the procurement of equipment, materials, and civil works required for the Project, in accordance with the *Procurement Guidelines* of the Asian Development Bank (ADB).
- (xi) Lead the preparation of consultants' technical working papers and progress reports, and assist the CPMU in preparing quarterly progress reports on the Project to be submitted to the project steering committee and ADB.

## **B. Agricultural Extension Management**

3. The agricultural extension management specialists should have adequate work experience, preferably in Viet Nam, and expertise in the development and implementation of pro-poor and client-oriented extension delivery systems, including those of a contestable extension delivery system. In close consultation with the National Agricultural Extension Center of MARD, the specialists will undertake the following:

- (i) Assist the CPMU and provincial project management units (PPMUs) of the project provinces in establishing appropriate project management systems and mechanisms for local stakeholder participation.
- (ii) Assist the CPMU and PPMUs in implementing the central and provincial contestable extension funding mechanisms.
- (iii) Develop systems and procedures for financial management and auditing of extension funds, including the potential for nongovernment contributions to the costs of extension delivery.
- (iv) Facilitate the development of central and provincial extension program priorities, including those with a commodity, thematic, and targeted community focus, and the development of provincial extension investment portfolios.
- (v) Help improve the management, monitoring and evaluation, and reporting skills of the PPMUs and other relevant provincial agencies.
- (vi) Prepare and test the extension program guidelines, which incorporate (a) eligibility and selection criteria for extension contracts and service providers; (b) development of appropriate terms of reference for contracts and job description for service providers; (c) monitoring and evaluation; and (d) financial management, accounting, auditing, and reporting systems.
- (vii) Develop extension service provider training modules for low-cost and participatory extension methodology, and farmer group business development and management.
- (viii) Organize and facilitate training of trainers workshops for provincial extension service provider trainers from target provinces.
- (ix) Assist in establishing an appropriate system for conducting demonstration trials on a contractual basis in the project provinces.
- (x) Help with the procurement of equipment and materials related to the project activities for agricultural extension and on-farm demonstration trials.

### **C. Agricultural Vocational Training**

3. The agricultural vocational training specialists should have adequate work experience, preferably in Viet Nam, and relevant expertise in vocational and technical training in the agriculture sector and in curriculum planning and development. In close consultation with MARD, the responsibilities of the specialists will include the following:

- (i) Ensure effective coordination among MARD; Ministry of Labor, Invalids, and Social Affairs; and other relevant agencies, including the Ministry of Education and Training, with respect to implementation of the project component for rural-based technical and vocational training.
- (ii) Assist MARD in formulating the work plans for staff development and strengthening of institutional capacity of the selected technical and vocational schools covered under the Project.
- (iii) Assist MARD and the technical and vocational schools selected for the Project in effectively adopting the national curriculum guide and the program accreditation system in close consultation with the General Department of the Ministry of Labor, Invalids, and Social Affairs.
- (iv) Help formulate, in collaboration with the agricultural extension management specialists and in consultation with the Ministry of Education and Training, detailed curricula for the 10 selected technical and vocational training schools of MARD to provide a basis for identifying and specifying classroom and laboratory equipment and facilities.
- (v) Help strengthen the linkage of MARD and the agricultural technical and vocational schools with the relevant industry representatives in relation to the labor market in the agriculture sector.
- (vi) Provide other necessary technical and advisory support for the CPMU and PPMUs in the area of technical and vocational training in the agriculture sector.

### **D. Social Development**

4. The social development specialists should have an advanced degree in the relevant social sciences, and adequate experience in social development activities preferably in Viet Nam. The specialists will undertake the following:

- (i) Formulate detailed work plans for the social development aspects of the Project based on the gender and indigenous people's action plans prepared during project formulation with any revisions, if necessary.
- (ii) Provide technical support and guidance for the CPMU and PPMUs on implementation of the gender and indigenous people's action plans, and help develop an appropriate mechanism to ensure that the social development aspects are fully addressed.
- (iii) Ensure that socially adverse impacts of the Project are avoided and properly addressed during implementation.
- (iv) Help provide capacity strengthening support for project staff and other key stakeholders through participatory workshops and training courses in consultation with the CPMU and PPMUs.
- (v) Ensure a mechanism for appropriate social monitoring activities for the Project.

### **E. Environmental Assessment**

5. The environmental assessment specialists should have an advanced degree in environmental sciences or agriculture; and adequate experience working in environmental

assessment under projects of external funding agencies. Tasks of the specialists will include the following:

- (i) Conduct a detailed review of the project environmental monitoring plan (EMP), developed during project formulation, and prepare an appropriate work plan and schedule to implement the EMP in consultation with the CPMU and PPMUs.
- (ii) Provide technical support and guidance for the CPMU and PPMUs on EMP implementation, and help develop an appropriate mechanism in project management to ensure that appropriate environmental assessments are carried out and environmental aspects are fully addressed.
- (iii) Help formulate necessary environmental assessment reports in accordance with the guidelines of the Government and ADB in carrying out civil works included in the Project.
- (iv) Assist the CPMU and PPMUs in ensuring the procurement works are done in line with the environmentally responsible guidelines included in ADB's *Environmental Assessment Guidelines* (2003).
- (v) Assist the CPMU and PPMUs in developing an appropriate environmental monitoring system and institutionalizing the system in project management.

## **F. Financial Management**

6. The financial management specialists should have a degree in finance and other relevant fields; and adequate practical experience in projects funded by external funding agencies in developing countries, preferably in Viet Nam. The specialists will undertake the following:

- (i) Conduct a detailed review of the existing procedures of MARD for accounting and financial reporting at the central level and in the five project provinces within 1 month of project inception, and make specific recommendations on the means to resolve potential issues in financial management.
- (ii) Assess the staff capability, particularly at the PPMUs, the participating research institutes, and technical and vocational training schools, as required, and identify needs for training on financial management.
- (iii) Assist the CPMU, PPMUs, the participating research institutes, and technical and vocational training schools, as required, in establishing an appropriate uniform financial system for accounting, monitoring, and reporting acceptable to ADB and the Government.
- (iv) Provide the CPMU and PPMUs with necessary advice and training in accordance with the relevant financial regulations of the Government, and ADB's *Loan Disbursement Handbook* and statement of expenditure procedures.
- (v) Assist the CPMU and PPMUs in identifying implementation issues related to financial management, and resolving them in close consultation with the Ministry of Finance, State Bank of Viet Nam, provincial treasuries, and ADB.

## **G. Monitoring and Evaluation**

7. The monitoring and evaluation specialists should have an advanced degree in relevant fields; and adequate experience in project monitoring and evaluation in developing countries, preferably in Viet Nam. The specialists will have the following responsibilities:

- (i) Develop an appropriate methodology to assess financial impact of extension programs.
- (ii) Develop appropriate methodologies for evaluating the economic, social, and environmental impact of the Project.

- (iii) Prepare a monitoring and evaluation training manual, and train provincial and district staff in target provinces in the conduct and reporting of project monitoring and evaluation with close reference to the Government regulations on monitoring and evaluation of externally financed projects.
- (iv) Prepare an annual implementation timetable for monitoring and evaluation, including data collection and analysis.
- (v) Provide advice to the CPMU and PPMUs on the consolidation of project monitoring and evaluation, and the development of procedures to monitor, and evaluate provincial and national impact.
- (vi) Assist the CPMU to develop performance indicators and measures for the development of institutional capacities to plan and manage contestable extension delivery systems to ensure effective project activities in terms of its impact.
- (vii) Manage the ongoing project monitoring and impact evaluation process.

Provide project and program reports to the National Agricultural Extension Center and provincial administrations on the national and provincial impact of the extension program.

## **QUALITY- AND COST-BASED SELECTION (QCBS) STEPS IN THE SELECTION PROCESS AND SUBMISSIONS**

### **Step 1. Shortlisting of Consulting Firms and Preparation of RFP**

1. The Executing Agency (EA) Consultant Selection Committee (CSC) prepares (i) a long list of 15 to 20 consulting firms; (ii) shortlisting criteria; (iii) consulting services budget including details of provisional sum and contingency; (iv) narrative evaluation criteria; (v) shortlist of 5 to 7 consulting firms from the long list; and (vi) a draft Request for Proposal (RFP) with terms of reference (TOR), data sheet, summary evaluation sheet and personnel evaluation sheet, and a draft contract. The EA's CSC updates and confirms the schedule in Consultant Recruitment Activity Monitoring (CRAM) sent by ADB. Minutes of the meeting are prepared and signed by all members of the CSC.

### **Step 2. SUBMISSION 1 – Invitation Documents and Shortlist**

2. The EA submits to ADB the following CSC-approved documents (i) copy of the signed minutes of the CSC shortlisting meeting; (ii) long list; (iii) shortlisting criteria; (iv) narrative evaluation criteria; (v) consulting services budget including details of provisional sum; and contingency; (vi) shortlist; (vii) the draft RFP with TOR, data sheet, summary evaluation sheet, personnel evaluation sheet, and a draft contract; and (viii) updated CRAM.

3. If ADB's recommendation (Step 3) involves substantial amendments that require another review by ADB, a resubmission<sup>1</sup> of the invitation documents may be required.

### **Step 3. Approval of Invitation Documents and Shortlist by ADB**

4. ADB reviews the documents included in SUBMISSION 1 and approves them or makes appropriate recommendations for amendments to be made by EA. Further processing of the consultancy selection by EA is pursued only after receipt of ADB's approval of SUBMISSION 1.

### **Step 4. Release of RFP to Consultants by EA**

5. The EA, on receipt of approval from ADB incorporates ADB's comments as appropriate and sends the RFP to the shortlisted consultants. Narrative technical evaluation criteria are not attached to the RFP but retained by the EA for submission to EA's CSC for use during technical evaluation. Prior to the submission date for proposals, the shortlisted consultants have the right to seek clarifications on the RFP. The EA will send the clarifications in writing not only to the firms that sought clarification but also to all the shortlisted firms without disclosing the source of the query.

### **Step 5. Receipt of Proposals by EA**

6. Under QCBS, technical and financial proposals are received at the same time in two separate envelopes both placed in one cover envelope. The financial proposals are not opened and are safely stored by the EA until the technical evaluation process is completed and ADB approval is received. The CSC members do not have access to the financial proposals until the receipt of ADB's approval of the EA's technical evaluation report.

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<sup>1</sup> In general, when submissions are found to be incomplete or necessitate substantial amendments, resubmissions may be called for.

## **Step 6. Evaluation of Technical Proposals**

7. The CSC members separately and independently evaluate the technical proposals using the narrative evaluation criteria prepared by the CSC during the shortlisting, and approved by ADB. Technical proposals are scored out of a maximum of 1,000 points.

8. The CSC members jointly discuss the individual scores and arrive at consensus. The CSC disqualifies proposals with scores less than 750 points.

## **Step 7. SUBMISSION 2 – Evaluation of Technical Proposals**

9. The EA submits to ADB the following CSC-approved documents: (i) copy of the signed minutes of the CSC evaluation meeting; (ii) narrative evaluation criteria; (iii) summary evaluation sheet; (iv) personnel evaluation sheets; (v) narrative comments on evaluation highlighting the strengths and weaknesses of each proposal; and (vi) updated CRAM.

## **Step 8. Approval of Technical Proposal by ADB**

10. ADB reviews the report and approves the EA's technical evaluation or makes appropriate recommendations for amendments to be made by the EA. Further processing of the consultancy selection by the EA is pursued only after receipt of approval from ADB.

## **Step 9. Invitation for Public Opening of Financial Proposals**

11. The EA informs, by fax or e-mail, the consultants whose technical proposals were found to be responsive (that is, scored 750 or more points), the time and place where their financial proposals will be publicly opened. The date of public opening should be at least a week after the notification. Attendance of the consultants is optional.

12. At the same time, the EA notifies the consultants whose proposal scored less than 750 points that they have been eliminated from the selection process.

## **Step 10. Public Opening of Financial Proposals**

13. In the presence of consultants who chose to attend the public opening, the EA reads out the scores of the qualified technical proposals (those with a score equal or greater than 750 points). The EA then opens the financial proposals and reads out the total price of each proposal. The EA does not read out any other details of the financial proposals or allow consultants to inspect financial proposals. Immediately after the public opening, the EA sends by fax or e-mail the record sheet with the technical scores and the total price shown in the financial proposals to all firms that submitted responsive proposals.

## **Step 11. Financial Evaluation**

14. The EA's CSC reviews the financial proposals and calculates the evaluated total price (ETP) by correcting arithmetic errors, adjusting omissions, and deducting the non-competitive elements – provisional sum and contingency. Cost in currencies other than US dollars are converted to US dollars using the exchange rate from the source and date indicated in the RFP

data sheet. The financial proposals with the lowest ETP is given a score of 1,000 and the other proposals are given scores that are inversely proportional to their prices.

15. The formula used to determine the score of each financial proposal is:

$$S_f = 1,000 \times F_m / f$$

$S_f$  – financial score,  $F_m$  – lowest-priced proposal,  $F$  – price of the proposal being considered

## **Step 12. Ranking of Proposal**

16. The EA's CSC calculates the total score for each proposal by adding the weighted scores for technical quality and price. The weight for technical quality is 80 percent and the weight for cost is 20 percent. These weights are fixed.

## **Step 13. SUBMISSION 3 – Financial Evaluation and Ranking of Proposals by EA**

17. The EA submits to ADB the following CSC-approved documents: (i) copy of the signed minutes of the CSC evaluation and ranking meeting' (ii) record of attendance at public opening; (iii) record of proposed total prices' (iv) completed financial evaluation sheets; (v) overall ranking; (vi) updated CRAM; and (vii) a request seeking ADB's approval for commencing contract negotiations with the first-ranked firm.

## **Step 14. Approval of Evaluation and Ranking of Proposals by ADB**

18. ADB reviews the documents included in SUBMISSION 3 and approves them or makes appropriate recommendations for amendments to be made by the EA. Further processing of the consultancy selection by the EA is pursued only on receipt of approval from ADB.

## **Step 15. Contract Negotiations**

19. Following receipt of ADB approval, the EA invites the first-ranked firm to contract negotiation. The negotiations include technical discussions on the methodology, comments on the TOR, the consultant's personnel and the EA's counterpart facilities. It is important that these discussions do not substantially alter the requirements in the TOR because this might materially alter the terms of the consultant's technical proposals and its costs. During financial negotiations, experts' remuneration rates and the other unit costs shown in the consultant's financial proposals are not subject to negotiation; however, minor changes of inputs and quantities of cost items may be made.

## **Step 16. SUBMISSION 4 – Draft Negotiated Contract**

20. The EA submits to ADB a copy of the draft negotiated contract and updated CRAM.

## **Step 17. Approval of Draft Negotiated Contract by ADB**

21. ADB reviews the draft negotiated contract together with appendixes and approves it or makes appropriate recommendations for amendments to the contract to be made by the EA and the consulting firm.

## **Step 18. Signing the Contract**

22. After receiving ADB's approval of the draft negotiated contract, the EA and the consulting firm sign the contract.

**Step 19. SUBMISSION 5 – Signed Contract**

23. The EA submits a copy of the signed contract and updated CRAM to ADB for its record.

**Step 20. Post Contract Negotiation Actions**

24. After the contract has been signed, the EA advises, in writing, the shortlisted firms that were unsuccessful. The financial proposals of the firms that submitted technical proposals that scored less than 750 points are returned unopened.

**MODEL OF NARRATIVE EVALUATION CRITERIA  
FOR SIMPLIFIED TECHNICAL PROPOSAL (STP)  
(QBS AND QCBS)**

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**I. APPROACH AND METHODOLOGY - 300 points -fixed (10 pages maximum)**

**A. Methodology and Work Plan - 200 points (fixed)**

**Criteria:** The degree to which the presented approach matches the requirements of the TOR. To include written methodology, organization chart, and work program (bar chart).

**Factors to consider:** Assessment of the inter-relationship of methodology write-up and work program. A consistent relationship is to be given maximum points. Work program to be assessed on completeness and logical sequence of events.

**B. Personnel Schedule - 50 points (fixed)**

**Criteria:** Relationship between required person-months and proposed work program. To be in the format of Form TECH-2 of the RFP.

**Factors to consider:** Requirements close to TOR estimated inputs are to be given maximum points (50%). For each expert's input the appropriateness of time allocated to the tasks to be performed is to be assessed (50%). Check the balance between field and home office time and assess appropriateness of proposed number of trips to the field.

**C. Proposal Presentation - 50 points (fixed)**

**Criteria:** Clarity of the entire proposal and whether the proposal complies with the following page restrictions stated in the ADB's Letter of Invitation:

- (i) Approach and Methodology, Work Plan and Personnel Schedule, to be **limited to a maximum of 10 pages**;
- (ii) Biodata of each expert in the Consultant's team to be **limited to a maximum of 5 pages**.

**Factors to consider:** If all the items requested in the Letter of Invitation are covered in a clear and easily understandable form and if the proposal is assembled in a professional manner, maximum points are to be given (20%). Assess if the proposal conforms with the Letter of Invitation page restrictions. Maximum points to be given to complying proposals (80%). Proposals, which exceed the page restrictions and contain other information, such as project experience sheets, background information about the firm, appendices, etc. should be marked down (5 points per page in excess of the limit).

## II. **PERSONNEL - 700 points – fixed** (5 pages maximum per biodata)

### **International Consultants**

**Criteria:** Separate assessment of each expert listed on page 2 of 2 of the Summary Evaluation Sheet. Each expert is to be evaluated against the tasks assigned in accordance with four main criteria:

- (i) general experience such as academic qualifications and the number of years of working related experience; (10-20%)
- (ii) project related experience based on the number of relevant projects implemented; (60-70%)
- (iii) overseas experience and/or country experience; (10-20%) and
- (iv) permanent/full-time<sup>2</sup> staff status, for the Team Leader and for expert nominated as Team Leader (10% fixed). To be considered a permanent/full-time staff, a team leader or expert nominated as team leader must be full-time employee of the shortlisted firm or associate firm(s) for at least 1 year before the date the shortlisted firm submits its technical proposal.

### **National Consultants**

**Criteria:**

- (i) general experience such as academic qualifications and the number of years of working related experience; (10-25%)
- (ii) project related experience based on the number of relevant projects implemented; (60-70%)
- (iii) experience in working with international consulting firm or international organization/international agency; (10-20%)

### **Factors to consider**

---

<sup>2</sup> A regular full-time employee of the Consultant or the Sub-Consultant is defined as a person who, on the date of submission of the Consultant's Proposal:

- (a) is currently employed under a Contract or agreement of employment with the Consultant or the Sub-Consultant;
- (b) has been employed by the Consultant or the Sub-Consultant for the last 12 consecutive months preceding the date of submission of the Proposal;
- (c) is entitled to receive regular remuneration and benefits (e.g. social security, pension or medical contributions) from the Consultant or the Sub-Consultant; and
- (d) is engaged to work for the Consultant or the Sub-Consultant for the number of hours per day and days per year considered the norm in the country of employment or in the country in which the person is assigned.

**For QBS:** If more than one expert is nominated for a position the overall rating is calculated as the summation of the individual rating of each person prorated on the basis of person-month input. If there is no indication of person-month input, experts are considered as alternative experts rather than joint experts. When alternative experts are nominated for the same position, the score of the least qualified expert shall be used.

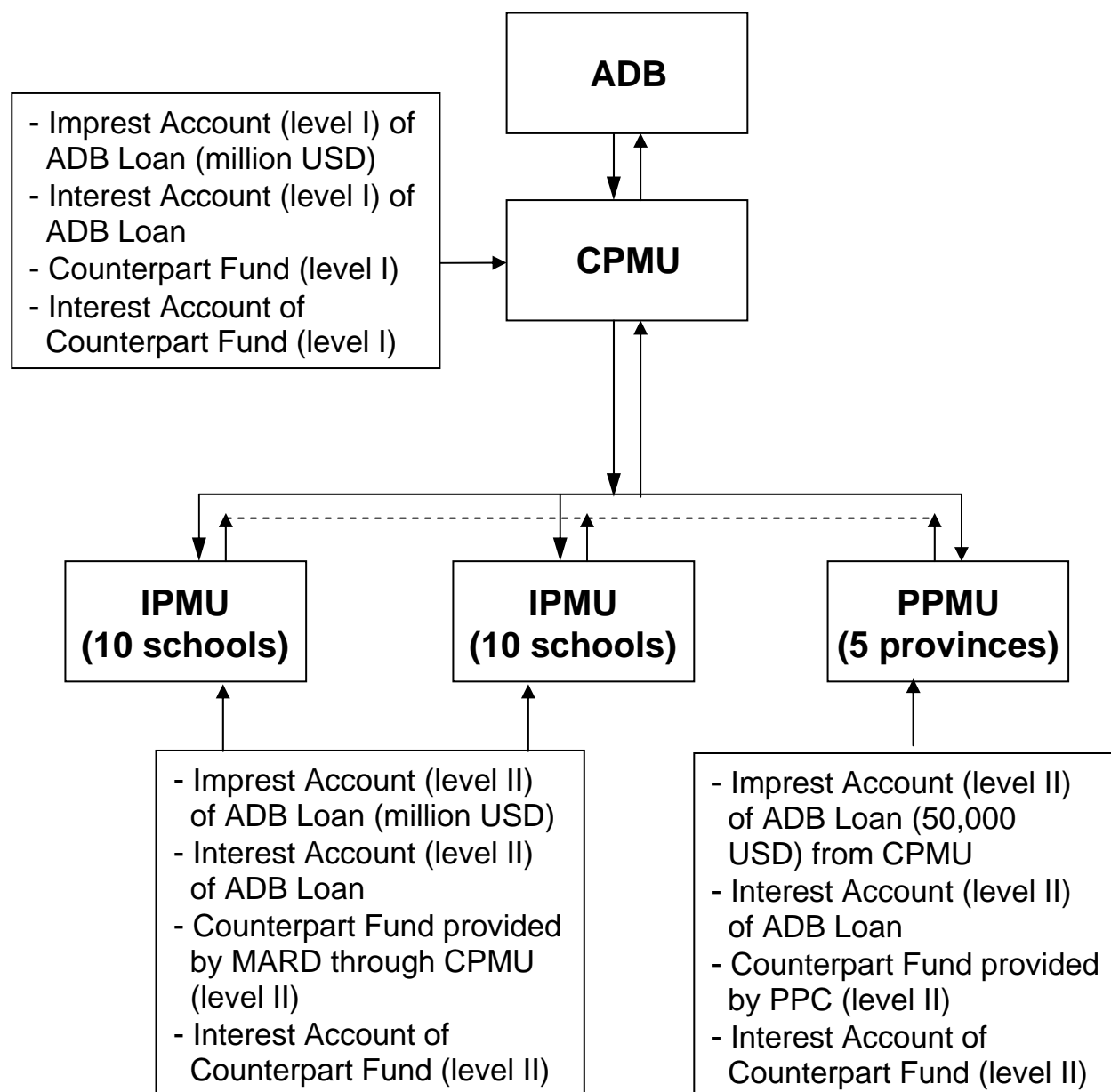
**For QCBS:** Only one CV may be submitted for each position.

## INDICATIVE SCHEDULE FOR CONSULTANTS

POSITION	PROJECT YEAR						International person-months	National person-months
	2006	2007	2008	2009	2010	2011		
Agricultural Research Management							16	34
Agricultural Extension Management							5	22
Agricultural Vocational Training							1	11
Social Development							2	6
Environmental Assessment							2	11
Financial Management							1	8
Monitoring and Evaluation							2	4
TOTAL							29	96

 Target  
 Actual

## FUNDS FLOW CHART



## DISBURSEMENT MODALITIES

### A. Imprest Fund Procedures

1. The imprest fund procedure is one where ADB makes an advance disbursement from the loan account for deposit to an imprest account (the Account) to be used exclusively for ADB's share of eligible expenditures.

#### Objectives

2. The main objective for establishing the Account is to help the borrower reduce cash flow difficulties by pre-financing project expenditures thereby facilitating project implementation. The other objectives are

- providing the borrower with more control over payments; and
- reducing the number of withdrawal applications and related costs.

#### Conditions for Use of the Procedure

3. The following conditions must exist before the borrower is allowed to use the procedure.
- **Need for the Procedure** - The borrower is to justify using the procedure, indicating the cash flow requirement for effective project implementation.
  - **Borrower's Capability** - The borrower must have sufficient administrative and accounting capabilities to establish adequate internal control, accounting, and auditing procedures to ensure efficient use of the Account and its operation.
  - **Audit Arrangements** - The borrower must also have the capability to arrange for periodic and annual independent audits of the Account by auditors acceptable to ADB.

#### Approval of Procedure

4. During appraisal or review missions, ADB staff identify the need for the imprest fund procedure. If the procedure is approved, it must be provided for in the RRP and loan agreement. If, during project implementation, the borrower finds it necessary to use the procedure, it may request ADB's approval. The request for using the imprest fund procedure should be sent to CTL for joint approval by the controller and the projects director concerned.

#### Basic Requirements

5. A signed withdrawal application for imprest account must be submitted to ADB together with a statement of the estimated ADB share of project expenditures on form ADB-IFP-EES (included in the ADB Loan Disbursement Handbook).

#### Establishing the Account

6. The borrower is required to open, for the exclusive use of the project, a separate bank account for depositing advances. The imprest account is opened in the borrower's name.

#### Location of the Account

7. The Account may be opened at the central bank of the borrower's country or in a commercial bank the borrower designates, provided that the institution chosen is capable of:

- executing foreign exchange and local currency transactions;
- opening letters of credit and handling a large volume of transactions; and
- issuing detailed monthly bank statements promptly.

### **Currency of the Account**

8. The currency of the Account is agreed upon during loan negotiations and must be indicated in the loan agreement. To maintain the Account value against depreciation, it is to be maintained in a convertible and stable currency.

### **Using the Account**

9. The borrower uses the Account to pay contractors, suppliers, and others for ADB's share of eligible project expenditures incurred in local and foreign currencies.

### **Ceiling of Advances**

10. For project loans, total advances at any time are not to exceed estimated expenditures for the next six months or 10 percent of the loan amount, whichever is lower. The borrower must obtain prior ADB approval for any upward changes in the approved ceiling. Requests for changes are sent to CTL, Disbursement Operations Division for approval by the assistant controller and projects manager concerned.

### **Initial Advance**

11. The borrower may request an initial advance from ADB based on approved contracts and planned expenditures for the first six months of the project, including LCs in small amounts. The initial advance and subsequent advances are not to exceed the approved ceiling of advances. All advances are deposited in the imprest account.

### **Liquidation/Replenishment**

12. As eligible expenditures are incurred and paid from the Account, the borrower requests liquidation and replenishment of the Account by submitting a withdrawal application duly supported by documents, as required under the reimbursement procedure and the corresponding bank statement and reconciliation statement. Withdrawal application must be prepared in the currency of the Account.

### **Recovery of Advances or Final Liquidation of the Account**

13. Advances are to be gradually reduced within one year before the loan closing date or when the undisbursed balance of the loan, including outstanding commitments, is equal to twice the amount of advance, whichever comes first. This is to ensure that sufficient time is provided for the borrower to obtain supporting documentation for clearing the outstanding advances before the loan account is closed. The form to be used is in the ADB's Loan Disbursement Handbook. The borrower must promptly refund to ADB, in the currency of the Account, any balance of the advance not liquidated at the time of loan closing.

## **Comfort Letter**

14. If the imprest account is maintained in a commercial bank, a comfort letter is required to protect the interest of both the borrower and ADB. The letter confirms that the commercial bank shall not assert any claim to set off, seize, or attach amounts on deposit to the Account to satisfy amounts due to the commercial bank by the borrower.

## **Second-Generation Imprest Account (SGIA)**

15. An SGIA refers to an imprest account opened in the name of an implementing agency or unit, which receives funds from the first generation imprest account, to meet project expenditures incurred by the implementing agency or unit. Immediately after the effective date, each Project province, and participating research institutes and technical and vocational schools if required, shall establish an SGIA at its provincial treasury.

## **Audit Arrangements**

16. Imprest accounts and SGIAs must be audited regularly by independent and qualified auditors acceptable to ADB. The audit is carried out as part of the regular annual audit of the EA's accounts. A separate opinion is included in the annual audit report.

## **Review by ADB Staff**

17. ADB reserves the right to conduct spot or random checks of expenditures covered by the Imprest fund through special disbursement missions or project review missions.

## **Suspending Replenishment**

18. ADB may suspend replenishment of the Account if
- the loan is declared suspended by ADB, partially or fully;
  - audit reports or ADB missions indicate significant irregularities in the operation of the imprest account; or
  - the Account has been inactive for more than six months and no application for replenishment has been submitted.

19. During the suspension, no additional fund will be advanced to the account. However, except when the loan is suspended or refund is requested by ADB, available funds in the Account can be used to meet eligible expenditures. Withdrawal applications submitted for these expenditures will be applied to liquidate the balance of advances.

## **Flowchart**

20. The narrative procedures and flowchart illustrating the procedural and document flow for the imprest fund procedures are presented in the ADB's Loan Disbursement Handbook.

## **Checklist**

21. It is necessary to ensure that:
- the withdrawal applications are signed by authorized signatories.

- bank statements and bank reconciliation statements are included to support the requests for liquidation and replenishment.
- expenditures items are eligible for liquidation and replenishment.
- a separate summary sheet needs to be prepared for each category and subcategory.
- for loans to be closed within the next 12 months, advances are to be gradually reduced.
- the currency of withdrawal application should be the same as the currency of the imprest account.

## **B. Statement of Expenditures (SOE) Procedures**

22. SOE procedure is a reimbursement procedure requiring no submission of supporting documentation. The procedure derives its name from the SOE form, which is submitted with the withdrawal application. The SOE replaces the usual supporting documents and the summary sheet. The SOE form provides data on contracts and disbursements up to the authorized ceiling amount. In the SOE, the borrower certifies that (i) expenditures have been incurred and paid for under the terms and conditions of the loan agreement, and (ii) records are maintained and are available for examination by ADB disbursement/review missions and independent auditors.

23. The SOE forms are available in the ADB's *Loan Disbursement Handbook* (the Handbook) dated January 2007:

- SOE form for contracts of \$100,000 and below (Appendix 22);
- SOE for for contracts over \$100,000 (Appendix 23);
- SOE form for operating costs (Appendix 24); and
- SOE form (free format) (see Appendix 25).

24. The SOE procedure may be used for reimbursement of eligible expenditures and to liquidate advances provided into the imprest account, in accordance with ADB's *Loan Disbursement Handbook* dated January 2007.

### ***Conditions for using SOE Procedure***

25. The following conditions must exist before the borrower may use the procedure:
- **Impracticability of Full Documentation** - The SOE -procedure is used where it is impractical to require full documentation. This may apply to EA operating costs or expenditures related to small civil works contracts scattered over a wide area.
  - **Borrower's Capability** - The borrower must have sufficient administrative and accounting capabilities to prepare and maintain proper SOE records and make them readily available for examination.
  - **Audit Arrangements** - The borrower must be capable of arranging for periodic or annual audits of SOE transactions as part of the project's audit.

### ***Approval of the SOE Procedure***

26. During appraisal missions, ADB staff will identify the need for the SOE procedure in consultation with the borrower. If the procedure is approved, it is provided for in the report and recommendation of the President (RRP) and loan agreement.

27. If, during project implementation, the borrower needs to use simplified documentation, it may request ADB's approval. Request to use the SOE procedure is sent to the Controller's Department for approval by the controller following recommendations by Controller's and

projects departments. (However, if the requesting EA has previously obtained ADB approval for using the procedure or if the request is for an increase in SOE ceiling or use of the procedure for additional loan categories, approval is requested from the assistant controller concerned.)

### ***Limits in using SOE***

28. For project loans, the ceiling is US\$100,000 per contract. Any other ceiling may be approved by ADB on a loan to loan basis. This should be provided for in the loan agreement.

29. For nonproject loans (e.g., loans to DFIs) the ceiling is usually related to the “free limit” of the subloan amount.

### ***Ineligible Payments***

30. Where ADB subsequently finds any payment made under SOE procedure to be insufficiently supported or ineligible for ADB financing, ADB may offset the amount of the unjustified or ineligible payment against subsequent withdrawals for reimbursement or request the borrower or EA to refund the same amount to the loan account.

### ***Audit Arrangements***

31. SOE records must be audited regularly by independent and qualified auditors acceptable to ADB. The audit is carried out as part of the regular annual audit of the EA's accounts. A separate opinion is included in the annual audit report.

### ***Review by ADB Staff***

32. ADB reserves the right to conduct spot or random checks of expenditures covered by SOE through disbursement missions or review missions. Documents are to be kept in the EA's office and must be readily available for checking by disbursement and review missions or upon ADB's request for submission of supporting documents on sampling basis.

### ***Suspending Use of the SOE***

33. ADB may suspend using SOE procedure when (i) the borrower continuously claims ineligible expenditures; (ii) the EA fails to submit the audit report before the deadline; (iii) the audit report indicates significant irregularities in the use of the ADB funds in project implementation; and (iv) the disbursement/review mission finds significant irregularities in the use of ADB funds.

## **C. Direct Payment Procedures**

34. ADB pays the designated beneficiary, at the request of the Recipient, from the loan funds.

### ***Supporting Documents for Direct Payment***

- (i) Signed Withdrawal Application (ADB-DRP/RMP, Appendix 3 of Handbook);
- (ii) Summary Sheet (ADB-DRP-SS, Appendix 4 of Handbook);
- (iii) Contract or confirmed purchase order, indicating amount and due date;

- (iv) For payment of goods: supplier's invoice and bill of lading or other similar documents; and
- (v) For payment of services: consultants' claim or invoice

#### **D. Commitment Procedure (page 26 of Handbook)**

35. This procedure is used for financing import of goods. A letter of credit is usually opened by a commercial bank. The negotiating bank is authorized to seek payment from ADB under the Loan.

36. ADB issues a Commitment Letter against a letter of credit (L/C), and agrees to pay (on behalf of the Recipient and out of Loan funds) the negotiating bank for the payments made or to be made to the supplier in accordance with the terms of the L/C.

#### ***Supporting Documents for Issuing Commitment Letter***

- (i) Signed Application for Commitment Letter (ADB-CL, Appendix 5 of Handbook);
- (ii) Summary Sheet (Appendix 6)
- (iii) Contract or confirmed Purchase Order;
- (iv) Two signed copies of L/C.

37. ADB issues a Commitment Letter to the designated commercial bank (usually advising bank) as shown in Appendix 7 of the Handbook.

#### ***ADB's Payment to the Negotiating Bank***

38. The Commitment Letter provides for ADB's payment to the negotiating bank upon receipt of the reimbursement claim confirming that negotiation has been done in full compliance with the letter of credit terms. Such reimbursement claim is usually made by tested telex or authenticated SWIFT message.

#### ***Amendment to the Letter of Credit***

39. ADB's approval is required for amendment to the letter of credit (L/C) involving:

- (i) terms of payment including currency and amount of L/C;
- (ii) the description or quantity of goods;
- (iii) beneficiary;
- (iv) country of origin; and
- (v) extension of the expiry date of L/C beyond the grant closing date.

40. Amendments not mentioned above do not require ADB's approval. For example, extension of L/C expiry date within grant closing date does not require ADB's approval, but simply inform ADB of such extension by filling out the form shown as Appendix 11 of Handbook and attaching one copy of the amendment.

#### **E. Other Disbursement Procedures**

41. Reference should be made to ADB's *Loan Disbursement Handbook* for details on the other disbursement procedures.



**POTENTIAL PROBLEM PROJECT**

Rating Criteria	Flag (Yes/NO)	Actual Rating	Remarks
1. Project Implementation Delays	No	NYE	
2. Poor Compliance with Covenants	No	S	
3. Established, Staffed, and Operating PMU/PIU	No	S	
4. Fielding of Consultants	No	Not Yet Due	
5. Shortage of Counterpart Funds/Cofinancing	No	NYE	
6. Cost Overrun	No	NYE	
7. Poor Compliance with Audited Project Accounts and Agency Financial Statements	No	S	
8. Environmental or Social Problems	No	S	
9. Significant Disbursement Delays	No		0.000 / 0.000=
10. In Risk Sector in a Country with History of Past Problems	No	33%	
11. Project Fielded Missions	Yes	0	
Overall Rating	No		< 4 flags

**Override PP Rating (for COSO use only)**

New PP Rating:	Effective Date:	Date of Lifting:
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Justification for Override	Justification for Lifting

Update Control : Akn Mahfuzuddin Ahmed; Christopher J. Wensley; Cynthia R. Garcia; Eileen T. Quisumbing; Masahiro Otsuka  
 Last Updated by : COSO Monthly Uploading  
 Last Modified on : 28/05/2007 12:04 PM  
 Created on : 18/01/2007 10:46 AM

SEAE: 36304

### Rating Criteria for the Assessment of Implementation Progress

Project: 36304 - AGRICULTURE SCIENCE AND TECHNOLOGY

Loan Number: 2283-VIE(SF)

Department: SERD

Division: SEAE

Approval Date: 11/12/2006


Signing Date: 14/03/2007

Effectivity Date:

Original Closing Date: 30/06/2012

Status: ACTIVE

<b>Loans Not Yet Effective</b>	As of : 30/04/2007 <b>4.6</b> months after loan approval <b>1.5</b> months after loan signing	IP Rating Satisfactory
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**Note:** This is for recording purposes only and does not affect in any way the overall IP Rating. For guidelines in calculating project progress, please refer to Appendix 2 of PA15.01 

Project Progress:

#### Override IP Rating (for COSO use only)

New IP Rating:	Effective Date:	Date of Lifting:
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#### Justification for Override

#### Justification for Lifting

#### Rating Upon Suspension (for COSO use only)

New IP Rating:	Effective Date:	Date of Lifting:
Remarks:		

Update Control : Akm Mahfuzuddin Ahmed; Christopher J. Wensley; Cynthia R. Garcia; Eileen T. Quisumbing; Masahiro Otsuka  
 Last Updated by : COSO Monthly Uploading  
 Last Modified on : 25/05/2007 08:09 AM  
 Created on : 18/01/2007 09:08 AM

**IMPACT AND OUTCOME****Impact**

Description
Achievement of sustainable and equitable agricultural growth.

**Outcome**

Description
Strengthened national system of agriculture science and technology (AST).

Performance Targets/Indicators	Rating (HS,S,PS,U)	Progress/Status
1. Client-oriented AST system in place with improved and more effective mechanisms for technology dissemination.	S	
2. Closer linkages established between research and extension activities.	S	
3. Multiple extension services in place, involving various service providers.	S	

Key Assumptions/Risks		Rating (HS,S,PS,U)	Assessment of Current Status
<b>Assumptions:</b>			
1. Continued Government commitment to the market-oriented agriculture sector in line with the national socioeconomic development plans.		S	
2. Continued Government policies and actions to streamline AST institutions to respond to the national development goals.		S	
3. Agriculture market information systems effectively implemented.		S	
<b>Risks:</b>	<b>Mitigated (Y/N)</b>		
1. Research-led technological advances in agriculture may benefit wealthy farmers at the expense of poor farmers. Wealthier farmers may in fact have more resources to apply new technologies.	Yes	S	The selection criteria for research and extension contracts and demonstration trials will have pro-poor elements to reflect local farmers' needs, and give priority to socially sensitive activities in the provincial agricultural extension plans with regard to participation of women and ethnic minority groups.
2. Inadequate provision of counterpart resources for operation and maintenance of equipment and facilities upgraded under the Project.	Yes	S	The Government has assured ADB that it will provide adequate incremental budget to maintain sustainability of project impact. ADB will continue its dialogue with the Government to ensure adequate financial resources for the upgraded equipment and facilities.
3. Weak linkages between agricultural research and extension.	Yes	S	The selection criteria for agricultural research proposals will require the inclusion of either the PAEC or provincial advisory council for agricultural extension so that relevant local stakeholders are involved in the planning and implementation of the research activities. This will ensure that local demand is reflected in the proposed research and extension contracts.
4. Inadequate stakeholder participation in planning and implementing AST activities under the Project.	Yes	S	Inclusion of provincial advisory councils in the formulation of provincial agricultural extension plans will facilitate the process of stakeholder consultations in the project activities.
<b>Overall Rating</b>		S	NOTE: Overall Rating is based only on Assumptions and Risks until project completion. Thereafter, Immediate DO assessment will be included
<b>Rating Upon Suspension (for COSO use only)</b>			
New Impact and Outcome Rating:		Effective Date:	Date of Lifting:
Remarks:			

**Recent Development (Date: 28/05/2007)**

The Loan was signed on 14 March 2007.

One condition, out of two, for loan effectiveness have been fulfilled (establishment of 5 Provincial Project Management Units for each project

SEAE: 36304

province). The second condition (establishment of Project Steering Committee is expected by end May or early June). Expected loan effectiveness is on or before 14 June 2007.

#### Problems with Impact and Outcome

Description	Action Taken/Proposed

#### Project Quality (one time input)

Capacity Building Component	Training Component	Participatory Process	Project Manager/Project Office prior to Loan approval	Incorporated Lessons Learned in Sector/Country	Logical Framework
Yes	Yes	Yes	Yes	Yes	Yes

Update Control : Akm Mahfuzuddin Ahmed; Christopher J. Wensley; Cynthia R. Garcia; Eileen T. Quisumbing; Masahiro Otsuka  
 Last Updated by : Eileen T. Quisumbing  
 Last Modified on : 28/05/2007 11:53 AM  
 Created on : 03/01/2007 03:55 PM

**IMPLEMENTATION PROGRESS**

<b>Project Outputs</b>		
<b>Description</b>	<b>Indicators / Targets</b>	<b>Status</b>
1. Capacity of physical and human resources for agricultural research improved.	Efficiency and usage of laboratory equipment increased substantially.	
	Research staff with relevant postgraduate qualification increased from 20% in 2003 to 30% in 2008 in line with the human resource development plan for agricultural research.	
2. Agricultural research activities made more responsive to client needs.	Research and technology transfer contracts undertaken in provinces of different agroecological regions.	
	Not less than 40% of the value of research contracts addressing needs of upland or remote communities.	
3. Farmers' access to participatory and pro-poor agricultural extension improved.	Needs-based provincial planning systems for agricultural extension established.	
	Project extension activities implemented in upland and remote areas of the five project provinces.	
	Not less than 40% of the value of extension contracts addressing needs of upland or remote communities.	
4. Improved linkage of agricultural extension services with research strengthened.	Participation of provincial extension centers in regional research activities, including provincial research programs and field research trials.	
	Practical linkages between farmer groups, extension service providers, and research institutes formalized.	
	Effective mechanisms for increased stakeholder participation in extension services established.	
5. Rural-based technical and vocational training made more responsive to national sector goals.	Effective systems to link between schools and industries in place.	
	Appropriate curriculum guidelines introduced to reflect national sector goals.	
6. Capacity of rural-based technical and vocational training strengthened.	Average usage of school and laboratory equipment in the schools selected under the Project increased substantially.	
	Average of about 90% of the graduates of the targeted schools enter into full-time employment.	

**Key Project Inputs**

Loan proceeds of \$30 million equivalent	

<b>Key Assumptions/Risks (Input-Output)</b>	<b>Assessment of Current Status</b>
<b>1. Assumptions:</b> <ul style="list-style-type: none"> <li>- The Government's plan for research institute reorganization implemented.</li> <li>- Skilled staff retained in the national AST system.</li> <li>- Adequate financial resources for proper operation and maintenance.</li> </ul> <b>Risk:</b> <ul style="list-style-type: none"> <li>- Inappropriate intervention into procurement and selection of trainees.</li> </ul>	
<b>2. Assumptions</b> <ul style="list-style-type: none"> <li>- Government procedures and regulations improved for the client-oriented AST system of the country.</li> <li>- Increased awareness among the stakeholder</li> </ul>	

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agencies about the need for client-oriented agricultural research activities.	
<b>3. Assumptions</b> <ul style="list-style-type: none"> <li>- Active participation of key stakeholders in local communities in planning and implementation of grassroots extension services.</li> <li>- Effective linkage between research and extension maintained.</li> </ul> <b>Risk</b> <ul style="list-style-type: none"> <li>- Inadequate finance made available for the extension services.</li> </ul>	
<b>4. Assumptions</b> <ul style="list-style-type: none"> <li>- Government procedures and regulations improved for effective linkages between research and extension.</li> <li>- Increased awareness among local extension workers about the need to strengthen linkages with research activities.</li> </ul>	
<b>5. Assumptions</b> <ul style="list-style-type: none"> <li>- National curriculum guides developed in line with the national sector goals.</li> <li>- School-industry councils provide effective guidance to schools.</li> <li>- Labor market information effectively communicated to technical and vocational schools.</li> </ul>	
<b>6. Assumptions</b> <ul style="list-style-type: none"> <li>- Adequate financial resources provided for operation and maintenance of upgraded equipment and facilities.</li> </ul>	

**Implementation Progress**

<b>Loans Not Yet Effective</b>	As of : 30/04/2007 4.6 months after loan approval 1.5 months after loan signing	IP Rating Satisfactory
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**Design Changes**

Assessment of Current Status
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**Recent Development (Date: 28/05/2007)**

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**Problems with IP**

Description	Action Taken/Proposed
None.	

## Project-Specific Covenants

## COVENANTS

## Project and EA Accounts

EA	FY End	FY	Months Due After FY	Due	Date Received	Months Delayed	Acceptable Y / N	Status of Compliance	Rating
<b>Submission of Audited Project Accounts (APA):</b>									
MARD	Sep	07/08	6	31/03/2009	-	0	-	NYD	S
<b>Submission of Agency Financial Statements (AFS):</b>									
MARD	Sep	07/08	6	31/03/2009	-	0	-	NYD	S
<b>Overall Compliance and Rating:</b>								NYD	S
<b>Remarks:</b>									

## Project Specific Covenants

Project-specific covenants	Date Due	Date Complied	Delays (mo.)	Status of Compliance	Rating (S,PS,U)	Remarks/Issues
<b>Sector</b>					-	
1. -						
<b>Environmental</b>					<b>Not Yet Due</b>	
1. LA, Sched. 5, para. 17 The Borrower shall ensure that (i) environmental impact assessments under relevant categories, as defined under the Borrower's laws and regulations, will be carried out during the design phase of all civil works, and (ii) the environmental monitoring plan for the Project will be effectively implemented.				<b>Not Yet Due</b>	-	
<b>Social</b>					S	
1. LA, Sched. 5, para. 9 The Borrower shall ensure that at least 10% of the trainees are women.				<b>Not Yet Due</b>	-	
2. LA, Sched. 5, para. 10 The Borrower shall ensure that demonstration trials and extension services under the Project will be implemented in poor communes where at least 30% of households are classified as poor households, as defined by the Borrower's appropriate laws and regulations.				<b>Not Yet Due</b>	-	
3. LA, Sched. 5, para. 12 The Borrower shall ensure that Project activities will be implemented in line with the Project's gender action plan, as agreed between the Borrower and ADB. In particular, the agreed gender action plan shall be reflected in the provincial plans for agricultural extension to be developed under the Project.				<b>Not Yet Due</b>	-	
4. LA, Sched. 5, para. 13 The extension contracts to be funded under the Project shall have provisions that at least 40% of beneficiaries of these services are women. The contracts to be awarded in the final year of project implementation shall have provisions that at least 50% of beneficiaries are women.				<b>Not Yet Due</b>	-	
5. LA, Sched. 5, para. 14 The Borrower shall ensure that Project activities will be implemented in line with the Project's specific actions for indigenous peoples, as agreed between the Borrower and ADB, and that the agreed specific actions for indigenous peoples will be reflected in the provincial plans for agricultural extension to be developed under the Project.				<b>Not Yet Due</b>	-	
6. LA, Sched. 5, para. 16 The Borrower shall ensure that civil works to be financed under the Project will not require resettlement or land acquisition, as defined in ADB's Policy on Involuntary Resettlement. If, due to unforeseen circumstances, such resettlement or land acquisition is unavoidable, the Borrower shall (i) prepare a resettlement plan in accordance with ADB's Policy on Involuntary Resettlement; (ii) submit it to ADB for approval prior to awarding the concerned civil works contract; and (iii) ensure that any resettlement activities will be carried out in compliance with the resettlement plan.				<b>Ongoing</b>	S	Being complied with. Civil works will be done on the existing compounds of technical and vocational training schools and will not require land acquisition.
<b>Financial</b>					<b>Not Yet Due</b>	
1. LA, Art IV, Sec 4.02 (a) The Borrower shall (i) maintain, or cause to be maintained, separate accounts for the Project; (ii) have such accounts and related financial statements audited annually, in accordance with appropriate auditing standards consistently applied, by independent						

## Project-Specific Covenants

auditors whose qualifications, experience and terms of reference are acceptable to ADB; (iii) furnish to ADB, as soon as available but in any event not later than 6 months after the end of each related fiscal year, certified copies of such audited accounts and financial statements and the report of the auditors relating thereto (including the auditors' opinion on the use of the Loan proceeds and compliance with the financial covenants of this Loan Agreement as well as on the use of the procedures for imprest account/statement of expenditures), all in the English language; and (iv) furnish to ADB such other information concerning such accounts and financial statements and the audit thereof as ADB shall from time to time reasonably request.	
<b>Not Yet Due</b> -	
2. LA, Art IV, Sec 4.02 (b) The Borrower shall enable ADB, upon ADB's request, to discuss the Borrower's financial statements for the Project and its financial affairs related to the Project from time to time with the auditors appointed by the Borrower pursuant to Section 4.02(a) hereabove, and shall authorize and require any representative of such auditors to participate in any such discussions requested by ADB, provided that any such discussion shall be conducted only in the presence of an authorized officer of the Borrower unless the Borrower shall otherwise agree.	
<b>Not Yet Due</b> -	
3. LA, Sched. 3, para. 5 (a) Except as ADB may otherwise agree, the Borrower shall, immediately after the Effective Date, (i) establish an imprest account at a commercial bank acceptable to ADB; and (ii) cause each of the Project provinces, and participating research institutes and technical and vocational schools if required, to establish a Second Generation Imprest Account (SGIA) at its provincial treasury.	
<b>Not Yet Due</b> -	
4. LA, Sched. 5, para. 5 The Borrower shall ensure that adequate counterpart staff and funds will be provided for operation and maintenance of the Project facilities upgraded in the selected agriculture research institutes, and further ensure that such institutes will provide adequate staff and funds for operation and maintenance after their transformation into self-financed organizations in accordance with the Borrower's Decree No. 115, issued in 2005.	
<b>Not Yet Due</b> -	
<b>Economic</b> -	
1. -	
<b>Others</b> S	
1. Established, Staffed, and Operating PMU/PIU LA, Sched. 5, para. 3 The CPMU, headed by a project director, shall be established in the Agricultural Project Management Board under MARD, and comprise at least a deputy head, a planning officer, a finance and accounting officer, a monitoring and evaluation officer, a procurement officer and other necessary supporting staff on a full-time basis.  LA, Sched. 5, para. 4 The PPMU, headed by a PPMU manager, shall be established under the provincial department of agriculture and rural development in each of the Project provinces, and comprise a planning officer, a monitoring and evaluation officer, an accountant, and other necessary supporting staff. PMUs may be established under participating research institutes, and technical and vocational training schools, if required and deemed appropriate, to facilitate the Borrower's decentralization policy for project implementation and management.	The CPMU within MARD's Agricultural Projects Management Board was established on 9 March 2006 (Decision No. 561/QD-BNN-TCCB)  Being complied with. Five PPCs have been established. PPMU comprises a director, an accountant, and a coordinator. Initial composition of the PPMU is adequate to operationalize the Project at the provincial level.  IPMUs will be established in each of the 20 (10 research institutes and 10 agricultural colleges and vocational schools) participating institutions by July 2007.
<b>Ongoing</b> S	
2. Fielding of Consultants	
<b>Not Yet Due</b> -	
3. LA, Sched. 4, para. 7 (a) The Borrower shall ensure that all Goods and Works procured (including without limitation all computer hardware, software and systems, whether separately procured or incorporated within other goods and services procured) do not violate or infringe any industrial property or intellectual property right or claim of any third party.	
<b>Not Yet Due</b> -	
4. LA, Sched. 4, para. 7 (b) The Borrower shall ensure that all contracts for the procurement of Goods and Works contain appropriate representations, warranties and, if appropriate, indemnities from the contractor or supplier with respect to the matters referred to in subparagraph (a) of this paragraph.=	
<b>Not Yet Due</b> -	
5. LA, Sched. 4, para. 8 The Borrower shall ensure that all ADB-financed contracts with consultants contain appropriate representations, warranties and, if appropriate, indemnities from the consultants to ensure that the consulting services provided do not violate or infringe any	

## Project-Specific Covenants

industrial property or intellectual property right or claim of any third party. <b>Not Yet Due</b>	-	
6. LA, Sched. 5, para. 2 The PSC, headed by a vice minister of MARD, shall be established and comprise representatives of concerned departments of MARD, the Ministry of Planning and Investment, the Ministry of Finance, the State Bank of Vietnam, the Ministry of Science and Technology, the Ministry of Education and Training, and the Project provinces. <b>Ongoing</b>	<b>S</b>	The PSC is expected to be established by end May or early June 2007.
7. LA, Sched. 5, para. 6 MARD shall establish a committee, represented by the Science and Technology Council of MARD, other relevant government agencies, including agro-enterprises and associations, to examine and select research proposals to be funded under the Project on a competitive basis. <b>Not Yet Due</b>	-	
8. LA, Sched. 5, para. 7 The Borrower shall ensure that the following criteria will be applied for selecting such research proposals: (i) appropriateness to the client needs in the region through the results of participatory rural assessments; (ii) relevance to the national sector goals, strategies, and priorities; (iii) technical and financial viability and sustainability; (iv) linkage with agricultural extension and effective mechanisms for participatory technology development and information dissemination; (v) compliance with social and environmental requirements; (vi) involving at least one provincial agricultural extension center or extension advisory council; and (vii) not more than \$100,000 for each research proposal. <b>Not Yet Due</b>	-	
9. LA, Sched. 5, para. 8 The Borrower shall ensure that overseas study programs to be funded under the Project will be carried out in a manner acceptable to ADB. In particular, the Borrower shall ensure that appropriate arrangements are developed so that the trainees participating in the overseas study programs will provide relevant services after returning from the programs. Such arrangements shall be developed in consultation with ADB prior to the implementation of the study programs. The selection of the trainees shall be subject to ADB's approval. <b>Not Yet Due</b>	-	
10. LA, Sched. 5, para. 11 The Borrower shall ensure that the following criteria will be applied for the extension contracts financed under Component 2.2 as described in paragraph 2 of Schedule 1 to this Loan Agreement: (i) Extension contracts are in line with the provincial plan for agricultural extension in the respective province; (ii) they focus on the priority subjects included in the plan for improved knowledge and technology related to crop and livestock production and marketing; and (iii) each of the extension contracts shall cost up to the maximum of \$10,000. <b>Not Yet Due</b>	-	
<b>Overall Rating</b>	<b>S</b>	

## Problems/Remarks/Issues with Covenants

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## **REPORTING REQUIREMENTS**

### **A. Draft Format for Quarterly Progress Report**

#### **1. Executive Summary**

1. This section will summarize the events during the period under review, including (i) major events and progress relating to project implementation, (ii) status of major procurement and disbursement actions, (iii) implementation problems encountered, (iv) significant project impact noted and reported, and (v) other related matters. It will also include the summary of the activities planned for the next period for review. The Executive Summary needs to be concise and clearly focused on major points to be reported. The Executive Summary will be extremely important as it would form the basis for the reporting document to be submitted to the inter-ministerial Project Steering Committee of the Government and ADB.

#### **2. Status of Project Implementation**

##### **Important Events**

2. The important events to be reported include the relevant policy and institutional changes, personnel changes, budgetary matters, project issues, etc.

##### **Progress**

3. The project performance during the period under review needs to be presented in a summary table format by project component.

##### **Status of Disbursement**

4. The summary of the disbursements under the project needs to be reported with the contents, amount, supplier and procurement mode of the contract. The progress of disbursement and liquidation with ADB will be included in the report in a summarized form.

##### **Project Management**

5. One of the important purposes of the quarterly progress report is to identify management problems and issues to be resolved for effective project implementation. They will be stated in the report together with their cause and effect, and recommendations of the Central Project Management Unit and the Provincial Project Management Units for their resolution.

##### **Project Impact**

6. The format to be used by the field staff for monitoring and reporting needs to include sections for socioeconomic and environmental impacts (positive and negative) generated under the Project. Actual measures taken by the field staff to mitigate adverse impact or to enhance positive impact will also be described in detail. The Design and Monitoring Framework for the Project should be referred to in assessing the impact.

### **3. Other Matters**

7. This section will discuss other matters related to project activities. Any outstanding issues or problems will be highlighted together with the recommended measures for resolution. This report will facilitate discussions particularly at the meetings of the inter-ministerial Project Steering Committee and ADB's review missions.

### **4. Work Program for the Next Quarter**

8. The specific project activities planned for the next quarter, including major procurements and disbursements, required inputs and targets, etc. will be described in this section. Any implementation and managerial issues to be addressed immediately need to be highlighted.

## **B. Draft Format for the Project Completion Report**

### **1. Project Description**

- Project objectives
- Project scope
- Implementation arrangements
- Description and justifications for changes, if any, in the project scope, related policy and institutional issues, or implementation arrangements. The Design and Monitoring Framework for the Project should be referred to.

### **2. Project Implementation**

- Comparison between the original implementation arrangements and schedule, and the actual performance. Indicate areas, length and causes of delays, and remedial actions taken.
- Comparison between the cost estimates prepared during appraisal and the actual costs. Local currency costs incurred, appropriate exchange rates for their conversion into US dollars, and the foreign currency costs must be compiled accurately with reference to audited project accounts. Factors that contributed to any significant cost overruns or under-runs should be indicated.
- Statement of problems or difficulties encountered in the recruitment of consultants under the loan with reference to the ADB's procedures prescribed by ADB. The assessment of the consultant's performance, including the consultant's working relationship with the Executing Agency (EA), vis-à-vis the terms of reference for the assignments should be included.
- Statement of problems or difficulties encountered in the procurement and disbursement under the loan with reference to the ADB's procedures and requirements. The assessment of supplier's or contractor's performance vis-à-vis the terms of the contract should be included.
- Extent of compliance of the Borrower and the EA with loan covenants. Reasons for noncompliance or delays in compliance and the remedial actions taken should be highlighted.
- Reasons for any delays in loan utilization. Appropriateness of the disbursement methods used should be evaluated. Justification for the reallocation of loan proceeds, if any, should be included in the report.

### **3. Sustainability of Project Operations**

- Description of the status of project operations after completion. Problems encountered during the transitional period.
- Measures taken to ensure the sustainability of project operations with respect to management, staffing, budget, funding, maintenance, follow-up support, etc.
- Analysis of prospects of project benefits being realized.

### **4. Evaluation of ADB's Performance**

- Assessment of ADB's performance in supervising project implementation. This should include comments on the concept and design of the project. Effectiveness and timeliness of assistance extended by ADB to the solution of problems encountered during implementation.
- Comments on the ADB's guidelines, procedures and requirements. Problems encountered and measures taken to resolve these problems. Suggested changes in such procedures or requirements.

## SAMPLE AUDIT LETTER

ASIAN DEVELOPMENT BANK  
**Regional Department**  
 Sector Division / Regional or Resident Mission

[Date]<sup>1</sup>

[The Borrower]  
 Dear Sir or Madam:

Subject: **[Loan No. and Project Title]**  
**FINANCIAL REPORTING AND AUDITING REQUIREMENTS**

This letter is to ensure your timely compliance with the loan covenants and the quality of financial information as required by ADB. ADB's *Handbook for Borrowers on the Financial Governance and Management of Investment Projects Financed by the ADB* (the Booklet) is enclosed to guide you.

ADB, by its Charter, is required to ensure that the proceeds of any loan made, guaranteed, or participated in by ADB are used for the purposes for which the loan was approved. ADB requires accurate and timely financial information from its borrowers to be assured that expenditure was for the purposes stated in the loan agreement.

For this particular loan, the requirements are stipulated in sections \_\_\_\_\_<sup>2</sup> and \_\_\_\_\_<sup>3</sup> of the Loan Agreement of \_\_\_\_\_<sup>6</sup> between ADB and [the Borrower] and sections \_\_\_\_\_<sup>4</sup> and \_\_\_\_\_<sup>5</sup> of the Project Agreement<sup>7</sup> of \_\_\_\_\_ between ADB and [name of the EA]. Copies of the Loan/Project Agreements are enclosed for onward transmission by your office to your EA and the auditor(s), together with a copy of this letter.

The following are the main requirements:

- ADB requires the EA to maintain separate project accounts and records exclusively for the Project to ensure that the loan funds were used only for the objectives set out in the Loan or Project Agreements. The project accounts comprise the following:<sup>8</sup>

The first set of project accounts to be submitted to ADB covers the fiscal year ending \_\_\_\_\_. As stipulated in the Loan or Project Agreements, they are to be submitted up to \_\_\_\_\_ months after the end of the fiscal year. For this loan, the deadline is by \_\_\_\_\_. A sample report format with explanatory notes, is attached as Annex A.

- The accounts and records for the project are to be consistently maintained by using sound accounting principles. Please stipulate that your external auditor is to express an opinion on whether the financial report has been prepared using international or local generally accepted accounting standards and whether they have been applied consistently.

ADB prefers project accounts to use international accounting standards prescribed by the International Accounting Standards Committee. Please advise your external auditor to comment on the impact of any deviations, by [name of the Executing Agency] from international accounting standards.

Please ensure that your external auditor specifies in the Auditor's Report the appropriate auditing standards they used, and direct them to expand the scope of the paragraph in the Auditor's Report by disclosing the key audit procedures followed. Your external auditor is also to state whether the same audit procedures were followed for all supplementary financial statements submitted.

ADB wishes that auditors conform to the international auditing standards issued by the International Federation of Accountants. In cases where other auditing standards are used, request that your external auditor to indicate in the Auditor's Report the extent of any differences and their impact on the audit.

- The external auditor's opinion is also required on whether
  - the proceeds of the ADB's loan have been utilized only for the project as stated in the Loan Agreement;
  - the financial information contains data specifically agreed upon between [name of the Borrower or EA] and ADB to be included in the financial statements;
  - the financial information complies with relevant regulations and statutory requirements; and
  - compliance has been met with all the financial covenants contained in the Loan or Project Agreements.
- The Auditor's Report is to clearly state the reasons for any opinions that are qualified, adverse, or disclaimers.
- Actions on deficiencies disclosed by the external auditor in its report are to be resolved by [name of Borrower or Executing Agency] within a reasonable time. The external auditor is to comment in the subsequent Auditor's Report on the adequacy of the corrective measures taken by [name of Borrower or EA].

Compliance with these ADB requirements will be monitored by review missions and during normal project supervision, and followed up regularly with all concerned, including the external auditor.

Yours sincerely,

Director /  
Country Director  
(Sector Division/  
Regional or Resident Mission)

cc: (EA)  
(External auditor of the Borrower or EA)

- 1 The audit letter, with the loan and project agreements, is sent to the borrower when the auditor has been appointed or when the agreements are sent by the program department to the Ministry of Finance or other authority of the borrower.
- 2 Specify section no. in the loan agreement on maintaining project accounts and records.
- 3 Specify section no. in the loan agreement on the audit requirements.
- 4 Specify section no. in the project agreement on maintaining project accounts and records.
- 5 Specify section no. in the project agreement on the audit requirements.
- 6 If there is a project agreement.
- 7 When more than one project agreement, provide similar information.
- 8 Listed are standard accounts required from nonrevenue-earning entities. Try to identify specific titles of financial statements expected to be submitted by the Borrower and EAs. For revenue-earning entities, the submissions consist of the entities' audited financial statements. For nonrevenue-earning entities, the submissions consist of audited project accounts.

### LOAN COVENANTS

Reference in LA	Covenant	Responsibility	Status of Compliance
Sec 4.02 (a)	The Borrower shall (i) maintain, or cause to be maintained, separate accounts for the Project; (ii) have such accounts and related financial statements audited annually, in accordance with appropriate auditing standards consistently applied, by independent auditors whose qualifications, experience and terms of reference are acceptable to the Asian Development Bank (ADB); (iii) furnish to ADB, as soon as available but in any event not later than 6 months after the end of each related fiscal year, certified copies of such audited accounts and financial statements and the report of the auditors relating thereto (including the auditors' opinion on the use of the Loan proceeds and compliance with the financial covenants of this Loan Agreement as well as on the use of the procedures for imprest account/statement of expenditures), all in the English language; and (iv) furnish to ADB such other information concerning such accounts and financial statements and the audit thereof as ADB shall from time to time reasonably request.	Central Project Management Unit (CPMU), Provincial Project Management Units (PPMU), and Institute Project Management Units (IPMU)	Not yet due.
Sec 4.02 (b)	The Borrower shall enable ADB, upon ADB's request, to discuss the Borrower's financial statements for the Project and its financial affairs related to the Project from time to time with the auditors appointed by the Borrower pursuant to Section 4.02(a), and shall authorize and require any representative of such auditors to participate in any such discussions requested by ADB, provided that any such discussion shall be conducted only in the presence of an authorized officer of the Borrower unless the Borrower shall otherwise agree.	CPMU, PPMUs, and IPMUs	Not yet due.
Sec 4.03	The Borrower shall enable ADB's representatives to inspect the Project, the goods financed out of the proceeds of the Loan, and any relevant records and documents.	CPMU, PPMUs, and IPMUs	Not yet due.
Sched. 4, para. 7 (a)	The Borrower shall ensure that all Goods and Works procured (including without limitation all computer hardware, software and systems, whether separately procured or incorporated within other goods and services procured) do not violate or infringe any industrial property or intellectual property right or claim of any third party.	CPMU, PPMUs, and IPMUs	Not yet due.
Sched. 4, para. 7 (b)	The Borrower shall ensure that all contracts for the procurement of Goods and Works contain appropriate representations, warranties and, if appropriate, indemnities from the contractor or	CPMU, PPMUs, and IPMUs	Not yet due.

Reference in LA	Covenant	Responsibility	Status of Compliance
	supplier with respect to the matters referred to in subparagraph 7 (a) of Schedule 4.		
Sched. 5, para. 3	The Central Project Management Unit (CPMU), headed by a project director, shall be established in the Agricultural Project Management Board under MARD, and comprise a deputy head, a planning officer, a finance and accounting officer, a monitoring and evaluation officer, and other necessary supporting staff on a full-time basis. The CPMU shall be responsible for day-to-day Project implementation; interdepartmental coordination among MARD's concerned departments; central-level procurement, consultant recruitment, and fund disbursement; and provision of support to the Provincial Project Management Units (PPMUs).	MARD	The CPMU within MARD's Agricultural Projects Management Board was established on 9 March 2006 (Decision No. 561/QD-BNN-TCCB)
Sched. 5, para. 4	The PPMU, headed by a PPMU manager, shall be established under the provincial department of agriculture and rural development in each of the Project provinces, and comprise a planning officer, a monitoring and evaluation officer, an accountant, and other necessary supporting staff. The PPMU shall be responsible for (i) overall management and supervision of Project activities related to agricultural extension in the concerned province, including contractual arrangements for service delivery, finance and project accounting, procurement, monitoring and evaluation, and reporting, and (ii) provincial-level coordination among the relevant provincial departments. Each of the PPMUs shall have a meeting with the CPMU at least once every other month. Project implementation units may be established under participating research institutes, and technical and vocational training schools, if required and deemed appropriate, to facilitate the Borrower's decentralization policy for project implementation and management.	MARD, Provincial People's Committees (PPC)	Partially complied with. Four, out of five, PPCs have issued decisions on the establishment of PPMUs (Nghe An, Thanh Hoa, Ninh Thuan, and Quang Nam). MARD expects that establishment of all five PPMUs will be done by 15 May 2007.
Sched. 5, para. 2	The Project Steering Committee (PSC), headed by a vice minister of MARD, shall be established and comprise representatives of concerned departments of MARD, the Ministry of Planning and Investment, the Ministry of Finance, the State Bank of Vietnam, the Ministry of Science and Technology, the Ministry of Education and Training, and the Project provinces. The PSC shall be responsible for interministerial coordination and provision of overall policy guidance to the Project and shall endorse the Project annual work plans and budget. Representatives of farmers' associations and other Project's stakeholders shall participate in the PSC meetings as required.	MARD, MPI, MOF, SBV, MOST, and PPMUs	MARD expects to receive the nominations of representatives from the organizations by 8 May 2007 and will submit the list of members to the Minister on 15 May 2007 for approval.

Reference in LA	Covenant	Responsibility	Status of Compliance
Sched. 5, para. 5	The Borrower shall ensure that adequate counterpart staff and funds will be provided for operation and maintenance of the Project facilities upgraded in the selected agriculture research institutes, and further ensure that such institutes will provide adequate staff and funds for operation and maintenance after their transformation into self-financed organizations in accordance with the Borrower's Decree No. 115, issued in 2005.	SBV	Not yet due.
Sched. 5, para. 6	MARD shall establish a committee, represented by the Science and Technology Council of MARD, other relevant government agencies, universities, private sector organizations and agro-industries, to examine and select research proposals to be funded under the Project on a competitive basis.	MARD	
Sched. 5, para. 7	<p>The Borrower shall ensure that the following criteria will be applied for selecting such research proposals:</p> <ul style="list-style-type: none"> <li>(i) appropriateness to the client needs in the region through the results of participatory rural assessments;</li> <li>(ii) relevance to the national sector goals, strategies, and priorities;</li> <li>(iii) technical and financial viability and sustainability;</li> <li>(iv) linkage with agricultural extension and effective mechanisms for participatory technology development and information dissemination;</li> <li>(v) compliance with social and environmental requirements;</li> <li>(vi) involving at least one provincial agricultural extension center or extension advisory council; and</li> <li>(vii) not more than \$100,000 for each research proposal.</li> </ul>	MARD	Not yet due.
Sched. 5, para. 8	The Borrower shall ensure that overseas study programs to be funded under the Project will be carried out in a manner acceptable to ADB. In particular, the Borrower shall ensure that appropriate arrangements are developed so that the trainees participating in the overseas study programs will provide relevant services after returning from the programs. Such arrangements shall be developed in consultation with ADB prior to the implementation of the study programs. The selection of the trainees shall be subject to ADB's approval.	CPMU	Not yet due.
Sched. 5, para. 9	The Borrower shall ensure that at least 10% of the trainees are women.	CPMU	Not yet due.

Reference in LA	Covenant	Responsibility	Status of Compliance
Sched. 5, para. 10	The Borrower shall ensure that demonstration trials and extension services under the Project will be implemented in poor communes where at least 30% of households are classified as poor households, as defined by the Borrower's appropriate laws and regulations.	CPMU, and PPMUs	Not yet due.
Sched. 5, para. 11	The Borrower shall ensure that the following criteria will be applied for the extension contracts financed under Component 2.2 as described in paragraph 2 of Schedule 1 to the Loan Agreement: (i) Extension contracts are in line with the provincial plan for agricultural extension in the respective province; (ii) they focus on the priority subjects included in the plan for improved knowledge and technology related to crop and livestock production and marketing; and (iii) each of the extension contracts shall cost up to the maximum of \$10,000.	CPMU, and PPMUs	Not yet due.
Sched. 5, para. 12	The Borrower shall ensure that Project activities will be implemented in line with the Project's gender action plan, as agreed between the Borrower and ADB. In particular, the agreed gender action plan shall be reflected in the provincial plans for agricultural extension to be developed under the Project.	CPMU, PPMUs, and IPMUs	Not yet due.
Sched. 5, para. 13	The extension contracts to be funded under the Project shall have provisions that at least 40% of beneficiaries of these services are women. The contracts to be awarded in the final year of project implementation shall have provisions that at least 50% of beneficiaries are women.	CPMU, PPMUs, and IPMUs	Not yet due.
Sched. 5, para. 14	The Borrower shall ensure that Project activities will be implemented in line with the Project's specific actions for indigenous peoples, as agreed between the Borrower and ADB, and that the agreed specific actions for indigenous peoples will be reflected in the provincial plans for agricultural extension to be developed under the Project.	CPMU, and PPMUs	Not yet due.
Sched. 5, para. 16	The Borrower shall ensure that civil works to be financed under the Project will not require resettlement or land acquisition, as defined in ADB's Policy on Involuntary Resettlement. If, due to unforeseen circumstances, such resettlement or land acquisition is unavoidable, the Borrower shall (i) prepare a resettlement plan in accordance with ADB's Policy on Involuntary Resettlement; (ii) submit it to ADB for approval prior to awarding the concerned civil works contract; and (iii) ensure that any resettlement	CPMU	Being complied with. Civil works will be done on the existing compounds of technical and vocational training schools and will not require land acquisition.

Reference in LA	Covenant	Responsibility	Status of Compliance
	activities will be carried out in compliance with the resettlement plan.		
Sched. 5, para. 17	The Borrower shall ensure that (i) environmental impact assessments under Category II, as defined under the Borrower's laws and regulations, will be carried out during the design phase of all civil works, and (ii) the environmental monitoring plan for the Project will be effectively implemented.	CPMU	Not yet due.



## Supplementary Appendixes

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Project Number: 36304  
November 2006

### VIET NAM: Agriculture Science and Technology Project

Asian Development Bank

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## CHRONOLOGY AND PROJECT READINESS CRITERIA

### A. Chronology

1. The agriculture sector in Viet Nam has grown rapidly at an average rate of 4.1% per annum during 1995–2005. From a net importer of rice in the late 1980s, Viet Nam has become the second largest rice exporter in the world, and exports large quantities of commercial crops, including coffee, rubber, tea, pepper, groundnuts, and cashew nuts. Agriculture science and technology (AST) have played an important role in contributing to agricultural growth through improved agricultural inputs and technologies for farmers although the past efforts focused more on yield improvement rather than quality improvement.

2. More effective use of AST for technological changes is required to ensure food security and promote agricultural diversification, and to improve the quality of high-value crops and livestock and fishery products that are comparable with neighboring countries and trade competitors. This is essential in view of the rapid integration of Vietnamese agriculture into international markets through accession to the World Trade Organization and through bilateral and multilateral Free Trade Agreements.

3. Major policy and structural weaknesses in agricultural research, extension, rural training, and market information systems are being addressed under the Agriculture Sector Development Program (ASDP).<sup>1</sup> Reforms in these institutions will also require investments in human resources and infrastructure for improved AST. Such investment will enable them to contribute more significantly to agricultural growth in a changing global environment.

4. In March 2003, ADB assisted the Government in formulating a sector road map for AST in Viet Nam<sup>2</sup> based on dialogue with key policy makers and stakeholders in the sector. In line with the long-term development strategy of the Government, this road map called for (i) detailed analysis and inventory assessments focused on the AST systems in Viet Nam; (ii) increased emphasis on client-oriented research and extension; (iii) partnerships with the private sector, NGOs, and international agricultural research centers and service providers; and (iv) provision of comprehensive and quality services with increased focus on disadvantaged farm households. The road map also stressed the need for a wider consensus on the long-term objectives and strategy, and for investment in the upgrading of physical and human resources for AST. Based upon request from the Government, a project preparatory technical assistance (TA 4194)<sup>3</sup> was formulated in line with the road map and to prepare specific components of ADB's investment support for improved AST in Viet Nam.

5. The Consultants for the TA (Lincoln International, New Zealand) commenced their work in April 2004, and completed TA activities in March 2005 with the submission of their Final Report. Under the TA, stakeholder analysis and consultations were conducted in several ways, including participatory rural appraisals, focus group meetings, national and regional workshops, and market information surveys in different agro-ecological zones, including five project provinces in the central region for extension services.

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<sup>1</sup> ADB. 2002. *Report and Recommendation of the President to the Board of Directors on Proposed Loans to the Socialist Republic of Viet Nam for the Agriculture Sector Development Program*. Manila. (Loans 1972/1973–VIE) The loans were approved on 16 December 2002, and became effective on 23 October 2003. Two of the three tranches of the program loan have been disbursed.

<sup>2</sup> ADB. 2003. *Strategy and Road Map for Agriculture Science and Technology in Viet Nam*. Manila.

<sup>3</sup> ADB. 2003. *Technical Assistance to the Socialist Republic of Viet Nam for Preparing the Agriculture Science and Technology Project*. Manila. (TA 4194–VIE)

6. ADB's Loan Fact-finding Mission visited Viet Nam from 29 August to 9 September 2005 to agree on the objective, scope and implementation arrangements for the proposed Agriculture Science and Technology Project (the Project). The ADB Mission met with the representatives of the Government, external funding agencies, and civil society organizations, and also confirmed the progress of the ASDP program loan for the second tranche release.

7. In September 2005, there were important developments in the policy and institutional reforms in the national AST system in Viet Nam, including the Government's decision for reorganization of agricultural research institutes of MARD, and issuance of Decree No.115 for the autonomy of science and technology institutions. These important milestone events contributed to the significant progress of the ASDP program loan and to creating favorable environment for the proposed investment under the AST Project. Based on these achievements of the Government, the second tranche of the ASDP program loan was successfully released in December 2005.

## **B. Tentative Processing Schedule**

8. A Management Review Meeting (MRM) for the Project was organized on 3 March 2006. At the MRM, the Vice President (Operations 1) (i) endorsed the recommendation for the fielding of a Loan Appraisal Mission for the Project in March 2006, and (ii) instructed the Mission to fully take into account the comments and suggestions given at MRM and during the interdepartmental review, and to improve the presentation of the RRP. The Loan Appraisal Mission visited Viet Nam from 15–28 March 2006 to conduct a final review of the proposed Project.

9. The subsequent schedule for loan processing was as follows:

Staff Review Committee	8 June 2006
Loan Negotiations	29–30 June 2006
Board Circulation	20 November 2006
Board Approval	11 December 2006

## **C. Project Readiness Criteria**

<b>Status as of 15 November 2006</b>			
<b>Activities</b>	<b>Target Date</b>	<b>Current Status Anticipated Activities</b>	<b>Responsibility</b>
Central Project Management Unit	Prior to loan negotiations	Established on 9 March 2006	MARD
Provincial Project Management Units	Prior to loan effectiveness		MARD, DARD
Project Steering Committee	Prior to loan effectiveness		Government
Project implementation schedule	Appendix 7. Details to be prepared and finalized at project inception.		MARD
Project Administration Memorandum	Prior to project inception	First draft prepared and proposed to MARD during loan appraisal in March 2006.	MARD, ADB

<b>Activities</b>	<b>Target Date</b>	<b>Current Status Anticipated Activities</b>	<b>Responsibility</b>
Workshop on project implementation and procurement	At loan inception		MARD, ADB
Financial management system	At loan inception		MARD, ADB, MOF
Counterpart funds for the first-year program		Confirmed during loan negotiations in November 2006	MARD, ADB, MOF
Consultants:		RFP was drafted in July 2006.	MARD
• Shortlist	TBD		
• Request for proposals (RFP)	TBD		
• Recommendation for contract award	TBD		
Procurement:			
• Specification/Bidding documents	Second quarter in 2007		
• Bidding	TBD		
• Recommendations for contract award	TBD		
Auditing arrangements	TBD		

ADB = Asian Development Bank; DARD = (Provincial) Department of Agriculture and Rural Development; MARD = Ministry of Agriculture and Rural Development; MOF = Ministry of Finance; CPMU = central project management unit; PPMU = provincial project management unit; RFP = request for proposal; TBD = to be determined.  
Source: Asian Development Bank.

## DETAILED COST TABLES

Table B1: Components Project Cost Summary

Items	(Dong Million)			(US\$'000)			% Foreign Exchange	% Total Base Costs
	Local	Foreign	Total	Local	Foreign	Total		
1. Client-oriented Agricultural Research and Capacity Strengthening	115,085	135,490	250,574	7,228	8,510	15,738	54	44
2. Grassroot Agricultural Extension Improvement	98,854	25,258	124,112	6,209	1,586	7,795	20	22
3. Rural-based Technical and Vocational Training	59,709	84,310	144,019	3,750	5,295	9,045	59	25
4. Project Management Support	31,324	20,314	51,639	1,967	1,276	3,243	39	9
	304,973	265,372	570,344	19,154	16,667	35,821	47	100
Physical Contingencies	26,672	5,441	32,113	1,675	342	2,017	17	6
Price Contingencies	24,166	446	24,611	1,518	28	1,546	2	4
	355,811	271,259	627,069	22,347	17,037	39,384	43	110
Interest During Implementation	–	9,814	9,814	–	616	616	100	2
	<b>355,811</b>	<b>281,072</b>	<b>636,883</b>	<b>22,347</b>	<b>17,653</b>	<b>40,000</b>	<b>44</b>	<b>112</b>

**Table B2: Disbursement Accounts by Financiers**  
(\$'000)

Item	Asian Development Bank		The Government		Total		Foreign Exch.	Taxes)	Duties & Taxes
	Amount	%	Amount	%	Amount	%			
3. Civil Works	1,462	75.0	487	25.0	1,949	4.9	231	1,542	177
4. Equipment	7,804	75.4	2,550	24.6	10,354	25.9	7,752	1,659	943
5. Vehicles	36	50.0	36	50.0	73	0.2	23	13	36
6. Materials	2,589	75.0	863	25.0	3,452	8.6	543	2,595	314
8. Training	7,016	78.2	1,952	21.8	8,968	22.4	5,320	3,603	45
9. Research/Extension Contracts	8,688	78.3	2,401	21.7	11,090	27.7	2,016	8,065	1,008
11. Consulting Services	982	100.0	—	—	982	2.5	982	—	—
12. Incremental Staff	—	—	1,441	100.0	1,441	3.6	—	1,441	—
13. Operating Costs	807	75.0	269	25.0	1,076	2.7	170	807	98
	29,384	74.6	10,000	25.4	39,384	98.5	17,037	19,725	2,622
Interest During Implementation	616	100.0	—	—	616	1.5	—	—	—
	30,000	75.0	10,000	25.0	40,000	100.0	17,037	19,725	2,622

Table B3: Client-Oriented Research Programs

Item	Unit	Quantities						Unit Cost - Negotiation (US\$)	Base Cost - Negotiation (US\$ '000)						Totals Including Contingencies (US\$ '000)					
		2007	2008	2009	2010	2011	Total		2007	2008	2009	2010	2011	Total	2007	2008	2009	2010	2011	Total
I. Investment Costs																				
A. Proposals from Regional Research Institutes	lump	0.25	0.25	0.25	0.25	-	1	2,860,000	715	715	715	715	-	2,860	787	787	787	787	-	3,146
B. Proposals from Other Institutions /a	lump	0.25	0.25	0.25	0.25	-	1	2,640,000	660	660	660	660	-	2,640	726	726	726	726	-	2,904
Total									1,375	1,375	1,375	1,375	-	5,500	1,513	1,513	1,513	1,513	-	6,050

/a Including universities, enterprises and nongovernment organizations.

**Table B4: Training and Post-graduate Programs for Research Staff**

Detailed Costs		Quantities						Unit Cost - Negotiation (US\$)	Base Cost - Negotiation (US\$ '000)					Totals Including Contingencies (US\$ '000)						
Unit		2007	2008	2009	2010	2011	Total		2007	2008	2009	2010	2011	Total	2007	2008	2009	2010	2011	Total
I. Investment Costs																				
A. Overseas Training /a																				
1. Doctoral Studies																				
Overseas PhD Fees /b	study year	-	10	20	20	10	60	25,000	-	250	500	500	250	1,500	-	250	500	502	252	1,504
Overseas PhD Subsistence Allowance /c	study year	-	10	20	20	10	60	18,000	-	180	360	360	180	1,080	-	180	360	361	182	1,083
Overseas PhD Travel Expenses /d	study year	-	10	20	20	10	60	1,700	-	17	34	34	17	102	-	17	34	34	17	102
Subtotal Doctoral Studies									-	447	894	894	447	2,682	-	447	894	897	451	2,689
2. Master Studies																				
Overseas MSc/MPhil Fees /e	study year	-	8	8	7	7	30	25,000	-	200	200	175	175	750	-	200	200	176	177	752
Overseas MSc/MPhil Subsistence Allowance	study year	-	8	8	7	7	30	18,000	-	144	144	126	126	540	-	144	144	126	127	542
Overseas MSc/Mphil Travel	study year	-	8	8	7	7	30	1,700	-	14	14	12	12	51	-	14	14	12	12	51
Subtotal Master Studies									-	358	358	313	313	1,341	-	358	358	314	316	1,345
3. Overseas Postdoctoral Program																				
Overseas Postdoctoral Fees /f	study year	-	-	7	7	6	20	4,500	-	-	32	32	27	90	-	-	32	32	27	90
Overseas Postdoctoral Subsistence Allowance	study year	-	-	7	7	6	20	18,000	-	-	126	126	108	360	-	-	126	126	109	361
Overseas Postdoctoral Travel	study year	-	-	7	7	6	20	1,700	-	-	12	12	10	34	-	-	12	12	10	34
Subtotal Overseas Postdoctoral Program									-	-	169	169	145	484	-	-	169	170	147	486
Subtotal Overseas Training									-	805	1,421	1,376	905	4,507	-	805	1,421	1,380	913	4,519
B. Training for Existing Equipment																				
lumpsum		-	1	1	1	1	4	19,760	-	20	20	20	20	79	-	23	24	25	26	98
Total									-	824	1,441	1,396	925	4,586	-	828	1,445	1,405	939	4,617

/a Training costs are based on quoted fee rates and appropriate subsistence allowance costs.

/b Doctoral study is to be completed in three years.

/c Unaccompanied single status.

/d One economy class round trip per year.

/e Master study is to be completed in two years.

/f Postdoctoral program is to be completed in one year.

Table B5: Upgrading of Laboratory Equipment

Item	Unit	Quantities					Unit Cost - Negotiation (US\$)	Base Cost - Negotiation (US\$ '000)						Totals Including Contingencies (US\$ '000)						
		2007	2008	2009	2010	2011		Total	2007	2008	2009	2010	2011	Total	2007	2008	2009	2010	2011	Total
I. Investment Costs																				
A. Crops and Biotechnology																				
1. Cuu Long Rice Research Institute																				
Emission Spectrometer	unit	-	0.5	0.5	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	
Water Analysis Apparatus	unit	-	0.5	0.5	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	
Sensor for Liquid Electrophoresis	unit	-	0.5	0.5	-	-	1	88,660	-	44	44	-	-	89	-	45	45	-	-	
Sensor for Gas Chromatographer	unit	-	0.5	0.5	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	
Sample Storage Cabinet	unit	-	0.5	0.5	-	-	1	5,541.25	-	3	3	-	-	6	-	3	3	-	-	
Fermenter (2liter) with Sterilizing System	unit	-	0.5	0.5	-	-	1	25,168	-	13	13	-	-	25	-	15	15	-	-	
Shaking (horizontal)	unit	-	0.5	0.5	-	-	1	4,433	-	2	2	-	-	4	-	2	2	-	-	
Incubator	unit	-	0.5	0.5	-	-	1	7,203.625	-	4	4	-	-	7	-	4	4	-	-	
Incubation Chamber	unit	-	0.5	0.5	-	-	1	8,866	-	4	4	-	-	9	-	4	5	-	-	
Sterile Autoclave (150 liter)	unit	-	0.5	0.5	-	-	1	7,436	-	4	4	-	-	7	-	4	5	-	-	
Centrifuge (250 cc)	unit	-	0.5	0.5	-	-	1	22,165	-	11	11	-	-	22	-	11	11	-	-	
Seed Preservation Chamber (-4C)	unit	-	0.5	0.5	-	-	1	16,623.75	-	8	8	-	-	17	-	8	8	-	-	
PCR (Polymerase Chain Reaction) 96Wells	unit	-	0.5	0.5	-	-	1	13,728	-	7	7	-	-	14	-	8	8	-	-	
Automated Sequencing System	unit	-	0.5	0.5	-	-	1	132,990	-	66	66	-	-	133	-	67	68	-	-	
Electrophoresis (Vertical)	unit	-	0.5	0.5	-	-	1	2,770.625	-	1	1	-	-	3	-	1	1	-	-	
Electrophoresis (horizontal)	unit	-	0.5	0.5	-	-	1	2,770.625	-	1	1	-	-	3	-	1	1	-	-	
ADN Micro Array, Gybridization, Scanner and Spares	unit	-	0.5	0.5	-	-	1	205,920	-	103	103	-	-	206	-	120	125	-	-	
Specimen Cutting Appratus	unit	-	0.5	0.5	-	-	1	6,864	-	3	3	-	-	7	-	4	4	-	-	
Living Cell Counter	unit	-	0.5	0.5	-	-	1	4,433	-	2	2	-	-	4	-	2	2	-	-	
Cell Measuring Apparatus	unit	-	0.5	0.5	-	-	1	5,720	-	3	3	-	-	6	-	3	3	-	-	
Electron Scanning Microscope	unit	-	0.5	0.5	-	-	1	55,412.5	-	28	28	-	-	55	-	28	28	-	-	
Fluorescent Spectrometer	unit	-	0.5	0.5	-	-	1	16,623.75	-	8	8	-	-	17	-	8	8	-	-	
Subtotal Cuu Long Rice Research Institute								-	317	317	-	-	633	-	341	349	-	-	690	
2. Viet Nam Academy of Agricultural Science																				
a. Crop Breeding at Former FCRI (Food Crops Research Institute)																				
Electron Scale	unit	-	0.5	0.5	-	-	1	2,402.4	-	1	1	-	-	2	-	1	1	-	-	
Microscope	unit	-	0.5	0.5	-	-	1	11,082.5	-	6	6	-	-	11	-	6	6	-	-	
Electron Palma Meter Stick	unit	-	3	-	-	-	3	171.6	-	1	-	-	-	1	-	1	-	-	-	
Amyrose Dosing Apparatus	unit	-	0.5	0.5	-	-	1	40,040	-	20	20	-	-	40	-	23	24	-	-	
Male Sterilizing Appratus	unit	-	0.5	0.5	-	-	1	1,716	-	1	1	-	-	2	-	1	1	-	-	
Pollination Machine	unit	-	2	-	-	-	2	221.65	-	0	-	-	-	0	-	0	-	-	0	
Seed Collecting Machine	unit	-	2	-	-	-	2	443.3	-	1	-	-	-	1	-	1	-	-	-	
Brix Meter	unit	-	2	-	-	-	2	664.95	-	1	-	-	-	1	-	1	-	-	-	
Desiccator	unit	-	1	1	-	-	2	2,770.625	-	3	3	-	-	6	-	3	3	-	-	
Magnifier	unit	-	2	-	-	-	2	332.475	-	1	-	-	-	1	-	1	-	-	-	
Vacuum Seed Packing Machine	unit	-	0.5	0.5	-	-	1	33,247.5	-	17	17	-	-	33	-	17	17	-	-	
Freezers	unit	-	1	1	-	-	2	1,108.25	-	1	1	-	-	2	-	1	1	-	-	
Nitrate Content Meter	unit	-	0.5	0.5	-	-	1	22,165	-	11	11	-	-	22	-	11	11	-	-	
Leaf Area Measuring Set	set	-	0.5	0.5	-	-	1	13,728	-	7	7	-	-	14	-	8	8	-	-	
Grass Cutter	unit	-	2	-	-	-	2	343.2	-	1	-	-	-	1	-	1	-	-	-	
Digital Camera	unit	-	0.5	0.5	-	-	1	554.125	-	0	0	-	-	1	-	0	0	-	-	
Shelves for Specimen Containers	unit	-	5	-	-	-	5	171.6	-	1	-	-	-	1	-	1	-	-	-	
Trays	unit	-	50	50	-	-	100	11.44	-	1	1	-	-	1	-	1	1	-	-	
Subtotal Crop Breeding at Former FCRI (Food Crops Research Institute)								-	72	67	-	-	139	-	78	74	-	-	152	

Supplementary Appendix B

b. Upgrading Experimental Field Station at Forme																				
Electricity Water Supply System	unit	-	1	1	-	-	2	55,412.5	-	55	55	-	-	111	-	56	57	-	-	113
Pumping Machine	unit	-	2	-	-	-	2	554.125	-	1	-	-	-	1	-	1	-	-	-	1
Greenhouse	unit	-	0.5	0.5	-	-	1	18,348	-	9	9	-	-	18	-	11	11	-	-	22
Husking and Polishing Machine	unit	-	0.5	0.5	-	-	1	20,502.625	-	10	10	-	-	21	-	10	10	-	-	21
Grain Sorting Machine	unit	-	0.5	0.5	-	-	1	5,541.25	-	3	3	-	-	6	-	3	3	-	-	6
Soil Moisture Test Apparatus	unit	-	2	-	-	-	2	572	-	1	-	-	-	1	-	1	-	-	-	1
Electric Balance	unit	-	1	1	-	-	2	2,860	-	3	3	-	-	6	-	3	3	-	-	7
Tractor	unit	-	0.5	0.5	-	-	1	11,082.5	-	6	6	-	-	11	-	6	6	-	-	11
Plough	unit	-	1	1	-	-	2	11,440	-	11	11	-	-	23	-	13	14	-	-	27
Pesticide Sprayers	unit	-	2	-	-	-	2	775.775	-	2	-	-	-	2	-	2	-	-	-	2
Computers	unit	-	5	5	-	-	10	1,108.25	-	6	6	-	-	11	-	6	6	-	-	11
Multi Media Projector	unit	-	0.5	0.5	-	-	1	4,433	-	2	2	-	-	4	-	2	2	-	-	5
Subtotal Upgrading Experimental Field Station at									-	109	105	-	-	214	-	114	112	-	-	226
c. Science and Technology Transfer Programme :																				
Laptop Computers	unit	-	0.5	0.5	-	-	1	2,216.5	-	1	1	-	-	2	-	1	1	-	-	2
Multi Media Projector	unit	-	0.5	0.5	-	-	1	4,433	-	2	2	-	-	4	-	2	2	-	-	5
Digital Camera	unit	-	0.5	0.5	-	-	1	1,108.25	-	1	1	-	-	1	-	1	1	-	-	1
Screen	unit	-	0.5	0.5	-	-	1	554.125	-	0	0	-	-	1	-	0	0	-	-	1
Subtotal Science and Technology Transfer Progr									-	4	4	-	-	8	-	4	4	-	-	8
Subtotal Viet Nam Academy of Agricultural Science									-	185	176	-	-	362	-	196	190	-	-	387
3. Institute of Agricultural Science of Southern Viet																				
a. Seed Variety and Testing Laboratory																				
Analyzer Weight	unit	-	0.5	0.5	-	-	1	1,108.25	-	1	1	-	-	1	-	1	1	-	-	1
Seed Counter	unit	-	0.5	0.5	-	-	1	743.6	-	0	0	-	-	1	-	0	0	-	-	1
Oven	unit	-	0.5	0.5	-	-	1	1,440.725	-	1	1	-	-	1	-	1	1	-	-	1
Humidity Meter	unit	-	1	1	-	-	2	110.825	-	0	0	-	-	0	-	0	0	-	-	0
Technical Scale	unit	-	1	1	1	-	3	720.362	-	1	1	1	-	2	-	1	1	1	-	2
Rice Husking Machine	unit	-	0.5	0.5	-	-	1	1,108.25	-	1	1	-	-	1	-	1	1	-	-	1
Rice Polisher	unit	-	0.5	0.5	-	-	1	1,108.25	-	1	1	-	-	1	-	1	1	-	-	1
Weights (5kg-50kg)	unit	-	2	2	-	-	4	3,879	-	0	0	-	-	0	-	0	0	-	-	0
Small Seed Jars	unit	-	15	15	-	-	30	4,004	-	0	0	-	-	0	-	0	0	-	-	0
Microscope	unit	-	1	1	-	-	2	720.363	-	1	1	-	-	1	-	1	1	-	-	1
Desiccator	unit	-	1	1	-	-	2	35,464	-	0	0	-	-	0	-	0	0	-	-	0
Seed Preservation Chamber	unit	-	0.5	0.5	-	-	1	1,773.2	-	1	1	-	-	2	-	1	1	-	-	2
Hand-held Counting Equipment	unit	-	0.5	0.5	-	-	1	144.073	-	0	0	-	-	0	-	0	0	-	-	0
Specimen Divider	unit	-	0.5	0.5	-	-	1	2,574	-	1	1	-	-	3	-	2	2	-	-	3
Quick Humidity Meter	unit	-	0.5	0.5	-	-	1	1,440.725	-	1	1	-	-	1	-	1	1	-	-	1
Specimen Oven	unit	-	0.5	0.5	-	-	1	1,440.725	-	1	1	-	-	1	-	1	1	-	-	1
Seed Grinder	unit	-	0.5	0.5	-	-	1	1,440.725	-	1	1	-	-	1	-	1	1	-	-	1
Specimen Drying Box	unit	-	10	10	-	-	20	148.72	-	1	1	-	-	3	-	2	2	-	-	4
Analyzing Weight	unit	-	0.5	0.5	-	-	1	1,108.25	-	1	1	-	-	1	-	1	1	-	-	1
Magnifier	unit	-	2	3	-	-	5	22.165	-	0	0	-	-	0	-	0	0	-	-	0
Specimen Container	unit	-	0.5	0.5	-	-	1	286	-	0	0	-	-	0	-	0	0	-	-	0
Air Conditioner	unit	-	0.5	0.5	-	-	1	1,219.075	-	1	1	-	-	1	-	1	1	-	-	1
Specimen Containing Shelf	unit	-	0.5	0.5	-	-	1	457.6	-	0	0	-	-	0	-	0	0	-	-	1
Soft Paper	unit	-	0.5	0.5	-	-	1	743.6	-	0	0	-	-	1	-	0	0	-	-	1
Petri Dishes	unit	-	50	50	-	-	100	1,441	-	0	0	-	-	0	-	0	0	-	-	0
Subtotal Seed Variety and Testing Laboratory									-	12	12	1	-	25	-	13	13	1	-	27
b. Seed Multiplication Facility																				
Ploughing, Racking Machine	unit	-	0.5	0.5	-	-	1	11,082.5	-	6	6	-	-	11	-	6	6	-	-	11
Paddy Plucker	unit	-	0.5	0.5	-	-	1	1,108.25	-	1	1	-	-	1	-	1	1	-	-	1
Cleaner/Divider of Seed Variety CL2	unit	-	0.5	0.5	-	-	1	3,324.75	-	2	2	-	-	3	-	2	2	-	-	3
Seed Variety Drier (8t)	unit	-	0.5	0.5	-	-	1	3,324.75	-	2	2	-	-	3	-	2	2	-	-	3
Subtotal Seed Multiplication Facility									-	9	9	-	-	19	-	10	10	-	-	19

**c. Soil and Plant Analysis**

EC Meter	unit	-	1	2	-	-	3	720.362	-	1	1	-	-	2	-	1	1	-	-	2
Salt Meter	unit	-	1	1	-	-	2	720.363	-	1	1	-	-	1	-	1	1	-	-	1
pH Meter	unit	-	2	2	-	-	4	720.363	-	1	1	-	-	3	-	1	1	-	-	3
Colorimeter	unit	-	0.5	0.5	-	-	1	5,541.25	-	3	3	-	-	6	-	3	3	-	-	6
Electrode Deoxidizer	unit	-	2	2	-	-	4	249.356	-	0	0	-	-	1	-	1	1	-	-	1
Water Distiller	unit	-	0.5	0.5	-	-	1	2,216.5	-	1	1	-	-	2	-	1	1	-	-	2
Specimen Grinder	unit	-	0.5	0.5	-	-	1	1,440.725	-	1	1	-	-	1	-	1	1	-	-	1
Kjeldal Set	unit	-	0.5	0.5	-	-	1	4,004	-	2	2	-	-	4	-	2	2	-	-	5
Specimen Reverter	unit	-	0.5	0.5	-	-	1	1,884.025	-	1	1	-	-	2	-	1	1	-	-	2
Horizontal Shaker	unit	-	0.5	0.5	-	-	1	400.4	-	0	0	-	-	0	-	0	0	-	-	0
Centrifuger	unit	-	0.5	0.5	-	-	1	1,108.25	-	1	1	-	-	1	-	1	1	-	-	1
Laboratory Glassware	lump	-	0.25	0.25	0.25	0.25	1	1,430	-	0	0	0	0	1	-	0	0	0	0	2
Chemical Materials	lump	-	0.25	0.25	0.25	0.25	1	4,004	-	1	1	1	1	4	-	1	1	1	1	5
Refrigerator	unit	-	0.5	0.5	-	-	1	443.3	-	0	0	-	-	0	-	0	0	-	-	0
Oven	unit	-	0.5	0.5	-	-	1	1,496.137	-	1	1	-	-	1	-	1	1	-	-	2
Technical Scale	unit	-	0.5	0.5	-	-	1	720.363	-	0	0	-	-	1	-	0	0	-	-	1
Analyzing Weight	unit	-	0.5	0.5	-	-	1	1,662.375	-	1	1	-	-	2	-	1	1	-	-	2
<b>Subtotal Soil and Plant Analysis</b>									-	15	16	1	1	34	-	16	17	2	2	36

**d. Plant Protection and Animal Health**

Microscope	unit	-	0.5	0.5	-	-	1	3,324.75	-	2	2	-	-	3	-	2	2	-	-	3
Magnifier	unit	-	1	1	-	-	2	1,108.25	-	1	1	-	-	2	-	1	1	-	-	2
Bacteria Counter	unit	-	5	5	-	-	10	387.888	-	2	2	-	-	4	-	2	2	-	-	4
Other Small Instruments	unit	-	0.5	0.5	-	-	1	85.8	-	0	0	-	-	0	-	0	0	-	-	0
Electric Cooker	unit	-	0.5	0.5	-	-	1	6,372.438	-	3	3	-	-	6	-	3	3	-	-	6
Autoclave	unit	-	0.5	0.5	-	-	1	85.8	-	0	0	-	-	0	-	0	0	-	-	0
Thermostat	unit	-	0.5	0.5	-	-	1	1,052.838	-	1	1	-	-	1	-	1	1	-	-	1
Sterile Incubator	unit	-	0.5	0.5	-	-	1	1,108.25	-	1	1	-	-	1	-	1	1	-	-	1
Refrigerator (Large)	unit	-	0.5	0.5	-	-	1	2,216.5	-	1	1	-	-	2	-	1	1	-	-	2
Oven	unit	-	0.5	0.5	-	-	1	443.3	-	0	0	-	-	0	-	0	0	-	-	0
Refrigerator (Small)	unit	-	0.5	0.5	-	-	1	387.888	-	0	0	-	-	0	-	0	0	-	-	0
Instrument Steaming	unit	-	0.5	0.5	-	-	1	1,108.25	-	1	1	-	-	1	-	1	1	-	-	1
Microscope	unit	-	0.5	0.5	-	-	1	1,108.25	-	1	1	-	-	1	-	1	1	-	-	1
pH Meter	unit	-	0.5	0.5	-	-	1	299.228	-	0	0	-	-	0	-	0	0	-	-	0
Water Distiller	unit	-	0.5	0.5	-	-	1	387.888	-	0	0	-	-	0	-	0	0	-	-	0
Analyzing Weight	unit	-	0.5	0.5	-	-	1	1,108.25	-	1	1	-	-	1	-	1	1	-	-	1
Fat Density Apparatus	unit	-	0.5	0.5	-	-	1	743.6	-	0	0	-	-	1	-	0	0	-	-	1
Embryo Inspector	unit	-	0.5	0.5	-	-	1	1,108.25	-	1	1	-	-	1	-	1	1	-	-	1
Sperm Shooting Gun	unit	-	0.5	0.5	-	-	1	720.363	-	0	0	-	-	1	-	0	0	-	-	1
Frozen Sperm Preserver	unit	-	0.5	0.5	-	-	1	1,496.137	-	1	1	-	-	1	-	1	1	-	-	2
Petri Dishes	unit	-	50	50	-	-	100	1.716	-	0	0	-	-	0	-	0	0	-	-	0
<b>Subtotal Plant Protection and Animal Health</b>									-	15	15	-	-	29	-	15	15	-	-	30

**Subtotal Institute of Agricultural Science of Southern****4. Southern Fruit Research Institute****a. Post-Harvest Handling**

Cool Storage	unit	-	2	2	-	-	4	5,541.25	-	11	11	-	-	22	-	11	11	-	-	23
Controlled Atmosphere Packing Machine	unit	-	0.5	0.5	-	-	1	36,572.25	-	18	18	-	-	37	-	19	19	-	-	37
<b>Subtotal Post-Harvest Handling</b>									-	29	29	-	-	59	-	30	30	-	-	60

b. Plant Breeding and Cultivation																				
Chlorophyl Measuring Apparatus	unit	-	0.5	0.5	-	-	1	2,288	-	1	1	-	-	2	-	1	1	-	-	3
Photosynthesis Measuring Apparatus	unit	-	0.5	0.5	-	-	1	14,872	-	7	7	-	-	15	-	9	9	-	-	18
Vibrating Sieve for Soil Analysis	unit	-	0.5	0.5	-	-	1	1,716	-	1	1	-	-	2	-	1	1	-	-	2
Polypliod Measuring Machine	unit	-	0.5	0.5	-	-	1	49,871.25	-	25	25	-	-	50	-	25	25	-	-	51
Microscope (2000-5000 magnification)	unit	-	0.5	0.5	-	-	1	3,324.75	-	2	2	-	-	3	-	2	2	-	-	3
Microscope/Magnifier (30-40 times)	unit	-	0.5	0.5	-	-	1	609.537	-	0	0	-	-	1	-	0	0	-	-	1
Ph Meter	unit	-	0.5	0.5	-	-	1	775.775	-	0	0	-	-	1	-	0	0	-	-	1
Desktop Computer	unit	-	0.5	0.5	-	-	1	1,108.25	-	1	1	-	-	1	-	1	1	-	-	1
PCR Machine for Molecular Multiplication	unit	-	0.5	0.5	-	-	1	8,588.938	-	4	4	-	-	9	-	4	4	-	-	9
ELISA Reading Machine	unit	-	0.5	0.5	-	-	1	12,467.813	-	6	6	-	-	12	-	6	6	-	-	13
Subtotal Plant Breeding and Cultivation									-	48	48	-	-	96	-	50	51	-	-	100
c. Biotechnology Division																				
Controlled Temperature Vidrator for Cell Incubation	unit	-	0.5	0.5	-	-	1	10,251.313	-	5	5	-	-	10	-	5	5	-	-	10
Pipette Washing Machine	unit	-	0.5	0.5	-	-	1	1,994.85	-	1	1	-	-	2	-	1	1	-	-	2
Autoclave	unit	-	0.5	0.5	-	-	1	755.04	-	0	0	-	-	1	-	0	0	-	-	1
Vacuum Centrifuge for DNA Drying	unit	-	0.5	0.5	-	-	1	4,820.888	-	2	2	-	-	5	-	2	2	-	-	5
Cool Centrifuge for Biochemical Analysis	unit	-	0.5	0.5	-	-	1	6,427.85	-	3	3	-	-	6	-	3	3	-	-	7
Spectrophotometer for DNA, RNA and Protein Ana	unit	-	0.5	0.5	-	-	1	7,757.75	-	4	4	-	-	8	-	4	4	-	-	8
Vertical Electrophoresis & Power Supply	unit	-	0.5	0.5	-	-	1	1,828.613	-	1	1	-	-	2	-	1	1	-	-	2
Trans-blot SD-dry Transfer Cell	unit	-	0.5	0.5	-	-	1	4,543.825	-	2	2	-	-	5	-	2	2	-	-	5
Subtotal Biotechnology Division									-	19	19	-	-	38	-	19	20	-	-	39
Subtotal Southern Fruit Research Institute									-	96	96	-	-	193	-	99	100	-	-	199
Subtotal Crops and Biotechnology									-	650	642	2	1	1,295	-	690	695	2	2	1,389
B. Livestock and Biotechnology																				
1. Institute of Agricultural Science of Southern Viet																				
a. Livestock Environment Laboratory																				
Microorganism Oven	unit	-	0.5	0.5	-	-	1	4,433	-	2	2	-	-	4	-	2	2	-	-	5
Bacterium Counter	unit	-	0.5	0.5	-	-	1	3,657.225	-	2	2	-	-	4	-	2	2	-	-	4
Microorganism Incubator	unit	-	1	1	-	-	2	2,604.388	-	3	3	-	-	5	-	3	3	-	-	5
Autoclave	unit	-	0.5	0.5	-	-	1	1,144	-	1	1	-	-	1	-	1	1	-	-	1
Microorganism Filter	unit	-	0.5	0.5	-	-	1	2,288	-	1	1	-	-	2	-	1	1	-	-	3
Microscope	unit	-	0.5	0.5	-	-	1	4,433	-	2	2	-	-	4	-	2	2	-	-	5
Combined Electrical Conductivity and pH Meter	unit	-	0.5	0.5	-	-	1	1,329.9	-	1	1	-	-	1	-	1	1	-	-	1
pH Meter	unit	-	0.5	0.5	-	-	1	365.723	-	0	0	-	-	0	-	0	0	-	-	0
Dissolved Oxygen Apparatus	unit	-	0.5	0.5	-	-	1	686.4	-	0	0	-	-	1	-	0	0	-	-	1
pH and Soil Moisture Meter	unit	-	0.5	0.5	-	-	1	886.6	-	0	0	-	-	1	-	0	0	-	-	1
Deoxidizer Meter	unit	-	0.5	0.5	-	-	1	748.069	-	0	0	-	-	1	-	0	0	-	-	1
Dissolved Solid Apparatus	unit	-	0.5	0.5	-	-	1	543.4	-	0	0	-	-	1	-	0	0	-	-	1
Gas Chromatograph	unit	-	0.5	0.5	-	-	1	22,165	-	11	11	-	-	22	-	11	11	-	-	23
Microwave Washing Tank	unit	-	0.5	0.5	-	-	1	8,145.638	-	4	4	-	-	8	-	4	4	-	-	8
Salt Apparatus	unit	-	0.5	0.5	-	-	1	2,288	-	1	1	-	-	2	-	1	1	-	-	3
Heat and Humidity Meter	unit	-	0.5	0.5	-	-	1	1,496.137	-	1	1	-	-	1	-	1	1	-	-	2
Gas Pump	unit	-	0.5	0.5	-	-	1	748.069	-	0	0	-	-	1	-	0	0	-	-	1
Ozone Scourer	unit	-	0.5	0.5	-	-	1	2,604.388	-	1	1	-	-	3	-	1	1	-	-	3
Analyzer N-Kjendal	unit	-	0.5	0.5	-	-	1	4,045.113	-	2	2	-	-	4	-	2	2	-	-	4
Centrifuge	unit	-	0.5	0.5	-	-	1	4,045.113	-	2	2	-	-	4	-	2	2	-	-	4
Centrifugal Grinder	unit	-	0.5	0.5	-	-	1	3,324.75	-	2	2	-	-	3	-	2	2	-	-	3

Motorized Sieve	unit	-	0.5	0.5	-	-	1	12,183.6	-	6	6	-	-	12	-	7	7	-	-	15
Speedometer	unit	-	0.5	0.5	-	-	1	1,108.25	-	1	1	-	-	1	-	1	1	-	-	1
Hotplate Stirrer	unit	-	0.5	0.5	-	-	1	1,144	-	1	1	-	-	1	-	1	1	-	-	1
3 Sides Shaker	unit	-	0.5	0.5	-	-	1	5,720	-	3	3	-	-	6	-	3	3	-	-	7
Test-tube Shaker	unit	-	0.5	0.5	-	-	1	2,688.4	-	1	1	-	-	3	-	2	2	-	-	3
Mud Specimen Gauge	unit	-	0.5	0.5	-	-	1	915.2	-	0	0	-	-	1	-	1	1	-	-	1
Hydrogen Generator	unit	-	0.5	0.5	-	-	1	5,929.138	-	3	3	-	-	6	-	3	3	-	-	6
Nitrogen Generator	unit	-	0.5	0.5	-	-	1	9,586.363	-	5	5	-	-	10	-	5	5	-	-	10
Waste Gas Treatment Model	unit	-	0.5	0.5	-	-	1	9,895.6	-	5	5	-	-	10	-	6	6	-	-	12
Aerobic Wastewater Disposal Model	unit	-	0.5	0.5	-	-	1	11,440	-	6	6	-	-	11	-	7	7	-	-	14
Aerobic Microorganism Tank Model	unit	-	0.5	0.5	-	-	1	9,152	-	5	5	-	-	9	-	5	6	-	-	11
UASB Model	unit	-	0.5	0.5	-	-	1	6,120.4	-	3	3	-	-	6	-	4	4	-	-	7
Static Deposition Model	unit	-	0.5	0.5	-	-	1	2,216.5	-	1	1	-	-	2	-	1	1	-	-	2
Active Mud Model	unit	-	0.5	0.5	-	-	1	2,688.4	-	1	1	-	-	3	-	2	2	-	-	3
<b>Subtotal Livestock Environment Laboratory</b>									-	78	78	-	-	155	-	84	86	-	-	170
<b>b. Meat Quality Laboratory</b>																				
pH Meter	unit	-	0.5	0.5	-	-	1	1,108.25	-	1	1	-	-	1	-	1	1	-	-	1
Colorimeter	unit	-	0.5	0.5	-	-	1	7,757.75	-	4	4	-	-	8	-	4	4	-	-	8
Meat Water Retention Meter	unit	-	0.5	0.5	-	-	1	609.537	-	0	0	-	-	1	-	0	0	-	-	1
Deep Freeze (150l)	unit	-	0.5	0.5	-	-	1	1,496.137	-	1	1	-	-	1	-	1	1	-	-	2
Refrigerator (150l)	unit	-	0.5	0.5	-	-	1	609.537	-	0	0	-	-	1	-	0	0	-	-	1
<b>Subtotal Meat Quality Laboratory</b>									-	6	6	-	-	12	-	6	6	-	-	12
<b>c. Semen Quality Laboratory</b>																				
Microscope	unit	-	1	1	-	-	2	1,108.25	-	1	1	-	-	2	-	1	1	-	-	2
Sperm Concentration Definer	unit	-	1	1	-	-	2	2,936.863	-	3	3	-	-	6	-	3	3	-	-	6
pH Meter	unit	-	1	1	-	-	2	664.95	-	1	1	-	-	1	-	1	1	-	-	1
Semen Packing Machine	unit	-	0.5	0.5	-	-	1	11,802.863	-	6	6	-	-	12	-	6	6	-	-	12
Package Labelling Machine	unit	-	0.5	0.5	-	-	1	2,216.5	-	1	1	-	-	2	-	1	1	-	-	2
Pig Breeding Laboratory	unit	-	1	1	-	-	2	2,216.5	-	2	2	-	-	4	-	2	2	-	-	5
Pig Lean Meat Meter	unit	-	0.5	0.5	-	-	1	2,216.5	-	1	1	-	-	2	-	1	1	-	-	2
<b>Subtotal Semen Quality Laboratory</b>									-	15	15	-	-	30	-	15	15	-	-	31
<b>Subtotal Institute of Agricultural Science of Southern</b>									-	99	99	-	-	197	-	105	107	-	-	212
<b>C. Post-harvest Technology</b>																				
<b>1. Viet Nam Academy of Agriculture Science</b>																				
<b>a. Processing and Multiplication at Former Tea Research</b>																				
Fresh Tea Classification Screening	unit	-	0.5	0.5	-	-	1	1,440.725	-	1	1	-	-	1	-	1	1	-	-	1
Continuous Fermentation Apparatus	unit	-	0.5	0.5	-	-	1	6,006	-	3	3	-	-	6	-	4	4	-	-	7
Multipurpose Special Tea Processing Machine	unit	-	0.5	0.5	-	-	1	609.537	-	0	0	-	-	1	-	0	0	-	-	1
Crumpling Machine	unit	-	1	1	1	-	3	365.723	-	0	0	0	-	1	-	0	0	0	-	1
Fresh Special Tea Screener	unit	-	0.5	0.5	-	-	1	886.6	-	0	0	-	-	1	-	0	0	-	-	1
Continuous Dryer	unit	-	0.5	0.5	-	-	1	12,744.875	-	6	6	-	-	13	-	6	7	-	-	13
Dryer	unit	-	1	1	1	-	3	5,873.725	-	6	6	6	-	18	-	6	6	6	-	18
Incense Creator	unit	-	1	1	1	-	3	720.362	-	1	1	1	-	2	-	1	1	1	-	2
Screener	unit	-	0.5	0.5	-	-	1	2,216.5	-	1	1	-	-	2	-	1	1	-	-	2
Shaking Screener	unit	-	0.5	0.5	-	-	1	2,548.975	-	1	1	-	-	3	-	1	1	-	-	3
Separator	unit	-	0.5	0.5	-	-	1	1,496.137	-	1	1	-	-	1	-	1	1	-	-	2
Levelling Distributor	unit	-	0.5	0.5	-	-	1	1,496.137	-	1	1	-	-	1	-	1	1	-	-	2
Tea Bag Packing Machine	unit	-	0.5	0.5	-	-	1	80,902.25	-	40	40	-	-	81	-	41	41	-	-	82
Tea Grinder	unit	-	0.5	0.5	-	-	1	132.99	-	0	0	-	-	0	-	0	0	-	-	0
Versatile Meter	unit	-	0.5	0.5	-	-	1	886.6	-	0	0	-	-	1	-	0	0	-	-	1
Visual Colorimeter	unit	-	0.5	0.5	-	-	1	3,768.05	-	2	2	-	-	4	-	2	2	-	-	4

Desktop Computer	unit	-	1	1	1	-	3	1,108.25	-	1	1	1	-	3	-	1	1	1	-	3
Printers	unit	-	1	1	1	-	3	554.125	-	1	1	1	-	2	-	1	1	1	-	2
Air Conditioner	unit	-	0.5	0.5	-	-	1	1,219.075	-	1	1	-	-	1	-	1	1	-	-	1
Technical Scale	unit	-	0.5	0.5	-	-	1	609.537	-	0	0	-	-	1	-	0	0	-	-	1
Refrigerator 2201	unit	-	0.5	0.5	-	-	1	720.363	-	0	0	-	-	1	-	0	0	-	-	1
Specimen Chamber	unit	-	2	2	-	-	4	177.32	-	0	0	-	-	1	-	0	0	-	-	1
Bag Stick	unit	-	1	1	1	-	3	743.6	-	1	1	1	-	2	-	1	1	1	-	3
Grass Cutter	unit	-	1	1	-	-	2	2,173.6	-	2	2	-	-	4	-	3	3	-	-	5
Excavator for Tea	unit	-	1	1	-	-	2	3,260.4	-	3	3	-	-	7	-	4	4	-	-	8
Fertilizer Machine for Tea	unit	-	0.5	0.5	-	-	1	5,264.188	-	3	3	-	-	5	-	3	3	-	-	5
Pesticide Sprayer	unit	-	1	1	-	-	2	803.481	-	1	1	-	-	2	-	1	1	-	-	2
Microscope with Screen	unit	-	0.5	0.5	-	-	1	3,989.7	-	2	2	-	-	4	-	2	2	-	-	4
Humidity Vacuum	unit	-	1	1	-	-	2	886.6	-	1	1	-	-	2	-	1	1	-	-	2
Tea Garden	lump	-	0.5	0.5	-	-	1	34,402.5	-	17	17	-	-	34	-	20	21	-	-	41
Gene Multiplier	unit	-	0.5	0.5	-	-	1	9,974.25	-	5	5	-	-	10	-	5	5	-	-	10
ADN Power Supply Electrophoresis Set	unit	-	0.5	0.5	-	-	1	1,716	-	1	1	-	-	2	-	1	1	-	-	2
Small Cold Centrifuge	unit	-	0.5	0.5	-	-	1	4,987.125	-	2	2	-	-	5	-	3	3	-	-	5
Camera & Image Interpretation Apparatus for Electrophoresis Equipment	unit	-	0.5	0.5	-	-	1	14,872	-	7	7	-	-	15	-	9	9	-	-	18
Test Tube Mixer and Shaker	unit	-	0.5	0.5	-	-	1	686.4	-	0	0	-	-	1	-	0	0	-	-	1
Freezer	unit	-	0.5	0.5	-	-	1	6,926.563	-	3	3	-	-	7	-	4	4	-	-	7
Hotplate Stirrer	unit	-	0.5	0.5	-	-	1	715	-	0	0	-	-	1	-	0	0	-	-	1
Bi Distiller	unit	-	0.5	0.5	-	-	1	3,088.8	-	2	2	-	-	3	-	2	2	-	-	4
Visual Ultra-violet Spectrophotometer	unit	-	0.5	0.5	-	-	1	11,082.5	-	6	6	-	-	11	-	6	6	-	-	11
Microscope with Halogen Illuminator & Camera	unit	-	0.5	0.5	-	-	1	8,034.813	-	4	4	-	-	8	-	4	4	-	-	8
GPS Locator	unit	-	0.5	0.5	-	-	1	387.888	-	0	0	-	-	0	-	0	0	-	-	0
Underground Temperature & Water Content Meter	unit	-	0.5	0.5	-	-	1	2,216.5	-	1	1	-	-	2	-	1	1	-	-	2
Spectrophotometer Spare Parts	lump	-	0.5	0.5	-	-	1	7,722	-	4	4	-	-	8	-	5	5	-	-	9
Chlorophyll Fluorescent Meter	unit	-	0.5	0.5	-	-	1	8,034.813	-	4	4	-	-	8	-	4	4	-	-	8
High Efficiency Liquid Chromatograph	unit	-	0.5	0.5	-	-	1	110,825	-	55	55	-	-	111	-	56	57	-	-	113
Atomic Absorption Spectrophotometer	unit	-	0.5	0.5	-	-	1	138,531.25	-	69	69	-	-	139	-	70	71	-	-	141
Ion Chromatograph and Colorimeter	unit	-	0.5	0.5	-	-	1	49,871.25	-	25	25	-	-	50	-	25	25	-	-	51
<b>Subtotal Processing and Multiplication at Former Tea Research Institute (TRI)</b>									-	287	287	9	-	584	-	297	301	10	-	608
<b>b. Analysis of Pesticide Residues at Former National Institute of Plant Protection (NIPP)</b>																				
Gas Chromatograph	unit	-	0.5	0.5	-	-	1	12,744.875	-	6	6	-	-	13	-	6	7	-	-	13
Inlet Capillary Sampler Chamber	unit	-	0.5	0.5	-	-	1	4,654.65	-	2	2	-	-	5	-	2	2	-	-	5
Interface of Chromatograph and MS	unit	-	0.5	0.5	-	-	1	2,216.5	-	1	1	-	-	2	-	1	1	-	-	2
Automatic Sampler	unit	-	0.5	0.5	-	-	1	6,505.428	-	3	3	-	-	7	-	3	3	-	-	7
Detector MS	unit	-	0.5	0.5	-	-	1	74,308.163	-	37	37	-	-	74	-	38	38	-	-	76
Vacuum Pressure Meter	unit	-	0.5	0.5	-	-	1	2,105.675	-	1	1	-	-	2	-	1	1	-	-	2
GC/MS Library	unit	-	0.5	0.5	-	-	1	6,063.2	-	3	3	-	-	6	-	4	4	-	-	7
Analyzing Columns	unit	-	0.5	0.5	-	-	1	2,936.863	-	1	1	-	-	3	-	1	1	-	-	3
Helium Supplier	unit	-	0.5	0.5	-	-	1	775.775	-	0	0	-	-	1	-	0	0	-	-	1
Controlling Software	unit	-	0.5	0.5	-	-	1	6,864	-	3	3	-	-	7	-	4	4	-	-	8
Spectrophotometer	unit	-	0.5	0.5	-	-	1	3,324.75	-	2	2	-	-	3	-	2	2	-	-	3
Gene Cloning Equipment for PCR	unit	-	0.5	0.5	-	-	1	13,299	-	7	7	-	-	13	-	7	7	-	-	14
Cold Centrifuge for PCR	unit	-	0.5	0.5	-	-	1	7,480.688	-	4	4	-	-	7	-	4	4	-	-	8
Test-tube Shaker for PCR	unit	-	0.5	0.5	-	-	1	664.95	-	0	0	-	-	1	-	0	0	-	-	1
Deep Refrigerator for PCR	unit	-	0.5	0.5	-	-	1	831.188	-	0	0	-	-	1	-	0	0	-	-	1
Micropipets for PCR	unit	-	3	3	-	-	6	154.44	-	0	0	-	-	1	-	1	1	-	-	1
PCR Operational Chamber	unit	-	0.5	0.5	-	-	1	2,216.5	-	1	1	-	-	2	-	1	1	-	-	2
ELISA System	unit	-	0.5	0.5	-	-	1	14,961.375	-	7	7	-	-	15	-	8	8	-	-	15
<b>Subtotal Analysis of Pesticide Residues at Former National Institute of Plant Protection (NIPP)</b>									-	81	81	-	-	163	-	83	84	-	-	168

c. Pests and Diseases Resources at Former NIPP																			14 Supplementary Appendix B		
Stereo Microscope	unit	-	0.5	0.5	-	-	1	18,840.25	-	9	9	-	-	19	-	10	10	-		-	19
Specimen Drying Facilities	unit	-	1	1	1	-	3	1,108.25	-	1	1	1	-	3	-	1	1	1		-	3
Specimen Collecting Equipment	unit	-	1	1	-	-	2	1,108.25	-	1	1	-	-	2	-	1	1	-		-	2
Incubator-Binder	unit	-	0.5	0.5	-	-	1	1,662.375	-	1	1	-	-	2	-	1	1	-		-	2
Dry Freezing Machine	unit	-	0.5	0.5	-	-	1	27,706.25	-	14	14	-	-	28	-	14	14	-		-	28
Insect Pin Box	unit	-	50	50	-	-	100	11.44	-	1	1	-	-	1	-	1	1	-		-	1
Portable Insect Trap	unit	-	1	1	-	-	2	1,144	-	1	1	-	-	2	-	1	1	-		-	3
Steam Thermostat	unit	-	0.5	0.5	-	-	1	1,108.25	-	1	1	-	-	1	-	1	1	-		-	1
Insect Dissection	unit	-	5	-	-	-	5	114.4	-	1	-	-	-	1	-	1	-	-		-	1
Automatic Dehumidifier	unit	-	2	2	-	-	4	554.125	-	1	1	-	-	2	-	1	1	-		-	2
Cleaner Machine	unit	-	1	1	-	-	2	110.825	-	0	0	-	-	0	-	0	0	-		-	0
Digital Camera	unit	-	1	1	-	-	2	1,662.375	-	2	2	-	-	3	-	2	2	-		-	3
Disease Sample Preservation Cabinet	unit	-	5	5	-	-	10	228.8	-	1	1	-	-	2	-	1	1	-		-	3
Disease Sample Display Cabinet	unit	-	5	5	-	-	10	228.8	-	1	1	-	-	2	-	1	1	-		-	3
Insect Sample Preservation Cabinet	unit	-	25	25	-	-	50	800.8	-	20	20	-	-	40	-	23	24	-		-	48
Insect Sample Display Cabinet	unit	-	0.5	0.5	-	-	1	228.8	-	0	0	-	-	0	-	0	0	-	-	0	
Microorganism Sample Glass Boxes	unit	-	20	20	-	-	40	57.2	-	1	1	-	-	2	-	1	1	-	-	3	
Air Conditioners	unit	-	4	4	-	-	8	1,219.075	-	5	5	-	-	10	-	5	5	-	-	10	
Subtotal Pests and Diseases Resources at Former NIPP									-	60	60	1	-	122	-	65	66	1	-	132	
Subtotal Viet Nam Academy of Agriculture Science									-	429	429	10	-	868	-	446	452	11	-	909	
2. Western Highlands Agro-Forestry Scientific and Technology Center																					
a. Post-harvest and Livestock Divisions																					
Equipment for Feed/Food Analysis	set	-	0.5	0.5	-	-	1	74,252.75	-	37	37	-	-	74	-	38	38	-	-	75	
Seed Colorimeter	unit	-	0.5	0.5	-	-	1	7,203.625	-	4	4	-	-	7	-	4	4	-	-	7	
PCR for Microorganism and Biochemical Analysis	set	-	0.5	0.5	-	-	1	36,572.25	-	18	18	-	-	37	-	19	19	-	-	37	
Subtotal Post-harvest and Livestock Divisions									-	59	59	-	-	118	-	60	60	-	-	120	
b. Microbial and Biochemical Research																					
Microscope and Drawing Machine	unit	-	0.5	0.5	-	-	1	14,130.188	-	7	7	-	-	14	-	7	7	-	-	14	
Stereo Microscope (magn80)	unit	-	0.5	0.5	-	-	1	7,203.625	-	4	4	-	-	7	-	4	4	-	-	7	
Drying Oven	unit	-	1	1	-	-	2	4,433	-	4	4	-	-	9	-	4	5	-	-	9	
Bacteria Counter	unit	-	0.5	0.5	-	-	1	3,660.8	-	2	2	-	-	4	-	2	2	-	-	4	
Seed Weight & Moisture Meter	unit	-	0.5	0.5	-	-	1	2,216.5	-	1	1	-	-	2	-	1	1	-	-	2	
Water Distiller (Twice)	unit	-	0.5	0.5	-	-	1	7,321.6	-	4	4	-	-	7	-	4	4	-	-	9	
Water Distiller (Once)	unit	-	0.5	0.5	-	-	1	4,576	-	2	2	-	-	5	-	3	3	-	-	5	
Nitro Container	unit	-	0.5	0.5	-	-	1	2,216.5	-	1	1	-	-	2	-	1	1	-	-	2	
Subtotal Microbial and Biochemical Research									-	25	25	-	-	50	-	27	27	-	-	54	
Subtotal Western Highlands Agro-Forestry Scientific and Technology Center									-	84	84	-	-	168	-	86	87	-	-	174	
Subtotal Post-harvest Technology									-	513	513	10	-	1,037	-	532	539	11	-	1,082	

D. Land Management

1. Viet Nam Academy of Agriculture Science

a. Soil and Environment Analysis at Former TRI

Analyzing Scale	unit	-	0.5	0.5	-	-	1	2,516.8	-	1	1	-	-	3	-	1	2	-	-	3
Drying Oven	unit	-	2	2	-	-	4	1,329.9	-	3	3	-	-	5	-	3	3	-	-	5
Light Meter	unit	-	0.5	0.5	-	-	1	243.815	-	0	0	-	-	0	-	0	0	-	-	0
Heat and Humidity Meter	unit	-	2	2	-	-	4	498.713	-	1	1	-	-	2	-	1	1	-	-	2
Dry Plant Specimen Grinder	unit	-	0.5	0.5	-	-	1	1,372.8	-	1	1	-	-	1	-	1	1	-	-	2
Wet Plant Specimen Grinder	unit	-	0.5	0.5	-	-	1	1,716	-	1	1	-	-	2	-	1	1	-	-	2
Testing Oven	unit	-	0.5	0.5	-	-	1	4,433	-	2	2	-	-	4	-	2	2	-	-	5
Bi Distiller	unit	-	0.5	0.5	-	-	1	3,657.225	-	2	2	-	-	4	-	2	2	-	-	4
Toxic Gas Discharging Chamber	unit	-	0.5	0.5	-	-	1	5,541.25	-	3	3	-	-	6	-	3	3	-	-	6
pH Meter	unit	-	1	1	1	-	3	664.95	-	1	1	1	-	2	-	1	1	1	-	2
Quick pH Meter	unit	-	0.5	0.5	-	-	1	1,108.25	-	1	1	-	-	1	-	1	1	-	-	1
Humidity Vacuum	unit	-	0.5	0.5	-	-	1	554.125	-	0	0	-	-	1	-	0	0	-	-	1
Orbital Shaker	unit	-	1	1	1	-	3	2,173.6	-	2	2	2	-	7	-	3	3	3	-	8
Partial Dripper	unit	-	0.5	0.5	-	-	1	3,432	-	2	2	-	-	3	-	2	2	-	-	4
Pigment Content Meter	unit	-	0.5	0.5	-	-	1	2,659.8	-	1	1	-	-	3	-	1	1	-	-	3
Photosynthesis Meter	unit	-	1	1	1	-	3	21,610.875	-	22	22	22	-	65	-	22	22	22	-	66
Digestion Unit	unit	-	0.5	0.5	-	-	1	2,059.2	-	1	1	-	-	2	-	1	1	-	-	2
Kjeldahl Distillator	unit	-	0.5	0.5	-	-	1	4,155.938	-	2	2	-	-	4	-	2	2	-	-	4
Leaf Surface Meter	unit	-	1	1	1	-	3	5,541.25	-	6	6	6	-	17	-	6	6	6	-	17
Multi-norm Water Analyzer Meter	unit	-	0.5	0.5	-	-	1	5,153.362	-	3	3	-	-	5	-	3	3	-	-	5
Sterile Microorganism Drying Oven	unit	-	0.5	0.5	-	-	1	5,541.25	-	3	3	-	-	6	-	3	3	-	-	6
Hand Held Photosynthesis Meter	unit	-	0.5	0.5	-	-	1	10,306.725	-	5	5	-	-	10	-	5	5	-	-	10
Hand Held Leaf Surface Meter	unit	-	0.5	0.5	-	-	1	2,936.863	-	1	1	-	-	3	-	1	1	-	-	3
Water Transport Meter (in tree)	unit	-	0.5	0.5	-	-	1	2,548.975	-	1	1	-	-	3	-	1	1	-	-	3
Soil Respiration Apparatus	unit	-	0.5	0.5	-	-	1	2,802.8	-	1	1	-	-	3	-	2	2	-	-	3
Density Meter	unit	-	0.5	0.5	-	-	1	5,984.55	-	3	3	-	-	6	-	3	3	-	-	6
Flamce Photometer	unit	-	0.5	0.5	-	-	1	3,657.225	-	2	2	-	-	4	-	2	2	-	-	4
Colorimeter	unit	-	0.5	0.5	-	-	1	2,216.5	-	1	1	-	-	2	-	1	1	-	-	2
Analyzer Set for Soil Constituents	unit	-	0.5	0.5	-	-	1	743.6	-	0	0	-	-	1	-	0	0	-	-	1

Subtotal Soil and Environment Analysis at Forme

b. Central Highland Soils Research Station (Form

Atomic Absorption Apparatus	unit	-	0.5	0.5	-	-	1	57,200	-	29	29	-	-	57	-	33	35	-	-	68
Nitrate Analyzer	unit	-	0.5	0.5	-	-	1	1,662.375	-	1	1	-	-	2	-	1	1	-	-	2
Flame Photometer	unit	-	0.5	0.5	-	-	1	5,541.25	-	3	3	-	-	6	-	3	3	-	-	6
Protein Distiller	unit	-	0.5	0.5	-	-	1	8,866	-	4	4	-	-	9	-	4	5	-	-	9
Electronic Microscope	unit	-	1	1	-	-	2	2,216.5	-	2	2	-	-	4	-	2	2	-	-	5
Analytical Balances	unit	-	1	1	-	-	2	2,860	-	3	3	-	-	6	-	3	3	-	-	7
GPS	unit	-	1	1	1	-	3	1,108.25	-	1	1	1	-	3	-	1	1	1	-	3
Water Distiller	unit	-	0.5	0.5	-	-	1	6,649.5	-	3	3	-	-	7	-	3	3	-	-	7
Shaking Apparatus	unit	-	1	1	-	-	2	1,716	-	2	2	-	-	3	-	2	2	-	-	4

Subtotal Central Highland Soils Research Station

c. Plant Nutrient and Soils Department (Former NI

Gas Chromatograph	unit	-	0.5	0.5	-	-	1	70,928	-	35	35	-	-	71	-	36	36	-	-	72
Sample Handling Vibration Machine	unit	-	0.5	0.5	-	-	1	26,598	-	13	13	-	-	27	-	13	14	-	-	27
Automatic Analyzer	unit	-	0.5	0.5	-	-	1	17,732	-	9	9	-	-	18	-	9	9	-	-	18
Oven (IK)	unit	-	0.5	0.5	-	-	1	11,304.15	-	6	6	-	-	11	-	6	6	-	-	11
Centrifuge	unit	-	0.5	0.5	-	-	1	11,082.5	-	6	6	-	-	11	-	6	6	-	-	11
Automatic Microbial Testing System	unit	-	1	1	-	-	2	28,600	-	29	29	-	-	57	-	33	35	-	-	68
Microscope with Video Camera	unit	-	0.5	0.5	-	-	1	17,732	-	9	9	-	-	18	-	9	9	-	-	18
Deep Freezer	unit	-	0.5	0.5	-	-	1	16,623.75	-	8	8	-	-	17	-	8	8	-	-	17
Thermostat	unit	-	0.5	0.5	-	-	1	8,866	-	4	4	-	-	9	-	4	5	-	-	9
Poisonous Gas Sucker	unit	-	0.5	0.5	-	-	1	15,515.5	-	8	8	-	-	16	-	8	8	-	-	16
Bacterial Sterilizing Water Filter	unit	-	0.5	0.5	-	-	1	9,724	-	5	5	-	-	10	-	6	6	-	-	12
Cool Centrifuge	unit	-	0.5	0.5	-	-	1	8,201.05	-	4	4	-	-	8	-	4	4	-	-	8
Plant/Species Analysis Materials	unit	-	0.5	0.5	-	-	1	36,608	-	18	18	-	-	37	-	21	22	-	-	44
X-ray Apparatus	unit	-	0.5	0.5	-	-	1		-	-	-	-	-	-	-	-	-	-	-	-

DTA Heating Analyzer	unit	-	0.5	0.5	-	-	1	53,196	-	27	27	-	-	53	-	27	27	-	-	54
Oven for Sample Mineralization	unit	-	0.5	0.5	-	-	1	14,185.6	-	7	7	-	-	14	-	7	7	-	-	14
Colorimeter	unit	-	0.5	0.5	-	-	1	9,420.125	-	5	5	-	-	9	-	5	5	-	-	10
Graphite Oven	unit	-	0.5	0.5	-	-	1	64,278.5	-	32	32	-	-	64	-	33	33	-	-	65
Carbon Analyzing Set	unit	-	0.5	0.5	-	-	1	36,608	-	18	18	-	-	37	-	21	22	-	-	44
Ion Chromatograph	unit	-	0.5	0.5	-	-	1	85,335.25	-	43	43	-	-	85	-	43	44	-	-	87
Inductivity Couple Plasma	unit	-	0.5	0.5	-	-	1	11,636.625	-	6	6	-	-	12	-	6	6	-	-	12
<b>Subtotal Plant Nutrient and Soils Department (Foi</b>									-	291	291	-	-	583	-	306	311	-	-	617
<b>Subtotal Viet Nam Academy of Agriculture Science</b>									-	411	411	31	-	852	-	433	441	33	-	907
<b>2. Forest Science Institute of Viet Nam</b>																				
Atomic Absorbing Spectrometer	unit	-	0.5	0.5	-	-	1	110,825	-	55	55	-	-	111	-	56	57	-	-	113
Plant Photosynthesis Analyzer	unit	-	0.5	0.5	-	-	1	28,260.375	-	14	14	-	-	28	-	14	14	-	-	29
Climate Cabinet	unit	-	0.5	0.5	-	-	1	12,744.875	-	6	6	-	-	13	-	6	7	-	-	13
Combustion Gas Analyzer	unit	-	0.5	0.5	-	-	1	14,961.375	-	7	7	-	-	15	-	8	8	-	-	15
Directional Wave Gauge	unit	-	0.5	0.5	-	-	1	23,452	-	12	12	-	-	23	-	14	14	-	-	28
Specialized Computer	unit	-	1	2	-	-	3	3,324.75	-	3	7	-	-	10	-	3	7	-	-	10
Scanner (AO)	unit	-	0.5	0.5	-	-	1	8,311.875	-	4	4	-	-	8	-	4	4	-	-	8
Portable Computer	unit	-	2	2	-	-	4	1,329.9	-	3	3	-	-	5	-	3	3	-	-	5
Quantimeter System	unit	-	0.5	0.5	-	-	1	6,649.5	-	3	3	-	-	7	-	3	3	-	-	7
Leaf Area Meter	unit	-	1	1	-	-	2	7,203.625	-	7	7	-	-	14	-	7	7	-	-	15
Particulate Monitor	unit	-	1	1	-	-	2	12,190.75	-	12	12	-	-	24	-	12	12	-	-	25
Noise Meter	unit	-	1	1	-	-	2	5,541.25	-	6	6	-	-	11	-	6	6	-	-	11
Spectrophotometer	unit	-	0.5	0.5	-	-	1	6,649.5	-	3	3	-	-	7	-	3	3	-	-	7
Grass Apparatus	unit	-	0.5	0.5	-	-	1	5,720	-	3	3	-	-	6	-	3	3	-	-	7
Sediment Instrument	unit	-	0.5	0.5	-	-	1	16,016	-	8	8	-	-	16	-	9	10	-	-	19
GPS Machine	unit	-	1	2	-	-	3	1,108.25	-	1	2	-	-	3	-	1	2	-	-	3
Digital Luximeter	unit	-	1	1	-	-	2	1,662.375	-	2	2	-	-	3	-	2	2	-	-	3
Digital Caliper	unit	-	2	2	-	-	4	221.65	-	0	0	-	-	1	-	0	0	-	-	1
Scanner (A4)	unit	-	1	1	-	-	2	554.125	-	1	1	-	-	1	-	1	1	-	-	1
Water Checker	unit	-	0.5	0.5	-	-	1	5,541.25	-	3	3	-	-	6	-	3	3	-	-	6
Air Conditioner	unit	-	1	2	-	-	3	1,219.075	-	1	2	-	-	4	-	1	2	-	-	4
<b>Subtotal Forest Science Institute of Viet Nam</b>									-	155	161	-	-	317	-	161	169	-	-	330
<b>Subtotal Land Management</b>									-	566	572	31	-	1,169	-	594	610	33	-	1,236
<b>E. Economics, Strategies and Markets</b>																				
<b>1. Institute of Policy and Strategy for Agriculture and</b>																				
Desktop Computers	unit	-	44	43	-	-	87	1,108.25	-	49	48	-	-	96	-	49	49	-	-	98
Graphic Design Computers	unit	-	1	1	-	-	2	11,082.5	-	11	11	-	-	22	-	11	11	-	-	23
GIS Laptop and Software	unit	-	0.5	0.5	-	-	1	13,728	-	7	7	-	-	14	-	8	8	-	-	16
Laptop Computers	unit	-	4	4	-	-	8	2,216.5	-	9	9	-	-	18	-	9	9	-	-	18
Network Security/Firewall Equipment	unit	-	0.5	0.5	-	-	1	33,247.5	-	17	17	-	-	33	-	17	17	-	-	34
Router Multiservice Platforms	unit	-	1	1	-	-	2	5,541.25	-	6	6	-	-	11	-	6	6	-	-	11
24 Port Switches	unit	-	2	2	-	-	4	5,148	-	10	10	-	-	21	-	12	13	-	-	25
Server Room Equipment	unit	-	1	1	-	-	2	2,770.625	-	3	3	-	-	6	-	3	3	-	-	6
Large Main Server	unit	-	1	1	-	-	2	22,165	-	22	22	-	-	44	-	22	23	-	-	45
Main Servers	unit	-	3	3	-	-	6	9,420.125	-	28	28	-	-	57	-	29	29	-	-	57
Storage Servers	unit	-	1	1	-	-	2	31,031	-	31	31	-	-	62	-	31	32	-	-	63
Tape Storage Autoloaders	unit	-	1	1	-	-	2	24,381.5	-	24	24	-	-	49	-	25	25	-	-	50
Storage Media (diskettes, tapes, etc.)	lump	-	0.5	0.5	-	-	1	1,108.25	-	1	1	-	-	1	-	1	1	-	-	1

Studio/Media Editing System	unit	-	0.5	0.5	-	-	1	15,100.8	-	8	8	-	-	15	-	9	9	-	-	18
Progressive Scan Digital Video Camera	unit	-	1	1	-	-	2	5,541.25	-	6	6	-	-	11	-	6	6	-	-	11
High Definition Digital Video Camera	unit	-	0.5	0.5	-	-	1	4,100.525	-	2	2	-	-	4	-	2	2	-	-	4
Digital Camera	unit	-	3	3	-	-	6	554.125	-	2	2	-	-	3	-	2	2	-	-	3
GPS Machine	unit	-	1	1	-	-	2	332.475	-	0	0	-	-	1	-	0	0	-	-	1
Duplex Scanner	unit	-	2	3	-	-	5	1,662.375	-	3	5	-	-	8	-	3	5	-	-	8
UPS (Uninterruptible Power Supplies) (5kVA)	unit	-	1	1	-	-	2	6,649.5	-	7	7	-	-	13	-	7	7	-	-	14
Multi-function Large-format Photocopier	unit	-	1	1	-	-	2	8,866	-	9	9	-	-	18	-	9	9	-	-	18
Standard Photocopier	unit	-	2	3	-	-	5	4,433	-	9	13	-	-	22	-	9	14	-	-	23
Standard Laser Printer	unit	-	3	3	-	-	6	1,329.9	-	4	4	-	-	8	-	4	4	-	-	8
High Volume Laser Printer	unit	-	1	1	-	-	2	2,770.625	-	3	3	-	-	6	-	3	3	-	-	6
Offset Printer and Spares	unit	-	0.5	0.5	-	-	1	66,495	-	33	33	-	-	66	-	34	34	-	-	68
Large-size GIS Printer	unit	-	0.5	0.5	-	-	1	19,948.5	-	10	10	-	-	20	-	10	10	-	-	20
Large-size GIS Scanner	unit	-	0.5	0.5	-	-	1	19,948.5	-	10	10	-	-	20	-	10	10	-	-	20
GIS Software	unit	-	0.5	0.5	-	-	1	58,344	-	29	29	-	-	58	-	34	35	-	-	70
GIS Information Management	unit	-	1	1	-	-	2	25,740	-	26	26	-	-	51	-	30	31	-	-	61
Library Online E-database	unit	-	0.5	0.5	-	-	1	22,880	-	11	11	-	-	23	-	13	14	-	-	27
Library E-books and Journal	lump	-	0.5	0.5	-	-	1	22,880	-	11	11	-	-	23	-	13	14	-	-	27
Advanced Server Operating System	unit	-	0.5	0.5	-	-	1	12,584	-	6	6	-	-	13	-	7	8	-	-	15
SQL Server Software	unit	-	0.5	0.5	-	-	1	25,168	-	13	13	-	-	25	-	15	15	-	-	30
Communications Server Software	unit	-	0.5	0.5	-	-	1	9,152	-	5	5	-	-	9	-	5	6	-	-	11
Server Management Software	unit	-	0.5	0.5	-	-	1	2,288	-	1	1	-	-	2	-	1	1	-	-	3
Development Software	unit	-	0.5	0.5	-	-	1	8,008	-	4	4	-	-	8	-	5	5	-	-	10
<b>Subtotal institute of Policy and Strategy for Agriculture and Rural Development</b>									-	428	433	-	-	862	-	454	468	-	-	922
<b>F. Materials and Training for Equipment Operation /a</b>																				
1. Materials for Equipment Operation	lump	-	0.5	0.5	0.8	0.8	2.6	263,120	-	132	132	210	210	684	-	154	160	267	278	858
2. Training for Equipment Operation	unit	-	0.5	0.5	0.3	0.25	1.55	263,120	-	132	132	79	66	408	-	154	160	100	87	500
<b>Subtotal Materials and Training for Equipment Operation</b>									-	263	263	289	276	1,092	-	307	320	367	365	1,358
<b>Total</b>									-	2,520	2,521	333	278	5,652	-	2,682	2,738	413	367	6,200

\a To be included in the supply contracts for equipment.

Table B6: Strengthening of Pro-poor Provincial Agricultural Extension Services

Item	Unit	Quantities					Unit Cost -		Base Cost - Negotiation (US\$ '000)					Totals Including Contingencies (US\$ '000)						
		2007	2008	2009	2010	2011	Total	(US\$)	2007	2008	2009	2010	2011	Total	2007	2008	2009	2010	2011	Total
I. Investment Costs																				
A. Grassroot Extension Service Provider Training																				
1. Provincial Implementation Plan (PIP) Development																				
a. PIP Development Workshops /a																				
per diem	participant day	1,250	-	-	-	-	1,250	3.64	5	-	-	-	-	5	5	-	-	-	-	5
Incidental and Meals Expenses	participant day	1,250	-	-	-	-	1,250	7.488	9	-	-	-	-	9	11	-	-	-	-	11
Accommodation and Transport	participant day	1,250	-	-	-	-	1,250	7.488	9	-	-	-	-	9	11	-	-	-	-	11
Trainers /b	trainer day	100	-	-	-	-	100	20.8	2	-	-	-	-	2	2	-	-	-	-	2
Course Materials	set	10	-	-	-	-	10	67.6	1	-	-	-	-	1	1	-	-	-	-	1
Subtotal PIP Development Workshops									26	-	-	-	-	26	29	-	-	-	-	29
b. Provincial Extension Priority Workshops /c																				
per diem	participant day	900	-	-	-	-	900	4.004	4	-	-	-	-	4	4	-	-	-	-	4
Incidental and Meals Expenses	participant day	900	-	-	-	-	900	8.237	7	-	-	-	-	7	8	-	-	-	-	8
Accommodation and Transport	participant day	900	-	-	-	-	900	8.237	7	-	-	-	-	7	8	-	-	-	-	8
Trainers /d	trainer day	20	-	-	-	-	20	22.88	0	-	-	-	-	0	1	-	-	-	-	1
Course Materials	set	5	-	-	-	-	5	74.36	0	-	-	-	-	0	0	-	-	-	-	0
Subtotal Provincial Extension Priority Workshops									19	-	-	-	-	19	22	-	-	-	-	22
c. Indigenous Knowledge Survey /e																				
	district	-	20	20	10	-	50	780	-	16	16	8	-	39	-	18	19	10	-	47
Subtotal Provincial Implementation Plan (PIP) Development									45	16	16	8	-	84	51	18	19	10	-	98
2. Development of Training of Trainers (TOT) Modules																				
a. Incremental Staff Costs																				
Incremental Staff at NAEC (National Ag Ex Center)	person-month	6	6	-	-	-	12	357	2	2	-	-	-	4	2	3	-	-	-	5
Incremental Staff at PAECs (Provincial Ag Ex Centers)	person-month	30	30	-	-	-	60	210	6	6	-	-	-	13	7	7	-	-	-	15
Subtotal Incremental Staff Costs									8	8	-	-	-	17	10	10	-	-	-	20
b. Module Testing Workshops in Hanoi																				
	workshop	4	4	-	-	-	8	832	3	3	-	-	-	7	4	4	-	-	-	8
c. Production of Training Materials																				
	set	-	100	-	-	-	100	20.8	-	2	-	-	-	2	-	2	-	-	-	2
d. Formation of Provincial TOT Teams																				
	workshop	-	10	-	-	-	10	1,040	-	10	-	-	-	10	-	12	-	-	-	12
Subtotal Development of Training of Trainers (TOT) Modules									12	24	-	-	-	36	13	28	-	-	-	42
3. Grassroot Extension Service Provider Training																				
a. Commune Training /f																				
per diem	participant day	-	22,969	22,969	22,969	22,969	91,876	3.64	-	84	84	84	84	334	-	98	102	106	110	416
Incidental and Meals Expenses	participant day	-	22,969	22,969	22,969	22,969	91,876	7.488	-	172	172	172	172	688	-	201	209	218	227	855
Accommodation and Transport	participant day	-	22,969	22,969	22,969	22,969	91,876	7.488	-	172	172	172	172	688	-	201	209	218	227	855
Trainers /g	trainer day	-	1,838	1,838	1,838	1,838	7,352	20.8	-	38	38	38	38	153	-	45	46	48	50	190
Course Materials	set	-	100	100	100	100	400	67.6	-	7	7	7	7	27	-	8	8	9	9	34
Subtotal Commune Training									-	473	473	473	473	1,890	-	552	574	598	624	2,349
b. District Training /h																				
per diem	participant day	-	1,594	1,594	1,594	1,594	6,376	3.64	-	6	6	6	6	23	-	7	7	7	8	29
Incidental and Meals Expenses	participant day	-	1,594	1,594	1,594	1,594	6,376	7.488	-	12	12	12	12	48	-	14	15	15	16	59
Accommodation and Transport	participant day	-	1,594	1,594	1,594	1,594	6,376	7.488	-	12	12	12	12	48	-	14	15	15	16	59
Trainers /i	trainer day	-	128	128	128	128	512	20.8	-	3	3	3	3	11	-	3	3	3	4	13
Course Materials	set	-	10	10	10	10	40	67.6	-	1	1	1	1	3	-	1	1	1	1	3
Subtotal District Training									-	33	33	33	33	132	-	39	40	42	44	164
c. Provincial Training /j																				
per diem	participant day	-	94	94	94	94	376	3.64	-	0	0	0	0	1	-	0	0	0	0	2
Incidental and Meals Expenses	participant day	-	94	94	94	94	376	7.488	-	1	1	1	1	3	-	1	1	1	1	3
Trainers /k	trainer day	-	19	19	19	19	76	20.8	-	0	0	0	0	2	-	0	0	1	1	2
Course Materials	set	-	4	4	4	4	16	67.6	-	0	0	0	0	1	-	0	0	0	0	1
Subtotal Provincial Training									-	2	2	2	2	7	-	2	2	2	2	9
Subtotal Grassroot Extension Service Provider Training									-	507	507	507	507	2,029	-	592	617	642	670	2,521
4. Ongoing Grassroot Extension Service Provider Capacity Building																				
Training Needs Assessments /l	contract	-	5	5	5	5	20	104	-	1	1	1	1	2	-	1	1	1	1	3
Ongoing Service Provider Capacity Building /m	contract	-	30	30	30	30	120	2,080	-	62	62	62	62	250	-	73	76	79	82	310
Subtotal Ongoing Grassroot Extension Service Provider Capacity Building									-	63	63	63	63	252	-	73	76	80	83	313
Subtotal Grassroot Extension Service Provider Training									57	610	586	578	570	2,401	64	713	712	732	753	2,974

**B. Strengthening of Provincial/District Agricultural Extension****1. District Extension Facilities /n**

Two Desktop Computers per District	unit	80	80	-	-	-	160	1,108.25	89	89	-	-	-	177	89	90	-	-	-	179
Two TV/Video Sets per District	unit	80	80	-	-	-	160	277.063	22	22	-	-	-	44	22	22	-	-	-	45
One LAN and One ADSL per District	unit	80	80	-	-	-	160	572	46	46	-	-	-	92	51	53	-	-	-	105
Two megaphones per District	unit	80	80	-	-	-	160	286	23	23	-	-	-	46	26	27	-	-	-	52
Five Whiteboards per District	unit	40	40	-	-	-	80	57.2	2	2	-	-	-	5	3	3	-	-	-	5
Support for Incremental Operational Costs	lump	40	40	-	-	-	80	1.144	0	0	-	-	-	0	0	0	-	-	-	0
<b>Subtotal District Extension Facilities</b>									<b>182</b>	<b>182</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>364</b>	<b>191</b>	<b>195</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>386</b>

**2. Strengthening of Extension Governance and Managem****a. Regional Study Tour /o**

Allowance for Participants	participant day	-	140	-	-	-	140	60	-	8	-	-	-	8	-	9	-	-	-	9
Round-trip Air Tickets	participant	-	10	-	-	-	10	900	-	9	-	-	-	9	-	10	-	-	-	10
<b>Subtotal Regional Study Tour</b>									<b>-</b>	<b>17</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>17</b>	<b>-</b>	<b>19</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>19</b>

**b. Inter-provincial Study Visits /p**

per diem	participant day	-	375	750	750	675	2,550	3.64	-	1	3	3	2	9	-	2	3	3	3	12
Incidental and Meals Expenses	participant day	-	375	750	750	675	2,550	7.488	-	3	6	6	5	19	-	3	7	7	7	24
Accommodation and Transport	participant day	-	375	750	750	675	2,550	7.488	-	3	6	6	5	19	-	3	7	7	7	24
Study Materials	set	-	5	10	10	9	34	67.6	-	0	1	1	1	2	-	0	1	1	1	3

**Subtotal Inter-provincial Study Visits****Subtotal Strengthening of Extension Governance and Man****3. National Mass Media Programs /q****Subtotal Strengthening of Provincial/District Agricultural Ext****Total**

lump	0.05	0.1	0.25	0.3	0.3	1	1,100,000		55	110	275	330	330	1,100	61	121	303	363	363	1,210
									<b>237</b>	<b>317</b>	<b>290</b>	<b>345</b>	<b>343</b>	<b>1,531</b>	<b>251</b>	<b>344</b>	<b>320</b>	<b>382</b>	<b>380</b>	<b>1,677</b>
									<b>294</b>	<b>927</b>	<b>875</b>	<b>923</b>	<b>913</b>	<b>3,932</b>	<b>315</b>	<b>1,056</b>	<b>1,032</b>	<b>1,114</b>	<b>1,133</b>	<b>4,651</b>

\a 25 participants for 10 days per province.

\b Two trainers each for 5 days per province.

\c 90 participants for 2 days per province.

\d Two trainers each for 2 days per province.

\e One per district with commune and village extension contracts.

\f Each 5-day course has 25 participants. 245 courses on methodology, 245 courses on technical subjects, and 245 on farm management

\g Two trainers each for 5 days per course.

\h Each 5-day course has 25 participants. 17 courses on methodology, 17 courses on technical subjects, and 17 courses on farm management.

\i Two trainers each for 5 days per course.

\j Each 5-day course has 5 participants. 5 courses on methodology, 5 courses on technical subjects, and 5 courses on farm management.

\k One trainer for 5 days per course.

\l One annual survey in each province from the second year.

\m Courses contracted out, each with 3 days formal training and 2 days practical.

\n To be provided to a total of 80 districts in the project provinces for project activities as required.

\o On good practices in agricultural extension governance and management.

\p A total of 34 visits to be organized under the project.

\q As a financial provision, no physical or price contingencies are provided.

Table B7: Promotion of Contractual Agricultural Extension Services

Item	Unit	Quantities						Unit Cost - Negotiation (US\$)	Base Cost - Negotiation (US\$ '000)						Totals Including Contingencies (US\$ '000)					
		2007	2008	2009	2010	2011	Total		2007	2008	2009	2010	2011	Total	2007	2008	2009	2010	2011	Total
I. Investment Costs																				
A. On-farm Demonstrations and Participatory Research and Extension																				
Subject Matter Specialist Contracts	contract	-	20	20	20	20	80	1,560	-	31	31	31	31	125	-	36	38	40	41	155
On-farm Demonstrations	contract	-	10	10	10	10	40	1,560	-	16	16	16	16	62	-	18	19	20	21	78
Participatory Research Programs	contract	-	15	15	15	15	60	2,600	-	39	39	39	39	156	-	46	47	49	51	194
Subtotal On-farm Demonstrations and Participatory Research and Extension									-	86	86	86	86	343	-	100	104	109	113	426
B. Extension Delivery Systems to Mobilize Commune- and Village-based Extension																				
Village Contracts	contract	-	140	160	200	220	720	1,100	-	154	176	220	242	792	-	169	194	242	266	871
Commune Contracts	contract	-	59	64	123	139	385	5,500	-	325	352	677	765	2,118	-	357	387	744	841	2,329
Provincial Contracts	contract	-	7	15	15	15	52	11,000	-	77	165	165	165	572	-	85	182	182	182	629
Subtotal Extension Delivery Systems to Mobilize Commune- and Village-based Extension									-	556	693	1,062	1,172	3,482	-	611	762	1,168	1,289	3,830
C. Service Provider Monitoring and Impact Evaluation Capability																				
1. Database Development and Testing																				
Database Development	contract	1	-	-	-	-	1	6,240	6	-	-	-	-	6	7	-	-	-	-	7
Database Implementation	province	-	5	5	5	5	20	416	-	2	2	2	2	8	-	2	3	3	3	10
Subtotal Database Development and Testing									6	2	2	2	2	15	7	2	3	3	3	17
2. Service Provider Initial Training /a																				
per diem	participant day	-	700	-	-	-	700	3.64	-	3	-	-	-	3	-	3	-	-	-	3
Incidental and Meals Expenses	participant day	-	700	-	-	-	700	7.488	-	5	-	-	-	5	-	6	-	-	-	6
Accommodation and Transport	participant day	-	700	-	-	-	700	7.488	-	5	-	-	-	5	-	6	-	-	-	6
Trainers /b	trainer day	-	70	-	-	-	70	20.8	-	1	-	-	-	1	-	2	-	-	-	2
Course Materials	set	-	5	-	-	-	5	67.6	-	0	-	-	-	0	-	0	-	-	-	0
Subtotal Service Provider Initial Training									-	15	-	-	-	15	-	17	-	-	-	17
3. Service Provider Follow-up Training /c																				
per diem	participant day	-	100	200	100	-	400	3.64	-	0	1	0	-	1	-	0	1	0	-	2
Incidental Meals Expenses	participant day	-	100	200	100	-	400	7.488	-	1	1	1	-	3	-	1	2	1	-	4
Accommodation and Transport	participant day	-	100	200	100	-	400	7.488	-	1	1	1	-	3	-	1	2	1	-	4
Trainers /d	trainer day	-	10	20	10	-	40	20.8	-	0	0	0	-	1	-	0	1	0	-	1
Course Materials	set	-	5	5	-	-	10	67.6	-	0	0	-	-	1	-	0	0	-	-	1
Subtotal Service Provider Follow-up Training									-	2	4	2	-	9	-	3	5	3	-	11
Subtotal Service Provider Monitoring and Impact Evaluation Capability									6	19	7	4	2	38	7	23	8	5	3	46
Total									6	661	785	1,151	1,259	3,863	7	734	875	1,282	1,405	4,302

/a 20 participants in each province for one course per province, including 5 days formal training and 2 days field work.

/b Two trainers each for 7 days per course.

/c 20 participants in each province for 2 courses per province for 2 days.

/d Two trainers for 2 days per course.

Table B8: Improved Responsiveness to National Goals and Priorities

Item	Unit	Quantities					Total	Unit Cost -	Base Cost - Negotiation (US\$ '000)					Totals Including Contingencies (US\$ '000)					Total	
		2007	2008	2009	2010	2011		Negotiation	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011		
I. Investment Costs /a																				
A. Improving School-Industry Relationships /b																				
5 staff from 10 schools	PTD	75	75	-	-	-	150	23.92	2	2	-	-	-	4	2	2	-	-	-	4
5 staff from MARD	PTD	15	-	-	-	-	15	23.92	0	-	-	-	-	0	0	-	-	-	-	0
Participant Travels	person	50	-	-	-	-	50	41.6	2	-	-	-	-	2	2	-	-	-	-	2
Trainer Fees /c	days	8	-	-	-	-	8	52	0	-	-	-	-	0	0	-	-	-	-	0
Training Room and Equipment Rental	days	6	-	-	-	-	6	62.4	0	-	-	-	-	0	0	-	-	-	-	0
Training Materials	set	1	-	-	-	-	1	286	0	-	-	-	-	0	0	-	-	-	-	0
Subtotal Improving School-Industry Relationships									5	2	-	-	-	7	6	2	-	-	-	8
B. Participatory Planning Process /d																				
5 staff from 10 schools	PTD	-	75	75	-	-	150	23.92	-	2	2	-	-	4	-	2	2	-	-	4
5 staff from MARD	PTD	-	15	-	-	-	15	23.92	-	0	-	-	-	0	-	0	-	-	-	0
Participant Travels	person	-	50	-	-	-	50	41.6	-	2	-	-	-	2	-	2	-	-	-	2
Trainer Fees	days	-	8	-	-	-	8	52	-	0	-	-	-	0	-	0	-	-	-	0
Training Room and Equipment Rental	days	-	6	-	-	-	6	62.4	-	0	-	-	-	0	-	0	-	-	-	0
Training Materials	set	-	1	-	-	-	1	286	-	0	-	-	-	0	-	0	-	-	-	0
Subtotal Participatory Planning Process									-	5	2	-	-	7	-	6	2	-	-	8
C. Organizational Planning and Development for Responding to Changing Institutions																				
5 staff from 10 schools	PTD	-	60	-	-	-	60	23.92	-	1	-	-	-	1	-	2	-	-	-	2
5 staff from MARD	PTD	-	15	-	-	-	15	23.92	-	0	-	-	-	0	-	0	-	-	-	0
Participant Travels	person	-	25	-	-	-	25	41.6	-	1	-	-	-	1	-	1	-	-	-	1
Trainer Fees	days	-	4	-	-	-	4	52	-	0	-	-	-	0	-	0	-	-	-	0
Training Room and Equipment Rental	PTD	-	3	-	-	-	3	62.4	-	0	-	-	-	0	-	0	-	-	-	0
Training Materials	set	-	1	-	-	-	1	286	-	0	-	-	-	0	-	0	-	-	-	0
Subtotal Organizational Planning and Development for Responding to Changing Institutions									-	4	-	-	-	4	-	4	-	-	-	4
D. Curriculum Development and Learner-centered Teaching Methods /f																				
15 staff from 10 schools	PTD	900	-	-	-	-	900	23.92	22	-	-	-	-	22	24	-	-	-	-	24
Participant Travel	person	150	-	-	-	-	150	41.6	6	-	-	-	-	6	7	-	-	-	-	7
Trainer Fees	days	36	-	-	-	-	36	52	2	-	-	-	-	2	2	-	-	-	-	2
Training Room and Equipment Rental	days	32	-	-	-	-	32	62.4	2	-	-	-	-	2	2	-	-	-	-	2
Training Materials	set	1	-	-	-	-	1	286	0	-	-	-	-	0	0	-	-	-	-	0
Subtotal Curriculum Development and Learner-centered Teaching Methods									32	-	-	-	-	32	36	-	-	-	-	36
E. Design and Development of Teaching and Learning Resources /g																				
15 staff from 10 schools	PTD	-	600	-	-	-	600	23.92	-	14	-	-	-	14	-	17	-	-	-	17
Participant Travel	person	-	150	-	-	-	150	41.6	-	6	-	-	-	6	-	7	-	-	-	7
Trainer Fees	days	-	24	-	-	-	24	52	-	1	-	-	-	1	-	1	-	-	-	1
Training Room and Equipment Rental	days	-	20	-	-	-	20	62.4	-	1	-	-	-	1	-	1	-	-	-	1
Training Materials	set	-	1	-	-	-	1	286	-	0	-	-	-	0	-	0	-	-	-	0
Subtotal Design and Development of Teaching and Learning Resources									-	23	-	-	-	23	-	27	-	-	-	27

<b>F. Upgrading of Teachers' Technical Skills /h</b>																			
10 staff from 10 schools	PTD	-	1,000	-	-	-	1,000	23.92	-	24	-	-	-	24	-	28	-	-	28
Trainer Fees	days	-	88	-	-	-	88	52	-	5	-	-	-	5	-	5	-	-	5
Training Materials	set	-	8	-	-	-	8	286	-	2	-	-	-	2	-	3	-	-	3
<b>Subtotal Upgrading of Teachers' Technical Skills</b>									-	31	-	-	-	31	-	36	-	-	36
<b>G. Regional Study Tour /i</b>																			
2 staff from 10 schools /j	PTD	-	120	-	-	-	120	60	-	7	-	-	-	7	-	8	-	-	8
3 staff from MARD	PTD	-	18	-	-	-	18	60	-	1	-	-	-	1	-	1	-	-	1
Round Trip Air Tickets	person	-	23	-	-	-	23	900	-	21	-	-	-	21	-	23	-	-	23
<b>Subtotal Regional Study Tour</b>									-	29	-	-	-	29	-	32	-	-	32
<b>H. Development of 15 Curriculum Guides (CG)</b>																			
<b>1. Training for DACUM (Developing a Curriculum)</b>																			
5 staff from 10 schools	PTD	50	-	-	-	-	50	23.92	1	-	-	-	-	1	1	-	-	-	1
Trainer Fees /k	days	3	-	-	-	-	3	52	0	-	-	-	-	0	0	-	-	-	0
Training Room and Equipment Rental	days	2	-	-	-	-	2	62.4	0	-	-	-	-	0	0	-	-	-	0
Training Materials	set	1	-	-	-	-	1	286	0	-	-	-	-	0	0	-	-	-	0
<b>Subtotal Training for DACUM (Developing a Curriculum)</b>									2	-	-	-	-	2	2	-	-	-	2
<b>2. DACUM Workshop</b>																			
20 participants	PTD	40	-	-	-	-	40	23.92	1	-	-	-	-	1	1	-	-	-	1
Facilitator Fees /l	days	3	-	-	-	-	3	52	0	-	-	-	-	0	0	-	-	-	0
Seminar Room and Equipment Rental	days	2	-	-	-	-	2	62.4	0	-	-	-	-	0	0	-	-	-	0
Workshop Materials	set	1	-	-	-	-	1	286	0	-	-	-	-	0	0	-	-	-	0
<b>Subtotal DACUM Workshop</b>									2	-	-	-	-	2	2	-	-	-	2
3. Vocational Analysis for Curriculum Guides (CG)	CG	15	-	-	-	-	15	3,120	47	-	-	-	-	47	53	-	-	-	53
4. Standards and Evaluation	CG	-	15	-	-	-	15	5,720	-	86	-	-	-	86	-	100	-	-	100
5. Curriculum Guides Writing	CG	-	15	-	-	-	15	1,040	-	16	-	-	-	16	-	18	-	-	18
<b>Subtotal Development of 15 Curriculum Guides (CG)</b>									50	101	-	-	-	151	56	118	-	-	175
<b>I. Development of Technical Specifications</b>																			
1. Technical Specs for Equipment	CG	-	-	15	-	-	15	1,040	-	-	16	-	-	16	-	-	19	-	19
2. Technical Specs for Teaching Resources	CG	-	-	15	-	-	15	1,040	-	-	16	-	-	16	-	-	19	-	19
<b>Subtotal Development of Technical Specifications</b>									-	-	31	-	-	31	-	-	38	-	38
<b>Total</b>									<b>87</b>	<b>195</b>	<b>33</b>	<b>-</b>	<b>-</b>	<b>315</b>	<b>98</b>	<b>226</b>	<b>40</b>	<b>-</b>	<b>364</b>

\a Participant Training Day (PTD) of \$22 on an in-country training course includes \$5 for per diem, \$15 for accommodation, and \$2 for refreshments.

\b 3 days each.

\c Fee includes preparation of the course.

\d 3 days each.

\e 3 days each.

\f 6 days each.

\g 4 days each.

\h 10 days each.

\i On good practices in planning, quality control, qualification accreditation, and regional development.

\j PTD of \$60 on regional course includes \$20 for per diem and \$40 for accommodation.

\k Fee includes preparation of the program.

\l Fee includes preparation of workshop.

Table B9: Improvement of Training Capacity

Item	Unit	Quantities						Unit Cost -	Base Cost - Negotiation (US\$ '000)						Totals Including Contingencies (US\$ '000)					
		2007	2008	2009	2010	2011	Total	Negotiation (US\$)	2007	2008	2009	2010	2011	Total	2007	2008	2009	2010	2011	Total
I. Investment Costs																				
A. Da Nang Food College																				
1. Equipment - School Administration																				
Computers	unit	-	5	-	-	-	5	1,108.25	-	6	-	-	-	6	-	6	-	-	-	6
PC Software	set	-	3	-	-	-	3	171.6	-	1	-	-	-	1	-	1	-	-	-	1
Subtotal Equipment									-	6	-	-	-	6	-	6	-	-	-	6
2. Equipment - Laboratory and Practice Areas /a																				
Laboratory Equipment	laboratory	-	-	-	4	-	4	110,825	-	-	-	443	-	443	-	-	-	457	-	457
Food Processing Equipment	unit	-	-	-	8	-	8	55,412.5	-	-	-	443	-	443	-	-	-	457	-	457
Subtotal Equipment									-	-	-	887	-	887	-	-	-	915	-	915
3. Library Equipment and Resources																				
Computers	unit	-	-	-	-	10	10	1,108.25	-	-	-	-	11	11	-	-	-	-	12	12
Furniture	library	-	-	-	-	1	1	4,433	-	-	-	-	4	4	-	-	-	-	5	5
Learning Materials and Books	unit	-	-	-	-	425	425	22.88	-	-	-	-	10	10	-	-	-	-	13	13
Subtotal									-	-	-	-	25	25	-	-	-	-	29	29
4. Teaching Facility Renovation																				
10 classrooms for renovation	sqm	-	300	300	-	-	600	114.675	-	34	34	-	-	69	-	40	42	-	-	82
2 laboratories for renovation	sqm	-	-	120	-	-	120	137.61	-	-	17	-	-	17	-	-	20	-	-	20
Subtotal									-	34	51	-	-	85	-	40	62	-	-	103
5. Construction of Teaching Facilities																				
4 classrooms	sqm	-	240	-	-	-	240	201.828	-	48	-	-	-	48	-	57	-	-	-	57
5 laboratories	sqm	-	-	300	-	-	300	229.35	-	-	69	-	-	69	-	-	84	-	-	84
Subtotal									-	48	69	-	-	117	-	57	84	-	-	141
Subtotal Da Nang Food College									-	89	120	887	25	1,120	-	103	146	915	29	1,193
B. Bao Loc Secondary Technical and Vocational School																				
1. Equipment - School Administration																				
Computers	unit	-	5	-	-	-	5	1,108.25	-	6	-	-	-	6	-	6	-	-	-	6
PC Software	set	-	3	-	-	-	3	171.6	-	1	-	-	-	1	-	1	-	-	-	1
Subtotal Equipment									-	6	-	-	-	6	-	6	-	-	-	6
2. Equipment - Laboratory and Practice Areas /b																				
Laboratory Equipment	laboratory	-	-	-	3	-	3	110,825	-	-	-	332	-	332	-	-	-	343	-	343
Practice Area Equipment	unit	-	-	-	1	-	1	332,475	-	-	-	332	-	332	-	-	-	343	-	343
Subtotal Equipment									-	-	-	665	-	665	-	-	-	686	-	686
3. Library Equipment and Resources																				
Computers	unit	-	-	-	-	10	10	1,108.25	-	-	-	-	11	11	-	-	-	-	12	12
Furniture	library	-	-	-	-	1	1	4,433	-	-	-	-	4	4	-	-	-	-	5	5
Learning Materials and Books	unit	-	-	-	-	400	400	22.88	-	-	-	-	9	9	-	-	-	-	12	12
Subtotal									-	-	-	-	25	25	-	-	-	-	28	28
4. Teaching Facility Renovation																				
10 classrooms for renovation	sqm	-	150	150	150	150	600	114.675	-	17	17	17	17	69	-	20	21	22	23	86
5 laboratories for renovation	sqm	-	150	150	-	-	300	137.61	-	21	21	-	-	41	-	24	25	-	-	49
Subtotal									-	38	38	17	17	110	-	44	46	22	23	135
5. Construction of Teaching Facilities																				
10 classrooms	sqm	-	300	300	-	-	600	201.828	-	61	61	-	-	121	-	71	74	-	-	145
5 laboratories	sqm	-	-	300	-	-	300	229.35	-	-	69	-	-	69	-	-	84	-	-	84
1 practice area	sqm	-	-	300	-	-	300	229.35	-	-	69	-	-	69	-	-	84	-	-	84
Subtotal									-	61	198	-	-	259	-	71	242	-	-	313
Subtotal Bao Loc Secondary Technical and Vocational School									-	104	236	682	42	1,064	-	122	289	708	51	1,169

**C. Ha Tay Secondary Technical and Vocational School**
**1. Equipment - School Administration**

Computers	unit	-	5	-	-	-	5	1,108.25	-	6	-	-	-	6	-	6	-	-	-	6
PC Software	set	-	3	-	-	-	3	171.6	-	1	-	-	-	1	-	1	-	-	-	1
<b>Subtotal</b>									-	6	-	-	-	6	-	6	-	-	-	6

**2. Equipment - Laboratory and Practice Areas /c**

Laboratory Equipment	laboratory	-	-	-	3	-	3	110,825	-	-	-	332	-	332	-	-	-	343	-	343
Practice Area Equipment	unit	-	-	-	1	-	1	332,475	-	-	-	332	-	332	-	-	-	343	-	343
<b>Subtotal</b>									-	-	-	665	-	665	-	-	-	686	-	686

**3. Library Equipment and Resources**

Computers	unit	-	-	-	-	10	10	1,108.25	-	-	-	-	11	11	-	-	-	-	12	12
Furniture	library	-	-	-	-	1	1	4,433	-	-	-	-	4	4	-	-	-	-	5	5
Learning Materials and Books	unit	-	-	-	-	300	300	22.88	-	-	-	-	7	7	-	-	-	-	9	9
<b>Subtotal</b>									-	-	-	-	22	22	-	-	-	-	25	25

**4. Teaching Facility Renovation**

15 classrooms for renovation	sqm	-	300	300	300	-	900	114.675	-	34	34	34	-	103	-	40	42	44	-	126
7 laboratories for renovation	sqm	-	210	210	-	-	420	137.61	-	29	29	-	-	58	-	34	35	-	-	69
2 practice areas	sqm	-	-	300	300	-	600	137.61	-	-	41	41	-	83	-	-	50	53	-	103
<b>Subtotal</b>									-	63	105	76	-	244	-	74	128	97	-	299

**Subtotal Ha Tay Secondary Technical and Vocational School**
**D. Tien Giang Agricultural and Rural Development Vocational School**
**1. Equipment - School Administration**

Computers	unit	-	5	-	-	-	5	1,108.25	-	6	-	-	-	6	-	6	-	-	-	6
PC Software	set	-	3	-	-	-	3	171.6	-	1	-	-	-	1	-	1	-	-	-	1
<b>Subtotal</b>									-	6	-	-	-	6	-	6	-	-	-	6

**2. Equipment - Laboratory and Practice Areas /d**

Laboratory Equipment	laboratory	-	-	-	2	-	2	110,825	-	-	-	222	-	222	-	-	-	229	-	229
Food Processing Equipment	unit	-	-	-	5	-	5	55,412.5	-	-	-	277	-	277	-	-	-	286	-	286
Practice Area Equipment	unit	-	-	-	1	-	1	332,475	-	-	-	332	-	332	-	-	-	343	-	343
<b>Subtotal</b>									-	-	-	831	-	831	-	-	-	858	-	858

**3. Library Equipment and Resources**

Computers	unit	-	-	-	-	10	10	1,108.25	-	-	-	-	11	11	-	-	-	-	12	12
Furniture	library	-	-	-	-	1	1	4,433	-	-	-	-	4	4	-	-	-	-	5	5
Learning Materials and Books	unit	-	-	-	-	300	300	22.88	-	-	-	-	7	7	-	-	-	-	9	9
<b>Subtotal</b>									-	-	-	-	22	22	-	-	-	-	25	25

**4. Teaching Facility Renovation**

2 laboratories for renovation	sqm	-	120	-	-	-	120	137.61	-	17	-	-	-	17	-	19	-	-	-	19
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**Subtotal Tien Giang Agricultural and Rural Development Vocational School**
**E. Can Tho Agricultural and Rural Development Vocational School**
**1. Equipment - School Administration**

Computers	unit	-	5	-	-	-	5	1,108.25	-	6	-	-	-	6	-	6	-	-	-	6
PC Software	set	-	3	-	-	-	3	171.6	-	1	-	-	-	1	-	1	-	-	-	1
<b>Subtotal</b>									-	6	-	-	-	6	-	6	-	-	-	6

**2. Equipment - Laboratory and Practice Areas /e**

Laboratory Equipment	laboratory	-	-	2	-	-	2	110,825	-	-	222	-	-	222	-	-	226	-	-	226
Food Processing Equipment	unit	-	-	-	3	-	3	55,412.5	-	-	-	166	-	166	-	-	-	172	-	172
Practice Area Equipment	unit	-	-	-	1	-	1	332,475	-	-	-	332	-	332	-	-	-	343	-	343
<b>Subtotal</b>									-	-	222	499	-	720	-	-	226	515	-	741

**3. Library Equipment and Resources**

Computers	unit	-	-	-	-	10	10	1,108.25	-	-	-	-	11	11	-	-	-	-	12	12
Furniture	library	-	-	-	-	1	1	4,433	-	-	-	-	4	4	-	-	-	-	5	5
Learning Materials and Books	unit	-	-	-	-	300	300	22.88	-	-	-	-	7	7	-	-	-	-	9	9
<b>Subtotal</b>									-	-	-	-	22	22	-	-	-	-	25	25

<b>4. Teaching Facility Renovation</b>																			
1 laboratory for renovation	sqm	-	60	-	-	-	60	137.61	-	8	-	-	-	8	-	10	-	-	10
<b>5. Construction of Teaching Facilities</b>																			
2 laboratories	sqm	-	-	120	-	-	120	229.35	-	-	28	-	-	28	-	-	34	-	34
1 practice area	sqm	-	-	300	-	-	300	229.35	-	-	69	-	-	69	-	-	84	-	84
<b>Subtotal</b>									-	-	96	-	-	96	-	-	118	-	118
<b>Subtotal Can Tho Agricultural and Rural Development</b>										-	14	318	499	22	853	-	16	344	515
<b>F. Hai Phong Secondary Technical School for Food and</b>																			
<b>1. Equipment - School Administration</b>																			
Computers	unit	-	5	-	-	-	5	1,108.25	-	6	-	-	-	6	-	6	-	-	6
PC Software	set	-	3	-	-	-	3	171.6	-	1	-	-	-	1	-	1	-	-	1
<b>Subtotal</b>									-	6	-	-	-	6	-	6	-	-	6
<b>2. Equipment - Laboratory and Practice Areas /f</b>																			
Laboratory Equipment	laboratory	-	-	2	-	-	2	110,825	-	-	222	-	-	222	-	-	226	-	226
Food Processing Equipment	unit	-	-	-	3	-	3	55,412.5	-	-	-	166	-	166	-	-	-	172	172
<b>Subtotal</b>									-	-	222	166	-	388	-	-	226	172	398
<b>3. Library Equipment and Resources</b>																			
Computers	unit	-	-	-	-	10	10	1,108.25	-	-	-	-	11	11	-	-	-	-	12
Furniture	library	-	-	-	-	1	1	4,433	-	-	-	-	4	4	-	-	-	-	5
Learning Materials and Books	unit	-	-	-	-	300	300	22.88	-	-	-	-	7	7	-	-	-	-	9
<b>Subtotal</b>									-	-	-	-	22	22	-	-	-	-	25
<b>4. Teaching Facility Renovation</b>																			
2 classrooms for renovation	sqm	-	-	120	-	-	120	114.675	-	-	14	-	-	14	-	-	17	-	17
2 laboratories for renovation	sqm	-	120	-	-	-	120	137.61	-	17	-	-	-	17	-	19	-	-	19
<b>Subtotal</b>									-	17	14	-	-	30	-	19	17	-	36
<b>5. Construction of Teaching Facilities</b>																			
1 practice area	sqm	-	-	300	-	-	300	229.35	-	-	69	-	-	69	-	-	84	-	84
<b>Subtotal Hai Phong Secondary Technical School for Food and</b>										-	23	304	166	22	515	-	26	327	172
<b>G. Ho Chi Minh City Secondary Technical School for Food and</b>																			
<b>1. Equipment - School Administration</b>																			
Computers	unit	-	5	-	-	-	5	1,108.25	-	6	-	-	-	6	-	6	-	-	6
PC Software	set	-	3	-	-	-	3	171.6	-	1	-	-	-	1	-	1	-	-	1
<b>Subtotal</b>									-	6	-	-	-	6	-	6	-	-	6
<b>2. Equipment - Laboratory and Practice Areas /g</b>																			
Laboratory Equipment	laboratory	-	-	2	-	-	2	110,825	-	-	222	-	-	222	-	-	226	-	226
Food Processing Equipment	unit	-	-	-	5	-	5	55,412.5	-	-	-	277	-	277	-	-	-	286	286
<b>Subtotal</b>									-	-	222	277	-	499	-	-	226	286	512

3. Library Equipment and Resources																				26	Supplementary Appendix B	
Computers	unit	-	-	-	-	10	10	1,108.25	-	-	-	-	11	11	-	-	-	-	12			12
Furniture	library	-	-	-	-	1	1	4,433	-	-	-	-	4	4	-	-	-	-	5			5
Learning Materials and Books	unit	-	-	-	-	300	300	22.88	-	-	-	-	7	7	-	-	-	-	9			9
Subtotal									-	-	-	-	22	22	-	-	-	-	25	25		
4. Teaching Facility Renovation																						
5 classrooms for renovation	sqm	-	-	300	-	-	300	114.675	-	-	34	-	-	34	-	-	42	-	-	42		
2 laboratories for renovation	sqm	-	120	-	-	-	120	137.61	-	17	-	-	-	17	-	19	-	-	-	19		
Subtotal									-	17	34	-	-	51	-	19	42	-	-	61		
5. Construction of Teaching Facilities																						
1 practice area	sqm	-	-	300	-	-	300	229.35	-	-	69	-	-	69	-	-	84	-	-	84		
Subtotal Ho Chi Minh City Secondary Technical School									-	23	325	277	22	647	-	26	352	286	25	689		
H. Ha Noi Agricultural Materials and Food Secondary Te																						
1. Equipment - School Administration																						
Computers	unit	-	3	-	-	-	3	1,108.25	-	3	-	-	-	3	-	3	-	-	-	3		
PC Software	set	-	3	-	-	-	3	171.6	-	1	-	-	-	1	-	1	-	-	-	1		
Subtotal									-	4	-	-	-	4	-	4	-	-	-	4		
2. Equipment - Laboratory and Practice Areas /h																						
Laboratory Equipment	laboratory	-	-	2	-	-	2	88,660	-	-	177	-	-	177	-	-	181	-	-	181		
Food Processing Equipment	unit	-	-	-	5	-	5	55,412.5	-	-	-	277	-	277	-	-	-	286	-	286		
Subtotal									-	-	177	277	-	454	-	-	181	286	-	467		
3. Library Equipment and Resources																						
Computers	unit	-	-	-	-	5	5	1,108.25	-	-	-	-	6	6	-	-	-	-	6	6		
Furniture	library	-	-	-	-	1	1	4,433	-	-	-	-	4	4	-	-	-	-	5	5		
Learning Materials and Books	unit	-	-	-	-	300	300	22.88	-	-	-	-	7	7	-	-	-	-	9	9		
Subtotal									-	-	-	-	17	17	-	-	-	-	19	19		
4. Teaching Facility Renovation																						
5 classrooms for renovation	sqm	-	-	300	-	-	300	114.675	-	-	34	-	-	34	-	-	42	-	-	42		
4 laboratories for renovation	sqm	-	120	120	-	-	240	137.61	-	17	17	-	-	33	-	19	20	-	-	40		
Subtotal									-	17	51	-	-	67	-	19	62	-	-	82		
5. Construction of Teaching Facilities																						
4 laboratories	sqm	-	-	120	120	-	240	229.35	-	-	28	28	-	55	-	-	34	35	-	69		
1 practice area	sqm	-	-	300	-	-	300	229.35	-	-	69	-	-	69	-	-	84	-	-	84		
Subtotal									-	-	96	28	-	124	-	-	118	35	-	153		
Subtotal Ha Noi Agricultural Materials and Food Second																						
I. Central Water Resources Vocational School No.1 (Ha																						
1. Equipment - School Administration																						
Computers	unit	-	5	-	-	-	5	1,108.25	-	6	-	-	-	6	-	6	-	-	-	6		
PC Software	set	-	5	-	-	-	5	171.6	-	1	-	-	-	1	-	1	-	-	-	1		
Subtotal									-	6	-	-	-	6	-	7	-	-	-	7		
2. Equipment - Laboratory and Practice Areas /i																						
Laboratory Equipment	laboratory	-	-	4	-	-	4	74,252.75	-	-	297	-	-	297	-	-	303	-	-	303		
Pumping and Testing Unit	unit	-	-	-	4	-	4	55,412.5	-	-	-	222	-	222	-	-	-	229	-	229		
Subtotal									-	-	297	222	-	519	-	-	303	229	-	532		

<b>3. Library Equipment and Resources</b>																				
Computers	unit	-	-	-	-	5	5	1,108.25	-	-	-	-	6	6	-	-	-	-	6	6
Furniture	library	-	-	-	-	1	1	4,433	-	-	-	-	4	4	-	-	-	-	5	5
Learning Materials and Books	unit	-	-	-	-	310	310	22.88	-	-	-	-	7	7	-	-	-	-	9	9
<b>Subtotal</b>									-	-	-	-	17	17	-	-	-	-	20	20
<b>4. Teaching Facility Renovation</b>																				
2 classrooms for renovation	sqm	-	-	100	-	-	100	114.675	-	-	11	-	-	11	-	-	14	-	-	14
2 laboratories for renovation	sqm	-	60	60	-	-	120	137.61	-	8	8	-	-	17	-	10	10	-	-	20
<b>Subtotal</b>									-	8	20	-	-	28	-	10	24	-	-	34
<b>5. Construction of Teaching Facilities</b>																				
2 laboratories	sqm	-	-	60	60	-	120	229.35	-	-	14	14	-	28	-	-	17	18	-	34
1 practice area	sqm	-	-	200	-	-	200	229.35	-	-	46	-	-	46	-	-	56	-	-	56
<b>Subtotal</b>									-	-	60	14	-	73	-	-	73	18	-	90
<b>Subtotal Central Water Resources Vocational School N</b>									-	15	376	235	17	644	-	16	400	246	20	682
<b>J. Central Water Resources Vocational School No.2 (Qu</b>																				
<b>1. Equipment - School Administration</b>																				
Computers	unit	-	5	-	-	-	5	1,108.25	-	6	-	-	-	6	-	6	-	-	-	6
PC Software	set	-	5	-	-	-	5	171.6	-	1	-	-	-	1	-	1	-	-	-	1
<b>Subtotal</b>									-	6	-	-	-	6	-	7	-	-	-	7
<b>2. Equipment - Laboratory and Practice Areas /j</b>																				
Laboratory Equipment	laboratory	-	-	4	-	-	4	74,252.75	-	-	297	-	-	297	-	-	303	-	-	303
Pumping and Testing Unit	unit	-	-	-	4	-	4	55,412.5	-	-	-	222	-	222	-	-	-	229	-	229
<b>Subtotal</b>									-	-	297	222	-	519	-	-	303	229	-	532
<b>3. Library Equipment and Resources</b>																				
Computers	unit	-	-	-	-	5	5	1,108.25	-	-	-	-	6	6	-	-	-	-	6	6
Furniture	library	-	-	-	-	1	1	4,433	-	-	-	-	4	4	-	-	-	-	5	5
Learning Materials and Books	unit	-	-	-	-	250	250	22.88	-	-	-	-	6	6	-	-	-	-	8	8
<b>Subtotal</b>									-	-	-	-	16	16	-	-	-	-	18	18
<b>4. Teaching Facility Renovation</b>																				
2 classrooms for renovation	sqm	-	-	100	-	-	100	114.675	-	-	11	-	-	11	-	-	14	-	-	14
2 laboratories for renovation	sqm	-	60	60	-	-	120	137.61	-	8	8	-	-	17	-	10	10	-	-	20
<b>Subtotal</b>									-	8	20	-	-	28	-	10	24	-	-	34
<b>5. Construction of Teaching Facilities</b>																				
2 laboratories	sqm	-	-	60	60	-	120	229.35	-	-	14	14	-	28	-	-	17	18	-	34
1 practice area	sqm	-	-	200	-	-	200	229.35	-	-	46	-	-	46	-	-	56	-	-	56
<b>Subtotal</b>									-	-	60	14	-	73	-	-	73	18	-	90
<b>Subtotal Central Water Resources Vocational School N</b>									-	15	376	235	16	642	-	16	400	246	18	681
<b>K. Procurement of Teaching and Resources</b>																				
Teaching Resources (Textbooks, Video Materials, and Othe	school	-	-	-	10	-	10	76,419.2	-	-	-	764	-	764	-	-	-	968	-	968
<b>Total</b>									-	394	2,485	5,622	229	8,730	-	454	2,747	6,016	264	9,481

Table B10: Project Management Support

Item	Unit	Quantities						Unit Cost -	Base Cost - Negotiation (US\$ '000)						Totals Including Contingencies (US\$ '000)					
		2007	2008	2009	2010	2011	Total	Negotiation (US\$)	2007	2008	2009	2010	2011	Total	2007	2008	2009	2010	2011	Total
I. Investment Costs																				
A. Central Project Management Unit (CPMU)																				
1. Management Staff																				
CPMU Project Director	person-month	12	12	12	12	12	60	357	4	4	4	4	4	21	5	5	5	6	6	27
CPMU Deputy Project Director	person-month	12	12	12	12	12	60	262.5	3	3	3	3	3	16	4	4	4	4	4	20
Planning Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
Finance Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
Senior Procurement Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
Procurement Staff	person-month	18	24	24	12	12	90	126	2	3	3	2	2	11	3	4	4	2	2	14
Senior Monitoring and Evaluation Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
Monitoring and Evaluation Staff	person-month	9	18	24	24	24	99	126	1	2	3	3	3	12	1	3	4	4	4	16
Supporting Staff	person-month	24	24	24	24	24	120	105	3	3	3	3	3	13	3	3	3	3	3	16
Auxiliary Staff	person-month	36	36	36	36	36	180	72.45	3	3	3	3	3	13	3	3	3	3	4	16
Subtotal Management Staff									26	28	29	27	27	137	29	33	36	35	37	171
2. Technical Staff																				
Environment Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
Social Development Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
Research Officers	person-month	24	24	24	24	24	120	210	5	5	5	5	5	25	6	6	6	7	7	31
Extension Officers	person-month	24	24	24	24	24	120	210	5	5	5	5	5	25	6	6	6	7	7	31
Training and Curriculum Design Officers	person-month	24	24	24	24	24	120	210	5	5	5	5	5	25	6	6	6	7	7	31
Subtotal Technical Staff									20	20	20	20	20	101	23	24	25	26	28	126
3. Operating Expenses																				
Office, Travel and Communications Expenses	month	12	12	12	12	12	60	2,860	34	34	34	34	34	172	39	40	42	43	45	209
Vehicle Operating Costs	month	24	24	24	24	24	120	251.68	6	6	6	6	6	30	7	7	7	8	8	37
Subtotal Operating Expenses									40	40	40	40	40	202	45	47	49	51	53	246
4. Equipment																				
Computers	unit	10	-	-	-	-	10	1,108.25	11	-	-	-	-	11	11	-	-	-	-	11
Networking	unit	1	-	-	-	-	1	572	1	-	-	-	-	1	1	-	-	-	-	1
PC Software	set	4	-	-	-	-	4	800.8	3	-	-	-	-	3	4	-	-	-	-	4
Printers	unit	3	-	-	-	-	3	528.938	2	-	-	-	-	2	2	-	-	-	-	2
Photocopiers	unit	2	-	-	-	-	2	4,987.125	10	-	-	-	-	10	10	-	-	-	-	10
Fax Machine	unit	1	-	-	-	-	1	531.96	1	-	-	-	-	1	1	-	-	-	-	1
Telephone System	unit	1	-	-	-	-	1	664.95	1	-	-	-	-	1	1	-	-	-	-	1
Multi-media Projector	unit	1	-	-	-	-	1	4,433	4	-	-	-	-	4	4	-	-	-	-	4
Office Furniture	set	12	-	-	-	-	12	166.237	2	-	-	-	-	2	2	-	-	-	-	2
Air Conditioners	unit	7	-	-	-	-	7	1,329.9	9	-	-	-	-	9	9	-	-	-	-	9
Service Vehicle (4-wheel Drive)	unit	1	-	-	-	-	1	72,242.5	72	-	-	-	-	72	73	-	-	-	-	73
Miscellaneous Office Materials	lump	1	-	-	-	-	1	11,440	11	-	-	-	-	11	13	-	-	-	-	13
Subtotal Equipment									127	-	-	-	-	127	130	-	-	-	-	130
5. Consulting Services for Project Implementat																				
Agr Research Management (Int)	person-month	6	6	2	2	-	16	16,000	96	96	32	32	-	256	96	96	32	32	-	256
Agr Extension Management (Int)	person-month	3	2	-	-	-	5	16,000	48	32	-	-	-	80	48	32	-	-	-	80
Agr Vocational Training (Int)	person-month	1	-	-	-	-	1	16,000	16	-	-	-	-	16	16	-	-	-	-	16
Social Development (Int)	person-month	2	-	-	-	-	2	16,000	32	-	-	-	-	32	32	-	-	-	-	32
Environmental Assessment (Int)	person-month	2	-	-	-	-	2	16,000	32	-	-	-	-	32	32	-	-	-	-	32
Financial Management (Int)	person-month	1	-	-	-	-	1	16,000	16	-	-	-	-	16	16	-	-	-	-	16
Monitoring and Evaluation (Int)	person-month	1	1	-	-	-	2	16,000	16	16	-	-	-	32	16	16	-	-	-	32
Agr Research Management (Nat)	person-month	10	8	8	8	-	34	2,500	25	20	20	20	-	85	25	20	20	20	-	85

Agr Extension Management (Nat)	person-month	6	6	5	5	-	22	2,500	15	15	13	13	-	55	15	15	13	13	-	55
Agr Vocational Training (Nat)	person-month	4	7	-	-	-	11	2,500	10	18	-	-	-	28	10	18	-	-	-	28
Social Development (Nat)	person-month	2	2	2	-	-	6	2,500	5	5	5	-	-	15	5	5	5	-	-	15
Environmental Assessment (Nat)	person-month	5	2	2	2	-	11	2,500	13	5	5	5	-	28	13	5	5	5	-	28
Financial Management (Nat)	person-month	3	3	2	-	-	8	2,500	8	8	5	-	-	20	8	8	5	-	-	20
Monitoring and Evaluation	person-month	1	2	1	-	-	4	2,500	3	5	3	-	-	10	3	5	3	-	-	10
Out-of-Pocket Expenses	lump	30	30	22	10	-	92	2,800	84	84	62	28	-	258	84	84	62	28	-	258
Short-term Surveys and Assessments	lump	2	2	2	2	2	10	2,000	4	4	4	4	4	20	4	4	4	4	4	20
<b>Subtotal Consulting Services for Project Imple</b>									422	307	148	102	4	982	422	307	148	102	4	982
<b>Subtotal Central Project Management Unit (CPMU</b>									635	395	237	189	92	1,548	649	411	257	215	122	1,654
<b>B. Provincial Project Management (Thanh Hoa Pro</b>																				
<b>1. Provincial Project Management Unit (PPMU)</b>																				
PPMU Head	person-month	12	12	12	12	12	60	262.5	3	3	3	3	3	16	4	4	4	4	4	20
Planning and Procurement Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
MIS/Database Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
Extension/Training Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
Social Development Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
Monitoring and Evaluation Officer	person-month	6	12	12	12	12	54	210	1	3	3	3	3	11	1	3	3	3	3	14
Accounting Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
Administrative Assistant	person-month	12	12	12	12	12	60	105	1	1	1	1	1	6	1	1	2	2	2	8
Support Staff	person-month	12	12	12	12	12	60	72.45	1	1	1	1	1	4	1	1	1	1	1	5
<b>Subtotal Provincial Project Management Unit (P</b>									19	20	20	20	20	101	22	24	25	27	28	126
<b>2. PPMU Operating Expenses</b>																				
Office, Travel and Communications Expenses	month	12	12	12	12	12	60	858	10	10	10	10	10	51	12	12	13	13	14	63
Vehicle Operating Costs /a	month	12	12	12	12	12	60	251.68	3	3	3	3	3	15	3	4	4	4	4	18
<b>Subtotal PPMU Operating Expenses</b>									13	13	13	13	13	67	15	16	16	17	18	81
<b>3. PPMU Equipment</b>																				
Computers	unit	4	-	-	-	-	4	1,108.25	4	-	-	-	-	4	4	-	-	-	-	4
Laptopcomputer	unit	1	-	-	-	-	1	2,216.5	2	-	-	-	-	2	2	-	-	-	-	2
Networking	unit	1	-	-	-	-	1	572	1	-	-	-	-	1	1	-	-	-	-	1
PC Software	set	1	-	-	-	-	1	800.8	1	-	-	-	-	1	1	-	-	-	-	1
Printers	unit	1	-	-	-	-	1	528.938	1	-	-	-	-	1	1	-	-	-	-	1
Photocopier	unit	1	-	-	-	-	1	4,987.125	5	-	-	-	-	5	5	-	-	-	-	5
Fax Machine	unit	1	-	-	-	-	1	531.96	1	-	-	-	-	1	1	-	-	-	-	1
Multi-media Projector	unit	1	-	-	-	-	1	4,433	4	-	-	-	-	4	4	-	-	-	-	4
Office Furniture	set	7	-	-	-	-	7	166.237	1	-	-	-	-	1	1	-	-	-	-	1
Air Conditioners	unit	3	-	-	-	-	3	1,329.9	4	-	-	-	-	4	4	-	-	-	-	4
Miscellaneous Office Materials	lump	1	-	-	-	-	1	2,288	2	-	-	-	-	2	3	-	-	-	-	3
<b>Subtotal PPMU Equipment</b>									26	-	-	-	-	26	26	-	-	-	-	26
<b>Subtotal Provincial Project Management (Thanh H</b>									58	34	34	34	34	193	63	40	42	43	46	233
<b>C. Provincial Project Management (Nghe An Provi</b>																				
<b>1. Provincial Project Management Unit (PPMU)</b>																				
PPMU Head	person-month	12	12	12	12	12	60	262.5	3	3	3	3	3	16	4	4	4	4	4	20
Planning and Procurement Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
MIS/Database Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
Extension/Training Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
Social Development Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
Monitoring and Evaluation Officer	person-month	6	12	12	12	12	54	210	1	3	3	3	3	11	1	3	3	3	3	14
Accounting Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
Administrative Assistant	person-month	12	12	12	12	12	60	105	1	1	1	1	1	6	1	1	2	2	2	8
Support Staff	person-month	12	12	12	12	12	60	72.45	1	1	1	1	1	4	1	1	1	1	1	5
<b>Subtotal Provincial Project Management Unit (P</b>									19	20	20	20	20	101	22	24	25	27	28	126

2. PPMU Operating Exepenses																					30 Supplementary Appendix B	
Office, Travel and Communications Expenses	month	12	12	12	12	12	60	858	10	10	10	10	10	51	12	12	13	13	14	63		
Vehicle Operating Costs /b	month	12	12	12	12	12	60	251.68	3	3	3	3	3	15	3	4	4	4	4	18		
Subtotal PMU Operating Exepenses									13	13	13	13	13	67	15	16	16	17	18	81		
3. PPMU Equipment																						
Computers	unit	4	-	-	-	-	4	1,108.25	4	-	-	-	-	4	4	-	-	-	-	4		
Laptopcomputer	unit	1	-	-	-	-	1	2,216.5	2	-	-	-	-	2	2	-	-	-	-	2		
Networking	unit	1	-	-	-	-	1	572	1	-	-	-	-	1	1	-	-	-	-	1		
PC Software	set	1	-	-	-	-	1	800.8	1	-	-	-	-	1	1	-	-	-	-	1		
Printers	unit	1	-	-	-	-	1	528.938	1	-	-	-	-	1	1	-	-	-	-	1		
Photocopier	unit	1	-	-	-	-	1	4,987.125	5	-	-	-	-	5	5	-	-	-	-	5		
Fax Machine	unit	1	-	-	-	-	1	531.96	1	-	-	-	-	1	1	-	-	-	-	1		
Multi-media Projector	unit	1	-	-	-	-	1	4,433	4	-	-	-	-	4	4	-	-	-	-	4		
Office Furniture	set	7	-	-	-	-	7	166.237	1	-	-	-	-	1	1	-	-	-	-	1		
Air Conditioners	unit	3	-	-	-	-	3	1,329.9	4	-	-	-	-	4	4	-	-	-	-	4		
Miscellaneous Office Materials	lump	1	-	-	-	-	1	2,288	2	-	-	-	-	2	3	-	-	-	-	3		
Subtotal PMU Equipment									26	-	-	-	-	26	26	-	-	-	-	26		
Subtotal Provincial Project Management (Nghe An)									58	34	34	34	34	193	63	40	42	43	46	233		
D. Provincial Project Management (Quang Nam Province)																						
1. Provincial Project Management Unit (PPMU)																						
PPMU Head	person-month	12	12	12	12	12	60	262.5	3	3	3	3	3	16	4	4	4	4	4	20		
Planning and Procurement Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16		
MIS/Database Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16		
Extension/Training Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16		
Social Development Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16		
Monitoring and Evaluation Officer	person-month	6	12	12	12	12	54	210	1	3	3	3	3	11	1	3	3	3	3	14		
Accounting Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16		
Administrative Assistant	person-month	12	12	12	12	12	60	105	1	1	1	1	1	6	1	1	2	2	2	8		
Support Staff	person-month	12	12	12	12	12	60	72.45	1	1	1	1	1	4	1	1	1	1	1	5		
Subtotal Provincial Project Management Unit (PPMU)									19	20	20	20	20	101	22	24	25	27	28	126		
2. PPMU Operating Exepenses																						
Office, Travel and Communications Expenses	month	12	12	12	12	12	60	858	10	10	10	10	10	51	12	12	13	13	14	63		
Vehicle Operating Costs /c	month	12	12	12	12	12	60	251.68	3	3	3	3	3	15	3	4	4	4	4	18		
Subtotal PMU Operating Exepenses									13	13	13	13	13	67	15	16	16	17	18	81		
3. PPMU Equipment																						
Computers	unit	4	-	-	-	-	4	1,108.25	4	-	-	-	-	4	4	-	-	-	-	4		
Laptopcomputer	unit	1	-	-	-	-	1	2,216.5	2	-	-	-	-	2	2	-	-	-	-	2		
Networking	unit	1	-	-	-	-	1	572	1	-	-	-	-	1	1	-	-	-	-	1		
PC Software	set	1	-	-	-	-	1	800.8	1	-	-	-	-	1	1	-	-	-	-	1		
Printers	unit	1	-	-	-	-	1	528.938	1	-	-	-	-	1	1	-	-	-	-	1		
Photocopier	unit	1	-	-	-	-	1	4,987.125	5	-	-	-	-	5	5	-	-	-	-	5		
Fax Machine	unit	1	-	-	-	-	1	531.96	1	-	-	-	-	1	1	-	-	-	-	1		
Multi-media Projector	unit	1	-	-	-	-	1	4,433	4	-	-	-	-	4	4	-	-	-	-	4		
Office Furniture	set	7	-	-	-	-	7	166.237	1	-	-	-	-	1	1	-	-	-	-	1		
Air Conditioners	unit	3	-	-	-	-	3	1,329.9	4	-	-	-	-	4	4	-	-	-	-	4		
Miscellaneous Office Materials	lump	1	-	-	-	-	1	2,288	2	-	-	-	-	2	3	-	-	-	-	3		
Subtotal PMU Equipment									26	-	-	-	-	26	26	-	-	-	-	26		
Subtotal Provincial Project Management (Quang Nam Province)									58	34	34	34	34	193	63	40	42	43	46	233		

# E. Provincial Project Management (Dak Nong Prov

## 1. Provincial Project Management Unit (PPMU)

PPMU Head	person-month	12	12	12	12	12	60	262.5	3	3	3	3	3	16	4	4	4	4	4	20
Planning and Procurement Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
MIS/Database Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
Extension/Training Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
Social Development Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
Monitoring and Evaluation Officer	person-month	6	12	12	12	12	54	210	1	3	3	3	3	11	1	3	3	3	3	14
Accounting Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
Administrative Assistant	person-month	12	12	12	12	12	60	105	1	1	1	1	1	6	1	1	2	2	2	8
Support Staff	person-month	12	12	12	12	12	60	72.45	1	1	1	1	1	4	1	1	1	1	1	5

## Subtotal rovincial Project Management Unit (PP

## 2. PPMU Operating Expenses

Office, Travel and Communications Expenses	month	12	12	12	12	12	60	858	10	10	10	10	10	51	12	12	13	13	14	63
Vehicle Operating Costs /d	month	12	12	12	12	12	60	251.68	3	3	3	3	3	15	3	4	4	4	4	18

## Subtotal PMU Operating Expenses

## 3. PPMU Equipment

Computers	unit	4	-	-	-	-	4	1,108.25	4	-	-	-	-	4	4	-	-	-	-	4
Laptopcomputer	unit	1	-	-	-	-	1	2,216.5	2	-	-	-	-	2	2	-	-	-	-	2
Networking	unit	1	-	-	-	-	1	572	1	-	-	-	-	1	1	-	-	-	-	1
PC Software	set	1	-	-	-	-	1	800.8	1	-	-	-	-	1	1	-	-	-	-	1
Printers	unit	1	-	-	-	-	1	528.938	1	-	-	-	-	1	1	-	-	-	-	1
Photocopier	unit	1	-	-	-	-	1	4,987.125	5	-	-	-	-	5	5	-	-	-	-	5
Fax Machine	unit	1	-	-	-	-	1	531.96	1	-	-	-	-	1	1	-	-	-	-	1
Multi-media Projector	unit	1	-	-	-	-	1	4,433	4	-	-	-	-	4	4	-	-	-	-	4
Office Furniture	set	7	-	-	-	-	7	166.237	1	-	-	-	-	1	1	-	-	-	-	1
Air Conditioners	unit	3	-	-	-	-	3	1,329.9	4	-	-	-	-	4	4	-	-	-	-	4
Miscellaneous Office Materials	lump	1	-	-	-	-	1	2,288	2	-	-	-	-	2	3	-	-	-	-	3

## Subtotal PMU Equipment

## Subtotal Provincial Project Management (Dak Non

## F. Provincial Project Management (Ninh Thuan Pro

## 1. Provincial Project Management Unit (PPMU)

PPMU Head	person-month	12	12	12	12	12	60	262.5	3	3	3	3	3	16	4	4	4	4	4	20
Planning and Procurement Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
MIS/Database Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
Extension/Training Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
Social Development Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
Monitoring and Evaluation Officer	person-month	6	12	12	12	12	54	210	1	3	3	3	3	11	1	3	3	3	3	14
Accounting Officer	person-month	12	12	12	12	12	60	210	3	3	3	3	3	13	3	3	3	3	3	16
Administrative Assistant	person-month	12	12	12	12	12	60	105	1	1	1	1	1	6	1	1	2	2	2	8
Support Staff	person-month	12	12	12	12	12	60	72.45	1	1	1	1	1	4	1	1	1	1	1	5

## Subtotal rovincial Project Management Unit (PP

## 2. PPMU Operating Expenses

Office, Travel and Communications Expenses	month	12	12	12	12	12	60	858	10	10	10	10	10	51	12	12	13	13	14	63
Vehicle Operating Costs /e	month	12	12	12	12	12	60	251.68	3	3	3	3	3	15	3	4	4	4	4	18

## Subtotal PMU Operating Expenses

## 3. PPMU Equipment

Computers	unit	4	-	-	-	-	4	1,108.25	4	-	-	-	-	4	4	-	-	-	-	4
Laptopcomputer	unit	1	-	-	-	-	1	2,216.5	2	-	-	-	-	2	2	-	-	-	-	2
Networking	unit	1	-	-	-	-	1	572	1	-	-	-	-	1	1	-	-	-	-	1
PC Software	set	1	-	-	-	-	1	800.8	1	-	-	-	-	1	1	-	-	-	-	1
Printers	unit	1	-	-	-	-	1	528.938	1	-	-	-	-	1	1	-	-	-	-	1
Photocopier	unit	1	-	-	-	-	1	4,987.125	5	-	-	-	-	5	5	-	-	-	-	5
Fax Machine	unit	1	-	-	-	-	1	531.96	1	-	-	-	-	1	1	-	-	-	-	1
Multi-media Projector	unit	1	-	-	-	-	1	4,433	4	-	-	-	-	4	4	-	-	-	-	4
Office Furniture	set	7	-	-	-	-	7	166.237	1	-	-	-	-	1	1	-	-	-	-	1
Air Conditioners	unit	3	-	-	-	-	3	1,329.9	4	-	-	-	-	4	4	-	-	-	-	4
Miscellaneous Office Materials	lump	1	-	-	-	-	1	2,288	2	-	-	-	-	2	3	-	-	-	-	3

## Subtotal PMU Equipment

## Subtotal Provincial Project Management (Ninh Thi

									58	34	34	34	34	34	193	63	40	42	43	46	233
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**G. Institute/School Project Management****1. Institute Project Management (Northern Reg**

Institute Project Management Staff /g	person-month	144	144	144	144	144	720	126	18	18	18	18	18	91	20	21	23	24	25	113
Institute Project Management Expenses	person-month	96	96	96	96	96	480	200.2	19	19	19	19	19	96	22	22	23	24	25	117
Vehicle Operating Costs /h	person-month	96	96	96	96	96	480	78.75	8	8	8	8	8	38	9	9	9	10	10	47

**Subtotal institute Project Management (Northern****2. Institute Project Management (Southern Reg**

Institute Project Management Staff /j	person-month	144	144	144	144	144	720	126	18	18	18	18	18	91	20	21	23	24	25	113
Institute Project Management Expenses	person-month	96	96	96	96	96	480	200.2	19	19	19	19	19	96	22	22	23	24	25	117
Vehicle Operating Costs /k	person-month	96	96	96	96	96	480	78.75	8	8	8	8	8	38	9	9	9	10	10	47

**Subtotal institute Project Management (Southern****3. Institute Project Management (Central Regio**

Institute Project Management Staff /m	person-month	72	72	72	72	72	360	126	9	9	9	9	9	45	10	11	11	12	12	57
Institute Project Management Expenses	person-month	72	72	72	72	72	360	200.2	14	14	14	14	14	72	16	17	18	18	19	88
Vehicle Operating Costs /n	person-month	72	72	72	72	72	360	78.75	6	6	6	6	6	28	6	7	7	7	8	35

**Subtotal institute Project Management (Central****4. Institute Project Management (Northeastern**

Institute Project Management Staff /p	person-month	36	36	36	36	36	180	126	5	5	5	5	5	23	5	5	6	6	6	28
Institute Project Management Expenses	person-month	36	36	36	36	36	180	200.2	7	7	7	7	7	36	8	8	9	9	10	44
Vehicle Operating Costs /q	person-month	36	36	36	36	36	180	78.75	3	3	3	3	3	14	3	3	4	4	4	18

**Subtotal institute Project Management (Northea****5. Institute Project Management (Southeastern**

Institute Project Management Staff /s	person-month	30	30	30	30	30	150	126	4	4	4	4	4	19	4	4	5	5	5	24
Institute Project Management Expenses	person-month	30	30	30	30	30	150	200.2	6	6	6	6	6	30	7	7	7	8	8	37
Vehicle Operating Costs /t	person-month	30	30	30	30	30	150	78.75	2	2	2	2	2	12	3	3	3	3	3	15

**Subtotal institute Project Management (Southei****Subtotal Institute/School Project Management**

<b>Total</b>									146	146	146	146	146	729	164	171	179	188	196	899
									1,073	710	551	504	406	3,243	1,128	781	644	620	546	3,719

1a One existing vehicle assigned to the project.

1b One existing vehicle assigned to the project.

1c One existing vehicle assigned to the project.

1d One existing vehicle assigned to the project.

1e One existing vehicle assigned to the project.

1f Including participating research institutes, and technical and vocational training schools.

1g Under guidance of CPMU or PPMU.

1h Operating expenses for motorcycles.

1i Including participating research institutes, and technical and vocational training schools.

1j Under guidance of CPMU or PPMU.

1k Operating expenses for motorcycles.

1l Including participating research institutes, and technical and vocational training schools.

1m Under guidance of CPMU or PPMU.

1n Operating expenses for motorcycles.

1o Including participating research institutes, and technical and vocational training schools.

1p Under guidance of CPMU or PPMU.

1q Operating expenses for motorcycles.

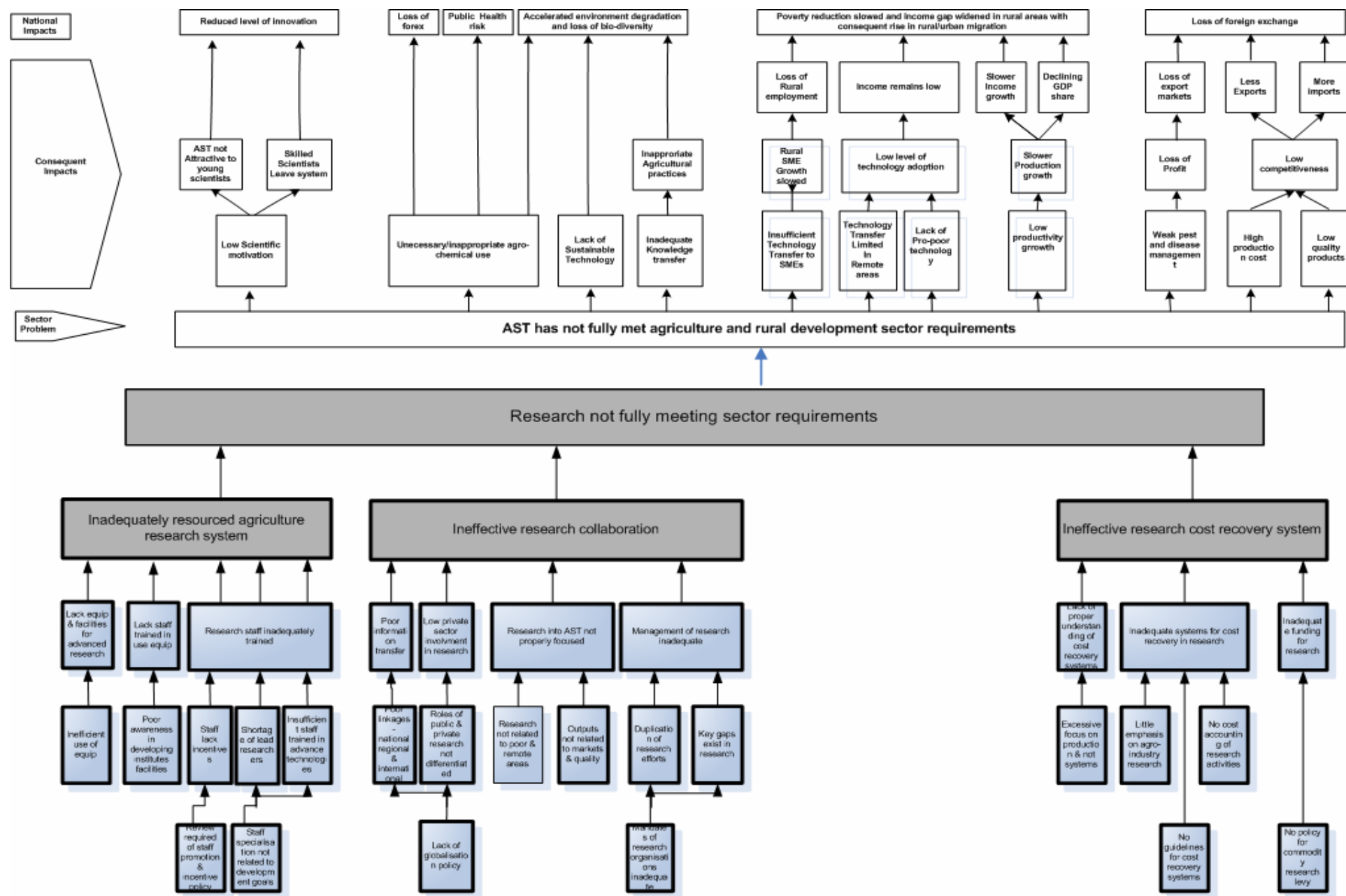
1r Including participating research institutes, and technical and vocational training schools.

1s Under guidance of CPMU or PPMU.

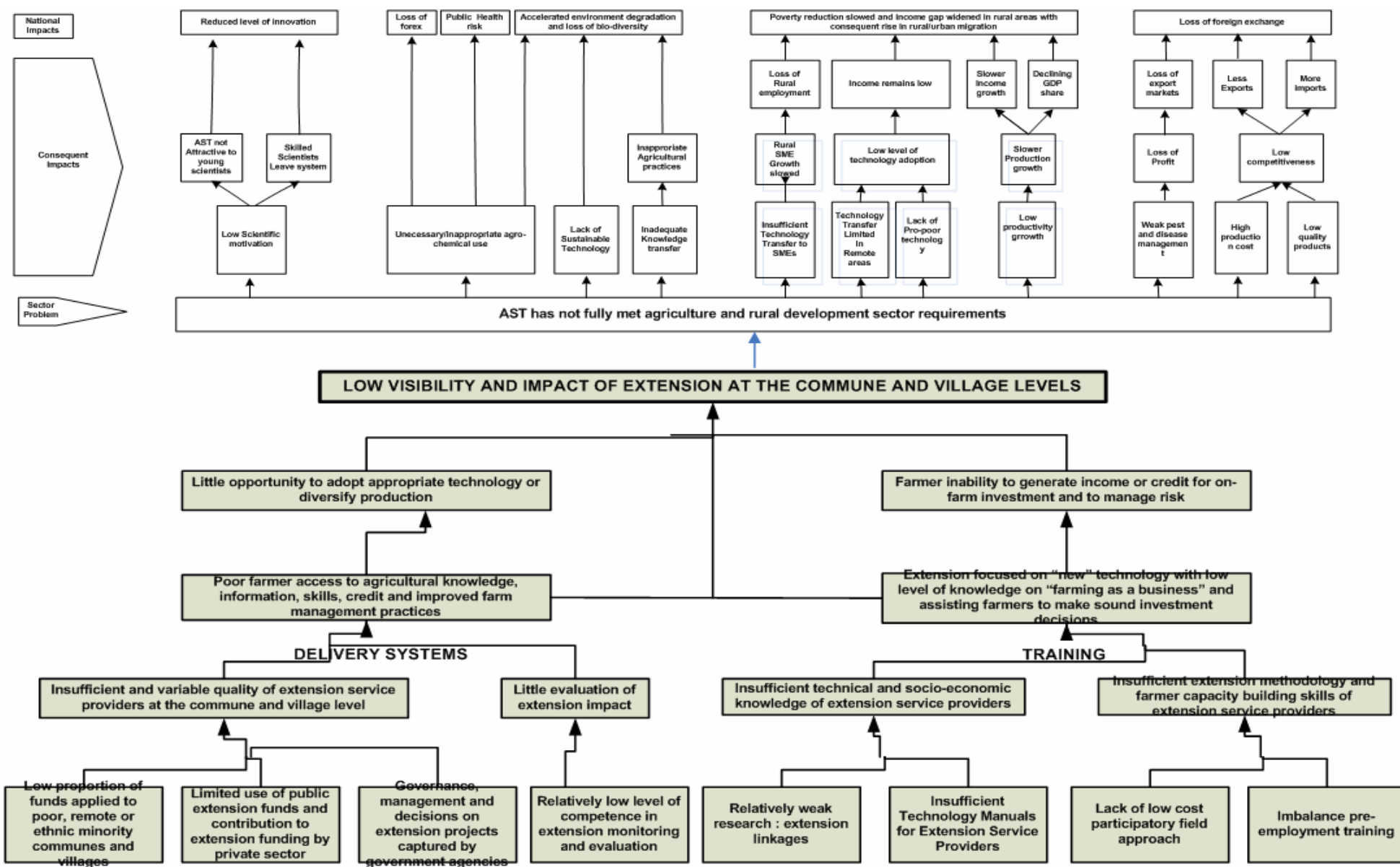
1t Operating expenses for motorcycles.

## PROBLEM TREE ANALYSIS

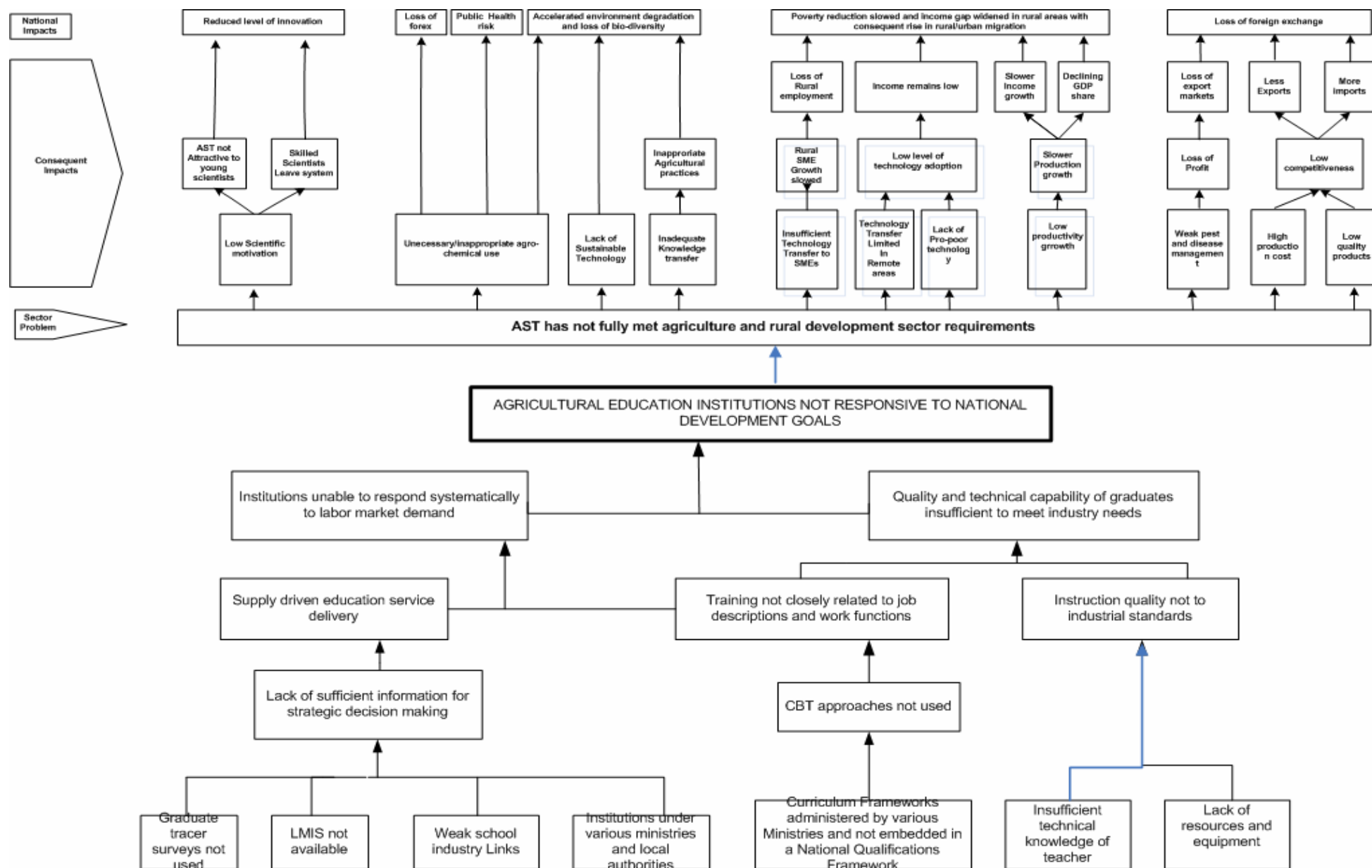
### 1. Problem Tree for Agriculture Research Systems



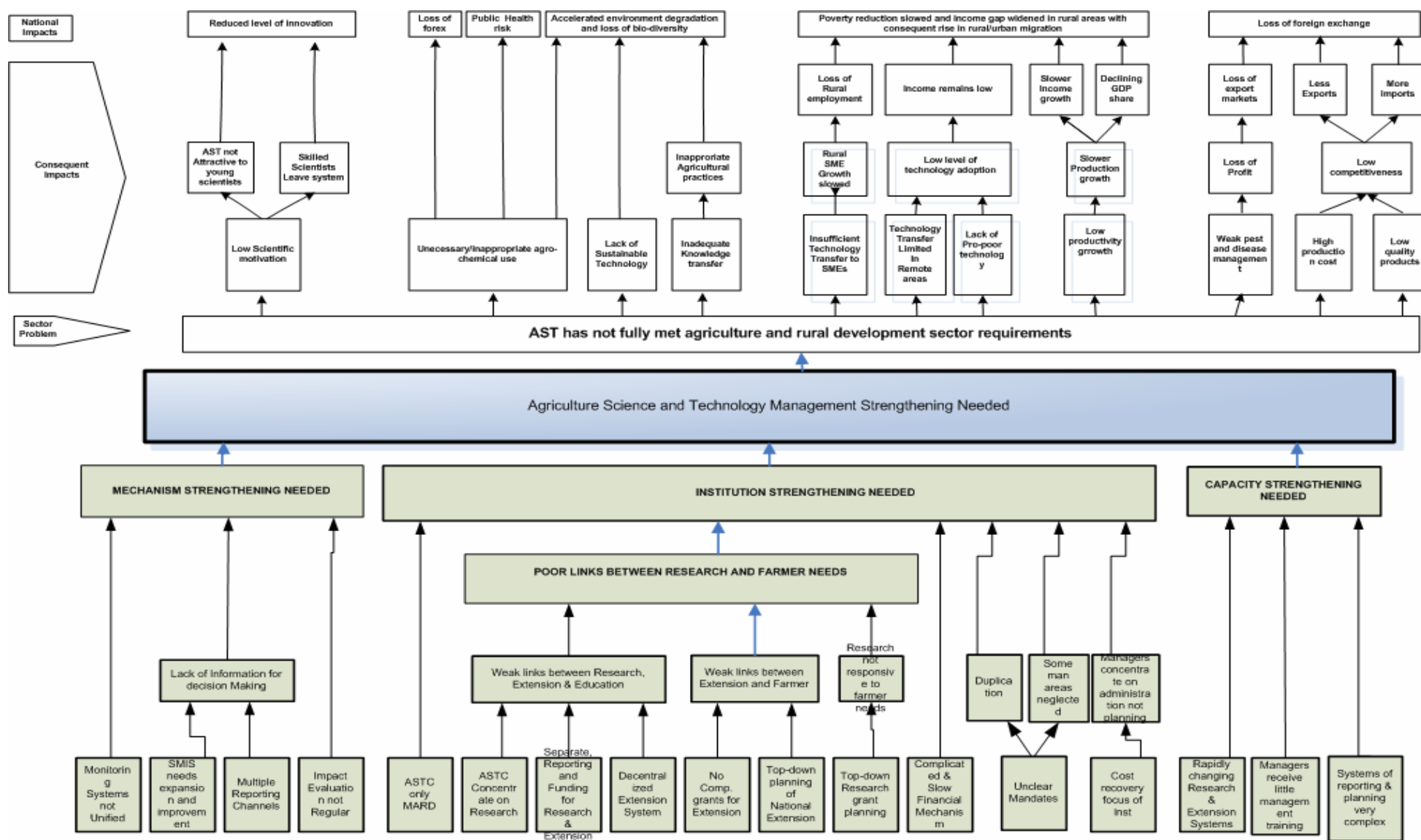
## 2. Problem Tree for Agriculture Extension Systems



### 3. Problem Tree for Rural-based Systems



#### 4. Problem Tree for Agriculture Science and Technology Management Systems



## SECTOR AND PROJECT ECONOMIC ANALYSIS

### I. MACROECONOMIC CONTEXT

#### A. The Macroeconomic Situation

1. Macroeconomic fundamentals are strong. Viet Nam has been one of the world's fastest-growing economies in recent years. Despite slow non-oil export growth, gross domestic product (GDP) grew at 8.4% in 2005, underpinned by both strong domestic demand and exports. This is slightly below the Government of Viet Nam (the Government) target of 8.5% for the year. Maintenance of high growth rates has had to be balanced with management of potential inflationary impacts, especially as international commodity prices have remained high in recent months. The Consumer Price Index (CPI) rose 8.5% in 2005, and central bank announcements have so far suggested a reluctance to apply strong monetary restraints to rein in this supply shock-induced inflation as it may entail an unduly high cost in terms of foregone output. Industrial production rose by about 11% in 2005, and economy-wide unemployment is presently estimated at around 6%. Nominal GDP in early 2006 is estimated at just under US\$55 billion<sup>1</sup> (or some \$670 per capita, based on total population of 82.4 million).

2. The Government's fiscal balance as a proportion of GDP was a relatively modest at – 1.4% in 2005, and accumulated public sector debt as a percentage of GDP is now around 9%. Strong growth in oil-related revenues should help keep the deficit below the budgeted level of 2.3% of GDP (in 2005). However, rising oil prices have also had an upward impact on the expenditure side; since domestic oil price adjustments have lagged behind international prices, The Government has compensated domestic oil distribution companies. (Such expenditure is estimated to have attained 0.5% of GDP in 2004, and the final figure will be higher for 2005). Another factor leading to higher expenditures is the recently-announced increase in government salaries and social insurance payments. The estimated cost to the budget for the last quarter of 2005 is Vietnamese Dong (D) 4.1 trillion, or around 0.5% of annual GDP. About D 13 trillion will be required in 2006.

3. Domestic interest rates have faced upward pressure due to inflation as well as increases in US interest rates, as bankers perceive that depositors will switch to US dollar deposits if Vietnamese dong rates are left unchanged. Interest rates on 1-year deposits in Vietnamese dong currently range between 8.4% and 8.8%. Credit growth accelerated in 2004 reaching 42% (year on year). This pace was roughly maintained in early 2005, as the growth rate had only fallen to 39% by May 2005. In 2004, lending in foreign currency rose by 60% compared with 38% for loans denominated in the domestic currency. Expectations of a slow depreciation of the Vietnamese dong combined with lower interest rates on foreign currency lending, appears to have made such lending more attractive (especially to the state-owned enterprises - SOEs). The main concern, nationally and as expressed by IMF (in recent Article IV consultations), with fast expanding credit (and especially loans to property) has been its quality, given the poor state of many balance sheets.<sup>2</sup> Credit quality has been hard to assess as banks (until very recently, and with the passage of Decree 493 in 2005), were required to report non-performing loans based on standards that were significantly weaker than internationally acceptable ones. Reform of state-owned commercial banks and the strengthening of the State Bank of Viet Nam's supervisory and regulatory roles are crucial aspects of the remaining reform agenda. The position of the biggest institutional lender to the agriculture sector—the Viet Nam Bank for Agriculture and Rural Development (VBARD)—is discussed later.

<sup>1</sup> World Bank. 2006. *Viet Nam – Key Economic Indicators*.

<sup>2</sup> IMF. January 2006. Viet Nam: 2005 Article IV Consultation' Staff Report.

4. The Government is likely to step up off-budget infrastructure investment that has been financed through issuance of bonds. Moody's recently raised the foreign-currency country ceiling for bonds and notes, and the foreign-currency rating for Government debt (to Ba3 from B1). The first Government sovereign bond issue received a strong response from international investors, and has reportedly raised \$750 million (compared with an initial proposal of \$500 million). The Government's 10-year dollar-denominated bonds carry a coupon of 6.875%, or 256.4 basis points over corresponding US Treasuries. Earlier plans to issue bonds worth US\$4 billion till 2010 could be revised upwards by as much as 75%.

5. Viet Nam officially maintains a managed floating exchange rate regime, but the exchange rate has *de facto* been pegged to the US dollar over the last 18 months. The D-US dollar exchange rate depreciated by less than 1% in 2004, and was broadly stable in 2005. With a widening of the inflation differential, the real effective exchange rate has appreciated by about 4.5% since end-2004. Heavy foreign-currency borrowing from domestic banks has increased the economy's exposure to exchange rate risks, and IMF has encouraged Viet Nam to adopt a more flexible exchange rate policy as part of its ongoing economic reform agenda.

6. Regarding trade, in 2005 the trade deficit widened to around 8% compared with 5.4% in the same period in the previous year. The current account deficit was about 4.5% of GDP in 2005 (aided by strong remittances). The deficit is mainly financed through official development assistance and non-debt-creating inflows of foreign direct investment (FDI). Foreign exchange reserves have risen from \$7 billion at end-2004 to \$8.3 billion in mid-2005, representing around 12 weeks worth of imports of goods and non-factor services. In the first 8 months of 2005, exports grew by 18.7% year on year. Strong prices led to crude oil exports increasing by 29.6% in value terms, despite a fall in volume of 11.3%. The other major export, garments, grew by less than 1% in the first 8 months. The recent expiry of the Agreement on Textiles and Clothing marked the onset of quota-free trade in the garments sector for the member countries of the World Trade Organization (WTO). Viet Nam's exports are often facing potential anti-dumping actions. The items currently under threat are footwear (especially from the EU), bicycles, and wood products. Over the first 8 months of 2005, imports grew at about 20% in value terms. Higher prices for commodities such as refined petroleum products and steel have been the main drivers of this increase. Imports of machinery, which had picked up in the first 4 months of 2005, have since flattened out. In March 2006 the Government's Statistical Office was reporting 20% export value increases year on year, with only very slight increases in imports (less than 2%) for the same period.

7. Steady progress has been made towards WTO membership, and Viet Nam will be the 150<sup>th</sup> member of WTO through ratification by December 2006. This resulted from successful bilateral negotiations with countries, including the US, and with groups of countries.

8. Despite the recent strong macroeconomic performance, poverty remains a major issue for Viet Nam. Analysis of the 2002 Multipurpose Household Survey data confirmed a continuing decline in the incidence of poverty, from 58% in 1993 to 37% in 1998 and 23% in 2004. The decline in recent years has not been uniform across the different regions of the country however: poverty in the Mekong Delta area showed the sharpest drop (from 37% in 1998 to 23% in 2002) while it remained the highest in the Central Highlands (about 52%). Poverty is strongly (but not entirely) related to agriculture opportunities. Life expectancy averages 71 years for women and 66 years for men, and adult literacy is high at around 90%. Poverty primarily relates to the experience of exclusion, and tends to be largely defined by geographic and ethnic factors in Viet Nam.

## **B. National Planning for Economic and Social Development**

9. The Government remains committed to maintaining high economic growth and achieving structural transformation of the economy, and has a concomitant commitment to reducing poverty. The over-arching planning process through which this is to be facilitated through the Socioeconomic Development Plan 2006–2010 (SEDP), which was officially issued in 2006. The Ministry of Planning and Investment (MPI) is managing a process of consultations with government agencies, NGOs (international and domestic), the private sector and international agencies. SEDP has incorporated the fundamentals of the extant ‘Comprehensive Poverty Reduction and Growth Strategy’ (CPRGS), the 2002 Development Goals and the Poverty Reduction Partnership Agreement (PRPA) signed with ADB (itself covering a subset of objectives set out in the CPRGS). In domestic terms, the new SEDP will update and expand the objectives and intentions of the earlier Strategy for Socioeconomic Development, 2001–2010.

10. The SEDP is analytically well-grounded in its review of Viet Nam’s recent economic and social achievements. The SEDP intends to consolidate the earlier economic and social gains made through the twin approaches of socialist-oriented market institutions and increased international integration. The main tasks to be undertaken in the SEDP period are to (i) promote growth and structural transformation, based on increasing competitiveness, (ii) extend the marketization of the economy, (iii) improve international economic integration and increase trade competitiveness through acquisition of improved technologies, (iv) develop science and technology and human resources, including for the management of natural resources and the environment, (v) reduce poverty and hunger and promote equality (including through the development of social security), and (vi) continue to build and maintain a strong State governance by rule of law with increased international status. These tasks have associated targets, such as GDP per capita to reach \$1,000 by the end of the period, GDP growth averaging over 8%, annual export growth of about 15%, pursuit of the Millennium Development Goals (MDGs)—with specific mortality, education, employment and service access indicator values), halving of poverty incidence to 15% of the population, increase forest cover and application of clean technologies, etc. The SEDP includes very specific economic targets for consumption, savings and investments, balances of trade and payments, FDI, State budgets, and sector performance.

11. According to the IMF, Viet Nam’s attainment of these targets as set out in its SEDP depends upon continuing prudent and somewhat revised macroeconomic management (including more transparent public expenditure, monetary and exchange rate policies, containment of the fiscal impulse from rising oil prices—and reducing of the domestic fuel subsidy, changes to the Government’s onlending practices, and continuing structural reforms in the financial sector, regarding SOEs, and with regard to trade liberalization and private sector development). Evidence for continuing reforms can be found. There have been numerous significant domestic and international political changes recently; the holding of local elections under amended laws in 2004 and active participation in ASEAN (including significant AFTA tariff changes) are examples of this. Also significant have been recent legal moves against systemic high-level corruption, and the signing of anti-corruption agreements with the UN and OECD.

12. For the agriculture sector, the number one goal laid out in the SEDP is to bring about ‘a quality change in agriculture production’, based on diversification, value addition, increased exporting and application of sustainable technologies. Overall, the value added of agriculture, forestry and fishery is expected to increase by about 3.0–3.2% per annum during the SEDP period. (While this will contribute to aggregate economic performance, because the non-

agriculture sectors are growing faster, a structural transformation of the economy will still take place). Rural hunger needs to be addressed through an orientation of national development efforts towards the poorest areas (e.g., the northwestern and central highlands regions) under the national target program like Program 135. Increasing rice and other staples' cultivation intensity, shifting to high-value livestock, fruits and vegetables based on local varieties, development of industrial crops' trademarks and a wider range of agro-technology-based products, improvement of rural-urban linkages via increasing agro-industrialization, stabilizing coastal fishing, reform of forest management and utilization, SOE reforms, and improving grassroots extension are all means towards achievements of these goals. (The Ministry of Agriculture and Rural Development (MARD) plan for 2006–2010 describes these means in more detail, and its contents are discussed below).

## II. AN OVERVIEW OF RECENT AGRICULTURE SECTOR PERFORMANCE

### A. Sector Growth and Structural Transformation<sup>3</sup>

13. The agriculture sector has grown at about 4% per annum during the last decade. This is high by international standards, although the second half of the 10 years was slightly lower than the early 1990s (of around 4.5% per annum on average), only about half that of overall GDP growth (at some 8% per annum), and short of the 5% annual sector growth target of the 2001–05 5-year plan (i.e., the first period of the 'Strategy for Socioeconomic Development, 2001–2010'). This achievement in growth may seem even more remarkable given the price collapse for many primary export commodities that occurred after the Asian Financial Crisis during 1997–1998.

14. As agricultural growth is much higher than population growth (of 1.8% per annum), per capita food production reached around 500 kg in 2002 (compared with 408 kg in 1998). Thus, food security has improved at the national level and Viet Nam has turned from a net food importer into one of world's biggest exporters of a number of agricultural products (such as rice, coffee, pepper, cashew nuts, and aqua-products).

15. The sector as a whole responded to the major policy changes (including land de-collectivization) initiated by *doi moi* in the late-1980s. More product-specific examples of growth have been partly in response to particular policies promoting import substitution (e.g., sugar, milk) and partly to take advantage of export opportunities (e.g., coffee). Other changes have been through growers' responses to markets as the economy more generally opened up (e.g., in livestock and fruits). The rice planted area has increased, but planted areas of other food crops and tree crops have risen even faster. Aquaculture has been a major contributor to recent sector growth (in the early 2000s) while the official share of forestry has been declining. Industrial crops now account for about 20% of the value of sector output.

16. Market forces (both domestic and external) now largely drive production and trade in agriculture. Domestic markets are deepening as growing incomes and urbanization increase consumer demand for a greater diversity and quality of higher value products across crop, livestock and fishery outputs, and growing orientation towards world markets, a trend that the country's WTO accession will reinforce, is also linking farmer production choices and incentives more closely with world price signals and market preferences. In large measure, these internal and external market demand characteristics are providing opportunities for activity

<sup>3</sup> Much of the material in this section is taken from World Bank. March 2006. *Accelerating Rural Development in Viet Nam: Growth, Equity And Diversification*.

diversification at the farm level, although also pressure to respond flexibly with activity shifts as market price changes alter relatively profitability across output options.

17. Despite these trends and also an official diversification policy (in national and MARD planning), there are many constraints and rigidities remaining in the sector. These include: (i) processing and marketing of rice, rubber, sugar, coffee, cashews, and other major crops are dominated by single-crop SOEs which are unlikely to promote other crops; (ii) agricultural support services are still focused largely on rice; (iii) irrigation and other physical infrastructure are largely built for, and operated primarily for, rice cultivation; (iv) dissemination of research, extension and market information services at the commune level are through groups promoting fulfillment of MARD's commodity production plans; (v) undeveloped market regulations and standards. The net impact has been overproduction of some commodities, to the point that Viet Nam's exports have contributed to downward pressure on world prices (e.g. rice, coffee).

18. In geographical terms, the earlier North-South disparities in agricultural performance are generally shrinking, but are growing between the lowlands and uplands. Competitive and highly-commercialized agriculture is presently transforming the Mekong Delta (80% commercial production for rice). Export-orientation in the Central Highlands expanded rapidly on the foundation of rapid coffee production expansion, until it was hit by the world price collapse in the late-1990s. The North is still characterized by a high degree of subsistence production, although the major increases in rice production of the 1990s have since been transformed into a more broad-based (in commodity terms) output mix, including tea production.

19. Overall, since the reforms of the 1980's, agriculture's contribution to GDP fell by half, from 40% to almost 20% in 2004, as total GDP growth far outstripped that of the sector. At the same time, the value share of agricultural exports fell from 60% to 30% (2005). However, agriculture still plays a very important role in the livelihoods of a majority of the Vietnamese people: four fifths of the country's population remain in rural areas and the sector still employs (fully or partly) some two-thirds of the labor force.

## **B. Major Trends in Agriculture Areas, Output, and External Trade**

20. Overall, cropped areas have increased significantly in recent years, but rates have varied greatly by type of crop planted. Perennial crops and industrial crop areas (and fruit tree plantings) growth rates have been much higher than for annual (i.e., rice) and other food crops.

**Table D1: Crop Areas By Type And Annual Growth Rates  
At Different Periods (1986–2000)**

	Area in 2000 (000ha)	Annual average growth (%)			
		1986–2000	1986–90	1991–95	1996–2000
<b>Total area</b>	12,470	2.7	1.2	3.0	3.5
Annual crop	10,448	2.1	1.0	2.6	2.5
Food crop	8,369	1.5	1.1	2.3	1.0
Other annual crops	809	2.4	(2.4)	5.8	2.7
Perennial crops	2,022	7.5	5.5	6.8	9.7
Industrial and forestry crop	1,397	7.7	7.2	6.6	9.2
Fruit trees	541	5.5	1.9	4.5	9.4

Source: General Statistics Office

21. The figures for industrial crops include tea and rubber (typically growing at about 4–6% in area terms respectively per year) and also coffee (anywhere between 25–30% increase per

year throughout the late 1990s) and cashew (typically between 6% and 17% annual increase in area terms per year).

22. Changes in Viet Nam's food production are highlighted in the following table. It can be seen that rice (paddy) production tripled in the two decades to 2003, that pork meat production went up by a factor of six, and vegetable production trebled. While these are of course dramatic increases, what is perhaps even more interesting in the context of the proposed Agriculture Science and Technology Project is that this was largely (but not entirely) due to the area increase just described. In the case of rice, a tripling of production volume came from something like a doubling of area, implying the greater relative importance of changes at the extensive margin vis-à-vis the intensive margin. While it is true that average yields of paddy did increase over the period quoted, in 2002–3 they were only about 20% higher than they had been a decade before, for example (i.e., about 4.2 tons/ha compared to 3.6 tons/ha).

**Table D2: Major Items of Food Production, and Food Production Index, 1979/81–2003**

Major Items	Unit	1979–81	1989–91	2000	2001	2002	2003
Rice, paddy	1000 MT	11,809	19,281	32,530	32,108	34,447	34,569
Indigenous pig meat	1000 MT	323	719	1,410	1,516	1,654	1,800
Vegetables (fresh)	1000 MT	2,205	2,887	5,632	6,278	6,235	6,326
<b>Food Production</b>							
Food Production Index	1999–01 = 100	39	61	100	104	113	118
Per capita Food Production Index	1999–01 = 100	57	72	100	103	110	113

Source: FAOSTAT

23. The food production indices show just how Viet Nam agriculture has changed in scale over the period, with a trebling of aggregate food production (and thereby turning a net food importer into an exporter) and a doubling of output on a per capita basis (with annual average population growth rates of over 2.0% until the end of the 1980s and around 1.5% on average throughout the 1990s).

24. Pig and poultry production grew at 6–7% per annum throughout the whole of the 1990s (to national head populations of some 23 million and 233 million respectively by 2002). Cattle herd growth has been more modest (about 3–4% increase per year) to 2002, and buffalo numbers have stagnated or declined. Fisheries, including aquaculture, has grown at about 5–6% per annum consistently throughout the 1990s. Fishery exports (including marine activity) now almost equal that of land-based agriculture.

25. Overall, export values from the agriculture sector have also changed dramatically in recent years. All Viet Nam's exports have increased more than seven-fold in value terms since 1990, and agriculture, livestock and fisheries values have increased four-fold (implying of course that non-agriculture exports have increased proportionately more). Table D3 shows that different crops have played very different roles in this overall increase. The value of (relatively low value) rice exports has doubled, but crops like rubber (five-fold value increase since 1990), cashew (nearly a ten-fold value increase since 1990), tea (four-fold value increase since 1990), pepper (eleven-fold value increase since 1990) and vegetables and fruits (four-fold increase) account for most of the aggregate value increase. The example of coffee in the table may be salutary for Viet Nam; after a seven-fold increase in earnings in the first half of the 1990s—based on the 25–30% area increase per year mentioned previously—the price collapsed due to oversupplies and relatively poor product quality. Annual export earnings are now only about 60% of their earlier peak.

**Table D3: Export Values By Product Type And Year (\$ million)**

	Year	1990	2000	2002
<b>All Exports</b>		2,404	14,308	16,706
Agriculture, livestock and fisheries		1,149	4,308	4,630
Agriculture		783.2	2,563	2,437
Rice		374	672	726
Rubber		53	170	263
Shelled cashew nut		22	129	212
Shelled ground nut		42	42	52
Pepper		9	143	108
Coffee		73	474	317
Tea		19	56	83
Vegetable and fruit		57	213	201
Forestry		126.5	155.7	170
Fishery (aquaculture)		239.1	1,479	2,023

Source: The Government of Viet Nam. The General Statistics Office, quoted in World Bank 'Accelerating Viet Nam's Rural Development: Growth, Equity and Diversification', Volume 4

26. What also emerges from studies of recent trade data is that primary international commodity prices have deteriorated while at the same time Viet Nam's agriculture imports (of relatively high value processed foods) have increased, causing the balance of agricultural trade to return to something like early 1990 levels. When these external forces are combined with the structure of effective protection which Viet Nam employs in favor of manufacturing (including that which arises through Viet Nam's trade-weighted index of tariff protection of agriculture products being only about 14%, and thus lower than east and south Asia and the average for all developing countries), there must be concerns about ways of encouraging future long-term investments into quality-based primary production (as distinct from agroprocessing, which does enjoy relatively favorable treatment).

27. This situation almost certainly explains why agriculture investment stagnated in real terms between 1999 and 2002 and why the role of the state remains dominant (accounting for nearly 60% of sector investment in 2002). FDI into agriculture is tiny (about 2% of all sector investment, and very low relative to the economy as a whole), and that of households and non-state participants is not increasing. The position of the special state-owned enterprise of VBARD exemplifies this. It is presently trying to separate commercial from social (i.e., policy-directed lending, for example towards coffee and cane cultivators) and is also finding ways to increase its lending to SMEs (in part with support from ADB via TA 4105–CAM: ASDP).

### **C. Agriculture and Poverty**

28. Economic trends in the agriculture sector impact upon poverty in Viet Nam, as elsewhere, in several key ways. The first way is by the types of employment opportunities (formal, self-employed; part or full-time) generated in agriculture activities. Despite the structural transformation of the economy which has occurred in recent years in Viet Nam, a high proportion of the population remain engaged with agriculture: 90% of rural households, and 70% of rural household members, are still engaged in agriculture one way or another. There is now a disproportionate involvement of women in agriculture, with more women than men having their main occupation in agriculture. However, this involvement with agriculture activities is

increasingly part-time. Only about a quarter of rural households are exclusively engaged in farming, while the rest combine farming with waged and non-farm employment. Very few households are exclusively engaged in formal employment, however, and the picture that emerges from recent income and poverty studies<sup>4</sup> across the country is that while many rural households are diversifying their activities, most wish to retain farming as an 'anchor' source of income (for at least some family members).

29. This picture, like poverty itself, varies across Viet Nam's regions. Relatively remote areas (Central Highlands, Northwest Mountains, and Northeast Mountains) have relatively low rates of non-farm employment, typically 7–15%, while the Red River Delta and Mekong Delta have relatively high rates, about 25% or more. Interestingly, the Viet Nam Household Living Standards Survey (VHLSS) suggests that agricultural employment in the southeast has actually increased in recent years (1998–2002) as the proximity to Ho Chi Minh City, with the consequent range of off-farm opportunities resulting in historically low farm employment but also proximity to produce markets, has encouraged greater agricultural diversification and regenerated primary production opportunities (although in non-rice crops).

30. Part of the pressure to find non-farm employment is of course explained by access to land, the second major mechanism through which agriculture and poverty are related. Table D4, below, shows that although the total area of agricultural land in Viet Nam increased in the last 20 years to 2000, and the proportion of the rural population as a share of the national population declined, the absolute number of people engaged in agriculture increased (to some 27.5 million from under 19 million two decades earlier) and that the labor to land ratio increased. While such trends, being a combination of demographic factors and resource endowment, were broadly similar across other Asian comparator countries, only Bangladesh has such a high labor-land ratio (and similar share of rural population in its total).

**Table D4: Rural Populations, Agriculture Land, and Land-Labor Ratios, Selected Asian Countries (1980-2000)**

	Share of Rural Population in Total Population, (%)		Agricultural Land (1,000 ha)		Total Active Economic Population in Agriculture (000s)		Agricultural Labor-Land-Ratio (persons/ha)	
	1980	2000	1980	2000	1980	2000	1980	2000
<b>Viet Nam</b>	80.8	75.9	6,858	8,780	18,741	27,527	2.7	3.2
<b>China</b>	80.0	63.9	434,220	548,658	407,187	511,001	0.9	0.9
<b>Myanmar</b>	76.0	72.3	10,385	10,812	12,736	17,950	1.3	1.6
<b>Indonesia</b>	77.8	59.0	38,000	44,777	34,743	49,309	0.9	1.1
<b>India</b>	76.9	72.3	180,355	180,795	208,765	263,369	1.2	1.5
<b>Bangladesh</b>	85.1	75.0	9,758	9,084	30,157	38,530	3.1	4.2

31. The key issue here is that, following Resolution 10 in 1988 and the passing of the Land Law 5 years later (and thus the subsequent speed and success of the land titling program), the (one-off) gains in agricultural area and incentives to the sector that were unleashed, did not improve the, already very poor, labor-land relationship. Indeed, the evidence is now that the

<sup>4</sup> *Operationalizing Pro-Poor Growth*; A joint initiative of AFD, BMZ (GTZ, KfW Development Bank), DFID, and the World Bank. October 2004. A Country Case Study on Viet Nam'. Rainer Klump and Thomas Bonschab.

rural population in Viet Nam will continue to grow (modestly at about 0.1% per year) to 2010 despite urbanization, and that pressure on agriculture land will thereby increase still further.

#### **D. Some Implications of Viet Nam's Agriculture Sector Characteristics**

32. From the foregoing description of Viet Nam's agriculture sector in the context of macroeconomic, policy, and demographic circumstances of the last 20 years (and including an awareness of some of the relationships between agriculture and the incidence and distribution of poverty), a few key points which may guide policies and project investments for future development of the sector can be made. These are

- (i) a significant increase in agriculture area and the initial major increases in export earnings from low-value, poor quality commodity production, which were observed in the late 1980s and early 1990s, are opportunities which cannot now be repeated;
- (ii) Viet Nam will continue to experience intense population pressure on land use, and the likelihood that primary production can move from its present smallholder base to any great extent is remote;
- (iii) economic conditions in the agriculture sector, and especially regarding the viability of farming on very small areas, will continue to have a major bearing on the country's success in addressing MDG/CPRGS poverty reduction targets, although this will affect different regions of the country differentially;
- (iv) agricultural diversification, both horizontally into new products and vertically up value chains of existing products, will be an increasingly necessary and appropriate strategy for large numbers of smallholders wishing to expand incomes from farming, and this will be encouraged by increased marketization both within Viet Nam and via increased integration into world markets (especially so with WTO accession and recent AFTA provisions enactment; and,
- (v) Government institutions will need to respond to what is essentially a qualitative change in policy requirements by revisiting Viet Nam's recent agriculture development to identify both previously-overlooked and also new sources of productivity growth. Institutional change and project investments will be needed to bring this about (and these will need to be tailored to local geographical circumstances and have at least some pro-poor dimensions).

33. By this last point is meant the fact that the determinants of recent sector growth have not to date fully included the benefits of locally-adapted and applied agriculture science and technology (AST). The following section illustrates this argument with material from various studies undertaken within Viet Nam.

### **III. UNDERSTANDING THE DETERMINANTS OF RECENT AGRICULTURE GROWTH**

#### **A. The Sources of Vietnamese Agriculture Growth**

34. As previously described, Viet Nam's agriculture sector has certainly achieved higher growth rates than in other countries in the region but the determinants of this growth have been significantly different. From the point of view of the proposed AST Project, what is most notable (and also which provides the technical rationale for investment) is that AST has made little demonstrated contribution to the high growth rate to date.

35. Agriculture growth in Viet Nam has been mostly due to factor accumulation, i.e., more land, irrigation, fertilizer, improved varieties (typically imported as 'spillovers' from research

elsewhere), and one-time institutional reforms, such as the return to family farming and subsequent land allocation/titling plus agricultural commodity trade liberalization that was introduced in the early 1990s. Factor accumulation was largely a result of state expenditures in irrigation and associated facilities, while the institutional changes were a direct result of policy reform. To date, productivity gains based on locally developed or adapted technology have been very much a secondary source of Viet Nam's agricultural growth.

36. The determinants of agricultural growth, summarized in Table D5, identify the relative contribution of changes in input of factors of production—labor, land, machinery, and fertilizer—and of total factor productivity (TFP) as the residual explanation for growth, encompassing institutional development, infrastructure, and social development as well as AST. Analysis of Viet Nam data clearly shows the major role played by increased fertilizer use in achieving the high growth rates. In the 1990s, over half the growth in agricultural production was due to increased fertilizer use, a much higher proportion than any of the regional countries. Thailand, with agricultural growth second only to Viet Nam, increasing fertilizer use is much less important while increased machinery use, in more capital intensive agriculture, accounts for double the machinery share of growth in Viet Nam.

**Table D5: Determinants of Agricultural Growth in Viet Nam and Neighboring Countries**

Item	Viet Nam			Philippines	Indonesia	Thailand
	1985–2000 <sup>1</sup>	1985–1989 <sup>2</sup>	1990–1999 <sup>2</sup>	1980–1998 <sup>3</sup>		1981–1995 <sup>3</sup>
Labor	19.5	20.9	14.1	19.6	12.7	1.9
Land	6.6	0.9	11.1	18.5	15.6	11.4
Machinery	3.4	(14.5)	18.9	25.7	12.8	40.6
Fertilizer	52.6	37.3	50.6	27.2	10.2	19.0
Factor Accumulation	82.1	44.6	94.7	91.0	51.3	72.9
Total Factor Productivity	17.9	55.3	5.4	9.0	48.7	27.1
Total	100.0	100.0	100.0	100.0	100.0	100.0
<b>Output Growth Rate</b>	<b>5.4</b>	<b>3.9</b>	<b>5.9</b>	<b>1.4</b>	<b>3.0</b>	<b>3.2</b>

<sup>1</sup> Sources: L. Prota and D. Smith. 2004. *A Regional Productivity Analysis of the Agriculture Sector In Viet Nam between 1985 and 2000*. Agrifood Consulting International.

<sup>2</sup> N.N. Que and F. Goletti. 2001. *Explaining Agricultural Growth in Viet Nam*—Background Paper for ADB. 2001. Technical Assistance to the Socialist Republic of Viet Nam for Preparing the Agriculture Sector Program. (TA 3223–VIE)

<sup>3</sup> Y. Mundlak, D.F.Larson, and R. Butzer. March 2002. *Determinants of Agricultural Growth in Indonesia, the Philippines, and Thailand* World Bank (RPO 683-06) and Government of Japan.

37. In Indonesia, factor accumulation contributes little more than 50% to total agricultural growth and 48.7% of growth is attributed to TFP. TFP's contribution to growth in Indonesia is 80% more than in Thailand and nine times more than in Viet Nam in the 1990s, reflecting a much greater direct contribution of government to growth in Indonesia. The analysis for Indonesia suggests that the major public goods contributing to growth were education, roads and health (in roughly equal measure).

38. The role of TFP, and thus institutional, infrastructure, social and AST development, in agricultural growth in Viet Nam is more comparable to its role in the Philippines, which has the lowest agricultural growth of the countries. The analyses in Viet Nam both show major differences between the late 1980s and the 1990s. In the late 1980s, TFP contributed over 50% of agricultural growth as the dismantling of the collective system provided a one-time boost to agricultural growth. By the 1990s, the gains from this institutional change had been secured and continued growth depended on increasing inputs, while TFP's contribution slumped to a 5.4% contribution.

39. Analyses have not distinguished between institutional change, infrastructure, social development and AST in making this combined 5.4% contribution to growth. However, it is clear that AST (nor any of other individual components of TFP) has in the past not been a significant contributor to Viet Nam's agricultural growth.

## B. Differences in Sources of Agricultural Growth within Viet Nam

40. Analyses of regional growth have also been made using subsets of the national data set, and these show substantial differences within Viet Nam (Table D6). National growth of 5.9% per year in the 1990–1999 period ranged from 3.7% in the Central Region to 7.0% in the South.

41. Farmers in the South had double the amount of land per farm worker as farmers elsewhere, with 0.54 ha compared to about 0.25 ha per farm worker, contributing to the much higher returns to labor but lower returns to land in the South. Compared to the national level of 5.4% of agricultural growth being attributable to TFP and public goods, the contribution in the South is 14.9%, almost three times the national level and over 20 times the contribution in the North. To the extent that AST plays a role in TFP, it appears that AST and other public goods make the biggest contribution to growth in the South, which is the least poor agricultural area in terms of both income poverty (returns to labor) and asset poverty (land per farm worker). This is consistent with the reasonable expectation that richer farmers will have the resources to be early adopters of new technology and that, in principle, AST contributes to growth through richer farmers rather than helping poor farmers.

42. Returns to land and labor in the North indicate more intensive farming systems responding to the shortage of land as the critical constraint on farm household production. These farming systems also seem to have developed to a stage where the returns to fertilizer use are the lowest in the country and, on average, are declining the most rapidly—at 8.3% per year in the 1990s.

**Table D6: Differences in Determinants of Regional Agricultural Growth in Viet Nam**

Item	1990–1999			
	North	Central	South	Country
<b>Annual Output Growth</b>	5.2	3.7	7.0	5.9
<b>Partial Factor Productivity (million Dong at 1994 prices)</b>				
Labor per person year	3.0	2.8	5.3	3.8
Land per Ha per year	12.6	11.2	9.7	10.7
Fertilizer per ton	55.2	133.1	79.7	73.7
Land/Labor (Ha)	0.24	0.25	0.54	0.36
<b>Annual Smoothed Productivity Growth Rates %</b>				
Labor	2.0	0.2	5.0	3.2
Land	6.4	3.6	3.4	4.1
Fertilizer	(8.3)	(2.6)	(5.2)	(6.2)
<b>Determinants of Growth</b>				
Factor Accumulation	99.3	95.4	85.2	94.6
Total Factor Productivity (TFP)	0.7	4.6	14.9	5.4
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Source: N.N. Que and F. Goletti. *Explaining Agricultural Growth in Viet Nam* Background Paper for ADB. 2001. *Technical Assistance to the Socialist Republic of Viet Nam for Preparing the Agriculture Sector Program*. (TA 3223–VIE)

43. The higher returns to fertilizer and the lower rate of decline in fertilizer productivity in the central region suggests that there is still scope for growth based on increased fertilizer use in poor areas. However, opportunities for fertilizer-based growth are being exhausted and continued growth requires increased contributions from other factors. The estimates of growth sources in Thailand suggests capital/machinery-based growth, though this may require other changes—Thailand's farming systems are more extensive, with larger farm sizes (a national average of 3.4 ha) and higher land/labor ratios than Viet Nam. A pre-condition of such capital intensive/land extensive farming systems is likely to be substantial rural-urban migration to allow larger farm sizes being consolidated (facilitated by rapid industrial and service sector growth, and labor outflow to other countries).

44. The scope for continued growth from land, labor and capital after the fertilizer-led period of growth is limited. Continued agricultural growth in Viet Nam will, therefore, require a substantial increase in the contribution of TFP/public goods through increased and more effective Government actions in the agriculture and rural sector. Such contributions, as in Indonesia, may include roads, improved health of rural communities, and appropriate, vocation-oriented training while development and improved dissemination of AST can promote growth through higher value agriculture - as a result of quality improvement and more market-oriented farming systems.

45. As noted with regard to the much higher TFP in the richer agriculture of the south, more effective AST will promote growth but, of its own, may not specifically address the needs of poorer farmers. Pro-poor agricultural growth will require provision of mechanisms for the AST demand of poor farmers to become effective and for the AST systems to be restructured to be responsive to farmer demands rather than a simple, top-down distribution of knowledge.

### **C. Implications of Past Growth Sources for Future Investments**

46. It may thus be observed that the substantial agricultural growth evident in Viet Nam has been attained by the country essentially 'catching up' with international and regional standard practices. The limit for such 'catch up' increases in production has now probably been reached and continued agricultural growth will increasingly require both new farming systems as well as more locally-driven productivity-based improvements to increase the value of agricultural production. (The probable only exception to this trend may be in the future allocation of forest lands, where a 'second generation' resource reform agenda is yet to be implemented).

47. This need for productivity-based improvement in agriculture is now widely-recognized by donors and Vietnamese agencies. A World Bank evaluation of an agricultural rehabilitation project concludes that agricultural technology increasingly will be a constraint to further development in Viet Nam, and reports that 'technology needs are evident at village level, while farmer receptivity appears exceptionally high'. Similarly, the World Bank 2006 *'Accelerating Viet Nam's Rural Development Growth, Equity Diversification'* report argues that an increasing reliance on productivity growth relative to factor expansion will put a heavier emphasis on greater success with agriculture research, extension and technology transfer.

48. The urgency of the situation in Viet Nam vis-à-vis promoting the productivity of agriculture is compounded by two key factors. The first factor, discussed in the previous section, is the very small farm sizes throughout most farming systems of the country (millions of families survive on land areas of 0.25 ha or less, for example). Changing land/labor ratios drive technology demand, and in this case the very small and shrinking farm sizes are likely to drive an exceptional thirst for intensification technologies.

49. The second factor is the misalignment that now exists between the new agriculture priorities and the allocation of fiscal resources in the sector. Under-funding of research and organizational fragmentation (partly being addressed through merging of research institutes in 2006, e.g., the formation of the Viet Nam Academy of Agricultural Sciences VAAS) in the past limit the speed with which new directions can be taken. It may be argued that, given the 7-to-10 year lag in technology flow from research and the need for agricultural diversification and productivity improvement, research system reform to improve efficiency and increased investment has already been left dangerously late.

#### **IV. VIETNAMESE AGRICULTURE AT THE CROSSROADS: PROMOTING A NEW PARADIGM**

##### **A. A Changing Agriculture Science and Technology Context**

50. Previous sections have demonstrated that the agriculture sector in Viet Nam is now at a critical point in its development where much more productivity-oriented contributions to growth are required. This same recognition is well-understood by the Vietnamese agencies responsible for agriculture sector planning and management (at a very general level from the Ministry of Planning and Investment - MPI and the SEDP, more specifically through MARD and its 5-year plan, and down to individual research institutes and provincial extension centers ready to implement AST-oriented projects).

51. Very recent developments in the agriculture sector confirm this view, including
- (i) the continuing successful implementation of the Agricultural Sector Development Program (ASDP), and the meeting of its various policy reform and institutional tranche conditionalities for release of funds;
  - (ii) the provision of further technical assistance to support agriculture science and technology management;
  - (iii) the recent (late 2005) merger of state research institutes (e.g., including those now constituted under VAAS); and
  - (iv) the issuance of Decree 115 in 2005, providing for the financial autonomy and independence of research institutions

52. These conditions help to establish both a technical justification for the proposed AST Project and also contribute to its economic rationale, because it demonstrates that the public sector is willing to address a problem for which markets have so far failed to provide a solution (see next section on the project's economic rationale for more discussion). However, in order to help substantiate a view that the sector conditions are actually likely to be favorable for introducing the AST Project, it will be worth examining the content of MARD's current 5-year sector plan, the existing AST roadmap (these two sources demonstrate the 'supply side' awareness of the importance of AST), and also the evidence that there is a genuine demand for the expected outputs of the AST project (and possibly one which will be manifestly effective in future if smallholder producers are willing and able to pay for similar services on a commercial basis).

##### **B. The MARD 5-Year Plan (2006–2010)**

53. The MARD 5-Year Plan 2006–2010 acknowledges as the second major constraint to agriculture sector development that the application of science and technology to agriculture is

weak, and specifically that links between research and extension are poor, resulting in non-systematic transfer of technology. Benefits from investments in AST are thought to be high:

*'Investment in science and technology and technical transfer is considered the most effective investment in comparison with investment in other areas within the agricultural sector' and 'there is lack of investment in well selected projects which can create major breakthrough to address quickly the sector's major constraints.'*<sup>5</sup>

54. In the high growth development scenario (including commercial agriculture) for the sector, investment in science and technology is made to reduce production costs and increase farm products' quality. In terms of specific activities related to objectives of increasing quality of outputs, the intentions are

*'to give priority to investment in science and technology, to create varieties with improved yield and quality for major crops which are closely related to processing in order to increase value added chains', and to 'invest in processing and post-harvest science and technology to increase product's value and competitiveness'.*

55. One of MARD's priority programs in the 5-year plan is an AST program, summarized in its logframe format as follows (Table D7). It is quite clear therefore that at the general level of sector planning and program design MARD is fully cognizant of the need to raise the relative importance of AST investments. MARD has also formulated a human resource development plan for agriculture research (in late-2005 under the ASDP).

**Table D7: MARD AST Program (from 5-Year Plan, 2006–2010)**

Priority Program	Activities	Monitoring Indicators
<b>Agricultural Science and Technology Program</b> (Biological Science Program) with several components:	<ul style="list-style-type: none"> <li>- Building a well-organized research institutions system;</li> <li>- Building well organized and effective system of science and technical transferring;</li> <li>- Establish mechanism for effective operation and management of research activities;</li> <li>- Create sets of varieties with high quality and improved yields for major export crops with registered trade marks;</li> <li>- Give priority for investment in applied research, and allocate adequate annual capital for regular operation;</li> <li>- Improve system of disease alert and monitoring of diseases and pests.</li> </ul>	<ul style="list-style-type: none"> <li>- Completion of reorganization of research institutions;</li> <li>- Completion of science and technology strategy for the sector, which is consistent with sector development strategy;</li> <li>- Issue management mechanism of technology transfer;</li> <li>- Improve organization of the extension system to the commune level. 100% of all communes have extension workers; and</li> <li>- Every export crop has a set of varieties with high quality and improved yield, which are suitable to market demand;</li> <li>- Priority projects to be implemented</li> <li>- Reduce pesticide use by 20%.</li> </ul>
1. varieties creation research		
2. science and technology for development of mountainous areas		
3. processing and post harvest technology		
4. economic and policy research		
5. improved quality and standard technology		

<sup>5</sup> MARD. February 2005. *The 5-Year Plan For Agricultural And Rural Sector, Period 2006 –2010* (Second Draft)

56. The Government commitment to improved service delivery in agriculture within the MARD 5-year plan framework can also be demonstrated by the recent increases in budget for the extension system. Partly under encouragement from the ASDP tranche conditions, allocations to agriculture extension have risen by about 12% per annum in the last 2 years, allowing not just quantitative increases in staffing numbers (about 6,000 staff, of whom at least 10% will be women and 10% ethnic minorities are to be recruited) but also qualitative changes (in the forms of more participatory training, existence of multiple services in several provinces, and the formation of the Extension Advisory Councils in 40 provinces).

### **C. A Road Map for Agriculture Science and Technology**

57. Further evidence of this awareness and commitment is provided by the Strategy and Road Map for Agriculture Science and Technology (which was prepared with resources under the ASDP in 2003) and later adopted by MARD.<sup>6</sup> A major premise of this strategy for developing agricultural research and extension was that it should be both holistic (meaning that it recognizes the links and interdependence between strategies for policies, capacity, equipment and mechanisms), and also systemic (meaning that any strategy developed must look at the entire system of agricultural research and extension, both now and in the future). Mechanisms for capacity strengthening, facility and equipment strengthening, and 'institutional mechanism strengthening' should be viewed as components of an integrated strategy to achieve the vision of effective agricultural research and extension. Being components of an integrated strategy implies that the individual strategies cannot be implemented in a piecemeal fashion, but rather should be implemented in accordance with a well-defined framework for effecting change.

58. Such a framework for implementing strategies to effect changes in AST was formulated in shape of a 10-Step 'roadmap' based on a logical sequencing of activities. These steps were as follows:

- (i) Consultative process with policymakers and stakeholders to identify a preliminary set of desired outcomes for the change process in agricultural research and extension;
- (ii) Consultative process with policymakers and stakeholders to arrive at a preliminary identification of perceived constraints to change in the system;
- (iii) Detailed inventory of human resource capacity within the research and extension system;
- (iv) Detailed inventory of research and extension facilities and equipment;
- (v) Detailed analysis of the institutional mechanisms of agricultural research and extension systems;
- (vi) Detailed analysis of alternative policy options;
- (vii) Consultative development of formal set of goals for the agricultural research and extension system;
- (viii) Evaluation of the available capital for investment;
- (ix) Development of an investment framework and timetable; and
- (x) Adaptation of strategies and goals based on achieved results.

59. Without going into detail regarding the technical characteristics of any specific interventions, it is immediately apparent that many elements of this 10-step process have been incorporated in the subsequent process and design of the current AST project, from a consultative stakeholder-oriented problem/constraint identification, through formalization of

<sup>6</sup> Agrifood Consulting International. 2003. *Strategy and Road Map for Agricultural Science and Technology in Viet Nam*. ADB RSC C31072-VIE. Background Report for Asian Development Bank. Agrifood Consulting International, Ha Noi, Viet Nam (March 2003)

options for human resource upgrade, and necessary capital equipment re-provisioning. Explicit in the 'roadmap', and implicit in the 10-steps above, was a need to strengthen research-extension linkages and make the whole, more integrated AST effort more pro-poor in its impacts than the Government's efforts hitherto.

#### **D.      The Farmer Demand for Improved Agriculture Science and Technology**

60.      Turning from the evidence of supply side (i.e., the Government) awareness to demand side analysis, the market information survey undertaken as a part of TA 4194–VIE addressed the actual and preferred sources from which farmers receive information on new varieties and on agricultural technical and management matters. Results for the major sources are summarized in Table D8 (for new varieties) and Table D9 (for technical and management issues).

**Table D8: Farmers' Existing and Preferred Sources for Information on New Varieties (%)**

<b>Source of Information Ranked by Importance</b>	<b>Existing<sup>a</sup></b>				<b>Preferred<sup>a</sup></b>			
	<b>1</b>	<b>2</b>	<b>3</b>	<b>Total</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>Total</b>
Newspaper/Magazine	0.4	1.7	3.0	5.2	1.6	1.6	3.7	7.0
Television	6.9	11.3	8.7	26.8	9.0	11.1	13.5	33.6
Personal contacts (including neighbours and other farmers)	14.7	14.7	11.3	40.7	4.5	4.1	11.1	19.7
Cooperatives, extension clubs, community groups	34.2	27.7	15.6	77.5	29.5	35.7	15.6	80.7
Supply companies (SOE and private)	8.7	6.1	7.4	22.1	11.1	10.7	11.1	32.8
Extension agents and centre	23.4	17.3	7.4	48.1	24.2	16.8	8.2	49.2
Research stations and organizations	2.2	1.3	2.2	5.6	7.8	1.2	2.0	11.1
DARD	1.7	1.3	1.7	4.8	2.5	1.6	1.6	5.7
Others	7.8	13.9	9.5	31.2	9.8	14.8	12.7	37.3
<b>Total</b>	<b>100.0</b>	<b>95.2</b>	<b>66.7</b>		<b>100.0</b>	<b>97.5</b>	<b>79.5</b>	

<sup>a</sup> Figures 1, 2, 3 indicate the first, second and third important sources.

Source: Agricultural Market Information Survey. ADB. 2004. *Technical Assistance to the Socialist Republic of Viet Nam for Preparing the Agriculture Science and Technology*. Manila. (TA 4194–VIE)

**Table D9: Farmers' Existing and Preferred Sources for Information on Technical and Management Issues (%)**

Source of Information Ranked by Importance	Existing <sup>a</sup>				Preferred <sup>a</sup>			
	1	2	3	Total	1	2	3	Total
Newspaper/Magazine	0.0	5.0	7.2	12.2	3.3	4.5	5.8	13.6
Television	5.9	13.1	17.6	36.5	9.5	10.7	13.2	33.5
Personal contacts (including neighbours and other farmers)	14.0	18.5	8.1	40.5	5.4	3.7	9.5	18.6
Cooperatives, extension clubs, community groups	35.1	26.6	8.1	69.8	38.4	39.3	15.3	93.0
Supply companies (SOE and private)	5.9	8.6	2.7	17.1	3.7	4.1	3.3	11.2
Extension agents and centre	31.5	13.5	9.9	55.0	25.2	18.2	7.0	50.4
Research stations and organizations	1.4	0.0	0.0	1.4	4.5	3.3	0.0	7.9
DARD	1.4	0.9	2.3	4.5	2.5	1.2	2.5	6.2
Others	5.0	7.2	8.1	20.3	7.4	13.6	16.9	38.0
<b>Total Citing</b>	<b>100.0</b>	<b>93.2</b>	<b>64.0</b>		<b>100.0</b>	<b>98.8</b>	<b>73.6</b>	

<sup>a</sup> Figures 1, 2, 3 indicate the first, second and third important sources.

Source: Agricultural Market Information Survey. ADB. 2004. *Technical Assistance to the Socialist Republic of Viet Nam for Preparing the Agriculture Science and Technology*. Manila. (TA 4194-VIE)

61. In both cases, personal contacts, neighbors, and other farmers are a major source of information, cited by 40% of respondents as existing important sources. However, in indicating preferred sources of information, less than 20% cite the informal personal contacts as preferred suggesting a presently unmet demand for more formal and regular supply of information. Supply companies are also a significant source of information but while there is preference for more information from suppliers on new varieties there appears a desire to be less dependent upon them for technical and management information. About a third of farmers use and prefer TV as a source of information on varieties and technical and management subjects but about 10% also look to newspapers and magazines, especially for agricultural technical and management information. Major existing sources of information are community groups like cooperatives and extension clubs. Particularly for technical and management issues, farmers would prefer more information supplied through community groups, suggesting that such groups can be a highly effective channel of communications between farmers and the extension and research services.

62. In existing and preferred sources of information, extension is second only to the community groups with about half of all farmers citing extension agents and centers as existing and preferred sources of information. Research stations and organizations are a distinctly minor information source at present, especially concerning technical and management subjects, but farmers clearly want to have better access to the research information. This indicates farmer demands for better information linkages with research through extension in partnership with community groups.

63. As well as the PPTA study from which the earlier data was derived, a farmer needs study,<sup>7</sup> published in 2003, surveyed 1,261 farmers from each region of Viet Nam. The survey findings, summarized in Table D10, confirm the farmers' demands for agricultural technology and the extent to which they look to government agricultural and rural development agencies to meet those demands. A majority of farmers in every region look to the public agencies for support in research and in training, of both farmers and extension agents. About half seek

<sup>7</sup> MARD, UNDP and Royal Netherlands Government. 2003. *Farmer Needs Study Project VIE/98/004/B/01/99* Hanoi.

assurance of the quality of farm inputs, especially pesticides and drugs, and look to government agencies for development and enforcement of standards, tasks which involve both research and extension inputs.

64. Almost half of farmers look to government agencies as a source of information on farming practices and selling prices. Some also still look to government for the provision of publicly- funded goods and services, principally in relation to livestock, while significant numbers are willing to pay for the provision of goods by the extension services (perhaps seeing the extension service as less likely to overcharge or sell fake goods). These farmer needs are direct demands on extension service providers, but also reflect a demand for research and technical services as a derived demand from the need for new technology, training, and information.

**Table D10: Farmers' Desired Scope of Public  
Agricultural and Rural Development Agencies (%)**

Item	North	Central	South	National
<b>To Research</b>				
To develop scientific and technical research in agriculture	74	74	72	74
<b>To Train</b>				
To train farmers on agricultural extension	68	64	71	68
To train extension agents, plant protection agents, etc	70	60	58	63
<b>To Maintain Standards</b>				
To control quality of pesticides	53	46	49	50
To check quality of vet drugs and feed	48	47	41	45
<b>To Advise and Inform</b>				
To inform of plant protection	39	39	50	42
To provide information on selling prices	46	45	39	43
To advise on animal health and livestock breeding	41	41	42	41
<b>To Sell</b>				
To sell books providing useful information on agriculture	71	69	61	68
To sell inputs (seed, pesticide, fertilizer, etc)	32	31	35	33
To sell pesticides	29	24	29	28
To sell veterinary drugs	24	24	25	24
<b>To Give</b>				
To provide animal breeds	53	49	41	48
To organize and improve the quality of artificial insemination	49	48	38	45
To vaccinate animals against contagious diseases	34	38	36	36

Source: MARD, UNDP and Royal Netherlands Government. 2003. Farmer Needs Study Project VIE/98/004/B/01/99 Hanoi.

65. Apart from the demand derived from extension and research, the main demands for agricultural training are from the students wishing to undertake such training and their prospective employers in commercial agriculture and agro-industry. The survey of agricultural training undertaken during the TA 4194 concluded

*'the demand for secondary technical certificate programs is very high, with application rates of twice or more the enrolment rate not being unusual'.*

66. The present shortage of places on technical programs has resulted in many upper secondary school graduates taking places on vocational courses that are aimed primarily at lower secondary school graduates, almost 70% of the agricultural vocational program places are taken by upper secondary school graduates. At present, existing agricultural training

curricula and facilities provide out of date courses taught with inadequate equipment and facilities needed to provide the practical skills required by expanding agro-industries.

## V. PROJECT ECONOMIC RATIONALE

### A. The Technical Argument

67. Understanding the project economic rationale initially requires understanding of its technical logic. The previous sections describing the macroeconomic situation, agriculture sector context and the more specific AST issues have established a clear technical rationale for investment in the proposed AST project. To summarize this case

- (i) Rapid agricultural growth has been achieved in Viet Nam in the 1980s and 1990s. A major source of growth in the 1980s was the result of market liberalization and land de-collectivization, and reflected in the 55% share of sector growth attributable to Total Factor Productivity at that time. In the 1990s, TFP's contribution fell to some 5% while growth continued based on increased factor accumulation (essentially in the form of higher machinery and fertilizer use). The influence of the *doi moi* reforms faded in the 1990s, and the technological 'catching up' of the 1990s is now substantially complete. With the two major sources of past growth now exhausted, either a new source of growth must be found or agricultural growth will probably decline.
- (ii) The major contribution of AST to Viet Nam's growth in the 1990s was as 'spillover' from the accumulated benefits of research and development undertaken elsewhere, resulting in the increased fertilizer and machinery use. This source of growth will likely continue, but now more as a modest flow of new technology rather than the large-scale transfer of 'stocks' of technology experienced in the 1990s.
- (iii) In-country AST has had no noticeable role in past agricultural growth, being a part of the 5.4% TFP contribution (along with infrastructure, health and other public goods). To become a significant source of future agricultural growth, national AST needs to change to be much more effective. This will require capacity strengthening with improved equipment and upgraded human resource skills, new systems and management approaches (increasing the focus on the needs of agriculture and farmers), i.e., demand-driven management of an improved AST resource.
- (iv) Some \$6.5 billion-worth of agricultural research in the United States (and probably about the same amount from Europe and Australia) flows into the public domain each year, about 1,000 times Viet Nam's public agricultural research budget (and larger if privately-protected patent research is included). Rather than replicating these research efforts, the prime need is to identify the findings which are relevant to Viet Nam's needs and carry out applied and adaptive research to ensure that spillover benefits are secured by the agriculture sector as quickly and as effectively as possible.

## B. Establishing an Economic Rationale

68. Establishing an economic rationale<sup>8</sup> for investment in an AST project for Viet Nam on these technical lines at present requires, in the first instance, demonstrating some kind of market failure or limitation which makes public intervention necessary and/or desirable.

69. In the case of agriculture science and technology (and including its large-scale extension to farming populations), experience from developed countries indicates that it does not necessarily fall within the definition of a typical public good (i.e., being characterized by non-subtractability and non-excludability). The scale of research effort referred to in the previous paragraph, and also the operations of major agro-industrial companies round the world and in the region (and including major regional players such as Thailand's CP Group), clearly indicates that the private sector is already active in the provision of agriculture science and technology. Indeed, private companies such as CP, Cargill, and others are already active in Viet Nam's agriculture sector in the extension of certain technologies in concentrated geographical locations (e.g., in aquaculture, pig and poultry production based on contract farming models).

70. In the context of Viet Nam's agriculture sector at present, what makes private provision of more generalized, locally-suitable (and perhaps pro-poor) AST difficult is largely the existence of a very large population of smallholder agriculturalists, whose operations (in developed world terms) are only marginally profitable and who cannot easily pay (at least up-front in investment terms) for new technologies, which in case they may see as very risky. High transaction costs (including licensing compliances and corruption) for potential private investors entering the Vietnamese agriculture sector and also associated risks (e.g., to do with intellectual property and patent protection) compound the disincentive for investments in AST, other than in relatively well-defined and small-scale environments under the direct control of AST providers.

71. In the present context, what the public sector can do that the private sector cannot do is tailor (through adaptation and application by its local research institutions) existing research to local needs and extend this to a large population of small and relatively poor farmers via its existing nation-wide institutional extension structure. What is needed for this to be able to happen is that these existing institutions need to be strengthened (through capacity-building and technological upgrading), and it is this need that defines the scope and form of the present project.

72. Two other factors also quite specifically strengthen the case for public provision of AST in Viet Nam at present. These are

- (i) the necessary poverty-reduction dimension, which needs to be included in any AST efforts in Viet Nam. The national poverty reduction imperative encapsulated in the CPRGS and SEDP requires an additional effort to orient public AST to the needs of poor farmers. A USDA study (for example) notes that the private sector will play a role in application of the spillovers which will have greatest impact on economic growth, but will have little interest in the needs of poor farmers and poor regions. With the limited resources in developing countries like Viet Nam, public AST is marginal compared to spillovers, but when applied to the unmet needs of the poor it fulfils a unique role (which an FAO study suggests would not

<sup>8</sup> This and subsequent sections follow the approach and methodology detailed in ADB's '*Guidelines for the Economic Analysis of Projects*' (1997), and *Key Areas of Economic Analysis of Projects* (2003) (Economic Analysis and Operations Support Division, Economics and Research Department).

- only reduce poverty but, by including the poor in growth, would increase growth),<sup>9</sup> and
- (ii) the strategic importance of the role of AST for the future growth of the sector. The case was previously made that past sources of growth have been exhausted and also that very large numbers of people still depend on the sector for their livelihoods. These circumstances are fully reflected in the national and sector planning documents of the Government.

## VI. PROJECT ALTERNATIVES

### A. Considering the Counterfactual

73. The first consideration in outlining alternatives to the proposed investment in the project is to consider what would happen in the absence of such intervention. While establishing a counterfactual is inevitably somewhat conjectural in nature, it may seem plausible to argue that

- (i) the existing research institutes that are planned to be upgraded would continue to fail to meet scientific and operational standards that adapting and applying internationally-available research results require. As a result of this continuing downgrading, there would not be available new planting materials and cultivation advice for the extension service to offer to farmers;
- (ii) without better planning and training, field extension and technical staff will remain poor quality and relatively unprofessional in their understanding and delivery of technical contents; and
- (iii) as a direct consequence of this, agricultural growth in Viet Nam will probably stagnate, as the gains from existing resources have largely been achieved and productivity improvements leading to increasing primary and secondary diversification are now the only way forward.

### B. The Project Design Process

74. The design of the proposed AST Project has remained relatively stable since its inclusion (in the form of a Concept Note) in the ADB's Country Strategy and Program Update, 2005–2006 of July 2004:

*'Under the indicative logical framework, the project will have three broad categories for investment: (i) upgrading of human resources through training of staff of the institutions and organizations involved in AST researchers, extension agents, and staff of universities, colleges, vocational schools and NGOs; (ii) rehabilitation and modernization of facilities and equipment of AST institutions and organizations; and (iii) improvement and expansion of agriculture information networks'.*

75. The TA Report<sup>10</sup> underlying project design and technical content outlined the proposed project to be in line with the AST road map (Section IV-C), which stressed the need for investment in the upgrading of physical and human resources for AST. The TA Report defined the scope of the investment project in the context of major policy and structural weaknesses in agricultural research, extension, training and market information systems which would be

<sup>9</sup> Studies by ADB, IFPRI, USDA and others agree the distributional impact of AST is neutral to negative. (See Annex to this Appendix for discussion of this topic).

<sup>10</sup> ADB. 2003. *Technical Assistance to the Socialist Republic of Viet Nam for Preparing the Agriculture Science and Technology Project*. Manila.

addressed by ASDP and supported by required 'investments in human resources and infrastructure for AST'.

76. Later stages of project preparation and processing were concerned with the more detailed project design. Within the proposed project design, selection of alternatives has been made on the basis of a participatory approach in which stakeholders have:

- (i) determined priorities for investments in research facilities within the context of other investment projects and programs and the existing stock of equipment;
- (ii) reduced the need for choices between alternatives by including all the vocational and technical training schools with substantial enrolments in target subject areas; and
- (iii) indicated the lack of sustainability in market information projects (which led to the substantial removal of that component from the original conception of the investment).

(It may also be particularly noted that the proposed project does not establish any new institutions, but works within existing agencies and processes. This choice has been deliberate, and fits with the priorities of MARD).

### **C. The Best Alternative**

77. In sum, the consequences of not investing in upgrading agricultural sector productivity are likely to be significant for very large numbers of Vietnamese smallholder farmers in the medium- to longer-terms. Establishing new or parallel institutions to the existing AST framework as a possible alternative to the proposed design would not be feasible in terms of financial sustainability or given the scale of Viet Nam's existing AST resources. The proposed project design is both stable and substantially locally-owned. Overall, it is likely to be the best alternative to address the existing sector development problem of low agriculture productivity.

## **VII. PROJECT VIABILITY ANALYSIS**

### **A. Introduction, and Economic Pricing Assumptions**

78. The viability of the proposed project depends upon comparing costs and benefits of the investment. Comparison of costs and benefits requires their full identification, quantification, and valuation on a common basis. The estimated financial prices of costs and benefits will need to be adjusted to their economic values for the project economic viability analysis to be undertaken.

79. In order to establish a common basis for comparison of economic costs and benefits over the life of the project, the assumptions underlying the conversion of financial to economic prices are reflected in Table D11. The unit of account for the resource statement is thus the domestic price level expressed in Vietnamese dong (the SERF has been applied to tradeables' financial costs estimates on a component-by-component basis):

**Table D11: Summary of Economic Pricing Parameters**

<b>Economic Pricing Parameter</b>	<b>Value</b>
Official exchange rate (end-2004)	D/US\$ = 15,740
Domestic price level	Constant, 2004
Price basis for economic analysis	Domestic numeraire
Taxes and duties on applicable items	10%
Shadow exchange rate factor (SERF)	1.11
Tradeable resource content of equipment and construction costs assumptions:	
(i) AST Strengthening	55%
(ii) Grassroots Agricultural Extension Improvement	10%
(iii) Rural-based Technical And Vocational Training	70%
(iv) Project Management	5%

## B. Project Costs

80. Project costs have been compiled and generated in COSTAB software, and are contained in full in Supplementary Appendix C and summarized in RRP Appendix 6.

81. A summary of project costs by expenditure types and project components (from the COSTAB output) is contained in Tables D12 and D13. From this is derived the project baseline economic cost summary by component contained in Table D14. Note that because different components have such different expenditure accounts, i.e., civil works, equipment, training, operations etc distribution, there are differing amounts of divergence between financial and economic costs estimates across components. The biggest difference is felt by the research and vocational training components because of their relatively high proportions of expenditure on equipment. Total project baseline economic costs are estimated to be about 5% higher than financial costs on this basis.

**Table D12: Components Project Cost Summary**

<b>Item</b>	<b>Local</b>	<b>(Dong Million) Foreign</b>	<b>Total</b>	<b>Local</b>	<b>(US\$ '000) Foreign</b>	<b>Total</b>	<b>% Foreign Exchange</b>	<b>% Total Base Costs</b>
1. Client Oriented AST Strengthening	115,085	135,490	250,574	7,228	8,510	15,738	54	44
2. Grassroot Agriculture Extension Implementation	98,845	25,258	124,112	6,209	1,586	7,795	20	22
3. Rural-based Tech. and Vocational Training	59,709	84,310	144,019	3,750	5,295	9,045	59	25
4. Project Management Support	31,324	20,314	51,639	1,967	1,276	3,243	39	9
<b>Total Baseline Costs</b>	<b>304,973</b>	<b>265,372</b>	<b>570,344</b>	<b>19,154</b>	<b>16,667</b>	<b>35,821</b>	<b>47</b>	<b>100</b>
Physical Contingencies	26,672	5,441	32,113	1,675	342	2,017	17	6
Price Contingencies	24,166	446	24,611	1,518	28	1,546	2	4
<b>Total Project Costs</b>	<b>355,811</b>	<b>271,259</b>	<b>627,069</b>	<b>22,347</b>	<b>17,037</b>	<b>39,384</b>	<b>43</b>	<b>110</b>
Interest During Implementation	–	9,814	9,814	–	616	616	100	2
<b>Total Costs to be Financed</b>	<b>355,811</b>	<b>281,072</b>	<b>636,883</b>	<b>22,347</b>	<b>17,653</b>	<b>40,000</b>	<b>44</b>	<b>112</b>

**Table D13: Project Components Cost By Year (\$000)**

Item	2007	2008	2009	2010	2011	Total
1. Client Oriented AST Strengthening	1,375	4,719	5,337	3,104	1,202	15,738
2. Grassroot Agriculture Extension Implementation	300	1,587	1,661	2,074	2,173	7,795
3. Rural-based Tech. and Vocational Training	87	590	2,518	5,622	229	9,045
4. Project Management Support	1,073	710	551	504	406	3,243
<b>Total Baseline Costs</b>	<b>2,835</b>	<b>7,605</b>	<b>10,067</b>	<b>11,304</b>	<b>4,010</b>	<b>35,821</b>
Physical Contingencies	208	466	539	508	296	2,017
Price Contingencies	17	202	429	550	348	1,546
<b>Total Project Costs</b>	<b>3,061</b>	<b>8,273</b>	<b>11,034</b>	<b>12,361</b>	<b>4,654</b>	<b>39,384</b>
Taxes	236	525	752	881	228	2,622
Foreign Exchange	1,013	3,425	4,926	6,097	1,576	17,037

**Table D14: Project Economic Cost Summary By Component (\$ 000)**

Item	2007	2008	2009	2010	2011	Total
1. Client Oriented AST Strengthening	1,458	5,004	5,660	3,292	1,275	16,690
2. Grassroot Agriculture Extension Implementation	303	1,605	1,679	2,097	2,197	7,881
3. Rural-based Tech. and Vocational Training	94	635	2,712	6,055	246	9,742
4. Project Management Support	1,079	714	554	506	408	3,261
<b>Total Economic Costs</b>	<b>2,934</b>	<b>7,958</b>	<b>10,605</b>	<b>11,950</b>	<b>4,126</b>	<b>37,573</b>

### C. Project Benefits

82. The benefits of the proposed project fall into two distinct sets. Analysis of these two benefit streams follows separately

- (i) the research and extension activities increase capacity in general, and do so with joint costs of other projects and Government resources, without a measurable output, which can be directly attributed to the incremental investment from the project, and
- (ii) the vocational and technical training component causes quantifiable changes in the quality and quantity of graduates from the schools and colleges supported by the project for which an economic internal rate of return (EIRR) can be calculated.

#### 1. AST Strengthening

83. The project will not create any entirely new facilities from which clear streams of future benefits can be derived. The project will provide incremental and replacement equipment which will complement existing equipment previously financed by the Government and international agencies (including the ASDP and World Bank projects). These jointly-financed facilities will be used by researchers, incurring future operation and maintenance costs, which would also be jointly attributable to the combination of investments made in the research facilities. Attempts to allocate these costs and benefits to individual financing sources in such conditions would be arbitrary. Also, the use to which the resources will be put and the benefits which will be derived

cannot at present be predicted due to the participatory, demand-driven nature of the project's proposed extension and research activities. The project is not supporting specific research and extension programs, but rather strengthening the ability of the research and extension services to meet the needs of farmers and agro-enterprises.

84. Rather than hypothesize regarding potential research and extension activities, which may be undertaken by the AST-supported institutions in the current project and the returns that might be anticipated from such activities, a comparative, but empirically-grounded, approach is taken towards benefit estimation for the AST components of the project. The Annex to this Appendix summarizes a substantial number of past evaluations of actual research and extension activities that have been undertaken by various AST-supported research institutions. These examples cover many different situations in the last few decades, and include more recent case studies of projects involving Viet Nam. (Issues covering how benefits are estimated, the benefits that accrue to different types of AST projects, and how to design AST projects to be pro-poor, are all discussed in the Annex). Collectively, these examples indicate a range of quantified EIRR from 26% to 47%<sup>11</sup> and support an expectation of the project-supported institutions achieving what might be regarded as an 'internationally-typical' or reasonable average rate of return of about 35%.

85. It may be noted that rates of return claimed for single research projects are not a relevant guide to the returns which may be reasonably expected for a broad-based support for research and extension capacity as envisaged for the proposed project. An IFPRI review of post-evaluations of combined research and extension projects indicated a median return of 37% (Table DA1) and the USDA adjusted the over-valued typical return to research from 60% to 35% (Table DA2). Again, both of these results suggest that a return of about 35% for the AST component can be reasonably expected on the basis of international experience in research and extension.

## **2. Agricultural Vocational and Technical Training**

86. Under this component, the Project will upgrade the quality of graduates of the agricultural, post-harvest, and agribusiness courses provided by the principal vocational and technical training schools operated by MARD. Only one of the institutions at Da Nang is wholly devoted to the three subject areas, the others range from 35% to 94% focused on these subjects (Table D15). However, the project will support only those staff and facilities used in the target subjects.

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<sup>11</sup> Some examples were found of claims of returns to research in Viet Nam in excess of 1000% but such over-estimations have been excluded.

**Table D15: Student Enrolment and Main Infrastructure Features (10 Institutions)**

<b>Institution Location</b>	<b>HCMC</b>	<b>Ha Tay</b>	<b>Bao Lac</b>	<b>Tien Giang</b>	<b>Can Tho</b>	<b>Da Nang</b>	<b>Hai Phong</b>	<b>Ha Noi</b>	<b>Nam Ha</b>	<b>Quang Nam</b>	<b>Total</b>
<b>Facilities</b>											
<b>Classrooms</b>											
Present	20	26	21	22	36	30	17	29	30	11	242
(Renovation)	5	15	10	–	–	10	2	5	1	1	49
New	–	–	10	–	–	4	–	–	–	–	14
<b>Total with Project</b>	<b>20</b>	<b>26</b>	<b>31</b>	<b>22</b>	<b>36</b>	<b>34</b>	<b>17</b>	<b>29</b>	<b>30</b>	<b>11</b>	<b>256</b>
<b>Laboratories</b>											
Present	3	11	8	10	2	3	3	12	10	5	67
(Renovation)	2	7	5	2	1	2	2	4	1	1	27
New	–	–	–	–	2	5	–	4	–	–	11
<b>Total with Project</b>	<b>3</b>	<b>11</b>	<b>8</b>	<b>10</b>	<b>4</b>	<b>8</b>	<b>3</b>	<b>16</b>	<b>10</b>	<b>5</b>	<b>78</b>
<b>Students</b>											
<b>Present Enrolment</b>											
Agric and Post Harvest	618	893	436	1,691	1,507	2,509	186	1,038	1,632	1,165	11,675
Other Subjects	492	587	823	285	692	0	176	863	100	230	4,248
<b>Total</b>	<b>1,110</b>	<b>1,480</b>	<b>1,259</b>	<b>1,976</b>	<b>2,199</b>	<b>2,509</b>	<b>362</b>	<b>1,901</b>	<b>1,732</b>	<b>1,395</b>	<b>15,923</b>
Agric and Post Harvest %	56	60	35	86	69	100	51	55	94	84	73

87. The component will strengthen the linkages between the technical and vocational training schools, colleges, and the agricultural and agribusiness industries in their areas, particularly private sector employers. In partnership with industries, fifteen new curricula will be developed to provide modern, market- and employment-oriented courses and enable the institutions to provide the courses for an increased number of students. To ensure that the new curricula can be effectively taught, the project will: (i) provide necessary training for teachers; (ii) renovate and construct the classrooms, laboratories and practice areas; and (iii) upgrade equipment and materials for libraries and laboratories.

88. Upgrading of 10 key rural-based technical and vocational training schools, the introduction of new and relevant curricula, and improvements in teaching and learning resources will produce better qualified and experienced graduates, who will be readily employable in the agricultural and agri-business sectors. With the present enrolment of some 11,600 students in agricultural and post-harvest disciplines, about 5,800 better-qualified graduates from the 10 key training schools will enter into the skilled job market each year (based on average 2-year length of training programs). In addition, the increase in classroom capacity will allow enrolments to increase by 10%, adding about a further 580 graduates per year.

89. The economic benefits from the agricultural vocational and technical training can best be valued on the basis of likely future increases of financial income streams accruing to graduates. (This therefore applies to the existing student enrolment level of 5,800 graduates per year who receive increments to income higher than they would otherwise have done, and the whole income of graduates constituting the increased enrolment, i.e., 580 graduates per year, who would not have been trained in the absence of the project).

90. In this case, the increases to private income streams are taken to approximate the social value Viet Nam places on the training the graduates have received, in the absence of other market prices for the knowledge and skills that have been acquired. In practice, this basis of benefit valuation may be regarded as quite conservative as the graduates will be unable to

secure the entire productivity increase for themselves and additional benefits will arise from employers' increased profits.

91. This methodology is frequently applied in economic analysis of ADB education projects (especially vocationally-oriented ones—see Case Studies of projects in ADB's *'Guidelines for Economic Analysis of Projects'* CD, 2001), and was also applied in the Viet Nam 'Vocational and Technical Education Project' (VTEP).<sup>12</sup> It may be noted that the design assumptions regarding benefit quantification (Table D16) are taken to be more conservative than in the VTEP case by (i) delaying the first benefiting graduates from year 1 to year 5, (ii) reducing the incremental benefits for 'improved' graduates within the existing level of enrolment; (iii) removing the assumed annual increase in benefits; and (iv) reducing employment and pass rates. (It may also be noted that in principle this benefit valuation methodology could have been applied to masters', doctoral and post-doctoral trainees under the AST Strengthening component; it was not applied in this case because the trainee numbers are very small, estimated social returns are likely to be highly variable between individuals, and this training accounts for only a small portion of the project's costs).

**Table D16: Benefit Quantification Assumptions of  
Agricultural Vocational and Technical Training Component**

Item	Assumption Value
Annual graduates proportion of student enrolment	50%
Assumed working life of graduates	20 years
Project implementation period	5 years
Graduation year of first beneficiaries	5th year of project inception
First year of increased incomes	6th year of project inception
Incremental earnings of extra graduates	US\$500 per year
Incremental earnings of improved graduates	US\$250 per year
Annual increase in incremental benefits	0%
Graduate employment rate	90%
Graduation rate	80%

#### **D. Comparing Costs and Benefits**

92. The resource statement for the agricultural vocational and technical training component is summarized in Table D17 which includes up to year 2017 only; years beyond this are calculated on the same basis in the original spreadsheet. The base case EIRR for the component on the assumptions just outlined is 31.3%

93. Because benefits for two of the three project components have not been quantified, an EIRR for the project as a whole is not calculated. However, if the 'internationally-typical' EIRR for AST of about 35% and the calculated rate for the training component (i.e., 31.3%) are weighted according their relative proportions of project costs, the EIRR to the investment in the project as a whole is around 22%.

<sup>12</sup> ADB. 1998. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to Viet Nam for Vocational and Technical Education Project*. Manila.

**Table D17: Agricultural Vocational And Technical Training Component Resource Statement**

			PY1 2007	PY2 2008	PY3 2009	PY4 2010	PY5 2011	PY6 2012	PY7 2013	PY8 2014	PY9 2015	PY10 2016	PY11 2017
<b>1 ECONOMIC COSTS:</b>													
Economic Costs (\$000)			94	635	2712	6055	246						
<b>Economic Costs (VND billion)</b>			<b>1.48</b>	<b>9.99</b>	<b>42.68</b>	<b>95.31</b>	<b>3.88</b>						
<b>2 ECONOMIC BENEFITS:</b>													
<b>Improved graduate cohort:</b>	<b>Number</b>	<b>Year</b>											
	1	2011					3940	3940	3940	3940	3940	3940	3940
	2	2012						3940	3940	3940	3940	3940	3940
	3	2013							3940	3940	3940	3940	3940
	4	2014								3940	3940	3940	3940
	5	2015									3940	3940	3940
	6	2016										3940	3940
	7	2017											3940
	8	2018											
	9	2019											
	10	2020											
	11	2021											
	12	2022											
	13	2023											
	14	2024											
	15	2025											
	16	2026											
<b>Improved graduates incremental incomes</b> (lagged one year; VND billion)	<b>Number</b>	<b>Year</b>											
	1	2011						15.51	15.51	15.51	15.51	15.51	15.51
	2	2012							15.51	15.51	15.51	15.51	15.51
	3	2013								15.51	15.51	15.51	15.51
	4	2014									15.51	15.51	15.51
	5	2015										15.51	15.51
	6	2016											15.51
	7	2017											
	8	2018											
	9	2019											
	10	2020											
	11	2021											
	12	2022											
	13	2023											
	14	2024											
	15	2025											
<b>Total Incremental Incomes (improved graduates; VND billion)</b>								<b>15.51</b>	<b>31.01</b>	<b>46.52</b>	<b>62.02</b>	<b>77.53</b>	<b>93.03</b>

	Number	Year								
Increased graduate cohort:	1	2011		394						
	2	2012			394					
	3	2013				394				
	4	2014					394			
	5	2015						394		
	6	2016							394	
	7	2017								394
	8	2018								
	9	2019								
	10	2020								
	11	2021								
	12	2022								
	13	2023								
	14	2024								
	15	2025								
	16	2026								
	Number	Year								
Increased graduates incremental incomes (lagged one year; VND billion)	1	2011			3.10					
	2	2012				3.10				
	3	2013					3.10			
	4	2014						3.10		
	5	2015							3.10	
	6	2016								3.10
	7	2017								
	8	2018								
	9	2019								
	10	2020								
	11	2021								
	12	2022								
	13	2023								
	14	2024								
	15	2025								
Total Incremental Incomes (increased graduates; VND billion)					3.10	6.20	9.30	12.40	15.51	18.61
Total income from improved and increased graduates (VND billion)					18.61	37.21	55.82	74.42	93.03	111.64
3 NET ECONOMIC BENEFITS : VND billion					-1.48	-9.99	-42.68	-95.31	-3.88	18.61
						37.21	55.82	74.42	93.03	111.64

## Summary of economic benefit base case design assumptions:

Exchange rate (VND = \$US1.00)	15740
Assumed working life of graduates (years)	20
Project implementation period (years)	5
Graduation year of first beneficiaries (PY)	5
First year of increased incomes (PY)	6
Incremental earnings of extra graduates (\$/year)	500
Incremental earnings of improved graduates (\$/year)	250
Annual increase in incremental benefits (%)	0%
Graduate employment rate (%)	90%
Graduation rate (%)	75%
Student enrolment	11675
Annual graduation as % of enrolment	50%
Improved graduate numbers per year	5838
Increased graduate numbers per year	584

EIRR = 31.3%  
NPV @ 12% = 328 VND billion

	EIRR-sens	ENPV-sens
Grad emp 75% of base	0.58	0.785455
Ave earns = 2/3 of base	0.60	1.31016
Inc graduates at 50% expected	0.09	0.236364

## VIII. FINANCIAL AND INSTITUTIONAL SUSTAINABILITY

### A. AST Strengthening

#### 1. Agricultural Research

94. The agricultural research component will not establish any new research institutions but will fund upgrading of equipment and capacity building of staff. New equipment is likely to require consumable supplies, and component costs include a provision for initial stocks of such supplies equivalent to 10% of the equipment value. These stocks are expected to sustain operations during the project period and initial post-project use. This will allow demonstration of the utility of the new facilities to support increased budget provision or funding through cost recovery research contracts. This level of incremental cost incurrence is modest; the Government has agreed to fund an expected \$230,000 of such costs annually for the 10 research institutes.

#### 2. Agricultural Extension

95. Agricultural extension does not increase long-term Government commitments to increased extension staff or facilities, but does involve new activities in the form of extension contracts and increased numbers of service providers, requiring some new funding to be sustainable.

96. In the longer-term, a developed agriculture sector would be one in which the receivers of technical information would be willing to pay for it, and the Government's expenditure would either not be required at all (i.e., the private sector would have stepped in) or its costs would be recovered from farmers. In this context, the market information survey undertaken as part of the PPTA asked about farmers' willingness to pay for technical information on new varieties and technical aspects of farming. Some 85% (Table D18) indicated a willingness to pay for information, including 55–60% willing to pay for information 'on demand'.

**Table D18: Surveyed Willingness to Pay for Technical Information, (%)**

Willingness to Pay for Information on:	New Varieties	Technical/ Management
<b>Total</b>	100.0	100.0
Not willing to pay	14.1	15.3
Willing to pay	85.9	84.7
Willingness by information delivery type:		
Telephone service	39.1	39.5
Information bought as needed	55.2	59.3
Information provided through monthly newsletter	58.9	55.6
Information provided through workshops	43.5	44.0
Other types of services	6.9	8.9

Source: ADB. 2004. *Technical Assistance to the Socialist Republic of Viet Nam for Preparing the Agriculture Science and Technology Project*. Manila. (TA 4194–VIE). Agricultural Market Information Survey.

97. This willingness to pay for goods and services has already allowed development of a nongovernment service in the form of the government-trained but self-employed Animal Health

Workers (AHW). As an ODI paper<sup>16</sup> notes, there are a variety of models of agricultural technology services provided on a commercial or voluntary basis as well as by government. The farmer needs survey focused particularly on public sector providers, but does show that the self employed Animal Health Workers are the service providers most often in contact with farmers, with 70% of farmers reporting contacts (Table D19). This suggests that the training provided to service providers is likely to be sustainable at charge rates that are both affordable to farmers and will provide a viable income for the service providers.

**Table D19: Percentage of Farmers Having Contact  
With Selected Service Providers (%)**

Item	North	Central	South	National
<b>Direct Government Agricultural Service Providers</b>				
Extension agent (Commune)	53	38	19	38
Plant protection Agent (Commune)	51	34	16	35
District veterinary station	36	29	33	33
District extension station	20	17	20	19
<b>Nongovernment Service Providers</b>				
Animal health worker	80	73	55	70
Bank and credit providers	62	62	77	66
Cooperatives	77	57	17	53

Source: MARD, UNDP and Royal Netherlands Government. 2003. *Farmer Needs Study* Project VIE/98/004/B/01/99 Hanoi.

98. The extension contracts at village, commune, and district levels are more novel in Viet Nam and therefore may involve greater uncertainty as to sustainability. With smallest (village) contracts foreseen to average US\$500 (almost D 8 million), they will not be affordable for individual farmers and would need community groups, local government units or a combination of the two to sustain them after project support ends. Though there is a concern for sustainability of such contracts, an FAO study<sup>17</sup> suggests that public financing is critical at the beginning to create a market for extension services which, as its benefits are demonstrated, may develop into a sustainable model in the longer run. Sustainability of the extension contracts then depends on the demonstration of benefits so that farmers, farmer groups, local government or others develop ways to fund them. Failure to demonstrate benefits will result in the contracts not being sustained and, in that event, a cessation would be appropriate for a demand-driven system.

## **B. Agricultural Vocational and Technical Training**

99. Component design minimizes incremental costs by developing existing institutions that already have staff in posts and financial budgets, thus minimizing incremental costs. The upgraded staff will be already-existing staff trained by the project rather than new staff recruited to increase payrolls. In 6 of the 10 schools, there will be no increase in the number of classrooms or students, so no increase in teacher numbers. The total number of classrooms will be only slightly increased from 242 to 256 with a probable need for a comparable 7% increase in teaching staff.

<sup>16</sup> Farrington, J. November 1994. *Public Sector Agricultural Extension: Is There Life After Structural Adjustment?* Natural Resource Perspectives, No 2. Overseas Development Institute, London.

<sup>17</sup> Rivera, W. M. and Qamar, M. K. 2003. *Agricultural Extension, Rural Development, and The Food Security Challenge*. Food And Agriculture Organization of The United Nations. Rome.

100. The new curricula and supporting equipment and facilities may increase recurrent costs beyond the needs of the old curricula but these requirements can only be quantified when the curriculum development processes are completed. The Government has agreed to fund \$360,000 of expected annual incremental costs for the 10 technical and vocational schools.

## IX. POVERTY AND DISTRIBUTION ANALYSIS

### A. Introduction to Analysis

101. In view of the lack of quantification of many project benefits (i.e., those coming from the research and extension components), the distributional and poverty aspects of the project are considered qualitatively. No quantitative analysis of poverty impact [as measured by the Poverty Impact Ratio (PIR)] based on proportions of financial and economic benefits accruing to different types of project participants classified as to their poverty status has been attempted.

### B. AST Projects and ADB's Poverty Reduction Objectives

102. Perhaps the most obvious point to acknowledge is that AST projects are not inherently pro-poor in nature. While it is also true that the poor are unlikely to be pulled out of agriculture-based poverty without investments in AST, ADB's Special Evaluation Study<sup>18</sup> of agricultural research impact notes

*'there are legitimate concerns that research-led technological change in agriculture has favored wealthy farmers at the expense of poor producers and laborers.'*

103. Wealthier farmers have the resources to apply new technologies while poor farmers do not, giving rise to the AST bias to the negative or neutral effects on poverty noted by the SES and other studies. For example, an IFPRI study<sup>19</sup> on poverty impact of AST interventions concludes:

*'Technology's role in alleviating poverty is both indirect and partial; technology alone cannot overcome poverty.'*

A USDA<sup>20</sup> study also concludes:

*'Given the long time periods for R&D to have an effect, the difficulties in targeting R&D directly to the poor, and the availability of other policy instruments, agricultural research is a relatively blunt instrument for achieving distributional objectives.'*

104. Given ADB's overarching objective of poverty reduction (and of course the Government's own objectives in its SEDP and CPRGS) the issue necessarily arises as to how to incorporate this into a project that, on the face of it, may not lend itself to such purposes.

<sup>18</sup> ADB. December 2000. *Special Evaluation Study on the Policy Implementation and Impact of Agriculture and Natural Resources Research*. Manila. (ADB, SST:STU 2000-17)

<sup>19</sup> J. Kerr and S. Kolavalli. December 1999. *Impact of Agricultural Research on Poverty Alleviation: Conceptual Framework with Illustrations from the Literature* [EPTD Discussion Paper No 56, International Food Policy Research Institute (IFPRI) and Impact Assessment and Evaluation Group (IAEG)] CGIAR.

<sup>20</sup> P. W. Heisey. June 2001. *Agricultural Research and Development, Agricultural Productivity and Food Security*. Agricultural Information Bulletin No. 765-10, June 2001, Economic Research Service, USDA.

### C. Incorporating a Poverty Focus into Project Design

105. ADB's poverty strategy indicates two courses for incorporation of poverty-reduction objectives into project and program design:

- (i) that they '*be designed to accelerate pro-poor growth*', or
- (ii) that they '*focus in poverty directly*'.

106. In the first case, 'acceleration' implies an activity that intrinsically results in pro-poor growth. Given the lack of an intrinsic pro-poor character in AST, 'acceleration' does not apply and applying the other option of a poverty focus engineered into project design is necessary.

107. Engineering a poverty focus or designing a 'poverty inclusive' orientation may have several dimensions. A World Bank performance assessment<sup>21</sup> of the Viet Nam Agricultural Rehabilitation Project (VNARP) notes that

*'poverty focus is more than simply selecting areas where there is a high percentage of poor'—simply choosing poor provinces and districts does not give poverty focus as no area is wholly poor and the relatively better off farmers will always be better able to secure benefits'.*

108. Similarly, IFAD's<sup>22</sup> experience of participatory extension and research in Viet Nam in the cited Participatory Resource Management Project (PRMP)<sup>23</sup> concludes that the poorest cannot be reached by projects that endeavor to focus exclusively on them but need to be addressed inclusively as an integral part of the community. For them to be included requires more than their being members of a farmer group; if research or extension addresses purely cash crops this will be of little use to subsistence farmers even if they are members of the group. IFAD concludes that if the poorest farmers are to share the benefits, then the focus must be on household food security and nutrition rather than on income alone.

109. In relation to the present project, the following are design features that should ensure reasonable levels of poverty reduction impact being achieved

- (i) notwithstanding the World Bank VNARP-related quote just presented, the proposed project is working in 5 of Viet Nam's poorest provinces (including Dak Nong, one of the country's newest and most institutionally deprived locations) and thus, *ceteris paribus*, should have a greater poverty impact than a similar intervention located elsewhere;
- (ii) the use of participatory and pro-poor techniques for research contract selection (performance targets from the design and monitoring framework indicate that 30% of the total value of contracts must target upland and remote communities, for example); and

<sup>21</sup> World Bank. June 2002. *Project Performance Assessment Report, Socialist Republic Of Viet Nam, Agricultural Rehabilitation Project* (Credit 2561-Vn) Report No: 24291.

<sup>22</sup> IFAD. April 2001. *Viet Nam Country Programme Review and Evaluation: Agreement at Completion Point* (IFAD Report No. 1143).

<sup>23</sup> IFAD. April 1993. *Participatory Resource Management Project—Tuyen Quang Province*. (IFAD Loan L-I-328-VN [SDR 13.35m]).

- (iii) demonstration trials and extension service delivery will occur in poor communes where at least 30% of households are classified as poor, and compliance with the gender and ethnicity plans will reinforce the pro-poor focusing.

## **X. SENSITIVITY AND RISK ANALYSIS**

### **A. Introduction to Analysis**

110. The project design and monitoring framework (Appendix 1 of RRP) details specific assumptions and risks at the levels of outputs, outcomes and impacts for each of the components. More detailed discussion of risk and uncertainty vis-à-vis individual components now follows.

### **B. AST Strengthening**

111. The lack of predictable and directly quantifiable benefits of the AST components of research and extension prevents the undertaking of a quantitative sensitivity analysis. However, strong economic viability of the order of an attributed 35% EIRR is considered robust given:

- (i) the scope and range of the international analyses of research and extension reviewed earlier (and detailed in the Annex), suggesting average returns of around 35%;
- (ii) the ability of regional research to produce returns of international standards; and
- (iii) the track record of supported institutions in Viet Nam achieving outcomes consistent with international performance standards.

112. The economic growth benefits are thus reasonably secure. Given the established track record of the research institutes, including cooperation with international and regional research institutions, there should be no significant risks to achievement of economic growth benefits.

113. The benefits, about which there is perhaps some uncertainty, may be the poverty reduction benefits (see previous section). AST's inherent poverty impact is potentially neutral or negative, and requires the kind of design features described above to make a contribution to poverty reduction. The extension and research components seek to develop demand-driven and pro-poor services in a novel way and, therefore, have a degree of risk attached to them (simply by being untested in-country). In research, the participatory proposals for competitive use of the research fund introduce a poverty focus through farmer support being a criterion in the use of the fund. As long as these conditions are rigorously applied during implementation, then a positive poverty focus may be effectively achieved.

114. In extension, the risk to returns is contained by the training of extension service providers as self-employed and locally based extension workers, building on the positive experience of the animal health worker model. Previous projects, including IFAD's Participatory Resource Management Project, have successfully developed extension services for the poor, building on the animal health worker model of affordable, fee-based service provision. The novelty of the contract-based approach to extension still contains an element of risk in successful implementation and on-going sustainability, which is critical to the achievement of poverty reduction benefits.

115. To safeguard against risks in implementation, and support the risk mitigation features deliberately included in the project design, the component will be supported by most of the

project management activity, at provincial and district levels, and by the whole of the proposed consulting services support.

### C. Agricultural Vocational and Technical Training

116. In the agricultural vocational and technical component, the risks primarily relate to the assumptions made in the base case EIRR model (Table D17). The most critical design assumption of all is that new curricula will be developed which meet market and employment needs. This is dependent on the active partnership between the schools and the industrial, private sector employers in their locality to ensure the demand driven focus of the new curricula. Any attempt to short-cut the curriculum development, so as to bring forward the investment in physical assets, or to enforce 'top down' development at the expense of the school/industry partnerships would jeopardize the benefits. Once the new curricula are developed, the risk is that the schools may lack the trained staff and facilities to teach the new courses. However, the provision for training of staff, both academically and in teaching methods, is considered to guard against this risk.

117. To capture the effects of the component implementation not going as anticipated, the sensitivity of economic returns to different assumptions are summarized in Table D20. EIRRs associated with parameter changes and their calculated sensitivity indicators (SI) and switching values (SV) are shown.

**Table D20: Summary Sensitivity Resting Results**

Revised Design Assumption	EIRR (%)	Sensitivity Indicator	Switching Value
1 Employment of graduates is 75% of base case	26.8	0.58	24% of Base Case
2 Average earnings are two-thirds of base case	25.0	0.60	\$119
3 Annual incremental costs at 5% of training component costs	30.5	N / A	N / A
Combination of 1-3	20.3	N / A	N / A
4 Increased graduates at half expected rate	29.9	0.09	N / A

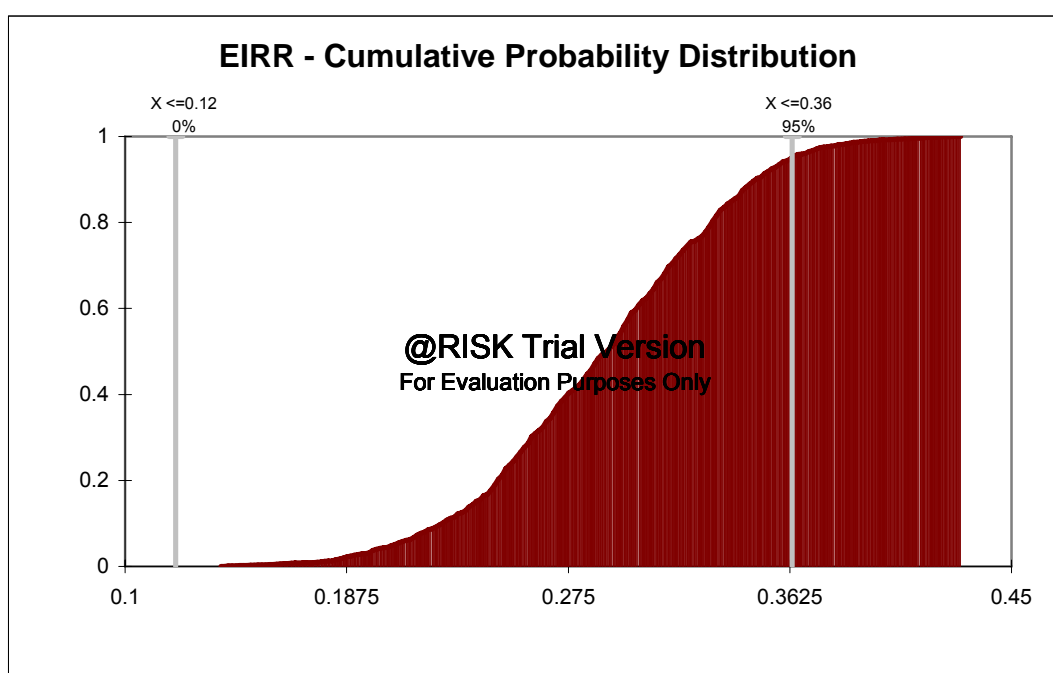
118. What the table implies is that even with major design parameters' assumptions turning out to be over-optimistic during implementation, returns to the project will remain high.

119. The sensitivity analysis only measures the consequences for economic returns in the event of the revised assumptions holding, but says nothing about the likelihood of such events occurring. Table D21 presents simple probability distributions of values (in triangular form) for some of these parameters, together with a distribution of the expected EIRR for the project (Figure D1) based on these distributions. It can be seen that, on the basis of this simple but quantitative-based risk model (developed with @Risk software, and applied on basis of ADB's *'Risk Analysis In the Economic Analysis Of Projects – A Handbook'*; 2002), that the probability of the component failing to achieve an EIRR of less than 12% (extreme left) is virtually zero.

**Table D21: Summary of Risk Modeling Assumptions For Agricultural Vocational and Technical Training Component**

Variable	Minimum Value	Most Likely Value	Maximum Value
Graduate employment rate (%)	50	90	100
Annual incremental earnings of extra graduates (\$)	200	500	700
Annual incremental earnings of improved graduates	100	250	350
Graduate employment rates	50	75	100

**Figure D1: Distribution of EIRR on Basis of Risk Assumptions For Agricultural Vocational and Technical Training Component**



## **XI. PROJECT PERFORMANCE MONITORING**

### **A. Introduction: Target, Indicators, and Institutional Arrangements**

120. The project design and monitoring framework (Appendix 1 of RRP) details specific targets at the levels of outputs, outcomes and impacts for each of the components, together with data sources and reporting mechanisms for information gathering.

121. The central project management unit (CPMU) will include a core monitoring and evaluation (M&E) team and the extension component will also develop M&E capability at local levels. The M&E system will be developed and benchmarks established in the initial phase of implementation. The above analyses of sensitivity, risk, poverty impact and sustainability

identify parameters to be monitored in order to assess performance during implementation so that timely corrective measures can be taken when required.

## **B. AST Strengthening**

122. AST activities are expected to produce an overall EIRR of the order of 35%, based on samples of applied research and extension activities internationally and within Viet Nam (Annex). Monitoring cannot cover every research effort of every participating institute, but will necessarily concentrate on random samples of research programs, preferably to which use of project-financed facilities or training have been applied.

123. A standardized format of a short research evaluation report, indicating economic growth impacts (through an EIRR calculation) and poverty impacts (through an indication of the number of poor households benefited, defining the prior poverty of the poor household and the scale and nature of the increase in terms of household food security, nutrition and income etc) may be prepared. The same format can be applied to all of the proposals for use of the research funds - as an appraisal *before* approval and an evaluation report *upon completion*. This can support the application of the criteria proposed for the use of the funds as well as monitoring the performance of the research component (against the expected returns of around 35%). Emphasis in monitoring research activities will be on achievement of economic growth benefits.

124. In the extension component, emphasis will be on benefits delivered to beneficiaries in terms of increased household food security, nutrition and incomes. Noting IFAD's experience, this should not focus exclusively on the poor but seek to benefit the whole community and ensuring that the poor share the benefits as an integral part of the community. In a simple model of contracts funded in response to self-created farmer groups, the inherent tendency of AST to neutral-to-negative poverty impacts is likely to emerge and monitoring must seek to detect this early if a poverty focus is to be achieved. As was just indicated for the research contracts evaluation, a similar *ex ante* and *ex post* evaluation format should be applied and developed prior to any contracts award.

125. Unlike IFAD's research and extension projects in Viet Nam, no community organization activity is currently included within the project, relying instead on extension workers and communities to include the poor. If monitoring of poverty impacts indicates weakness in reaching the poor, it may be appropriate to use the extension contracts to fund appropriate community organization to better achieve poverty objectives.

## **C. Agricultural Vocational and Technical Training**

126. The benefits of the rural-based training component depend on development of curricula and facilities, which upgrade the quality of graduates to make them more employable and secure higher incomes. The key measures to be monitored will be:

- (i) increased level of income secured by graduates of different courses;
- (ii) level of employment of graduates from different courses; and
- (iii) the pass rate of different courses.

127. These impacts will not be measurable until the last years of the project, after curricula have been designed and teaching begun. Monitoring should continue after project completion to facilitate post-evaluation of actual impacts. Benchmarks from which to measure changes and benefits arising from the project need to be established as early as possible during

implementation and established as time series to be continued through and after implementation. Benchmarks will include:

- (i) incomes secured by new graduates from present courses as a basis for measurement of increased incomes from improved quality of training;
- (ii) incomes of new lower and upper secondary graduates in the school catchment areas as a basis for measurement of the income increases of the expanded school enrolments;
- (iii) employment levels of existing graduates followed up to 5 years from graduation to compare with employment of graduates from the new curricula;
- (iv) employment levels amongst recent lower and upper secondary graduates as a basis for calculating the benefits of the increased school rolls;
- (v) graduation levels for each agricultural, post-harvest and agribusiness course as an input to calculations of incremental benefits and possible indication of impact of the teacher training programs, some of which will precede new curricula.

128. As the benefits will arise from the ability of new curricula to increase employability and incomes, an early warning of performance can be devised to monitor the success of curriculum development. This requires anticipation of market response to the curricula, implying feedback (and thus establishing mechanisms to garner such feedback) from the prospective industrial employers on their perceptions of appropriateness of curricula under development.

#### **D. Measuring Project Impact**

129. In the long-term and post-project, it will be important to evaluate the success of the project as a whole in terms of achieving its impact as they are defined in the design and monitoring framework (i.e., in relation to changes in agriculture value added, exports and incomes/poverty reduction). Change in these variables is likely to be relatively long-term in nature and also hard to differentiate from change caused by other projects and policies. However, in the 5 provinces in which the project will be operating via its extension activities, the provincial-level statistics of the type on agriculture and rural development already routinely compiled for the Government's General Statistics Office should be able to identify changes in areas, yields, and production of crops that have been extended via demonstrations or other efforts during the project life. This information will also be available to any subsequent post-evaluation exercises.

## THE IMPACTS OF INVESTMENTS IN AST – SOME EVIDENCE AND ISSUES

### A. Impacts of AST Projects and Programs

#### 1. Rates of Return Estimates (Ranges and Revisions)

1. An IFPRI<sup>1</sup> analysis of 1,852 evaluations of agricultural science and technology activities calculated a mean rate of return of 81.3% in a range of -100% to +5,645%. All such reviews indicate a large 'signal to noise ratio' with great spreads around the mean, which limit the ability to draw meaningful conclusions. The IFPRI study excludes the extreme, published values for rates of return up to 724,423% and ridicules such results with the simple calculation:

*investing \$1 at an internal rate of return of 700,000% per year would generate \$7,000 after 1 year ..... and \$2,401 trillion after 4 years. The Gross Domestic Product (GDP) of the world in 1997 was \$29.0 trillion.*<sup>2</sup>

2. While most evaluations are not so extreme, the IFPRI study notes that implausible over-estimation is the rule rather than the exception in AST impact evaluation:

*'Suppose the investment of \$1.21 billion in 1980 in US public agriculture R&D had earned an IRR of 50% per year, the midpoint of the conventional wisdom... The accumulated stream of benefits would be worth \$4 trillion (1980 dollars) by the year 2000—about 30 years worth of US agricultural GDP. The same amount invested at 8% per year would be worth \$6 billion (1980 dollars) in 2000—more plausible and still a good investment'*

3. The rates of return routinely claimed for agricultural R&D simply cannot be true. Both the IFPRI study and a US Department of Agriculture study<sup>3</sup> review the causes of this pattern of overstatement and an adjustment to a more realistic impact is indicated. Factors resulting in over estimates suggested by the studies are summarized below.

4. **Under-Estimation of Costs:** IFPRI summarizes that 'understatement of costs arises, in particular, from not allowing for the full social cost of using general taxation revenues for R&D ... occasionally fail to attribute an appropriate portion of R&D overhead ... or they omit components of effort involved in the development and extension phases of a project'. The USDA critique adds emphasis to the failure to account for the costs of: spillovers from other national, international and private sector research which contribute to project outputs; environmental and health costs resulting from new technology, such as pesticide and fertilizer residues; and the dislocation and adjustment costs of reduced on-farm employment and lower farmgate prices and incomes for poorer farmers who cannot quickly benefit from new technologies.

5. **Over-Estimation of Benefits:** IFPRI again summarizes that 'overstatement of benefits arises, in particular, from not counting the effects of private sector R&D and not counting the effects of spillovers of technology from other places (states, countries or institutions) and attributing all the gains in productivity to only a subcomponent of the total relevant R&D spending'. IFPRI also notes a 'selection bias' in ex-post evaluations, suggesting successes are

<sup>1</sup> J.M. Alston et al., IFPRI. 2000. *A Meta-Analysis of Rates of Return to Agricultural R&D*

<sup>2</sup> IFPRI 2000 page 54.

<sup>3</sup> K. Fuglie et al., May 1996. *Agricultural Research and Development: Public and Private Investments Under Alternative Markets and Institutions* (Agricultural Economics Report No. 735). Economic Research Service, US Department of Agriculture.

chosen and failures ignored. Both IFPRI and USDA suggest a substantial impact on benefit evaluation from assumptions of unrealistically short lags between research and impacts and from double counting benefits by claiming the whole benefits in an area for each relevant research project. Finally, USDA notes the impact of market distorting agricultural programs, which increase production, at a considerable cost, which is then included in calculations of benefits of research projects.

**Table DA1: Rates of Return to Different Scopes of AST Evaluations**

Area	Number of Observations	Rate of Return %				
		Mean	Mode	Median	Minimum	Maximum
Research Only	1,144	99.6	46.0	48.0	(7.4)	5,645.0
Extension Only	80	84.6	47.0	62.9	0.0	636.0
Research and Extension	628	47.6	28.0	37.0	(100.0)	430.0
All	1,852	81.3	40.0	44.3	(100.0)	5,645.0

Source: J.M. Alston et al., IFPRI 2000. *A Meta-Analysis of Rates of Return to Agricultural R&D*.

6. Most evaluations (Table DA1) narrowly address a single research or extension project and maximize the need to allocate costs and overheads. When the need to allocate is reduced, as when research and extension are evaluated together, the rates of return halve compared to the 'pure' research estimates. IFPRI notes that when a narrowly defined, single project is evaluated the mean rate of return is 2.5 times the rate of return when multi-project programs are evaluated. ADB's own evaluation of agricultural research<sup>4</sup> (SES) observes the high returns to agricultural research (single projects rather than multi-project programs and without extension) and adds 'it should be noted that the more disaggregated the analysis, the higher the variation expected in rates of return'.

7. The low 'signal to noise' ratio, and evident bias to overstatement of returns, in evaluations of single projects (research or extension) suggests that these evaluations are not an informative basis for decision making. Decisions are better based on evaluations which specifically include extension and dissemination as well as research in a multi-project program or institutional context. Caution also suggests use of median values to avoid the weighting to the higher values in calculation of the mean. On this basis, the most informative rate of return in Table DA1 is the 37% median rate of return in the combined evaluations of research and extension.<sup>5</sup>

8. USDA analysts estimated distortions caused by analysts' assumptions and suggest adjustments, shown in Table DA2. In view of the range and uncertainty of direction of external factors no general adjustment is proposed for these, though the indirect impacts on the environment, health and farm employment are more likely to be negative than positive. These adjustments suggest an adjusted rate of return of about 35%, consistent with the 37% median for evaluations of research and extension.

<sup>4</sup> ADB. 2000. *Special Evaluation Study on the Policy Implementation and Impact of Agriculture and Natural Resources Research* (ADB, SST:STU 2000-17). Manila.

<sup>5</sup> The median 37% is in the centre of core ranges estimated by USDA for private R&D and farmers schooling. Evidence was not available for a core range for extension, but a similar full range to private R&D and farmers schools may suggest a similar core range. USDA estimates higher returns to public R&D but IFPRI concludes there is no statistically significant difference between returns to public and private research. However, IFPRI concludes there are differences, significant at the 95% level or higher, between Government analysts on the one hand and university, private sector and other analysts, who evaluate research at 15%, 61%, and 49% lower than Government. IFPRI notes that international research institutions and funding bodies also have a pattern of high estimates. This tendency to high values by public sector analysts needs to be borne in mind reviewing results.

**Table DA2: Suggested Revisions to Rates of Returns, % per Year**

Adjustment	Range	Central Estimate
Unadjusted rate of return	60	55 to 65
Spillover from private research	9	5 to 15
Tax collection (deadweight losses)	6	3 to 9
Longer research lag	10	0 to 20
Commodity program effects/distortion	n.a.	Negligible
Environment, health, and safety	n.a.	+/-
Structural adjustment, labor displacement	n.a.	+/-
Adjusted rate of return	35	

Source: K. Fuglie et al., May 1996. *Agricultural Research and Development: Public and Private Investments Under Alternative Markets and Institutions* (Agricultural Economics Report No. 735). Economic Research Service, US Department of Agriculture.

9. Rates of return in the 30–40% range appear more plausible than the raw evaluations of research at a mean 100% in a range rising to 5,645% (Table DA1) and on to the extremes of 700,000% and more. The adjusted rates of return, 30% to 40%, are high compared to the opportunity cost of capital and justify continuing investment in research and extension by public and private sectors.

## **B. AST and the Poor**

### **1. Poverty Reduction Objectives**

10. In 1999, ADB approved a Poverty Reduction Strategy (PRS)<sup>6</sup> which marked a fundamental shift from its prior strategic framework. In its PRS Mission, ADB was driven

*‘to make elimination of poverty its principal raison d’être..... Reduction of poverty is no longer just one of five objectives, it is ADB’s overarching goal. To this end, the other strategic objectives (i.e., economic growth, human development, sound environmental management, and improving the status of women) will be pursued in ways that contribute most effectively to poverty reduction.’*

11. To achieve this overarching goal the PRS Strategy requires that

*‘All ADB loans and technical assistance will be expected to contribute to the reduction of poverty. Accordingly, all proposals will contain a specific assessment of their poverty impact, and the logical framework that accompanies each proposal will commence with poverty reduction as its ultimate objective. Projects or programs may (i) be designed to accelerate pro-poor growth, or (ii) focus on poverty directly.’*

12. In this context, ADB’s Special Evaluation Study of Agriculture and Natural Resources Research stated that ‘ADB’s agricultural research objectives are to increase food production and food security, and contribute toward poverty reduction.’ However, the SES described the links between research<sup>7</sup> and poverty reduction as being ‘blurred’ at best. A study<sup>8</sup> for CGIAR by

<sup>6</sup> ADB. 1999. *Fighting Poverty in Asia and the Pacific: The Poverty Reduction Strategy*. Manila. (Policy paper approved by the Board of Directors of ADB).

<sup>7</sup> The evaluation and those of IFPRI/IEAG and USDA cited in this section are concerned with research rather than extension which, as discussed earlier, have much greater poverty reduction impact.

IFPRI was less inhibited in summarizing the poverty impact of agricultural research: *'Technology's role in alleviating poverty is both indirect and partial; technology alone cannot overcome poverty.'* The USDA<sup>9</sup> concludes: *'Given the long time periods for R&D to have an effect, the difficulties in targeting R&D directly to the poor, and the availability of other policy instruments, agricultural research is a relatively blunt instrument for achieving distributional objectives.'* The substance of the special evaluation's analysis of research and poverty, discussed below, is consistent with the findings of IFPRI and USDA.

## 2. Poverty Reduction through Economic Growth

13. The SES suggests *'Benefits of research reach the poor through four main avenues: (i) raising farm income and employment; (ii) lowering food prices in the market; (iii) providing pathways out of poverty by raising incomes thus providing more education for children, better health and other household services, and creating rural and urban employment; and (iv) promoting broad-based economic growth.'* These benefit the whole population rather than the poor and are a restatement of the poverty impact of the 'trickle down' effect of general economic growth on the poor. This is consistent with IFPRI and USDA conclusions on indirectness and lack of poverty targeting.

14. Broad-based, sustainable economic growth may be a necessary condition of poverty reduction, but it is not sufficient.

## 3. Distribution Effects of Agricultural Research

15. The PRS Strategy requires that *'poverty interventions will be designed to disproportionately benefit the poor.'* The SES notes, *'However, there are legitimate concerns that research-led technological change in agriculture has favored wealthy farmers at the expense of poor producers and laborers.'* (page 7, Appendix 3).

16. As an example, SES notes that *'Since its release of the modern variety, IR8, in 1966, IRRI has produced a large number of IR-parented varieties resulting in average rice yields increasing from 2.1 tons/hectare (t/ha) in 1966 to about 4 t/ha in 1999. This significant increase was achieved under the irrigated ecosystem. However, in flood-prone and upland rain-fed areas, where most poor farmers live, the average yield achieved has been low, at about 1.5 t/ha and 1.1 t/ha, respectively.'* (p 20) SES also cites *'A study on the impact of rice research on productivity increases and rural poverty'*<sup>10</sup> by David and Otsuka showed that the production gap between favorable and unfavorable areas has widened within and across countries in South and Southeast Asia.'

17. The SES conclusion that the direct impact of agricultural research is to increase the gap between poor and better-off farmers is consistent with IFPRI findings: *'It is easy to find both cases in which poor farmers with small land holdings have benefited as much as large farms, and those in which the benefits of new technology were confined to wealthy, more commercialized farms.'* According to IFPRI, the distributional impact of agricultural research is

<sup>8</sup> J. Kerr and S. Kolavalli. December 1999. *Impact of Agricultural Research on Poverty Alleviation: Conceptual Framework with Illustrations from the Literature*. EPTD Discussion Paper No 56, International Food Policy Research Institute (IFPRI) and Impact Assessment and Evaluation Group (IAEG), CGIAR.

<sup>9</sup> P. W. Heisey. June 2001. *Agricultural Research and Development, Agricultural Productivity and Food Security*. Agricultural Information Bulletin No. 765-10, June 2001, Economic Research Service, USDA.

<sup>10</sup> David, C.C. and K. Otsuka. 1990. *Differential Impact of Modern Rice Varieties in Asia: An Overview*. Modern Rice Technology and Income Distribution in Asia. Colorado: Lynne Rienner Press.

either neutral or negative and there seems no significant body of analysis, which suggests that agricultural research can directly provide the positive distributional impacts required by the PRS strategy.

18. Though IFPRI provides no examples, its 'conceptual framework' to link research and poverty reduction suggests 'more equitable outcomes are more likely if land and income are relatively equally distributed and, markets, government services and infrastructure are well developed. Unfavorable social outcomes are more likely when these conditions are not in place.' In a report to a CGIAR workshop,<sup>11</sup> the researchers elaborated the conditions further to *'include an equitable distribution of land, secure ownership and tenancy rights, efficient inputs and output markets that serve all types of farmers, research and extension systems that are not biased towards large farms, and scale neutral technologies. These conditions can be summarized as 'equitable outcomes may arise when the initial conditions are equitable.'* In this tautology of 'equity before and equity after', there is negligible practical scope for poverty reduction.

19. With possible conceptual exceptions, the general rule identified by both the SES and IFPRI study is that agricultural research has little or no positive, direct impact on poverty reduction.

#### 4. Mitigation of Negative Impacts

20. The SES indicates two means by which the negative distributional impacts of agricultural research can be mitigated. First, it is noted that *'David and Otsuka (footnote 13) generally found that when both direct and indirect effects are taken into account, differential adoption of modern varieties (MVs) across different production environments has not significantly worsened income distribution. As MV adoption increases, labor demand in the favorable area increases due to greater labor requirements per crop, higher cropping intensity, and growth linkage effects on non-farm employment. Interregional migration from unfavorable to favorable areas is induced, largely equalizing wages across production environments. Also, rapid income growth induced by the new technologies has increased non-farm employment, helping to raise wage rates and reduce regional inequalities.'*

21. These indirect effects, almost balancing the negative impacts of research, appear to include further costs of research in the form of the sort of dislocation which tend to be ignored in evaluations of research returns. These 'mitigating dislocations' related to the claimed indirect benefits are:

- inter-regional migration from poor, unfavorable farming areas to the benefited, richer, favorable farming areas;
- rural-urban migration as farmers and farm laborers move from poor areas to take up nonfarm employment; and
- increased landlessness as farmers in favorable areas move to take on and off farm employment.

22. The analysts do not claim that these mitigation effects fully offset the negative distributional impact of research but, by ignoring the dislocation costs, may still be overstating the case for a low negative research impact.

<sup>11</sup> CGIAR. October 1999. *Preliminary End-of-Meeting Report*. International Centers Week, CGIAR, Washington DC.

23. Second, a range of mitigation effects to maintain poor farmers in a farming environment are cited: *'MVs (modern varieties) were adopted earlier on larger, owner-operated farms but small farms and tenant operators soon followed suit..... Public policies often helped smaller farmers through easy terms for credit and subsidized water and fertilizer.'*

24. The SES notes that in *'a related study, IFPRI examined the impact of different types of public investment in rural areas on agricultural growth and rural poverty.'*<sup>12</sup> *Government expenditures can directly benefit the poor through spending on rural development programs directly targeted to the poor as well as indirect effects that arise through investments.'* The sort of public investments which can directly help the poor are the roads, education and health care noted as the major components of Indonesia's high TFP.

25. Both the SES and IFPRI suggest that the negative impacts of research can be balanced by further public investments in infrastructure, credit, utilities and services. However, these benefits are completely independent of agricultural research and, to the extent that they are needed to mitigate the effects of research they are additional research costs, not benefits.

## 5. Research in Poverty-Focused AST

26. The logic of the PRS Strategy is to adjust research so that it has a pro-poor focus either directly or through pro-poor economic growth. The special evaluation proposes such an adjusted focus for research in terms of *'adaptive research on sustainable farming systems'* and *'a focus on areas of high poverty incidence and areas with a less-favored agro-ecological environment'*.

27. Such an approach is reviewed in the IFPRI study, which cautions that *'Past experience shows many cases in which attempts to design technologies with pro-poor characteristics were costly and ineffective, so new efforts must proceed with caution.'* Given this unsatisfactory past performance IFPRI notes that *'Two schools of thought are sharply divided on this issue. One argues that targeting research objectives to specific poverty-alleviation objectives would have a high opportunity cost in terms of foregone productivity increases, which are critical to poverty alleviation.'* The USDA agrees that *'Using R&D policy to try to correct income discrepancies could lead to more equitably distributed income, but at the cost of significantly slower productivity growth.'*

28. In this context, ADB's objectives of food production and food security contributing to poverty reduction would require a trade-off in which some food production and economic growth would need to be explicitly foregone in order to avoid the negative distributional impacts and, when possible, contribute to poverty reduction.

29. IFPRI's second school of thought in response to poor past experience is *'that many other poverty alleviation measures ..... have had poor performance at a very high cost, so ... targeted research could be more cost effective.'* This is a weak case for research when IFPRI and others cite credit, infrastructure, health and education amongst examples of poverty reduction activities, which reliably contribute to poverty reduction and may provide better use of investment funds.

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<sup>12</sup> S., P. Hazell, and S. Thorat. 1999. *Linkages between Government Spending, Growth and Poverty in Rural India*. Fan, Research Report 110. IFPRI, Washington, DC.

30. Failures of past farmer orientation in AST activities can be illustrated by experience in and lessons learned from previous ADB funded projects. As a relevant example, post-evaluation of the PNG Agricultural Research and Extension Project<sup>13</sup> found that:

*'the impact of the research programs on agricultural output has been relatively minor. The research outputs are either too expensive to use, or the problems that the outputs address are not as important to farmers as perceived by the research planners. Overall, a smaller and longer term research program would have sufficed, and would have been better if greater attention was given to socioeconomic aspects.*

*The Project did not address the ability of the research and extension institutions to adequately formulate and manage long-term programs. Wrong perceptions about farmers' needs and poor adoption of extended technology highlight weakness in this area. .... The selection of research and extension programs was based on research and extension staff perceptions about farmers' needs, which proved wrong. .... the major weakness in the research programs is the lack of economic and social perspective.'*

As the key research and extension issue for the future, the evaluation concluded: *'As part of the process of allocating resources in a cost effective manner, individual research and extension proposals should be selected for support on the basis of an objective assessment of their expected benefits, adoption rates, and development costs. Without this type of approach, the formulation of research and extension programs becomes subjective, based on the perceptions of individual staff and the persuasiveness of these staff in having their proposals adopted. There is little guarantee that such programs will address the priority concerns of the target groups.'*

31. The lesson from ADB experience is that management and decision making in research must be changed from the input oriented, subjective approach of researchers to an objective assessment of the needs of target beneficiaries. Such a change is needed to better achieve the economic growth objective in general but even more so is needed to address the needs of the poor and indigenous target groups through a pro-poor orientation of research and extension.

32. The IFPRI study also proposes a shift to demand oriented research and suggest 'participatory research and the possibility that poor people could have a greater say in the research agenda and the research process. Participatory research may facilitate improved performance in developing new technology for complex agricultural systems in unfavorable agro-climatic zones, which often have a high concentration of poor people. To date there has been little evaluation of the performance of participatory research, but it is an emerging area and the literature about it is growing.'

33. Given the past neutral or negative distributional, poverty impacts of agricultural research and the poor performance of past efforts to make research pro-poor, a radical change of approach to research management is needed and demand driven, participatory research may produce more positive poverty impacts as well as more effective realization of food production and economic growth benefits.

<sup>13</sup> ADB. December 1998. *Project Performance Audit Report on the Agricultural Research and Extension Project in Papua New Guinea*. Manila. (Loan No. 1110-PNG[SF]) PPA: PNG 24259.

## C. Extension in Poverty-Focused AST

### 1. Extension Performance

34. The USDA review (June 2001) suggests that because of developing countries' *'limited resources, their national research has had a limited impact on their agricultural productivity. In these countries, even when research results and new technologies have been developed, transferring them to farmers has been difficult because resources for extension activities have been limited.'* This lack of extension resources has limited technology based agricultural growth and the incomplete extension coverage has reinforced—rather than balanced—the inequitable distributional bias of research. An ODI paper<sup>14</sup> summarized views on the poor performance of extension: *'Donors perceived national extension services as fragmented, poorly trained, responsible to more than one authority, having little contact with research services and tending to work more with wealthier than with low-income farmers.'*

35. ODI attributed poor performance in part to the lack of resources available to governments and absence of effective performance monitoring to guide decisions. Innovative approaches to extension are required to promote food production and security benefits and ensure equitable access to technology. The World Bank supported agricultural rehabilitation project in Viet Nam tested the innovative approach of Farmer Field Schools (FFS) but the performance assessment report<sup>15</sup> concluded that *'efficiency and fiscal sustainability are questionable. The Farmer Field School (FFS) approach has so far reached only 4% of Viet Nam's farmers over about an 8-year period. Expenditure would have to increase dramatically to reach a reasonable coverage—say 50% over 10 years. Moreover, the impact data raise questions about the extent to which FFSs have really achieved incremental benefits ... FAO surveys indicate that farmers who attended FFS did not increase yields by much more than farmers who did not attend nor did they reduce insecticide use by more.'* Innovation needs to be appropriate to the circumstances, including affordability for governments and users.

### 2. Multidimensional Extension Services and Demand

36. The early concept of extension as the dissemination of research outputs has generally been discarded. The ODI study says that *'the term 'extension' has often been criticized for the linear, unidirectional flow of information between research services and farmers that it implies. There are ... multiple sources of new agricultural ... 'technology', which include private commercial and voluntary sectors and farmers' own innovations as well as public sector services. Information flows must therefore be multi-directional, and particular importance attaches to the feedback to researchers on how farmers respond to new technology.... Surveys of the sources of farmers' technical information are relatively easy to design and conduct yet they remain too few in number. A recent example indicates that government services are not among the top primary sources of information for many farmers.'*

37. This view of multi-directional information flows, increasing number of extension players and diminishing role of government is shared by the World Bank performance report and USDA analysis, with the latter noting that the private sector will have little interest in poor farmers and poor regions, thus making those the appropriate targets of government extension.

<sup>14</sup> Farrington, J. November 1994. *Public Sector Agricultural Extension: Is There Life After Structural Adjustment?* Natural Resource Perspectives, No 2. Overseas Development Institute, London.

<sup>15</sup> World Bank. June 2002. *Project Performance Assessment Report, Socialist Republic Of Viet Nam, Agricultural Rehabilitation Project (Credit 2561-Vn)* Report No: 24291.

38. An FAO study,<sup>16</sup> consistent with others, states that innovative extension *'will require (a) strengthening the management and program development skills of public sector agricultural extension staff; (b) developing both the ongoing services and collaboration with the private sector; (c) appraising the private sector's potential to contribute ... and to involve the various entities in that sector in calculated cost beneficial agricultural extension delivery services; and (d) training national, district and local agricultural extension staff in the skills required.'*

39. FAO notes that it is not only the supply of extension services which has become multidimensional but also that the needs of poor farmers are too complex to be served by simple commodity oriented information: *'At the same time more carefully differentiated extension strategies are required if governments are to reduce poverty among the rural poor because poverty is a multidimensional phenomenon. To date, various approaches recognize diverse livelihoods, e.g., the 'sustainable livelihoods approach' (LSA) and the 'farming systems approach' (FSA).'*

40. Pro-poor growth requires public extension which focuses limited resources to meet the multiple needs of poor farmers while richer and larger farmers access extension services of the private sector and NGOs on a more commercial basis. The FAO study notes the view that such a re-direction of public resources would not reduce growth of commercial agriculture but instead would include the poor in such growth, increasing both economic growth and poverty reduction impacts.

### 3. Participatory Processes

41. Poor farmers cannot afford commercial extension services and, using conventional models, government cannot afford to provide poor farmers with the services they need to reduce poverty and support economic growth. Poverty reduction, therefore, requires radical changes in extension models. The ODI study suggested that the main features of new approaches included: *'approaches based on farmer participation in diagnosis, testing and dissemination; farmer-to-farmer dissemination; 'para-professional' extensionists; extension through non-government intermediaries; innovative use of media.'*

42. FAO's Special Programme for Food Security, *'SPFS projects ..... utilize participatory approaches and methods to support food security and income generation. Core features of the SPFS strategy are national ownership with the participation of farmers and other stakeholders at all stages of the program's conception and implementation, priority given to small farmers, environmental awareness, integrated and multidisciplinary approach, emphasis on modernization of low-cost simple technologies, and social equity (gender and role of vulnerable groups).'* The FAO study summarizes the high priority need of effective public extension services as *'the creation of producer-led, demand-driven extension services that promote producer organization at the local, community and village level and generally lead to greater self-help, community-driven programmes.'*

### 4. Participatory Processes for AST

43. The World Bank performance report, as one of the lessons to be learnt from the agricultural rehabilitation project, highlights that: *'Poverty focus is more than simply selecting*

<sup>16</sup> Rivera, W. M. and Qamar, M. K., 2003. *Agricultural Extension, Rural Development And The Food Security Challenge*. Food And Agriculture Organization Of The United Nations. Rome.

*areas where there is a high percentage of poor.'* The consensus amongst agencies involved in AST is that the way forward is through participatory research and extension processes.

44. The IFPRI study observes that *'To date there has been little evaluation of the performance of participatory research, but it is an emerging area and the literature about it is growing.'* The ODI reports that *'There is growing evidence .... that participatory approaches enhance project benefits and, in some cases, stimulate wider empowerment of rural communities.'*

45. FAO clearly states one of the major obstacles to establishing effective participation: *'An insidious problem is how to reverse the top down attitude of extension agents and managers toward farmer groups in need of food security. Some of them hold the view that resource poor farmers are ignorant and incapable of managing production technologies and financial resources. These managers and extension agents think that as professionals they have the answers to all the farmers' problems. Experience and findings in the literature show neither perception to be true.'* This is the same misperception cited as a cause of the failure of ADB's project in PNG (footnote 16) and appears to be general.

46. ADB policy<sup>17</sup> formally supports participatory development (PD) processes, which are defined as *'Participatory development is a process through which stakeholders influence and share control over development initiatives, and the decisions and resources that affect them. Not only does this process enhance the sense of ownership and commitment of governments and stakeholders, and improve project quality, effectiveness, and sustainability; but it is particularly effective in giving a voice to the poor and the disadvantaged.'*

47. ADB's own evaluation of their performance<sup>18</sup> suggests *'there are major currently significant constraints within ADB that impede PD processes'*, an ADB<sup>19</sup> obstacle comparable to the 'top down misperceptions' observed in EAs. *'A general weakness observed in all the case studies is the lack of effective consultative mechanisms to enable community stakeholders to contribute to the process of project preparation. .... The consultations with primary stakeholders were generally for the purpose of gathering information and gaining consensus. However, they provided little opportunity for primary stakeholders to participate in the design of project interventions.'* ADB attributes the lack of participation in project identification and design to the fact that *'the costs for some stakeholders, notably EAs and ADB, may seem high, particularly the costs of longer project preparation and implementation arising from the need to consult and negotiate with a broader range of stakeholders'*. As a result, ADB notes that both *'the very limited resources available for PPTA fact finding'* and *'the generally limited resources available in PPTAs, notably time and capacity, for PD processes are considered major constraints'*.

48. The evaluation concludes that these are false economies as *'the costs of introducing participatory approaches in a project are only a fraction of those for infrastructure investment but the returns can be substantial and may emerge fairly quickly, even within large projects. Partly because of these returns, the benefits of consultative processes have generally far outweighed*

<sup>17</sup> ADB. December 1996. *Framework for Mainstreaming Participatory Development Processes into Bank Operations*. Manila.

<sup>18</sup> ADB. February 2001. *Special Evaluation Study On Participatory Development Processes In Selected Asian Development Bank Projects In Agriculture, Natural Resources, And Social Infrastructure Sectors*, SST: OTH 2000-07. Manila.

<sup>19</sup> There is no indication in the evaluation or other literature whether this constraint applies to other institutions.

*their additional costs.*' A World Bank study<sup>20</sup> also suggested that effective participation in project design produces good returns in the form of faster disbursements and implementation.

49. These suggest benefits of participation in terms of faster disbursement, more effective implementation and a bringing forward of the benefit stream through faster implementation. The evaluation also concludes that participation brings additional benefits for projects as *'Social capital, which is the fabric of society, strongly influences the rate of economic progress and the manner in which related benefits are distributed within society. Developing social capital should thus be an important objective of ADB's poverty-reduction projects. Strengthening the social capital of the poor in projects would imply increasing their opportunities for fully participating in the workings of society.'* To address the risk of 'top down misperceptions' institutional strengthening and training are required. To promote effective implementation and address the risks from constrained participatory processes in project design the ADB evaluation recommends flexibility in project implementation through a process oriented approach: *'In many documents describing project implementation strategy, the process learning based approach has been strongly recommended. The approach implies that flexibility should be built into project design so that there can be opportunities for learning. Inherent in this learning approach is the concept of participation becoming an iterative process throughout the project cycle.'*

#### **D. Examples of AST Project Impacts**

50. The following five case studies provide examples (all involving Viet Nam) of the impacts of AST projects of different types. These are (i) growth and production-oriented AST Projects (cases 1 and 2), (ii) social and poverty- oriented AST projects (cases 3 and 4), and (iii) environmentally-oriented AST Projects (case 5).

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<sup>20</sup> Jonathan Isham, Deepa Narayan, and Lant Pritchett. 1995. *Does Participation Improve Project Performance: Establishing Causality with Subjective Data* (Policy Research Working Paper 1357). World Bank.

### **Case 1. Acacia Hybridization – Forest Science Institute of Viet Nam (FSIV), Australian Centre for International Agricultural Research (ACIAR)<sup>21</sup>**

This case illustrates successful applied and adaptive research by an AST-supported institution - FSIV - which produces high returns, supporting effective economic growth objectives though not directly supporting poverty reduction. ACIAR undertook a research programme in Malaysia starting in 1988 for 'Hybridization and vegetative propagation of Australian tropical acacias' in cooperation with the Forest Research Institute of Malaysia and Sabah Forestry Development Authority. Viet Nam was neither a target of nor partner in the research but the Research Centre for Forest Tree Improvement (RCTRI) in FSIV was aware of the research and subsequently secured 'spill over' benefits for Viet Nam through applied and adaptive research.

The two objectives of the original research were to: (i) improve commercial potential of (Malaysia's) plantation forest industry by developing methods for breeding acacia hybrids with higher productivity than traditional tropical species; and (ii) establish low-cost methods for mass vegetative propagation of hybrid clones. Recognizing the potential to apply the research findings in Viet Nam, RCTRI began a program of research to use the technology in Viet Nam. With funding from ACIAR and SIDA as well as Government funds, RCTRI tested and adapted acacia hybrids in various ecological zones and released the first hybrid clone for adoption in Viet Nam in 1996. In 2004, a total of 6 hybrids have been adapted and released and another 4 are expected to be released in the near future. The hybrids have roughly double the growth rate of traditional species and have been planted on a total of 127,000 ha by 2004 with 46,000 ha planted in 2003 compared to only 37,000 ha of traditional species. Constraints on supplies of planting materials are being overcome and hybrids are expected to substantially replace traditional species by 2005. From the original Malaysian research the lag to full adoption in Viet Nam will have been about 17 years.

ACIAR's impact assessment calculates economic returns on the basis that the research programs expedited adoption of hybrids by four years rather than claiming the entire benefits of hybridization for a single group of research efforts. This approach helps avoid the common over-estimation of returns to research. Acacia plantations expanded from 45,000 ha in 1988 to 80,000ha in 1995. The maximum hybrid planted area is projected to be 430,000 ha achieved in 2014 with the project and 2017 without. With the project adoption of hybrids commenced in 1996 and will achieve 100% adoption in 2005, in the without project case adoption would have taken place over 2000 to 2010. The faster growth of hybrids results in a faster rotation and more frequent harvests. Applying these benefits to the projected planted areas, ACIAR assess the EIRR to be 47%. A 15% reduction in with project yields would reduce the EIRR to 39%, indicating a sensitivity index (SI) of 1.1 and, thus, robust benefits.

Though supporting economic growth and though hybrids are planted in both poor and wealthy provinces, the poverty impact is assessed as limited: 'the poorest of the poor, particularly the ethnic minorities, generally do not have the financial resources, skill or land resources (particularly) forestry which has relatively long lead times till harvest'. Provincial authorities tend to reinforce this by allocating forest land to wealthier households which are better able to develop it. The assessment suggests that the poorest can benefit from the 'flow-on' or trickle down increase in demand for labor.

<sup>21</sup> This summary is based on 'Acacia Hybrids in Viet Nam' ACIAR Project FST/1986/030, Impact Assessment Series Report No. 27, August 2004—available at [www.aciar.gov.au](http://www.aciar.gov.au).

## **Case 2. Hybrid Rice Development - Viet Lai 20 - Hanoi Agricultural University, Japan International Cooperation Agency (JICA)<sup>22</sup>**

This project is a successful cooperation between public sector research, international donors, and commercial interests developing and disseminating agricultural technology.

Hanoi Agricultural University (HAU) undertook a research program to produce a long grain two-line hybrid rice variety for multiplication in Viet Nam, the first local production aimed at import substitution of hybrid rice seeds. From 1996 to 1998 the research conducted 3,000 tests to successfully produce a hybrid crossing female 103 and male R20 lines. In 1998, JICA<sup>23</sup> began supporting the development and provided \$2.535 million up to completion in 2003 to fund continued testing and development, and prepare for marketing and the official recognition process. The hybrid was officially recognized by MARD in 2004.

The new hybrid—Viet Lai 20—proved to have similar productivity as imported hybrid seeds but has a shorter growing period of 110-115 days in the Winter-Spring season and 85-90 days in the Summer Autumn season. The shorter growing season offers the opportunity to grow an additional field crop between rice crops. In 2000, the Hai Phong Agricultural Technical Service Company (HPATS) became a partner to support field trials, commercial scale plant multiplication and marketing. From an initial planted area of 500ha in 2002 the area increased to 7,500 ha in 2003 and an estimated 17,000ha in 2004 and projected 25,000ha for 2005. As with other hybrids, the market area is in the northern irrigated areas including Hai Phong, Thanh Hoa and Lao Cai.

Viet Lai 20 is produced and sold commercially at prices roughly half those of imported hybrids from China. The lower cost of seed will increase returns to farmers, reducing poverty, and will attract more farmers to transfer from traditional varieties to higher yielding hybrids - thus increasing economic growth and reducing poverty.

Evaluation<sup>24</sup> includes: (i) only the benefit of reduced farm cost of hybrid seed of \$0.635/kg, (ii) a declining rate of expansion in Viet Lai 20 planted area to pass 100,000 ha in 2011 and 213,000 in 2022 at the end of the evaluated 20 year utilization period, (iii) a seeding rate of 60kg/ha for transplanting in irrigated areas of the North, and (iv) the estimated incremental development costs of HAU, JICA, and HPATS of \$3.4million equivalent from 1996. The estimated EIRR is 29.0%. The results are robust. A 10% lower growth in area after 2005 reduces EIRR to 27.8% (SI=0.4) and zero growth beyond the 25,000ha in 2005 gives a still viable 16.5% return at constant prices. Benefits reduced by 10% also give an EIRR of 27.8% and SI of 0.4 and a reduction in price differential from 50% to 9% is needed to give a 12% return equal to the opportunity cost of capital.

<sup>22</sup> Information from Viet Nam News Service (31 Aug04) and Viet Nam News Agency (www.vnanet.vn—1 Oct 04) reporting statements by HAU, JICA and HPATS.

<sup>23</sup> Improving the Education and Research Capacity of the Ha Noi Agricultural College No. 1 (HAU-JICAERC) 1998 for US\$2.5 million with supplementary US\$35,000 in 2003.

<sup>24</sup> Consultant estimates.

### **Case 3. Community Trap Barrier System (CTBS) – National Institute of Plant protection (NIPP), Institute of Agricultural Science of Southern Viet Nam (IAS), ACIAR, World Vision, and Others<sup>25</sup>**

The case illustrates the high farm level benefits available from AST and the need to combine technological and sociological inputs in adaptive research and extension to achieve those benefits. It also illustrates the need to focus AST if the poorer farmers are to access benefits and shows the active role of two AST supported institutions—NIPP and IAS—in such poverty focused work.

Under traditional, smallholder rice farming systems, rodents generally cause production losses in the order of 5–10%. More intensive farming, particularly increased cropping frequency in monoculture systems, has increased losses so that 15–30% is not unusual and occasional extremes are over 50%.<sup>26</sup> Increasing losses justified increased expenditure to prevent losses, often in the form of chemical solutions, which involved high costs and risks to human and environmental health. Physical measures included simple woven and plastic fences, often associated with traps. Development of a trap barrier system (TBS) for lowland rice was undertaken at the Malaysian Agricultural Research and Development Institute. ACIAR supported dissemination of the techniques in the region in cooperation with agricultural institutes in Malaysia, Indonesia, Thailand, Cambodia, and Laos as well as Viet Nam. In Viet Nam, the partner research institutes are NIPP and IAS both to be supported under AST.

CTBS seeks to disrupt the rat breeding cycle to reduce the population. Breeding coincides with development of the food source provided by the growing rice crop—breeding cycles increasing as cropping frequency increases. A ‘lure crop’ is grown several weeks advanced from the main crop. The lure crop is grown in a 20–50sqm enclosure with traps placed at the entrances to the enclosure. Trapped rats are killed and removed from the traps to prevent them from discouraging other rats entering the traps. A female rat killed at this early stage in the cropping cycle is equivalent to 30–40 young rats at harvest, and if the breeding of the early offspring are included then the rat population at harvest can be reduced by over 100 young for each female killed at planting. Over successive seasons, the underlying rat population declines.

The technology is simple and effective. The cost of each trap is \$20–40 and can be used for several seasons. Trials show that a single TBS can protect an area of 15–20 ha for the loss of only 20–50 sqm for the lure crop and traps. Benefits begin at the first harvest, giving high returns per hectare as indicated in Table D14. This provides an immediate opportunity for richer farmers on larger plots to increase harvested yields and incomes. For poorer farmers, on typical 0.5 ha plots, the costs of materials and maintenance are unchanged, but the TBS benefits are greatly reduced and do not justify individual use of TBS. For poor farmers, the investment of \$20–40 is also difficult even when substantial returns can be achieved at the first harvest.

<sup>25</sup> Principal sources used are: ‘Assessment of Rodent Control Projects in Viet Nam: Adoption and Impact’ ACIAR Project ASI/1998/036, AusAID CARD Project 2000/024, ACIAR/World Vision Project VN31-174945 Impact Assessment Series Report No. 24, March 2004; ‘Non-chemical Control of Rodents in Lowland Irrigated Rice Crops’ ACIAR Research Notes RN 26 9/01; ACIAR Project Notes on Project ASI/1998/036: Management of rodent pests in rice based farming systems (in collaboration with NIPP, Viet Nam and institutions in Laos, Malaysia and Indonesia), and Project CTE/2000/165: Facilitating farmer uptake of ACIAR project results: World Vision collaborative program (covers Viet Nam, Laos and Thailand); all available at [www.aciar.gov.au](http://www.aciar.gov.au).

<sup>26</sup> Assessment Series Report No. 24 cites a rodent outbreak in 2001 in Binh Thuan province in which mean rat damage was 40% ranging from 30% to 100% as drought in the hills drove rats to lowland areas in search of food.

**Table DA3. Assessed Impact of CTBS in Different Districts**

Region	North	South Central	South	South	South	Average
Province	Vinh Phuc	Binh Thuan	Soc Trang	Tien Giang	Bac Lieu	
District	Me Linh	Bac Binh	My Tu	Cai Be	Vinh Loi	
Year	Net Benefits—D '000/ha					
0	(135)	(131)	(221)	(187)	(45)	(144)
1	5,226	2,939	(61)	2,559	145	2,162
2	5,226	2,939	(61)	2,559	145	2,162
3	5,226	2,939	(61)	2,559	145	2,162
4	5,226	2,939	(61)	2,559	145	2,162
5	5,226	2,939	(61)	2,559	145	2,162
6	5,226	2,939	(61)	2,559	145	2,162
7	5,226	2,939	(61)	2,559	145	2,162
8	5,226	2,939	(61)	2,559	145	2,162
9	5,226	2,939	(61)	2,559	145	2,162
10	5,361	3,070	160	2,747	190	2,306
IRR	3868%	2241%	n.a.	1366%	322%	1503%
NPV*	26,282	14,747	(441)	12,798	706	10,818
BCR*	21.5	12.9	0.9	8.3	2.8	9.0

Note: \*Discount rate = 12%. All values are at constant 2002–3 prices. NPV = net present value, BCR = benefit-cost ratio.

Source: Adapted from 'Assessment of Rodent Control Projects in Viet Nam: Adoption and Impact' ACIAR Project ASI/1998/036, AusAID CARD Project 2000/024, ACIAR/World Vision Project VN31-174945 Impact Assessment Series Report No. 24, March 2004

The projects in Viet Nam have addressed the issue of providing access to CTBS technology for poor farmers through: (i) adaptive research to reduce costs, and (ii) social and community development to ensure equitable distribution of costs and benefits. As well as NIPP, IAS, ACIAR, and AusAID working from a technical base, the social and community aspects have been addressed in partnership with NGOs (World Vision and CARE), International Rice Research Institute (IRRI), and Canadian International Development Agency (CIDA). Provinces have individually funded extension staff and subsidies to support development. CTBS recognizes the need for effective community participation in implementation.

The benefits of CTBS use are: (i) incremental harvested rice yields; (ii) value of captured rats as a rodenticide-free food source; (iii) cost savings from reduction in rodenticide use; and (iv) costs saved from avoided use of plastic fences and other physical barriers. The value of benefits varies between locations depending on the farming systems used and rodent population.

At farm level, benefits are high, and total benefits of research and extension could be estimated and projected from average benefits per ha and projected areas adopting CTBS. However, estimation of a cost stream would be meaningless and arbitrary. The technology benefits from projects beginning at the Malaysian Agricultural Research and Development Institute and continuing through several ACIAR projects - in which Viet Nam's costs must be distinguished from those attributable to Indonesia, Malaysia, Thailand, Laos, and Cambodia. Costs incurred by World Vision, CARE, IRRI and CIDA would similarly need to be allocated, many of which were joint costs incurred to support CTBS and other activities. Finally, costs incurred by Government at national and provincial level need to be allocated. Such allocations of multiple joint costs contribute to the overestimation of returns to research noted in 2.3.1, the ACIAR does not attempt such an assessment.

#### **Case 4. Participatory Adaptive Research and Extension— Tuyen Quang Province, International Fund for Agricultural Development (IFAD)<sup>27</sup>**

The case illustrates the effectiveness of participatory approaches to research and extension in increasing economic growth and reducing poverty while emphasizing the need for incorporation of poverty reduction in the project design. Importantly, it illustrates the capacity of existing provincial extension services to implement innovative projects.

The Participatory Resource Management Project (PRMP)<sup>28</sup> was implemented from 1993 to 2001 in Tuyen Quang Province by the provincial authorities, particularly the extension services. PRMP used participatory rural appraisals (PRAs) to assess the problems and needs of rural households for technology support and build a responsive, problem-solving and demand-driven research and extension system. PRMP was assessed to have established effective linkages between research, extension and farmers with two-way flows of information of local knowledge and feedback on proposed technology. Activities included participatory adaptive research and substantial training for extension service providers, farmers and communities. Participatory extension focused on farming systems approaches to develop sustainable livelihoods rather than optimizing land-based production.

PRMP supported the training and use of Commune Veterinary Workers (CVW)/Animal Health Workers (AHW) to develop fee-based extension services provided by the self-employed CVW/AHW, which proved particularly successful in expanding pig and poultry raising to give improved nutrition and cash incomes for poor households. PRMP extension activities increased agricultural production and, through sustainable agro-forestry, maintained forest cover. Average yields of maize increased from 2.15t/ha to 3.00t/ha and paddy from 3.10t/ha to 4.20t/ha. Cultivated area expanded, fruit tree areas increasing from 965ha to 3,266ha and sugar cane from 1,185ha to 7,219ha. Better livestock extension resulted in reduced mortality of pigs and poultry and improved growth rates, which encouraged increases in livestock numbers. The evaluation does not calculate a rate of return but the yield and cultivated area data suggest substantial increases in production and probably viable EIRR.

In terms of poverty reduction, the second round PRA in 51 communes of Tuyen Quang showed an 11% increase in better-off households and a 12% reduction in the number of poor and very poor households, indicated that the poor shared the benefits. In detailed analyses, IFAD suggested that the very poor derived less benefit than the poor. The evaluation concludes that clear focus on household level food and nutritional security in project design is needed to help the poorest and that their needs must be addressed as an integral part of the rural community rather than as an enclave or sub-group of the rural community.

<sup>27</sup> Summarized from: 'Viet Nam Country Programme Review and Evaluation: Agreement at Completion Point' IFAD Report No. 1143, April 2001.

<sup>28</sup> 'Participatory Resource Management Project—Tuyen Quang Province' IFAD Loan L-I-328-VN (SDR 13.35m) approved 6 April 1993.

### Case 5. Biological Control of *Mimosa Pigra* in Rice Wetlands - NIPP, ACIAR<sup>29</sup>

The case illustrates a program of research projects addressing environmental issues to sustain agricultural production with applied research undertaken by an AST-supported institute (NIPP) in partnership with other countries to exploit 'spillover' opportunities. It also includes proposals for further applied research to increase benefits. *Mimosa Pigra*, or 'giant sensitive plant', is believed to be of Central American origin. It is a tall, prickly, woody, perennial shrub that forms impenetrable thickets in paddy fields and along water courses. Mechanical and herbicidal controls proved ineffective, and research sought biological controls. ACIAR financed two projects (PN8339 & PN8722), beginning in 1984 and 1988. Thailand's National Biological Control Research Centre was ACIAR's partner in both projects, which aimed at addressing the problem in Thailand, and successfully identifying and releasing 8 biological control agents. After developing the technology, project PN9319<sup>30</sup> began in 1993 to transfer the technology to Indonesia, Malaysia and Viet Nam for a research 'spillover.'

*Mimosa Pigra*: (i) blocks access to water and pasture by cattle; (ii) hinders establishment of plantation crops (particularly oil palm); and (iii) chokes waterways and accelerates siltation in reservoirs, increasing maintenance costs and/or reducing useful life of the waterworks.

ACIAR evaluates the benefits of the program combining all three projects rather than simply calculating the incremental benefits of transferring the technology to Viet Nam, Malaysia and Indonesia in the final project PN9319. Based on constant prices and border parity prices for rice the overall IRR for the three projects in all the countries is estimated at 26%. This is somewhat less than the high numbers commonly calculated for research and may be overly conservative:

- benefits are based on the lower cost of biological control compared to mechanical control, implicitly assuming that mechanical control is effective and would not reduce planted areas though mechanical control has not proven effective;
- the benefit stream is assumed to commence in 1999 after a 15-year development period, beginning in 1984, while the Thai written Working Paper 25 in 1996 already reports benefits from adoption of biological control; and
- benefits are based on the areas affected by *mimosa pigra* in 1990 with no allowance for continued expansion of the affected area in the without project case.

Within Viet Nam, great potential is seen for further benefits in controlling *mimosa pigra* to maintain agricultural production, particularly in the Mekong Delta. NIPP proposes further research to control and prevent the spread of *mimosa pigra* in the Mekong in the context of greater Mekong regional cooperation. The AST-supported institute's proposal includes partnership with Cambodia to identify the extent of *mimosa pigra* invasion in the lower Mekong, develop a mutually agreed regional action plan and provide information and training to support implementation of the action plan.

<sup>29</sup> Summarized from 'An Economic Evaluation of Realized and Potential Impacts of 15 of ACIAR's Biological Control Projects (1983-1996)' Working Paper Series No. 26, Economic Evaluation Unit, ACIAR, August 1997 with 'A Preliminary Evaluation of 54 ACIAR-Supported Projects in Thailand (1983-1995)' Working Paper Series No. 25, Economic Evaluation Unit, ACIAR, November 1996 and cooperation proposal to JFPR. ADB for 'Improving Competence of the Local People for Early Preventing and Control of Giant Sensitive Plant *Mimosa Pigra* Invasion of Wetland Conservation Zones and Agriculture Land in Mekong Delta Region', NIPP, MARD, Hanoi, November 2003.

<sup>30</sup> 87% of the benefits are estimated to accrue to Indonesia (70%), Malaysia and Viet Nam, suggesting a much higher rate of return to the incremental investment in the 'spillover' technology transfer project.

## SOCIAL ASSESSMENT

### I. REVIEW OF POVERTY AND SOCIAL DEVELOPMENT ISSUES

#### A. Introduction

1. The purpose of this report is to present the social and economic conditions of Viet Nam and the five project provinces to be covered under the proposed Agriculture Science and Technology (AST) Project with a particular focus on how the improvement of the national AST system, including agricultural research, extension and training, can contribute to poverty reduction and social development. Special care will be taken in the understanding of the issues related to gender and ethnicity, and on how the vulnerable groups in the Vietnamese society can benefit from the proposed project investment.

#### B. Methodology

2. This report is based on the review of the past studies and reports available on AST and socioeconomic conditions of the rural areas in Viet Nam, including those prepared by external funding agencies and civil society organizations in the country, and official publications and statistics.<sup>1</sup>

3. In addition, a rapid rural appraisal (RRA) exercise was conducted in the project provinces to examine the farming practices in upland and remote areas, and the livelihoods of rural households. During the RRA exercise, particular attention was given to women, ethnic minority population, and the functioning of the local agricultural extension centers.<sup>2</sup> Due to time constraints, it was decided not to carry out household interviews. All the data were therefore gathered through focus groups discussions (FGD) and interviews with key informants (such as members of the extension centers and village leaders).<sup>3</sup>

4. The RRA survey was carried out in Dak Nong, Ninh Thuan, Quang Nam, Nghe An, and Thanh Hoa. In each province, villages and communes were selected on the basis of their remoteness, social composition and incidence of poverty. Participatory techniques such as mapping, ranking, diagramming, were utilized to explore the following issues: evaluation of the livelihood systems, identification of the better option for increase in household living standards, role of extension, constraints and opportunities for the adoption of new farming technologies, evaluation of existing traditional farming technologies, difficulties and forms of involvement in extension.

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<sup>1</sup> Data at the country level can be found in (i) General Statistical Office. 2004. *Result of the Survey on Households Living Standards*. Hanoi; (ii) Ministry of Labor, Invalids, and Social Affairs, and the German Technical Cooperation Agency (GTZ). 2004. *Statistics on Hunger Eradication and Poverty Reduction (HEPR) for the period of 1998–2000 and 2001–2003*. Hanoi; (iii) 2003. *Comprehensive Poverty Reduction and Growth Strategy (CPRG)*. Hanoi; and (iv) United Nations Development Programme. 2003. *Human Development Report*. Hanoi. Data on provinces have been gathered from the provincial authorities. Studies on indigenous knowledge by Oxfam, AcionAid, etc.

<sup>2</sup> The field work in Thanh Hoa and Nghe An was conducted in collaboration with an NGO, CECI (Canada). The surveys in Quang Nam, Ninh Thuan, Gia Lai and Dak Nong Provinces were carried out by the social development specialists of ADB TA 4194–VIE: Agriculture Science and Technology Project.

<sup>3</sup> The focus groups consisted of poor farmers (men and women separately if necessary), poor farmers (with different ethnic backgrounds), local leadership groups at different levels including both officials and staff such as extension staff (in villages dominated by non-Kinh ethnic groups the leadership also included the traditional village leader; gia lang): representatives of Women's Union, Farmers' Union, Youth Union, and Veterans' Club.

## C. Poverty in Viet Nam

5. The rates of economic growth and poverty reduction in Viet Nam in recent years have been among the highest in the world. Viet Nam is now considered as one of the examples of successful combination between internal efforts and external assistance in the growth and poverty reduction processes. An outstanding achievement of the economy of Viet Nam in the renovation process is that economic growth has been combined with hunger elimination, poverty reduction, and improvement of people's livelihoods.

6. According to the Human Development Index (HDI), Viet Nam is now ranked as 109th out of 177 countries (UNDP, 2006).<sup>4</sup> The HDI in 2004 was 0.709 as compared to 0.618 in 1990, 0.661 in 1995 and 0.696 in 2000. According to the Human Poverty Index (HPI), Viet Nam is ranked as the 33rd out of 102 developing countries and areas with an HPI value of 15.7%.<sup>5</sup>

### 1. Definition and Measurement of Poverty

7. The definition of poverty is a compelling task. Poverty is in fact a multi-dimensional phenomenon, which includes limited income, limited opportunities to generate income, lack of assets, vulnerability in the face of adverse shocks, limited participation to decision making, etc. The Ministry of Labor, Invalids, and Social Affairs (MOLISA) in Viet Nam uses household income as an indicator to measure the degree of poverty. A household is considered poor if their per capita income is below a certain threshold, namely the poverty line.<sup>6</sup> The General Statistical Office (GSO) defines the poverty line on the basis of the cost of a consumption basket, which includes food and non-food items: a household is classified as poor if the household's expenditure on food does not guarantee acquisition of 2,100 Kcal per person per day. The National Center for Social Science and Humanities (NCSSH) computes an HDI at the provincial level (NCSSH, 2001). On the other hand, qualitative and participatory analysis of poverty can be found in Oxfam (1999), World Bank (1999) or in the series of Participatory Poverty and Governance Assessment (PPGA) undertaken by ADB in collaboration with Action Aid and Viet Nam Solutions Company (2003).

**Table E1: Poverty Incidence in Viet Nam**

	1993	1998	2002
National Poverty Rate	58.1	37.4	28.9
Urban	25.1	9.2	6.6
Rural	66.4	45.5	35.6
Food Poverty	24.9	15.0	10.9
Urban	7.9	2.5	1.9
Rural	29.1	18.6	13.6
Poverty Gap	18.5	9.5	6.9

Source: Government Statistics Office.

<sup>4</sup> The HDI measures achievements in key areas of human development such as standard of living, health, and education.

<sup>5</sup> The HPI indicates probability at birth of not surviving to age 40, and focuses on the following dimensions: living a long and healthy life, having access to education, and conducting a decent standard of living.

<sup>6</sup> Over the years, MOLISA has gradually changed the method of measuring the poverty line. From 1993 to 2000, households were divided into hungry and poor. The classification was based on the basis of the kilograms of rice available per person in a month. Currently, the poverty line is established at D80,000 per person per month in rural, mountainous areas, and islands; D100,000 per person per month in rural plain areas and D150,000 per person per month in urban areas. The Government of Viet Nam recently announced that a plan would be approved for raising the poverty line for the 2005–2010 period from October 2004 as the living standard of the majority of Vietnamese people has improved. The plan suggests that the poverty line for urban residents be set at D211,000 per person per month and for rural resident D183,000.

8. According to the 2002 Viet Nam Household Living Standard Survey (VHLSS), Viet Nam has a continuing declining trend in national poverty incidence: from 58% in 1993, 37% in 1998, to 29% in 2002. The poverty rate was literally halved in less than a decade and very few countries in the world have achieved a comparable success. Poverty reduction has been supported by the country's impressive economic growth (GDP growing at an annual rate of about 7%) in an enabling environment of a market-oriented economic policy.<sup>7</sup> As in many other countries, economic growth in Viet Nam tends to concentrate in the urban areas leaving rural areas and especially remote rural areas behind. As outcome of this process, poverty is mainly a rural phenomenon: the average poverty incidence in the rural area is estimated at 35% compared to 6.6% in urban areas. The latest figure for Viet Nam's overall poverty incidence is estimated at 23% in 2004.

## **2. Characteristics of Poverty**

9. The poverty profile developed on the basis of the 2002 VHLSS suggests that bigger households, and especially those with more children, more elderly members, or where the spouse is missing, tend to have a lower level of per capita expenditures and therefore are considered poorer. According to the Viet Nam Development Report (VDR) 2004, poverty is also strongly related with ethnicity: quantitative analysis demonstrates that even when all other characteristics are the same, the expenditures of a person belonging to an ethnic minority are 13% lower compared to those of a person belonging to the majority Vietnamese (Kinh or Hoa).

10. Educational level is highly correlated with household poverty. The VDR estimates that a household, whose head has technical education, spends almost 19% more expenditure than an average Vietnamese household. If household head has higher education, the percentage increases to 31. Similarly, occupation of household head is regarded as a significant predictor of household welfare.

11. Although a lack of financial resources is regarded as a major characteristic of poverty, the participatory exercises point out that there are other dimensions of household poverty beyond monetary measures. Poverty is mainly characterized in terms of exposure to indebtedness and vulnerability to illness. Additional characteristics, which affect the poor, are: the risk for children to drop out of school, not enough food to eat, dependence on wage-labor, lack of clothes and equipment, and illness.

12. On the other hand, having the wherewithal to generate a stable income that is sufficient to cover consumption and robust enough to withstand periods of misfortune or hardship without selling assets or taking destabilizing loans is regarded by the survey respondents as the single most important criterion, which poor households use in defining well-being. Households also consider a good, solid, well-located housing as an important feature of living standards.

## **3. Spatial and Regional Dimensions of Poverty**

13. Understanding the spatial dimension of poverty in a country is of crucial importance because it can be used to quantify suspected regional disparities in living standards, it facilitates the targeting of development programs and it may shed light on the geographic factors

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<sup>7</sup> In the social areas, according to the ADB Country Strategy and Programme (CSP), education enrolment rates have increased from 71% in school year 2000-2001 to 78% in school year 2002-2003 for lower secondary school. A \$49 million health fund for the poor was created, covering almost 14 million people. The Vietnamese government has also shown its commitment to tackling rural poverty by increasing the share of public investments for northern mountains, the northern and central regions, and the central highlands.

associated with poverty. A recent study by Minot, et al. (2003) has utilized a relatively new econometric method (small area estimation) to estimate various measures of poverty and inequality for provinces, districts and communes of Viet Nam.<sup>8</sup>

14. The survey utilized data from the 1997–98 VHLSS, and the 1999 Population and Housing Census. The research evidenced the following results:

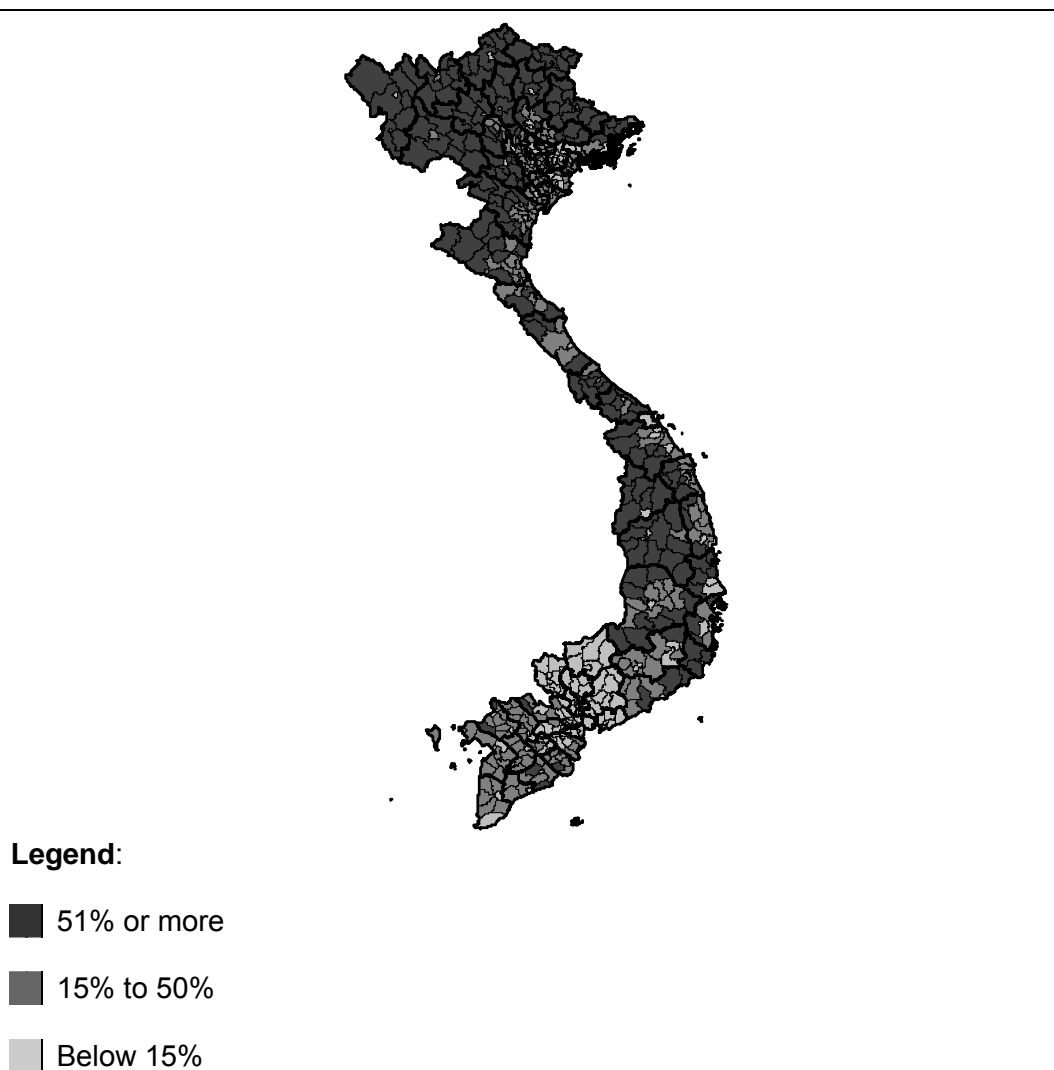
- Poverty incidences are highest in the Northeast and Northwest regions along the border with the People's Republic of China and Lao People's Democratic Republic, in the interior of the central coast, and the northern part of the central highlands.
- Poverty rates are intermediate in the two main deltas of Viet Nam, the Red River delta and the Mekong delta.
- Poverty rates are the lowest in the large urban areas, particularly Hanoi and Ho Chi Minh City and in the Southeast region.
- Urban poverty rates are consistently much lower than rural poverty rates.

15. The map of density of poverty (the number of poor people per unit of area) reveals that the density of poverty is greatest where the incidence of poverty is lowest. The region with the highest poverty rates (the Northeast, Northwest, and Central Highlands) are so sparsely populated that the number of poor people living there is relatively small. In contrast, the densely populated cities and the deltas account for a greater absolute number of poor people despite their lower poverty rates.

16. The study of Minot, et al. (2003) also provides useful insights for understanding inequality dynamics in Viet Nam. In general, inequality in per capita expenditures is relatively low in Viet Nam compared to international standards. Inequality is greatest in the large cities and in parts of upland areas. At the same time, the study points out that about two-thirds of inequality is found within districts rather than between them. Inequality therefore varies little from one district to another and it is greater among district with high per capita expenditures. Furthermore, inequality is higher in urban areas.

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<sup>8</sup> The small area estimation (SAE) technique of Ghosh and Rao (1994) also combines limited-size survey data with more comprehensive data sets (such as Censuses) that often do not include income or expenditure data.

**Figure E1: District Level Poverty Map in Viet Nam**

Source: Interministerial Poverty Mapping Task Force, 2003

#### **4. Determinants of Household Poverty**

17. Oxfam identifies various factors, which can be categorized as causes of household poverty: (i) few options for income generation; (ii) inability to accumulate savings; (iii) landlessness; and (iv) risky income generation options.

18. Especially in rural areas, economies are relatively non-diversified. Most people rely almost exclusively on agriculture-related activities. Beyond production activities, there are relatively few wage-labor opportunities. At the same time, agricultural production is often characterized by traditional techniques or decreasing marginal returns to inputs. For landless households, employment opportunities are rare or, when they exist, they are seasonal or poorly paid. The limited income-generation opportunities do not allow the growth of household savings. As reported by Oxfam in 1999, “if the slightest mishap occurs within the family, they often must borrow from moneylenders, who generally charge high interest rates”. By doing so, “they risk becoming trapped in a spiral of debt.”

19. The same report of Oxfam identifies landlessness as one of the main reasons for poverty. According to the survey conducted in Tra Vinh province, landless households remained excluded from any opportunities related to economic growth. This population group usually depends on daily wage labor as their primary source of income. The living difficulties are accompanied by impossibility to access to formal credit because of the lack of collaterals. Also, indebtedness prevents access to informal credit. Finally, the Oxfam participatory survey showed that income generating opportunities for the poor are not only limited but also characterized by high risks and insecurity: for example, the report presents the case of shrimp farming, which requires “a small amount of land but a large amount of capital, strong technical skills and a great deal of luck.” The chance of failure in shrimp farming is estimated at 50%.

## 5. Poverty and Ethnic Minorities

20. In Viet Nam, there are a multitude of ethnic minorities. Together with the Kinh (lowland Vietnamese) majority, which accounts for approximately 85% of the total population, more than 50 ethnic minorities can be identified in Viet Nam, some of them having less than 1,000 members (Dang, Son, and Hung, 1999). Ethnic minorities are often treated as a homogenous group although in reality there is a high degree of diversity among the groups in terms of language, farming practice, kinship, lifestyle, and belief.

**Table E2: Poverty and Schooling Data by Ethnic Group**

<b>Ethnic Group</b>	<b>Net Primary School Enrolment</b>	<b>Net Lower Secondary School Enrolment</b>
<b>Country</b>		
Kinh	93.4	64.8
Hoa	93.7	51.7
Khmer	76.3	22.5
<b>Central Highlands</b>		
Gia-Rai	67.6	14.9
Ba-Na	55.0	8.9
Xo-Dang	62.2	12.7
<b>Northern Uplands</b>		
Tay	94.7	51.0
Thai	83.9	32.1
Muong	94.5	52.3
Nung	89.3	39.2
Hmong	41.5	4.5
Dao	71.4	11.8
<b>Total</b>	<b>91.4</b>	<b>60.0</b>

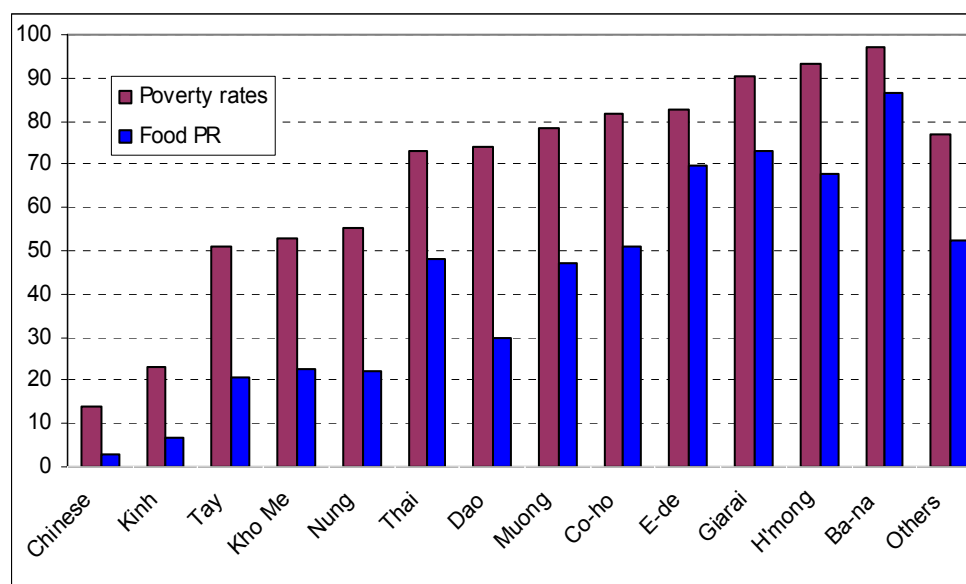
Source: Baulch et al. 2002 based on 1999 Census data.

21. Ethnic minorities are one of the groups more exposed to the risk of poverty. Recent research has shown that households, who do not belong to the Kinh or the Hoa (Chinese), constitute the poorest and least educated sections of the Vietnamese society (Viet Nam Poverty Working Group, 1999). On the basis of official statistics, the ethnic minorities comprise almost 14% of the population but account for 29% of the poor. The share of ethnic minorities among the poor is also increasing steadily: from 20% in 1993 to approximately 30% by 2002. A forecast suggests that by 2010 the share could be as high as 42%. It is therefore reasonable to consider that, in future, the challenge for poverty reduction in Viet Nam is closely linked to the capacity to promote social and economic development of ethnic minorities.

22. However, it is important to point out that not all the ethnic minority groups are equally disadvantaged. Baulch et al. (2002) distinguish three categories of population: (i) the main ethnic groups (the Kinh, the Hoa and the Khmer), (ii) the groups, who live in the central highlands, and (iii) those, who originate in the northern uplands. By looking at the VHLSS in 1993 and 1998, it is possible to note that the central highlands minorities constitute the poorest group. The incidence of poverty among this group is about 90%.

23. The 2004 VDR confirms considerable variations in poverty rates among ethnic groups. The variation holds both in terms of general and food poverty as shown in Figure E2. By looking at food poverty, it is possible to note that 86% of the Ba-Na population is not able to afford the food consumption basket. On the other hand, food poverty is experienced only by 21% of Tay. It is noticeable that among the six poorest ethnic groups, four (Ba-Na, Gia-Rai, E-De, and Co-Ho) are in the central highlands and two (H'mong and Muong) are in the northern mountains.

**Figure E2: Poverty Rates Across Ethnic Groups in 2002**



Source: WB. 2004: Estimated based on 2002 VHLSS

24. Table E2 shows primary and lower secondary school enrolment rates for twelve ethnic groups. The average primary school net enrolment rate (NER) in Viet Nam is quite high compared to other low-income countries. However, primary school NER is below 70% for 5 ethnic groups: the Ba-na, Gia-rai, Xo-dang in the central highlands; and Dao and the H'mong in the Northern Uplands.<sup>9</sup> Looking at the secondary school NER, it is noticeable that lower secondary NER is much lower compared to primary school NER. For Viet Nam overall, the net enrolment rate falls from 91% to 60%. At the same time, a clear gap exists between the Kinh (65%) and all other groups (52%) or less. Five ethnic groups, the NERs of Gia-Rai, Ba-na and Xo-dang in the central highlands, and H'mong and Dao in the north are lower than 20%.

<sup>9</sup> According to Baulch et al. (2002), in addition to poverty and remoteness, one of the factors discouraging ethnic minority children in these groups from attending primary school is lack of instruction in ethnic minority languages. Only 10 of the 334 primary schools surveyed in the VLSS98 taught any lessons in ethnic minority languages. Of these 10 primary schools, 7 were in the Southern region.

25. Social development concerns also hold for health, infrastructure, and participation. In Viet Nam, infant mortality rate is correlated with concentration of ethnic minorities. Figures are highest in the central highlands and there is concern that infant mortality may actually have increased in specific remote localities. Around 42% of rural households have access to safe drinking water. Although there are no precise estimates, it is likely that the share would be much lower for communes peopled by ethnic minorities.

26. Lack of land is perceived by ethnic minority people as one of the key causes of poverty. This issue is closely linked with problems of land allocation. The process of allocation and certification of land is nearly completed: over 90% of the agricultural land has been allocated to households with tenure secured through certification. The allocation process for forest land has been more complex and slow. Some of the main constraints to allocation of forest land include: difficulties in classification of forest land, conflicts of interest over land use, and a disabling legal and institutional environment. The allocation of forest land is of particular concern to minority groups since the majority lives in mountainous areas and depends on forest use for their livelihood.

## **6. Gender Differences in the Vietnamese Society**

27. In 2004, Viet Nam was ranked 80th based on gender development indicators (GDI) for gender equality, much higher compared to countries at a similar level of development. The enhanced equality among gender is considered one of the notable achievements of the renovation process as Viet Nam was ranked 101st in terms of GDI in 1997. Vietnamese women and men have made great contributions together to the struggle for independence and national reconstruction. Men and women in the rural areas, in particular, have largely been responsible for Viet Nam's transition from a poor country with severe food shortages to one of the world's leading exporters of key agricultural products including rice, coffee, rubber, cashew, tea, and vegetables.

28. Although enhanced gender equality is one of the Government commitments, in Viet Nam traditional social practices prevent Vietnamese women from enjoying equal rights and opportunities. However, the lack of thoroughly documented findings on household dynamics (especially rural households), including those of ethnic minority populations, limits the comprehensive understanding of the causes and characteristics of gender inequality.

### **a. Characteristics of Female-headed Households**

29. Approximately, one quarter of all the households in Viet Nam is headed by a female. Female-headed households (FHH) are mostly concentrated in urban areas (37%) compared to rural ones (17%). Having a male-headed household (MHH) is the pattern consistent with traditional gender role. While 96% of male household heads are married and their spouses living with them, two thirds of the FHH do not have the husband in the family. Widow women therefore make up most of all FHH whereas only a marginal 7% of female household heads are currently married with the husbands residing elsewhere. Approximately 33% of FHH have instead the male partner resident in the home.

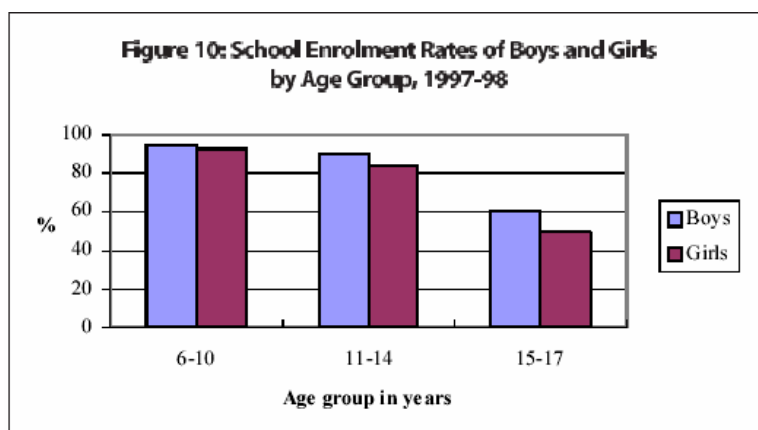
30. From an individual perspective, according to the VHLSS data, while in MHH there is no difference between the hours spent in paid work by the head and his wife, in FHH the spouse typically works much longer hours than the husband does. Women spend almost twice as much time as men undertaking housework for which they have no remuneration. In urban areas, women are most commonly engaged in sales, in local markets and stalls, on the streets or

stores. Men are instead more likely to be employed in skilled occupations such as mining, metal work, woodworking, manufacturing and handicraft. Women's employment in skilled occupations is limited to textile and garment sector and construction.

### b. Gender Differences in Human Development

31. According to 1997–98 VHLSS data, primary school net enrolment rate (NER) in Viet Nam is more than 90%. Very little difference exists between girls and boys enrolment rates as evidenced by Figure 3 below. However, a significant gender gap becomes apparent in the secondary school age group, which increases in the upper school level. Looking at the difference between the proportion of girls and boys enrolled in school, the gap has declined in last 5-years from 11 percentage points to 6 in lower secondary school.

32. In upper secondary school ages, the gap has declined from 15 percentage points to 11. However, as discussed before, for “children of ethnic minority and within the poorest segment of society, there has been very little change” (FAO and UNDP, 2002, p.14). The educational gender gap has actually widened for children of parents with no education. According to FAO and UNDP (2003), “a disappointing feature of education enrolment and completion is the re-emergence of a gender-gap in adult level of education. This can be assessed by looking at the statistics regarding the percentage of women and men, who did not complete more than the primary education. The data show that among adults aged 18–21 or 15–17, women are those who are more likely to have only the primary education diploma. One of the causes of this phenomenon relates to the high opportunity-cost of girls pursuing education above the primary level and to the social tradition that prioritize boys rather than girls' education.



Source: FAO and UNDP, 2002 based on 1998 VLSS

33. Vietnamese society has recorded considerable improvements in nutritional status during the last few years. By looking at gender disaggregated statistics, FAO and UNDP (2003) estimated that improvements have been greater among men. This is because “adult women are still more likely to suffer from chronic energy deficiencies than men” (FAO and UNDP, 2002, p.15). In rural areas, the gender gap in nutritional status tends to be considerably higher. Among such groups, in fact, women have access to relatively fewer resources and this increases their vulnerability to nutritional deficiencies.

## 7. Social Aspects in Agriculture

34. Agricultural production in Viet Nam has long been characterized by small-scale farming systems, mainly oriented to household consumption or sale in local markets. Agricultural production is the most important source of income for a large share of population and it accounts for around 22% of the national GDP. UNDP (2003) undertook a comprehensive farmer needs study, which analyzed farmers' livelihoods systems and outstanding needs for alleviating poverty and improving living standards. On the basis of the information contained in that report, it is possible to identify the following several social issues related to agriculture, including (i) access to land and enforcement of property rights,<sup>10</sup> (ii) access to rural financial services, (iii) access to and control of improved agricultural knowledge and technology, (iv) access to and control of forest and forest products, (v) access to social development facilities in the rural area, (vi) vulnerability to natural disasters, (vii) community participation in decision-making on agricultural production and marketing, and (viii) cultural and environmental diversity.

### a. Women in Agriculture

35. Women constitute half the total agricultural labor force. However, on the basis of the report by the National Committee for the Advancement of Women in Viet Nam (2004), the situation of women in the sector is characterized by various imbalances in the regulation of civil transactions, management of household properties, provision of credit, and delivery of agricultural and forestry extension services and information. Such imbalance is also seen in the activities of medium- to large-scale agricultural and agro-based enterprises.

36. Continued reforms and special efforts are required to promote women's access to improved agricultural knowledge and technology, and to productive resources, including land use and property rights, and rural credit. Some of these aspects are addressed in the proposed gender action plan for the Project.

### b. Ethnic Minorities and Agriculture

37. Traditionally, the Kinh majority is concentrated in the lowlands cultivating wet rice as the main staple crop. Other lowland groups are Hoa, Khmer, and Cham, who are also mainly wet rice growers, although most Hoa groups live in the urban areas. However, the bulk (approximately 75%) of the total ethnic minority population lives in the mountainous areas, stretching from the north to the south through the western part of the country, ending in the Central Highlands with its southern last part about 150 km north of Ho Chi Minh City. The livelihoods system of ethnic minority groups concentrated in mountainous areas is mainly dependent on agriculture. Consequently, increasing land productivity and stimulating agricultural development in mountainous areas are considered among key factors for poverty reduction of ethnic minorities.

38. Secure tenure is considered as a precondition for stimulating investment in land. Under the current situation, many ethnic minority farmers do not have sufficient income to cover the cost of land certification and to invest in increased agricultural productivity. The coping strategy

<sup>10</sup> The first Land Law from 1993 was recently updated into the Land Law of 2004 with minor changes and adaptations but where the five fundamental land use rights remain the essential part for the farmers. This has been done through the issuance of Land Use Certificates (LUC, or Red Books) on primarily agricultural land that recognizes five basic land use rights: exchange (chuyen doi), transfer (chuyen nhuong, lease (cho thue), inheritance (thua ke), and mortgage (the chap). The LUC is valid for 20 years. In case LUC has been issued for forest land, it is for 50 years and sometimes goes under the name of Green Book.

of poor farmers among ethnic minority groups is to spread risk and maximize different income opportunities through diversification. The Government's schemes for the provision of agricultural inputs among disadvantaged and vulnerable farmers have limited impact on ethnic minority farmers, who tend not to use fertilizer or improved seeds and have minimal irrigated rice fields.

#### D. Social Aspects of Research and Extension

39. The current agricultural extension services of the Government were officially established in Viet Nam in March 1993. They are therefore a relatively new development in Viet Nam. According to the "Farmers' Needs Study" conducted by UNDP in 2003, "after 10 years of operations, the State extension services have achieved inconsistent levels of efficiency and, in most of the cases, have failed to meet the needs of the majority of farmers" (Farmers' Needs Study, 2003, p. 35). The report argues that "in the recent past, agricultural extension was limited to the transfer of technology to farmers using irrelevant methods, did not pay sufficient attention to producers' interests and failed to deliver, to the fullest extent, the experts knowledge and experiences" (ibid.). The involvement of poor farmers in the Government's agricultural extension services has been very limited. The Participatory Poverty and Governance Assessment (PPGA) undertaken by ADB and ActionAid in 2003 in Dak Lak Province points out several issues, including

- **Models.** Agricultural extension offers poor farmers new models, which are often far beyond their capacity to adopt. The ability of poor farmers to adopt new models largely depends on their knowledge, economic situation and suitability of the model to the local conditions. The PPGA shows various cases in Dak Lak in which the models proposed were not suitable to poor people.<sup>11</sup>
- **Remoteness and Social Barriers.** Language is one of the barriers to access to training. Most of the ethnic minority people, especially women, do not have an adequate knowledge of Vietnamese and find difficulties in understanding extension materials. Villagers complained that agricultural extension workers often set up the demonstration models in one place only in each commune, so it was difficult for farmers to observe and learn because of the distance from their village to the demonstration site.
- **Skills and Assets.** According to the PPGA, the participants in training programs conducted by the Provincial Extension Center were mainly non-poor and highly educated people. The training agenda is not based on poor people's needs and capacities. They are in fact considered too theoretical and extension workers often selected well-off households to work as demonstration households. In addition, scarce access to credit reduces the likelihood that models which require capital and input will be adopted.
- **Resources.** In recent years, funding for agricultural extension has increased partly due to the measures under ADB's Agriculture Sector Development Program (ASDP). In addition to the agricultural extension center's own budget for extension, operations of provincial extension services also include supplementary funding sources from Program 135 (targeted national program for disadvantaged and vulnerable people), government projects, social development organizations and companies, who invest in projects or promote their products. However, officials at all levels indicated that these funds were far from enough to

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<sup>11</sup> For example, the model of raising Tam Hoang chickens in Quang Tan was very good, but farmers had to sell the chickens after just a few months because of the high price of the chicken's feed and the too complex feeding technique. In another example, farmers were provided with a new bamboo variety for producing shoot, but they felt afraid they would not be able to market new kinds of products because of the lack of market information.

meet the increasing basic needs of local people. The problem of resources does not exclusively deal with financial aspects. Human resources are also limited or scarcely qualified. With respect to the objectives of the AST Project, particularly relevant are the communication and training skills, which are currently underdeveloped. Finally, the low remuneration of existing extension staff does not provide incentives to increase the effectiveness and the quality of the service offered.

## **II. SOCIAL AND AGRICULTURAL CHARACTERISTICS OF PROJECT PROVINCES**

### **A. Introduction**

40. This section presents a general overview of the proposed project provinces in terms of social and agricultural characteristics. A thorough analysis of the provinces proposed for the Grassroots Agricultural Extension Improvement Component is necessary to ensure that the proposed investment have the maximum potential impact.

41. The project area for the extension component consists of five selected provinces of Thanh Hoa, Nghe An, Quang Nam, Ninh Thuan, and Dak Nong. They are situated in the north central (Thanh Hoa and Nghe An), central (Quang Nam and Dak Nong) and southeast part (Ninh Thuan) of Viet Nam. The two smallest provinces in terms of number of communes and population are Ninh Thuan and the recently established Dak Nong. The provinces are also quite different in size: Nghe An is the largest (16,500 km<sup>2</sup>) and Dak Nong is the smallest (6,500 km<sup>2</sup>).

42. The common characteristics of all the provinces except Dak Nong are: mountainous areas in the west, lower hills and lowlands in the center and flat lands along the coastal area in the east. Dak Nong is one of the five provinces in the Central Highlands with its mixture of high plateaus, lowland and high mountains. Another important common feature is the presence of non-Kinh ethnic groups in the mountainous part of the provinces (except for the Cham communities in Ninh Thuan who live mainly in the lowlands). The proportion of indigenous people in the population varies from more than 30% (Dak Nong) to 7% in Quang Nam.

### **B. Thanh Hoa Province**

43. The province of Thanh Hoa has one city, two towns, and 24 rural districts consisting of a total of 636 communes. The province includes three main agro-ecological areas. First, in the North West, there are mountains of over 1000m to 1500m, extending towards the South East. This hilly and mountainous region accounts approximately for 3/4 of the total province area and it is mainly covered by forests. The highland and mountainous region consists of 11 districts.<sup>12</sup>

44. The second area corresponds to the lowlands. These are the biggest in the central region and the third largest of the country. These plains consist mainly of river delta land of the Ma-Yen-Hoat river system. The lowest point of the plain is 1 meter above sea level.

45. The third area consists of the coastal region, which stretches from Nga Son, Hau Loc, Hoang Hoa, Sam Son, Quang Xuong to Tinh Gia. Along the sea, the province is characterized by the marshes of Nga Son and the mouths of the Hoat, Ma, Yen, and Bang rivers. The coastline is long and relatively straight.

<sup>12</sup> These include: Nhu Xuan, Nhu Thanh, Thuong Xuan, Lang Chanh, Ba Thuoc, Quan Hoa, Quan Son, Muong Lat, Ngoc Lac, Cam Thuy, and Thach Thanh.

**Table E2: Thanh Hoa—Main Characteristics**

Area (square kilometer) <sup>a</sup>	11,100
Number of communes and wards <sup>a</sup>	636
Number of communes in poverty <sup>a</sup>	102
Population in 2002 (in thousand) <sup>a</sup>	3,637
Rate of Kinh population (%) <sup>b</sup>	84
Rate of population working in agriculture (%) <sup>b</sup>	60
Overall poverty rate in 2003 (%) <sup>c</sup>	16
Incidence of rural poverty (%) <sup>b</sup>	49

<sup>a</sup> Source: 2004. *Statistics Yearbooks*.

<sup>b</sup> 2003. *Interministerial Poverty Mapping Task Force*.

<sup>c</sup> Molisa and GTZ. *Statistics on Hunger Eradication and Poverty Reduction* (HEPR).

46. The total population of Thanh Hoa was 3.5 million in 2001, of which Kinh accounted for 83.6%.<sup>13</sup> Main minority ethnic groups are the Thai, the Tho, and the Muong. Thanh Hoa is by far the most populous province in the project area. The population density varies between extremely high (up to 3,000 persons per square kilometre in the coastal regions) to extremely low (around 34 persons per square kilometer in Muong Lat district). Approximately 16% of the communes of Thanh Hoa are classified as poor.<sup>14</sup> The province is characterized by a significant share of labor force engaged in agricultural activities (around 60% of the population).

## 1. Social Assessment

47. Thanh Hoa province has a food poverty rate of about 16% overall (MOLISA, 2004). Rural poverty is instead estimated at 49%. The conditions of the province vary widely from the coastal plains areas to the high mountains bordering Laos. Such variation is well represented by comparing the poverty map and the ethnic composition map (Figure E1). Of the 17 rural districts, 7 have poverty rates higher than 50%.

48. According to MOLISA and GTZ estimates, in Thanh Hoa 16% of the households are below the food poverty threshold (MOLISA, 2004). This result makes Thanh Hoa the 15th poorest province of Viet Nam. According to the findings of the participatory RRA conducted during the TA, food security is still regarded as a main concern especially by women and remote rural households. In the surveyed villages, approximately 39% of the poor households experience food shortage in a range from 5 to 9 months per year.

49. The RRA results show that in Thanh Hoa province, rural poverty is mainly associated with the lack of access to business skills. In the case of households involved in agricultural production, poverty is often determined by the application of backward and inadequate technical information and methodologies in agricultural production. Poor rural households also report high difficulties in cash generation and absence of facilities such as vehicles and TV. At the village level, basic services, education and health infrastructures are lacking. At the same time, poverty is often associated with a status of high vulnerability: the absence of risk-reducing or coping strategies makes rural households highly vulnerable to exogenous events such as natural calamities and harvest losses.

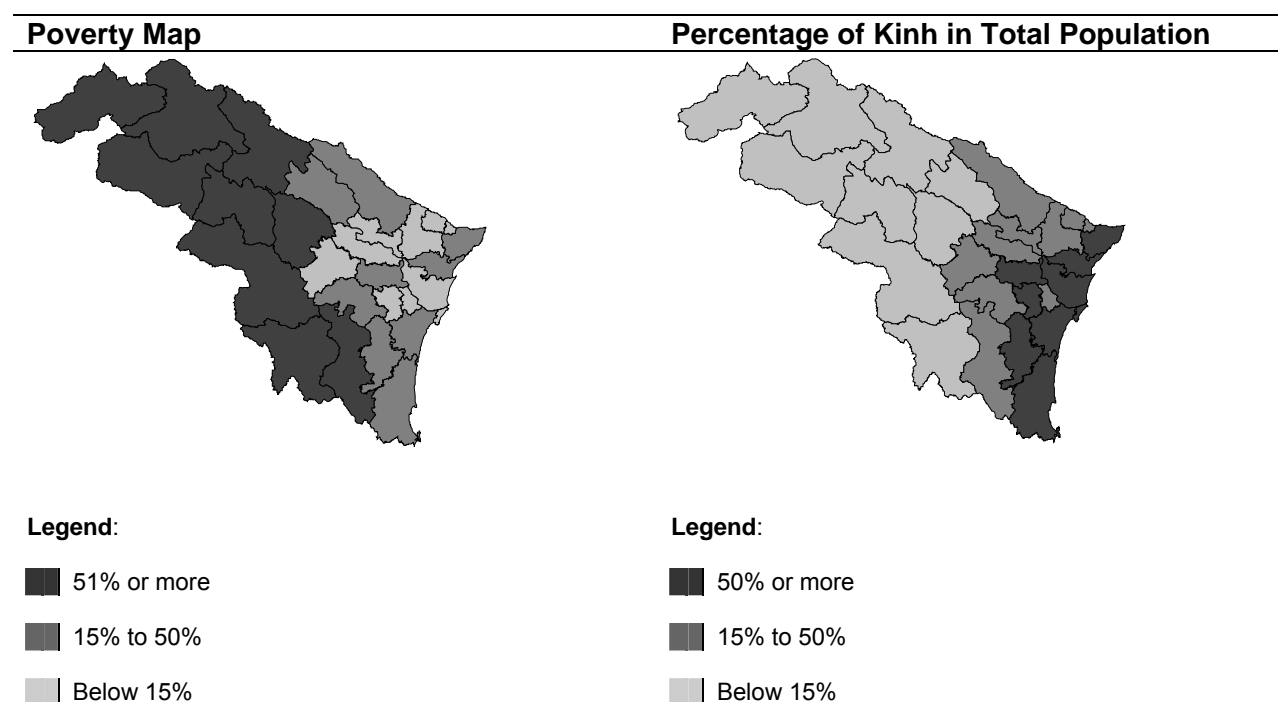
<sup>13</sup> This figure is based on Interministerial Poverty Task Force (2003) which uses 1997–98 Vietnamese Living Standards Survey and the 1999 Population and Housing census.

<sup>14</sup> The estimate is based on 2004 Statistics Yearbook that defines poor those communes whose poverty rate is higher than 40%.

50. The RRA found that few women occupy important positions in the commune administrative structure. The percentage of women in the commune people's council and committee is less than 20% in the surveyed communities. The participatory exercise found that women have lower access to social activities than men. On the other hand, the workload for women is 5 to 6 hours higher than for men.<sup>15</sup> According to the survey respondents, the gender gap is provoked by the traditional social attitudes.

51. Contrasting results emerge when intra-households gender dynamics are examined. On one side, rural households report that men and women have the same control and equal access to family resources. On the other hand, women have less access to education with respect to men. On the basis of the information gathered from the Women's Union, a profound gender imbalance exists in rural areas: most of agricultural services mainly consider the man as the main interlocutor. Women rarely participate in extension training or demonstrations. Particularly severe is the condition of women from ethnic minorities. In this case, gender inequality is accompanied with significant exposure to poverty.

**Figure E3: Poverty and Ethnic Composition Map—Thanh Hoa**



52. As commented above, the analysis of the territorial aspects of household poverty shows that in the areas where the Kinh population is not the majority, the share of poor population is above 50%. This figure suggests a striking correlation between the presence of ethnic minorities in a certain district and the poverty rate. The Kinh population is mostly concentrated in the coastal districts (more than 99% of the population) and midlands districts (more than 50% of the population). On the other hand, ethnic minorities live in uplands and mountainous parts.

<sup>15</sup> This figure is in accordance with FAO and UNDP (2002) that estimate that women work significantly more hours than men at each point in the life cycle. Between the ages of 25–64 years, a woman spends an average 13.6 hours a week in housework, compared to men who contribute 6 hours a week.

53. Different ethnic groups live in Thanh Hoa province. The Kinh are the majority of the population (approximately 83.6%). Other groups are Muong, Thai, and Tho. Considerable educational and social differences exist among the ethnic minorities living in Thanh Hoa. The RRA showed that the average low educational attainment of ethnic minorities constitutes one of the key constraints in overcoming household poverty. At the same time, the RRA did not identify a remarkably different indigenous knowledge among the surveyed ethnic groups. In many cases, traditional products and materials utilized by ethnic minorities have been abandoned in order to shift to modern techniques. Finally, all local ethnic products face marketing constraints. The demand for these types of products in the local market may be limited and transportation to other areas is expensive.

## **2. Agriculture and Livelihood Characteristics**

54. The total area of Thanh Hoa is 11,100 km<sup>2</sup> of which about 22% is used for agricultural purposes (240,000 ha). The forest and forest land area accounts for about 400,000 ha or about 40% of the total land area. More than 75% of the forest is classified as watershed protection forests. This is largely located in the high mountains (700 to 1,200 m above sea level) bordering Laos. Around 24% of total land (260,000 ha) is classified instead as bare land, including hills and mountains that has potential to be replanted with forest.

55. Rice and corn are the most popular food crops. Also peanuts and cassava are widely grown in the area. The southwestern part of Thanh Hoa province is involved in the cultivation of sugarcane, mainly for the Lam Son sugar factory. On this issue, it should be mentioned that the cultivation of sugarcane requires additional labor to be hired, particularly during harvest season. The high labor costs associated with sugarcane cultivation constitute one of the key motives, which make households prefer growing rice instead of shifting toward sugarcane as more profitable cultivation.

56. The RRA exercise conducted in Nhu Thanh district pointed out that off-farm activities are scarce and that the cultivation of food crops are considered the main livelihood strategy. High reliance of most of the households on cultivation and under-development of non-farm activities is seen in Thanh Hoa Province. Hybrid varieties are quite diffuse. In some cases, local varieties have been abandoned because of their long harvesting period and the low yield.

57. According to the RRA respondents, irrigation is the main obstacle to increasing production of food crops. Water scarcity is common among the farmers living in the province and constitutes one of the main obstacles to the introduction of alternative crops. Water scarcity is especially due to the conditions of dams, which are weakened by the poor maintenance. Fruit trees and gardening were generally not considered as profitable income-generating activities. Fruit trees are mostly for home-use. Also, the lack of knowledge on production techniques prevents the expansion of these activities. According to the RRA findings, the majority of the households cannot afford to raise livestock, except some middle-income and wealthy households. This is especially due to the costs of livestock inputs and veterinary costs which are seen as being relatively high.

## **3. Extension**

58. The provincial extension center has 28 staff. At the district level, all of the districts in Thanh Hoa have extension staff, with 605 of the communes having extension workers. Extension in Thanh Hoa concentrates largely on lowland communities. The services mainly concentrate on opportunities for product diversification, new cultivation techniques, and commercialization. Other activities are the dissemination of agro-forestry technologies to

improve quality and quantity of agro-forestry produce. In general, extension services differ according to the welfare level of the farmer: there is a high demand for business skills and loans from better-off households while the situation of poor households (in upland communes) is often constrained by the necessity to produce adequate food for own-consumption, and this decreases the incentives for introducing new crops.

59. The RRAs showed that many of the rural communities living in the province cannot benefit from appropriate extension services. The main reason relates to inadequate funding for extension. The RRAs found that some village farmers have never seen any extension workers or received any training. Farmers receive information on crops from the head of the commune. According to the RRA respondents, the timing of planting and the procedures for obtaining subsidized inputs were identified as the most recurrent issues for which farmers demand information. They receive little guidance on new varieties so that usually the only information source consists of the “instruction printed on the package”. Alternatively, information can be acquired by imitating neighboring farmers. In many cases, traditional cultivation methods are used in the cultivation of new hybrid varieties. This fact, combined with lack of experience and exposure to natural risk, often results in low yield or even loss of crops.

60. The RRA also reported that in many cases, extension services are limited to the provision of notional information. In contrast, farmers require more practical assistance, in-field models and systematic follow-up activities. Another problem related to the functioning of extension is the awareness of those participating in the training. In most of the cases, the participants in demonstrations exhibit passive behavior. The transfer of knowledge is therefore sometimes not effective. In addition, considerable difficulties are found in terms of dissemination of the information. The people working in the extension center seldom possess adequate communication and training skills.

### C. Nghe An Province

61. Nghe An Province is located in the North Central Coast agro-ecological region of Viet Nam. The province is divided into coastal, highland, and mountainous areas. The total area of the province is 16,500 km<sup>2</sup>, and it is the largest among the five selected project provinces. Its border with Laos to the west is 119 km while the coast line is 84 km long. A number of highways pass through the province, including No. 1A, 7A, and the Ho Chi Minh Highway. Vinh is the major city and Cua Lo as a provincial town. There are 6 lowland districts and 11 mountainous districts.<sup>16</sup>

**Table E3: Nghe An—Main Characteristics**

Area (km <sup>2</sup> ) <sup>a</sup>	16,500
Number of communes and wards <sup>a</sup>	469
Number of communes in poverty <sup>a</sup>	42
Population in 2002 (in thousand) <sup>a</sup>	2,977
Rate of Kinh population (%) <sup>b</sup>	87
Rate of population working in agriculture (%) <sup>b</sup>	57
Overall poverty rate in 2003 (%) <sup>c</sup>	13
Incidence of rural poverty (%) <sup>b</sup>	50

<sup>a</sup> Source: 2004. *Statistics Yearbooks*.

<sup>b</sup> 2003. *Interministerial Poverty Mapping Task Force*.

<sup>c</sup> Molisa and GTZ. *Statistics on Hunger Eradication and Poverty Reduction* (HEPR).

<sup>16</sup> Lowland districts are Dien Chau, Quynh Luu, Nghi Loc, Hung Nguyen, Nam Dan, and Do Luong; mountain districts are Thanh Chuong, Anh Son, Yen Thanh, Nghia Dan, Tan Ky, Quy Chau, Quy Hop, Que Phong, Con Cuong, Tuong Duong, and Ky Son.

62. The population in 2003 was close to 3 million and the number of households about 615,000. Population density varies between extremely high (more than 3,000 persons per km<sup>2</sup> in Vinh and more than 1,500 persons per km<sup>2</sup> in Cua Lo) to extremely low (around 25 persons per km<sup>2</sup> in Tuong Duong). Approximately 87% of the Nghe An population belong to the Kinh group. However, this rate differs considerably at the district level. The Kinh are concentrated in the coastal and midlands districts, where they account for more than 80% of the population. In contrast, in rural and mountainous areas, other ethnic groups are predominant.

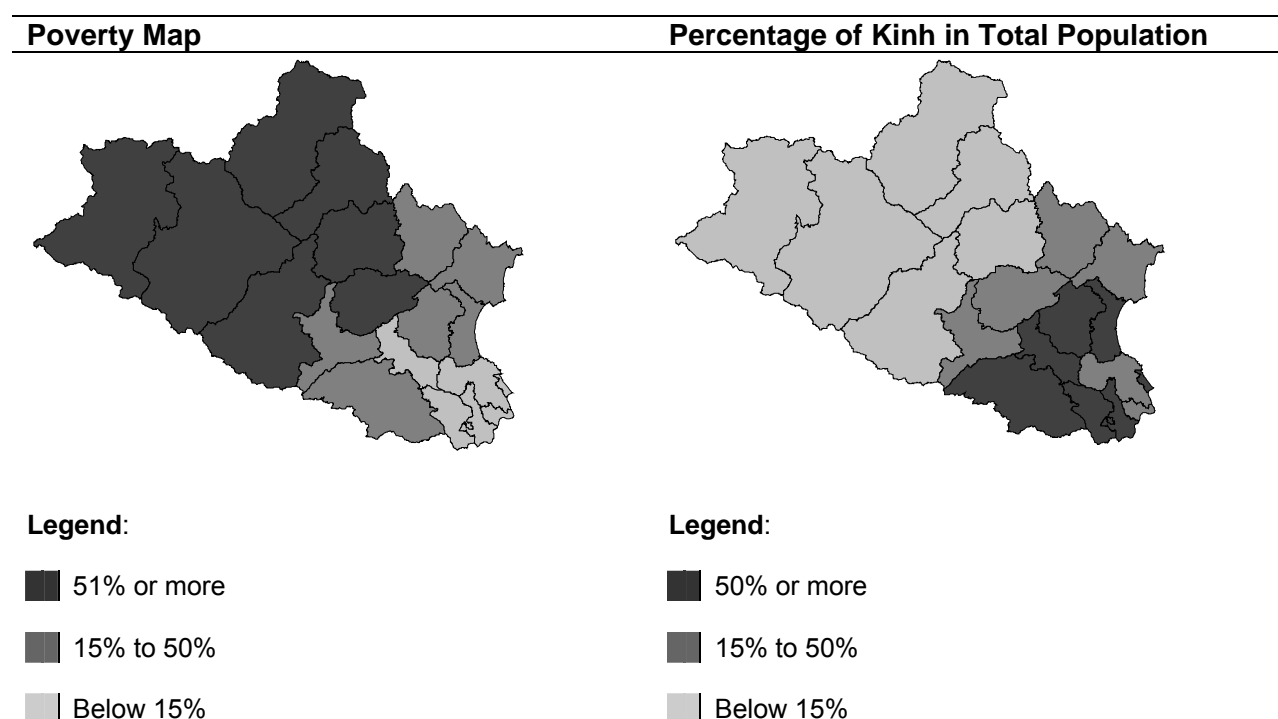
## 1. Social Situation

63. On the basis of the statistics on “hunger” and “food poverty” elaborated by MOLISA and GTZ (2004), Nghe An has an overall poverty rate of about 13%. On the basis of this figure, Nghe An is classified as the 11th poorest province of Viet Nam. As in many other provinces, poverty is mainly a rural phenomenon. The incidence of poverty in rural areas calculated by Inter-ministerial Poverty Mapping Task Force of the Government (2003) is 50%. The poverty condition of the province varies widely from the coastal plain areas to the high mountains bordering Laos. Such variation can be demonstrated by the poverty map below, which shows the different poverty incidence of coastal and mountainous areas. On the basis of official statistics, 42 out of 469 communes are classified as poor.

64. A considerable gap was found between the official poverty rate and the participatory RRA results. For example, in the Van Loi commune, according to MOLISA criteria poverty incidence is 18% whereas the RRA estimated a 30% poverty rate. According to local people, poor households have insufficient means of production (no land or not enough land for cultivation, no draught animals), large debts (private or government), poor access to social services (no appropriate education for children, incapacity to afford costs for health services).

65. The rate of better-off households according to MOLISA’s criteria is often higher than the results of the RRA (14% vs. 8% in Van Loi commune and 30% vs. 12% in Chau Dinh commune). Criteria identified by farmers for being better off include: regular income of D20–30 million per year, regular employment (normally off-farm), numerous livestock, availability of consumer goods (TV, motorcycles), and adequate housing conditions.

66. The RRA results showed that a general division of labor exists between women and men inside the households. Men are mostly responsible for heavy work (e.g. harvesting sugarcane, collecting wood, preparing land for planting). Women plant rice, tend to crops and do house work. Women are in charge of domestic activities (7 hours per day) and have less leisure time than men. Both men and women acknowledge that gender inequality comes from the traditional social norms. Inequality between husband and wife regarding access and control of household resources is limited. Decisions on family savings loans and participation in trainings are normally made consensually. Men have better access to motorcycles which are regarded as one of the most valuable assets. The survey participants said this is because rural women do not need a motorcycle for moving.

**Figure E4: Poverty and Ethnic Composition Map—Nghe An**

67. These ethnic groups number slightly over 400,000 people in the province. The Thai ethnic group is the most numerous with nearly 300,000 people. Other groups include the Tho, (about 58,000), the KhoMu (close to 30,000), and the H'mong (about 28,000). The Tho group evidences remarkable peculiarities in terms of livelihood sources and income generating activities. Textile weaving and coloring are very common. Similarly, in Tho villages, local species of ducks, pigs, and chicken can be found. Black sticky rice is cultivated on dry paddy land and traditional wine is produced from local leaves. In terms of agricultural characteristics, in mountainous villages, farmers use bamboo to make small irrigation weirs. In the rainy season the weirs are removed so that silt and debris is washed out naturally.

68. Local varieties of free-range chickens are common. All the goods produced by ethnic minorities, especially those living in remote areas, are produced on a very small scale. Because of this fact, the price of such products is often 30 to 50% higher compared to conventional products. For these reasons, the local market is not suitable. At the same time, ethnic groups face various difficulties to market these goods outside.

## 2. Agriculture and Livelihood Characteristics

69. On average, 57% of the adult population (15+) makes a living from agriculture, forestry and/or fishery although this figure is generally higher in the mountainous areas (above 60%). Approximately 12% of the total area of the province is used for agricultural cultivation. The remainder of the area is covered by mountains and forest and urban areas. In Nghe An, the main crops produced are wet rice, corn and peanut. Inadequate irrigation is the main obstacle for the expansion of cultivation of hybrid corn and rice. Where there is enough water, the average yield for rice is 3 to 4 tons/ha and for corn 1.5 to 2 tons/ha. With inadequate water, yields are reduced by half.

70. According to the RRAs conducted by the Canadian Center for International Study and Cooperation (CECI), in Quy Hop district of Nghe An, 80% of farm households use hybrid rice varieties for their crops. Local varieties are no longer cultivated by most households. Provision of seedlings and fertilizer through extension channels are frequently delayed. Other extension services (technical guidance; and market information for seedlings, fertilizer, and commercialization) are very poor and inaccessible to most of households because of the lack of extension staff at the commune levels. Fruit trees are not widely planted. In the provinces, there are few fruits and forestry products for commercialization. The survey respondents attribute this fact to the low value of these products in local markets, to the difficult market access for small-scale farmers and to high transportation costs. At the same time, technical information on growing fruit trees is not widely disseminated.

71. For livestock, buffalo, chickens, and pigs are common in most of the district households, although on a very small-scale. Currently, free-range local chickens are the most common livestock raising activity because they require small, low-cost initial investments (food, veterinary medicine). The RRA survey pointed out also the potential difficulties associated with livestock ownership: veterinary practices are not widespread and the risk of disease is relatively high.

### **3. Extension**

72. The participatory poverty assessment (PPA) conducted by the 2003 Poverty Task Force reviewed the extension program existing in Nghi Thai commune. In this case, the agricultural extension program has worked at the village level for more than one year. In such a short period of time, the local people have already recognized the achievements of the agricultural extension programs. The PPA pointed out in particular, the importance of extension for disseminating rice, soybean and groundnut planting techniques. Agricultural extension services also provide some commodities such as rice, maize, sesame and vegetable seedlings, fertilizer, and insecticide; some of which were sold on credit to the people and consequently give some support to the poor.

73. However, some of the information disseminated through extension does not conform to the economic situation of the poor. According to the report, the poor have few opportunities to apply the knowledge they learned to production. The Poverty Task Force report shows that agricultural extension sometimes focuses on technologies, which are not suitable to the farmers' livelihood systems. Cases have been reported of demonstrations of hybrid rice varieties that the poor could not afford because of difficulties in accessing fertilizer and insecticide in time with the cropping pattern or adequate irrigation. Other cases have been reported of agricultural extension on raising cows. On this topic, the poor did not have knowledge about diseases and epidemic prevention and control; neither did they have money to buy veterinary medicine when in need. These practices increase the wariness of the poor in approaching agricultural extension programs.

74. This is in accordance with the findings of the RRA that shows that most of the farmers are not satisfied with the training methodologies and extension models introduced. This is because training is mostly done in over-crowded classrooms with more than 70 trainees. In some cases, many farmers are provided with extension knowledge on crops and livestock that they do not cultivate or produce. Similarly, the PPA Report revealed that women have participated in training course about growing rice. However, although women attended training

programs to some degree, poor women were not often able to write down what was explained to them due to their low educational levels.<sup>17</sup>

75. The need for an appropriate delivery of extension services to the poor is strongly advocated by the Poverty Task Force PPA. The report argues that in order to help the poor to catch up with other households in applying scientific and technical knowledge to practice, there must be an exclusive way applied for the poor. Such an “exclusive way” does not only apply to techniques and research but also on the capacity to disseminate knowledge. On this issue, the PPA participants suggest extension workers to join people in the field every day and give them guidance on specific cropping or breeding techniques. The Poverty Task Force emphasizes the importance for training courses to be based on the actual educational attainment of the participants, on the level of labor organization and on current production techniques.<sup>18</sup>

76. In addition, the RRA research confirms that all surveyed groups expressed their willingness to pay for extension services if the quality of the service is improved and responds effectively to farming needs. In particular, farmers are interested in improving the quality and the production capacity of food crops (rice, corn, cassava). Extension should also assist farmers in the marketing of cash crops, especially sugarcane and pineapple. In particular, the surveyed farmers are interested in receiving updated information on places, prices and potential customers for local products.

#### D. Quang Nam Province

77. The province of Quang Nam is located in the South Central Coastal region. Although situated along the coast, Quang Nam also has mountains, midland, and plain areas. Natural land of Quang Nam is over 10,400 km<sup>2</sup>, of which mountains account for more than 80%, with steep slopes and complex river systems. The Province consists of 16 administrative districts including 2 towns (Tam Ky and Hoi An), with 225 communes. Quang Nam is situated in a convenient geographical position since all transportation between the North and the South of Viet Nam travels through this region.

**Table E4: Quang Nam – Main Characteristics**

Area (km <sup>2</sup> ) <sup>a</sup>	10,400
Number of communes and wards <sup>a</sup>	225
Number of communes in poverty <sup>a</sup>	92
Population in 2002 (in thousand) <sup>a</sup>	1,421
Rate of Kinh population (%) <sup>b</sup>	93
Rate of population working in agriculture (%) <sup>b</sup>	56
Overall poverty rate in 2003 (%) <sup>c</sup>	16.5
Incidence of rural poverty (%) <sup>b</sup>	46

<sup>a</sup> Source: 2004. *Statistics Yearbooks*.

<sup>b</sup> 2003. *Interministerial Poverty Mapping Task Force*.

<sup>c</sup> Molisa and GTZ. *Statistics on Hunger Eradication and Poverty Reduction* (HEPR)

<sup>17</sup> An important point raised by the Poverty Task Force is that in some cases “the husband could explain things to his wife after attending a training course. But if the wife took part in a course, it is unsure that she may explain what she had learned to her husband. For concrete courses, because of their low education, women’s attending (of training courses) may not be as beneficial as men’s.

<sup>18</sup> The report explicitly suggests that training courses “must be adjusted to be appropriate for remote and isolated areas where the educational level is low. Sometimes, agricultural extension workers should take trainees’ hands to show the work”.

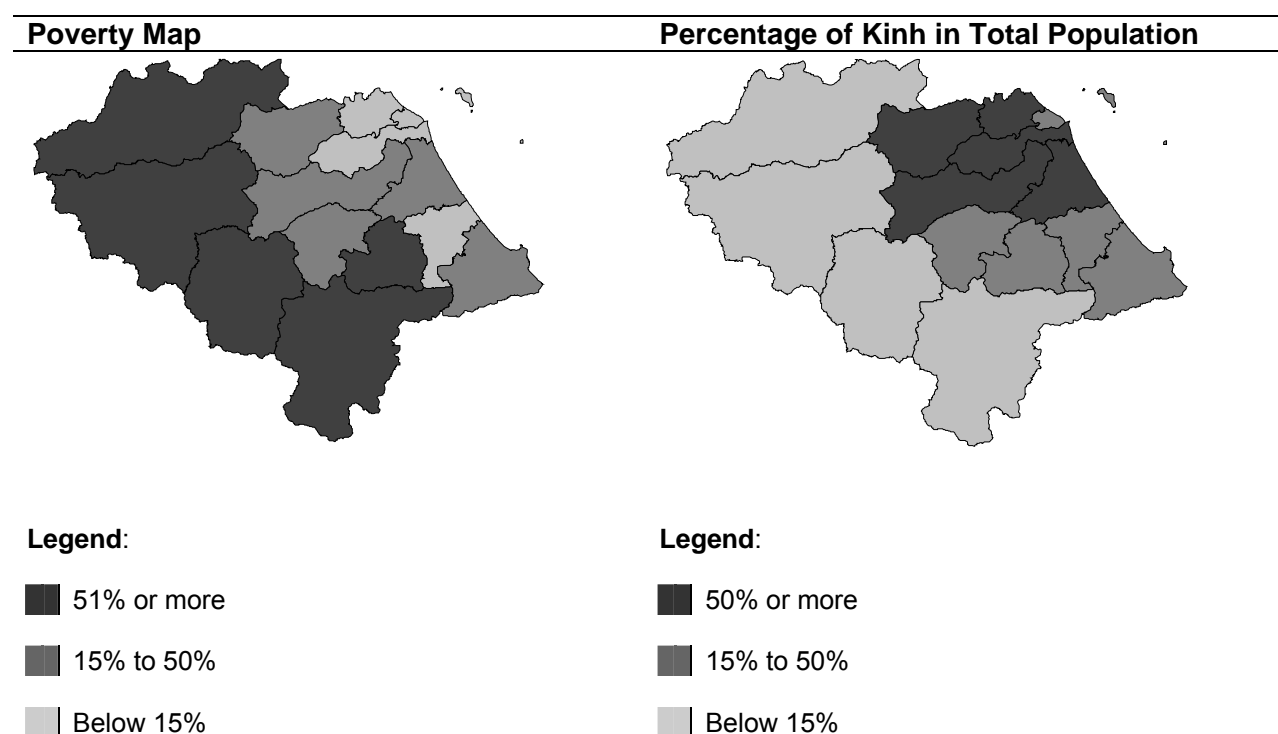
78. The geographical conditions are favorable for tourism and trade. Although there is a good potential for economic development, Quang Nam, in common with the other central coast provinces, is regarded as one of the poorest in Viet Nam. As in most of the Vietnamese provinces, poverty in Quang Nam is mainly a rural phenomenon: incidence of poverty in rural areas is 46%. The contribution of agriculture, forestry, and fishery to the provincial GDP has reduced substantially in the last few years. The share of GDP generated by agricultural activities has decreased from 63 to 43%. In contrast, the share of GDP generated by industry increased from 9 to 23% and by services from 28 to 34%.

## **1. Social Situation**

79. According to official statistics, the average income of a person living in Quang Nam is D 2.8 million per year (Provincial Statistical Services and Viet Nam Agriculture in 61 Provinces and Cities, 2001). MOLISA and GTZ evaluate overall poverty incidence in Quang Nam at 16.5%. The poverty situation varies from the mountainous interior of the province to the coastal plains area (including Hoi An town). As mentioned above, poverty is highly concentrated in rural areas: rural poverty incidence in this province amounts to 46% and it is more than 7 times higher compared to the poverty rate in urban areas. Such variation illustrated in the poverty map below, which shows the variation in poverty rates across the districts of the province. According to official statistics, 42% of the mountainous communes have a poverty rate higher than 50%.

80. The ADB Participatory Poverty and Governance Assessment (PPGA) evaluated the current trends in poverty and inequality in Central Coastal regions, including Quang Nam. Agricultural households in Quang Nam are vulnerable to natural, environmental and market factors. In the province, harsh climatic conditions and frequent natural disasters constitute a recurrent concern for agricultural households. Inadequate irrigation infrastructure negatively affects land productivity, and low farming skills result in inappropriate agricultural practices and further degradation of land productivity. Marketing capacities also need to be improved. Poor people, especially the ethnic minority people, lack experience in commercial activities and many cases have been reported of being cheated and unfair practices. A further cause of poverty relates to the weak management capacity of the local government. According to the PPGA report, many development programs and projects “were not transferred to the grassroots level”. This is due to the lack of transparency in financial administration for supported projects, programs and State budgets, at both the commune and village levels.

81. The PPGA reported that in general the majority of the poor does not have adequate resources for escaping from poverty. Most of the survey respondents have expressed a feeling of insecurity and hopelessness for future. Such feeling is generated by their thinking that escaping poverty is rather difficult because of the limited natural resources and employment opportunities in the province. The living standards of local people have improved little in recent years. Poverty still creates a heavy burden for the region and the gap between the rich and the poor is widening quickly despite the Government’s efforts to rehabilitate infrastructure or introduce new development programs.

**Figure E5: Poverty and Ethnic Composition Map—Quang Nam**

82. At the same time, the PPGA showed how the participation in governmental socioeconomic development programs constitutes one of the key strategies for escaping poverty. Other ways of increasing living standards are related to positive business experiences which often depend on the capacity of accessing credit. In many seaside villages, fishermen have overcome poverty by utilizing the public off-shore fishing program. However, such program is only sustainable when restrictions are placed on the number of off-shore fishing vessels. Alternatively, seaside villagers have considerably improved their living standards thanks to the governmental projects for aquaculture development. These investments had a positive outcome despite the market instability of fishery products.

83. According to official statistics, Kinh accounted for 93% of the total population living in Quang Nam. The Kinhs are more concentrated in the coastal regions and account for less than 50% of the population in the 4 districts that adjoin Laos and Kon Tum province. Four main ethnic minorities have a long history of living in Quang Nam: Co Tu, Xe Dang, (including Xo Teng, Mo Nam, Ca Dong), Gie Trieng (including Ve, Ta Rieng, Bho Noong), and Cor. Ethnic minorities reside in far and remote mountainous areas with bad infrastructure, steep slopes and lack of land for cultivation. Many irrigation systems cannot be used.

84. Each ethnic minority has their own traditional production experience (cultivation on eroded slopes, preservation of fertilized land, diversified cultivation of corn and bean). Besides, they also have traditional handicrafts such as brocade weaving, bamboo knitting, and traditional

cultures. Much of this experience and traditional customs are being lost due to many reasons such as agricultural settlement policy, changes in market demand, etc.<sup>19</sup>

85. The PPGA pointed out a new social issue in Quang Nam. This is related to the increasing number of young poor households, especially from ethnic minorities. After splitting from original families, these young households found themselves with limited land for cultivation. In most of the cases, they do not possess adequate financial and human capital assets since their farming experience is very limited. This category is highly exposed to the risk of poverty and destitution.

86. Another issue raised during the PPGA concerns the migration of ethnic minorities to centers from rural districts. The abandoned fields are often occupied by Kinh people. However, new fields are seldom allocated while their old fields become prohibited from cultivation in prevention of forest fire, leading to starvation when having no other income.

## **2. Agriculture and Livelihood Characteristics**

87. In Quang Nam, 56% of the population is involved in the agriculture sector. Approximately 35% of the total provincial GDP derives from agriculture. In agricultural production, crop cultivation contributes about 69% of value, animal husbandry accounts for about 28% and agricultural services about 3%. Main food crops grown in Quang Nam province are paddy rice, maize and cassava. Among the different food crops, paddy rice is planted in the largest area and contributes the highest production. While paddy rice and maize are used for food security, cassava is sold to a food processing company. Commercial cash crops grown in the province include sugar cane (2,500 ha), cinnamon, cashew (2,000 ha), ground nut (8,000 ha), cotton (3,000 ha) etc. In recent years, acacia have expanded rapidly in hilly and mountainous areas. For livestock, buffalo, cow, and pig are raised in almost all households. It is noted that, currently demand for cow raising have increased sharply in Quang Nam, while raising pigs can be expensive because of requiring inoculations and other veterinary services as well as purchased food supplements that the poor and ethnic minority families usually cannot afford.

88. Except for some better-off households, who are involved in cultivating new high yield varieties, other households cultivate local varieties in order to make sure that it meets their family food requirements. Information, market, and prices are also big issues for farmers. Local products (corn, chickens, and pigs) with high quality and good flavor can sell at a higher price than the same cross-bred ones. However, due to the lack of market and price information, farm-gate prices for these products are relatively low and can cause losses for farmers. Besides, marketing, advertising and product promotion which are not available and paid much attention are big constraints to developing local varieties.

## **3. Extension**

89. There are currently 26 extension staff members at the provincial level. At the district level, 10 of the districts in Quang Nam have extension staff. At the commune level, extension clubs have been established. Members of extension clubs are farmers with common interest,

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<sup>19</sup> Old people of ethnic minority groups are worried that their traditional customs are being lost because their offspring do not want to wear their traditional costumes; many do not know how to play their traditional musical instruments. A leader of Co Tu village said that in his community they were hunting in some certain periods of year, but many Kinh people now teach them hunting with modern hunting tools and Kinh restaurants are ready to buy wild animals, making ethnic minorities do more hunting and live on this (a 20 kg wild boar can be exchanged for rice good enough for a 5-member family in 4 months).

who volunteer to join the clubs. However, it seems that poor households and ethnic minorities could not join the club because of member fee barriers. The RRA conducted during project formulation in Quang Nam and Ninh Thuan Provinces pointed out important comments regarding the social aspects of extension.<sup>20</sup> First of all, extension is widely considered as having a positive impact on household livelihoods when this allows improvement in land productivity and reduction in vulnerability.

90. Recently, most of the extension activities have focused on the change of cropping structure from 3 crops of paddy rice/year to 2 crops of paddy rice/year to avoid the period of natural calamities. The number of extension training courses was limited to two or three per year. These include: pig fattening, home chicken-raising, pond-fish raising, cattle feeding, cultivation practices for new varieties of rice, corn, and cassava. In terms of functioning of the extension systems, the RRA found that local authorities, staff at all levels and farmers believe that extension is just a matter of transferring new advanced techniques to farmers. This implies that extension exclusively consists of “one-way” activities. By doing so, from the farmers’ perspective, the crops to cultivate and the animal to raise depend on guidelines coming from “higher levels”, or on the trends in other places, regardless of the appropriateness of these crops or livestock to local conditions.

91. The RRA pointed out also considerable differences among farmers in terms of approaches to extension: better-off households in the villages desired to cultivate cross-bred cows, pigs for lean meat, and hybrid corn. In contrast, poor and ethnic minority households are usually diffident towards new varieties of crops/animals until they have been instructed carefully. This skepticism is sometimes motivated by past negative experiences. Some varieties introduced to mountainous areas have been inappropriate for the natural and socioeconomic conditions of the localities.<sup>21</sup> In Quang Nam, it is noted that there is a failure in fruit cultivation as district extension stations introduced fruit varieties imported from other provinces. This sometimes leads to heavy losses among poor households when their cattle die or when there is a crop failure.<sup>22</sup>

92. According to both the RRA conducted during project formulation and the PPGA, the existing extension service seems to reach only few beneficiaries, namely the better-off households living in geographically advantaged areas. According to villagers, there are few poor households taking part in these training courses. Therefore, they have no opportunity to apply such knowledge. In other cases, the models are not suitable because the input requirements (fertilizer, pesticides) are not accessible to farmers living in remote rural areas. In Quang Nam, mass organizations (women and youth unions, and farmers’ associations) play a significant role in dissemination of new models such as cow raising.

93. Regarding ethnic minorities, most of the extension interventions have been conducted without an appropriate evaluation of their real needs and socioeconomic conditions. In addition, the way in which extension models were disseminated has led to a bad habit of waiting for

<sup>20</sup> An RRA was conducted in the two provinces without distinguishing the two. The survey result is also used for the description of the socioeconomic profiles of Ninh Thuan Province.

<sup>21</sup> For example, wet rice variety was introduced to ethnic minorities, but there is no or in lack of fields for wet rice. Or high yield cross-bred corn was not appropriate with consumption customs and habit of ethnic minorities, with lower quality than the local variety.

<sup>22</sup> At the same time, the RRA identified the need to improve research on local specialties, which require higher quality and productivity. In Quang Nam, this is the case of the Loong Boong, a fruit tree in Quang Nam, which grows wildly in forests, is now cultivated for remarkable profits. Farmers wish that research institutes can help improve the quality of the fruit, and reduce its harvest time (usually it takes 5–7 years to get fruits). High quality local cinnamon variety, which has been degenerated with low productivity, requires research for higher productivity.

“giving” or “assistance” from higher levels, constraining their activeness and decision-making, even changing sustainable and effective traditional methods.

## E. Ninh Thuan Province

94. Ninh Thuan is in the Southeast agro-ecological region of Viet Nam. Compared to most other provinces in Viet Nam it is a relatively small province of about 3,400 km<sup>2</sup>. Both highway No. 1 and the national railroad pass through the province. The topography of Ninh Thuan varies between coastal plains and river valleys with high mountains occupying the north, south and west of the province. The climate is arid and supports varied agricultural activities, including grape production, and goat and sheep production. These characteristics make Ninh Thuan one of the driest provinces in Viet Nam.

**Table E5: Ninh Thuan – Main Characteristics**

Area (km <sup>2</sup> ) <sup>a</sup>	3,400
Number of communes and wards <sup>a</sup>	59
Number of communes in poverty <sup>a</sup>	18
Population in 2002 (in thousand) <sup>a</sup>	548
Rate of Kinh population (%) <sup>b</sup>	78
Rate of population working in agriculture (%) <sup>b</sup>	47
Overall poverty rate in 2003 (%) <sup>c</sup>	13
Incidence of rural poverty (%) <sup>b</sup>	63

<sup>a</sup> Source: 2004. *Statistics Yearbooks*.

<sup>b</sup> 2003. *Interministerial Poverty Mapping Task Force*.

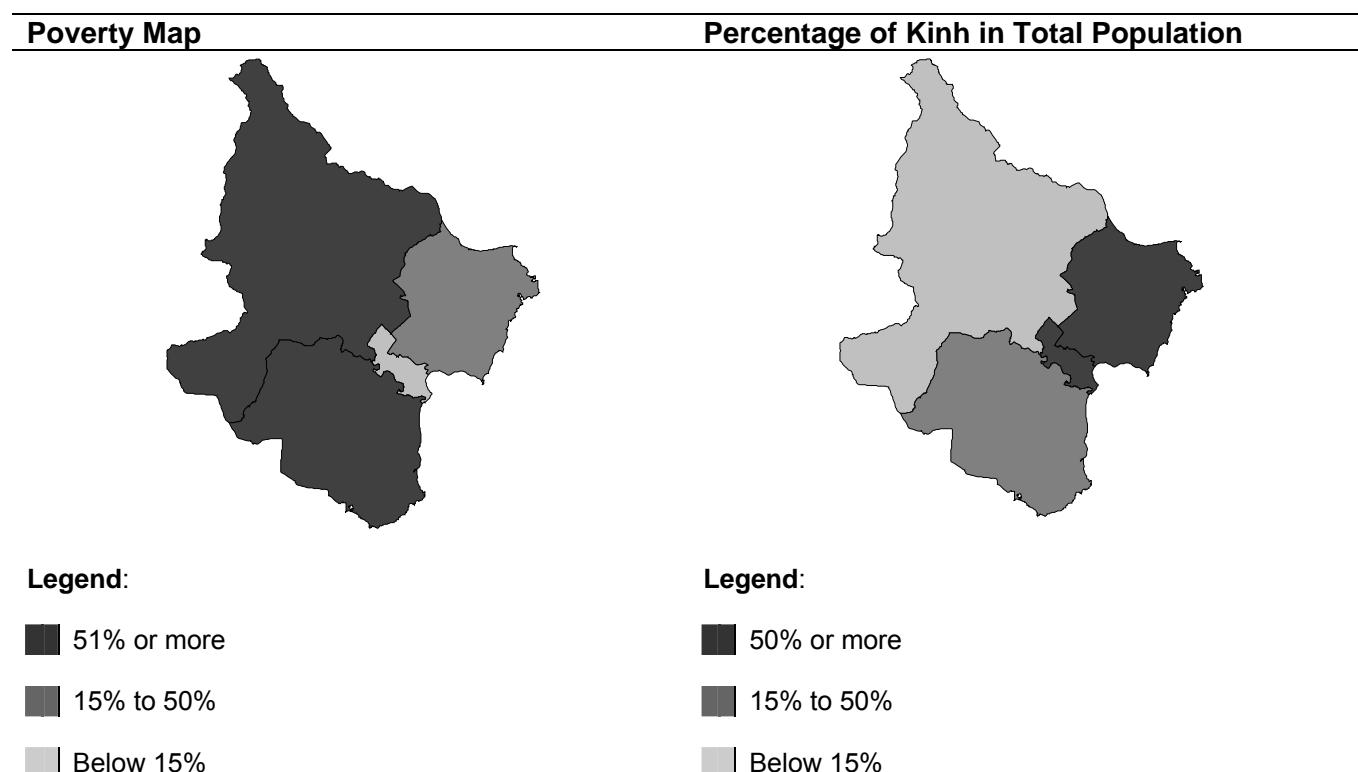
<sup>c</sup> Molisa and GTZ. *Statistics on Hunger Eradication and Poverty Reduction* (HEPR)

95. Ninh Thuan is an agricultural province. Agricultural production (including agriculture, livestock, forestry, and fishery) accounts for 45% of GDP of the province (2003) and more than 50% of its population work in the agriculture sector. Ninh Thuan consists of 6 districts, including a town (Phan Rang–Thap Cham town) with a total of 59 communes and wards. The province has 29 mountainous communes classified into 3 categories (based on the livelihood situations): 18 communes belong to the poorest category with difficulties and are eligible for the special Program 135 of the Government. The total population is 548,000 (2003) and the proportion of Kinh is 78%. According to official statistics, 13% of the Ninh Thuan population on average lives below the poverty line.

### 1. Social Situation

96. Ninh Thuan is the 23rd poorest province out of 61 provinces. Incidence of rural poverty is estimated at 63% (Inter-ministerial Poverty Mapping Task Force, 2003). Out of the 59 communes, 18 communes are categorized as poor, of which 9 communes are in Bac Ai District.<sup>23</sup> Recently, the Government of Viet Nam and donors have had many programs and projects focusing on poverty reduction, and this has resulted in the poverty ratio dropping from 28% in 1992 to 13% in 2003. However, the income disparity between urban and rural areas has increased during this period: from 1.4 times in 1995 to 1.8 times in 2002. According to DOLISA estimates, the gap between the 20% richest group and the 20% poorest group has increased from 4.87 times in 1995 to 9.16 times in 2002.

<sup>23</sup> A commune is classified as poor, if it has a poverty rate higher than 40%.

**Figure E6: Poverty and Ethnic Composition Map—Ninh Thuan**

97. Kinh people account for 78% of total population. Major ethnic minorities are Cham (about 12%) and Raglai (more than 9%). While Cham people live in the plain (mainly concentrated in Ninh Phuoc district with nearly 50,000 people), the Raglai ethnic people chiefly live in the mountainous area (concentrated in Bac Ai district with about 20,000 people).

98. There remains a big gap among regions within the province, among ethnic communities and between Kinh and ethnic minorities. According to reports of Ninh Thuan DPI and DOLISA at the Workshop “Integrating comprehensive growth strategy and poverty reduction with local planning” organized in December 2004 in Ninh Thuan, though the provincial poverty rate has been reduced to 13%, poor ethnic minority households accounted for 33.6% of the total poor. In 29 mountainous communes, poor ethnic minority households make up for 83% of total poor households. Except for the Cham people, each ethnic minority has their own traditional production experience (cultivation on eroded slopes, preservation of fertilized land, diversified cultivation of corn and beans). They also have traditional handicrafts such as brocade weaving, and bamboo knitting, and traditional cultures. Most of these experiences and traditional customs are being lost due to many reasons such as agricultural settlement policy, demand for wild animal meat, changes in cultures, etc.

## 2. Agricultural and Livelihood Characteristics

99. Crop cultivation occupies nearly 60% of the value of agricultural production in Ninh Thuan, animal husbandry more than 30% and agricultural services about 10%. Beside grain crops such as rice and corn, Ninh Thuan is famous for grape and cotton production, and animal husbandry such as cows, goats, and lambs. Agricultural land area is 69,000 ha, of which annual

crop land covers 60,200 ha and perennial trees 9,000 ha. The land area cultivated with food crops is 43,000 ha: rice covers 32,300 ha and maize covers 10,900 ha. Land area planted with tuber crops is 2,300 ha and vegetables cover 9,700 ha. Other crops grown are cotton (900 ha), sugarcane (2,000 ha), and tobacco (1,400 ha). Most of forests in Ninh Thuan are watershed and protection forests under the management of national plantations or army. It cannot therefore be owned by households. Some households are engaged in the management of forest resources and paid about D50,000/ha/year.

100. Regarding livestock, most households raise goats and sheep. The RRA conducted during project formulation showed that many households want to raise cattle, particularly cross-bred cows and goats. These are characterized by low susceptibility to disease compared to pigs and chickens. They are also suitable for the environmental conditions in Ninh Thuan. Livestock expansion is constrained by limited borrowing opportunities and absence of rural credit schemes. In addition, because of the high demand for breeding cows and goats, market prices have considerably increased during the last few years. At the same time, the RRA showed the necessity to foster farmers' knowledge in terms of veterinary and disease-prevention practices.

### **3.      Extension**

101. In Ninh Thuan province, the provincial agricultural extension center has 12 staff. At the district level, all 5 of the districts in Ninh Thuan have extension staff, with 45 of the 58 communes having extension workers. According to the RRA findings, extension in Ninh Thuan is widely considered as having a positive impact on household livelihoods when this allows land productivity to increase and vulnerability to be reduced. According to the information gathered during project formulation, the center has been involved in various projects, the most important financed by NAEC. The Women's Union received a support from the National Women's Union to develop a series of extension activities focused on livestock. The courses focused on: grape intensive technology, sheep raising, goat raising, rice intensive technology, hybrid maize, home gardening, and grape preservation. The field report showed that all the models have produced good results but the limited budget did not allow further expansion of the activities in the province.

102. At the same time, the extension center can play a crucial role in promoting environmental protection and poverty reduction. This is particularly so in the case of neem production. The growth of this type of tree is compatible with the sandy soil area, which characterizes the majority of Ninh Thuan. Farmers can benefit from growing of neem trees in terms of wood products and pesticides derived from its leaves. In addition, neem plantations decrease sea wind and prevent desertification in coastal areas. Together with neem production, other programs which are likely to have a positive impact on Ninh Thuan agricultural development are: goat- and sheep-raising, and grape development.

103. In terms of functioning of the extension system, the RRA exercise conducted in Ninh Thuan and Quang Nam found that local authorities, staff at all levels and farmers believe that extension is just a matter of transferring new advanced techniques to farmers. This implies that extension exclusively consists of "one-way" activities. By doing so, from the farmers' perspectives, the crops to cultivate and the animal to raise depend on guidelines coming from "higher levels", or on the trends in other places, regardless of the appropriateness of these crops or livestock to local conditions.

104. Also, the RRA pointed out considerable differences among farmers in terms of approaches to extension: better-off households in the villages desire to cultivate cross-bred

cows, pigs for lean meat, cross-bred corn. In contrast, poor and ethnic minority households are usually diffident towards new varieties of crops and animals until they are instructed carefully. This skepticism is sometimes motivated by past negative experiences. Some of the new varieties are not appropriate for the natural and socioeconomic conditions of the localities.<sup>24</sup>

105. Extension seems that in most of the cases it reaches exclusively few beneficiaries, namely the better-off households living in geographically advantaged areas. According to villagers, poor households are often not involved in the activities promoted during training. Therefore, they have no opportunity to apply such knowledge. In other cases, the models are not suitable because the input requirements (fertilizers, and pesticides) are not accessible to farmers living in remote rural areas. Regarding ethnic minorities, most of the extension interventions are conducted without an appropriate evaluation of their real needs and socioeconomic conditions.<sup>25</sup>

## F. Dak Nong Province

106. Dak Nong was established as a province in November 2003 from 6 districts in the Southwestern part of the former Dak Lak province in the central region. It is situated in the Southern Central Highland region with the 130 km borderline with Cambodia. In Dak Nong, natural area amounts to approximately 6,515 km<sup>2</sup>, of which forestry occupies more than half. In the province, there are 6 administrative districts with 52 communes and wards.

**Table E6: Dak Nong – Main Characteristics**

Area (km <sup>2</sup> ) <sup>a</sup>	6,515
Number of communes and wards <sup>a</sup>	52
Number of communes in poverty <sup>a</sup>	25
Population in 2002 (in thousand) <sup>a</sup>	388
Rate of Kinh population (%) <sup>b</sup>	68
Rate of population working in agriculture (%) <sup>b</sup>	86
Overall poverty rate in 2003 (%) <sup>c</sup>	17
Incidence of rural poverty (%) <sup>b</sup>	53

<sup>a</sup> Source: 2004. *Statistics Yearbooks*.

<sup>b</sup> 2003. *Interministerial Poverty Mapping Task Force*.

<sup>c</sup> Molisa and GTZ. *Statistics on Hunger Eradication and Poverty Reduction* (HEPR)

107. According to the most recent estimates (October 2004), Dak Nong population is approximately 390,000. The proportion of Kinh people is estimated at 68%. The highest concentration of Kinh is in Dak Mil (85%) and lowest in Dak Song (4%). Labor force accounts for about 45% of the population, 86% of whom are involved in forestry, agriculture and fishery. According to official statistics, the overall poverty rate in Dak Nong is estimated at 17%. This figure makes Dak Nong one of the poorest provinces in Viet Nam and the poorest among the provinces proposed to be included in the AST project. Approximately 48% of the Dak Nong communes are classified as poor.

<sup>24</sup> For example, wet rice variety was introduced to ethnic minorities, but there is no or shortage of fields for wet rice. Or high yield cross-bred corn was not appropriate with consumption custom and habit of ethnic minorities, with lower quality than the local variety.

<sup>25</sup> An additional source of concern stems from the fact that most farmers have a passive behavior during the training and approaches new technology as “assistance” coming from higher levels.

## 1. Social Situation

108. Dak Nong has a diversified structure of ethnic groups with 31 resident communities, of which approximately 68% is Kinh, 12% is native ethnic minorities (such as M'Nong, E De. Thai, Tay, Ma). Ethnic minority communities are located in 40 districts of the province. Like other provinces in the central highlands, Dak Nong has not only Kinh immigrants but also other ethnic groups from northern provinces. These include: Nung, Tay, Thai, and H'Mong. According to DOLISA data, the poverty rate varies among ethnic groups. Poverty rate of the Kinh is 5% while that of native ethnic minorities is 32% and of those who emigrated from other places, 12%.

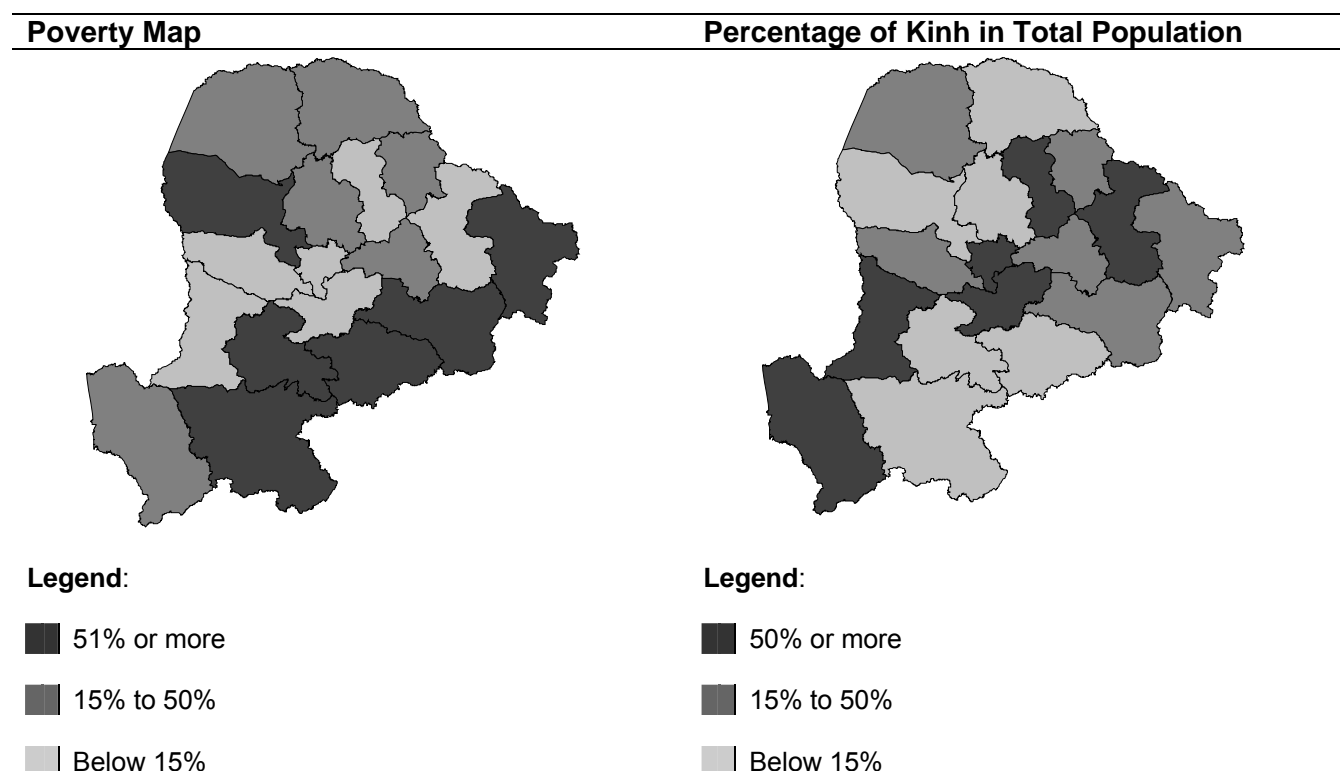
109. A significant gap exists between native and immigrating ethnic minorities. Though living and production conditions of ethnic minorities immigrating from the north are lower than those of the Kinh, they are better off compared to native ethnic minorities. Such difference may well be determined by the different attitude and education of immigrating community as well on the asset endowment. Immigrating ethnic minorities are also more fluent in the Vietnamese language and this facilitates communications.

110. According to the PPGA conducted by ADB and ActionAid Viet Nam in 2003, poverty reduction in Dak Lak<sup>26</sup> has to be based on improved farming practices and credit availability. These factors were regarded as determinants for escaping poverty, especially in rural areas. The possession of various types of physical, financial and human capital assets increases in fact the likelihood for a household to capture new income-earning opportunities. In addition, availability of roads, school and access to markets are also identified as driving factors in determining household living standards.

111. On the other hand, household vulnerability is evidenced through various dimensions: health problems, livestock diseases, inadequate resources, presence of elderly in the households, and lack of assets. Poverty is often associated with incapacity to cope with negative events (especially droughts and floods), which are repeatedly occurring in the region. Environmental degradation is also considered as one of the most severe risk factors for the farmers living in the region.

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<sup>26</sup> Prior to the division of Dak Lak into Dak Lak and Dak Nong.

**Figure E7: Poverty and Ethnic Composition Map—Dak Lak**

112. In the last few years, most of the growth experienced in Dak Lak was determined by the rapid expansion of cash crops, especially coffee for exports. The attractive market signals in the 1990s encouraged local farmers to expand and reclaim new land, converting some forests for coffee production. People from different parts of the country migrated into Dak Lak to set up coffee farms. As a result, the natural environment was seriously devastated: forest coverage decreased from about 90% in the 1960s to 57% in 1995 and to less than 50% in the late 1990s.

113. Deforestation has negatively impacted on the poor and the indigenous people. The livelihood system of these categories in fact relies on access to natural and common property resources. In the face of environmental degradation, alternative livelihood sources were not accessible. At the same time, almost all small-scale coffee growers suffered from the sharp drop in coffee prices in the late 1990s. As outcome of this impoverishment process, poor households have been progressively pushed towards forests or in less favorable areas with steep slopes, low fertility, and scarce access to water.

## **2. Agricultural and Livelihood Characteristics**

114. Dak Nong is a heavily agriculturally based economy, characterized by traditional subsistence farming practiced by the majority of local farmers. Agriculture and forestry generate more than 75% of the total provincial wealth. In agricultural production, crop cultivation accounts for 90%, husbandry for more than 6% and agricultural services for about 3%. Before the separation, Dak Lak has more than 790,000 hectares of fertile basaltic soil, which is quite suitable for the production of annually-produced food, and perennial industrial crops. The area cultivated with cereal crops amounts to 2,998 hectares and produces approximately 8,900 tons.

Average area of cereal crops is about 0.8 ha per person and average annual grain equivalent production is 162 kg per person. The majority of the agricultural area in Dak Nong is utilized for planting industrial crops as coffee, cashew, pepper, and rubber. The climate in the province is suitable for industrial crops. Dak Lak's coffee is one of Viet Nam's famous agro-product exports. However, fluctuations in coffee prices have had negative effects on production and income of households. Presently, a considerable number of farmers have abandoned coffee cultivation and introduced cassava, pineapple, Japanese sweet potatoes and cashew trees. There are also large areas of pasture in the province, which can support cattle raising. Livestock production in the province mainly focuses on cattle, pigs, and chicken.

115. Dak Lak has a high potential for the development of a sustainable agro-forestry program, as its natural forest area is the largest in Viet Nam. More importantly, more than 1.1 million hectares of natural forests is also a home for many kinds of valuable timber, non-timber products, and wild animals. Despite the high potential for agriculture, Dak Lak has a relatively low development base. The infrastructure system in the province is underdeveloped, especially the transportation, irrigation, water supply, and drainage systems.

116. Since economic reforms began in 1986, local minorities have begun to apply improved farming techniques, changing cropping patterns and gradually altering farming practices. However, old farming traditions and practices still prevail. Farmers are confused about what crops to cultivate and in need of assistance and consultancy on agricultural diversification, from technical assistance, technology, and new variety transfer to accessibility to market information.

### **3.      Extension**

117. Dak Nong is a new province, recently separated from Dak Lak. The organization of provincial agencies is therefore at the beginning stage. Organizational difficulties together with inadequate transportation infrastructure make extension activities rather difficult, especially in the remote rural areas. Dak Lak PAEC was regarded as one of the most effective extension centers in the regions. The province was involved in various projects, particularly on rural development and community development. However, most of those programs were implemented in districts and communes, which currently belong to the Dak Lak province. A series of agricultural extension initiatives were launched in 2004. These include: crop cultivation (hybrid rice, planted bamboo for shoot, hybrid maize, grafting cashew, coffee pruning), animal husbandry (chickens, lean-oriented pigs, new breed of cow), aquaculture, and agricultural diversification.

118. The RRA survey described various issues related to the functioning of the extension services in Dak Nong. In general, extension is perceived by farmers as crucially important for providing appropriate suggestions regarding the utilization of land and cultivation techniques. However, extension authorities are sometimes not aware of the most appropriate crops and animals with respect to the local environmental and climate conditions.<sup>27</sup> Extension activities sometimes exclusively focus on the introduction of new techniques and new varieties.<sup>28</sup> The lack of appropriate inputs and scarce access to credit do not permit poor farmers to introduce

<sup>27</sup> The RRA reported numerous cases of ethnic minority households, living in poverty though having land for cultivation. Most of these households do not know how and what to cultivate on their land. In many cases, the land has been sold to Kinh households and ethnic minority people become seasonal employees in Kinh farms.

<sup>28</sup> According to procedures at banks, households must have land certificates as collateral for their borrowing. However, most ethnic minorities and ethnic immigrants do not have such certificates, therefore they have no access to credits.

new varieties. At the same time, local varieties, traditional knowledge and customs are not taken into consideration.

119. In survey areas, most extension activities such as training courses and demonstration trials have been undertaken for the benefits of Kinh and immigrating ethnic minorities. In contrast, many native ethnic minorities were rarely able to participate in any extension training courses. Although the Government of Viet Nam has developed a special program for diffusing new varieties and fertilizers among ethnic minorities, the RRA exercise found that very few native ethnic minorities have received such assistance. The only possibility for native ethnic minorities to introduce new crops or technologies is through imitation.<sup>29</sup> However, imitation often leads to inappropriate cultivation techniques which decrease the quality of the product. A further constraint relates to the harsh environmental and transportation conditions, which do not permit demonstrations to be held in remote rural communities.

### **III. GENDER ACTION PLAN**

#### **A. Summary Gender Action Plan**

##### **1. Preparation**

120. Special attention was given to gender issues during project formulation. The participatory RRA exercises conducted in Ninh Thuan, Quang Nam, Dak Nong, Nghe An, and Thanh Hoa have encompassed a gender-disaggregated perspective on various issues related to project activities. Gender issues have been explored by separately looking at the division of labor within the household with special attention given to agricultural activities. The gender characteristics of the people in charge of commune or provincial administration have also been pointed out. The RRA also involved the provincial women's unions (WU). Interviews with key informants of women groups provided important insights on the existing livelihood strategies, feature of poverty, and ethnicity. WUs have also been analyzed by looking at their role in extension. There are in fact many extension services implemented by WU, which focuses on activities typically performed by women (livestock raising, gardening, and weaving).

##### **2. Project Formulation**

121. Various actions were identified during project formulation in order to promote the active involvement of women in the project activities. First, a gender-disaggregated approach to extension will be encompassed in the provincial plan for agricultural extension services. The plan relies on the needs' assessment conducted in the first year, which will be conducted in cooperation with WU and other grassroots organizations operating in each province. A special section of the plan exclusively focuses on extension intervention for women's farm activities (livestock, gardening, etc.). Second, the AST Project will stimulate the participation of women in its activities by keeping a bottom-up demand-driven approach. This will be done through targeted awareness campaigns aimed at ensuring that the "human capacity strengthening" opportunities available under the AST research component will be disseminated among Women's Union and other women groups. In addition, a gender disaggregated screening procedure of applications will be adopted with a higher score given to female applicants. Finally, the strengthening of the "on-the-job" and "experimental" training skills of extension officers

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<sup>29</sup> The RRA participants reported the case of some crops with high economic value (such as coffee and cashew), which have been cultivated with good results by Kinh or immigrating ethnic minorities. Native ethnic minorities have bought the seeds of these varieties and learnt cultivation techniques by imitating the Kinh.

(irrespective of gender consideration) is in accordance with one of the key findings of the RRA. Women participating in extension and demonstration trials often report the lack of effective dissemination of knowledge and information. This is particularly relevant for women living in remote rural areas due to their limited education and language capacity.

### **3. Implementation**

122. A social development officer position will be created in the Central Project Management Unit. The officer will be responsible for ensuring that the Project will continuously address gender issues and monitor the implementation of the gender action plan. In particular, (s)he will be responsible for (i) controlling the coherence of project activities with the gender action plan; (ii) controlling the mainstreaming of gender issues in the needs' assessments exercise; (iii) ensuring that the provincial project plans adopt a gender-disaggregated perspective in the definition of extension and training activities; (iv) controlling the gender-disaggregated perspective in monitoring and evaluation.

### **4. Gender Sensitive Perspective in Monitoring and Evaluation**

123. The Project will adopt a gender sensitive approach to monitoring and evaluation, which will consist of the identification of gender-disaggregated indicators and targets for evaluation of project activities. This will be supported by a data-gathering system, which will extensively involve women groups, female-led enterprises and women employees. The reporting on Project achievements in terms of impact and benefits will also be constructed on a gender-disaggregated basis.

## **B. Gender Plan**

124. The gender plan considered during the formulation of the Agriculture Science and Technology (AST) Project is in accordance with the "Gender Strategy in Agriculture and Rural Development to the Year 2010" of MARD. The MARD strategy starts from the consideration that gender inequalities undermine socioeconomic development in all areas and sectors. Countries that actively promote gender equality experience faster and more sustainable socioeconomic growth. The overall objective of the gender strategy is that national agricultural and rural development policies and programs contribute to increased income and reduction of rural poverty for men and women. This would be achieved through (i) improved gender equality and women's status in agricultural development, and (ii) enhanced gender responsiveness or rural development plans, programs and projects.

125. Most of the activities of the AST Project can be categorized within Objective 4 of the Gender Strategy. Objective 4 aims to achieve gender sensitive practices and gender equality in agricultural research, public services and training. The rationale behind this objective is that research on new technology and business development opportunities should be targeted to those fields from which both male and female workers have the potential to benefit. Regarding extension, the strategy aims at introducing gender consideration in the delivery of extension services. For this purpose, extension should give particular attention to the dissemination of new technologies in crop production, livestock and other subsectors. Moreover, consideration including location and duration of activities must be taken into account during the formulation and implementation of extension programs to ensure that both men's and women's needs are met.

126. The analysis outlined above is substantially in accordance with the findings of the RRAs conducted during the PPTA. The RRAs found that the provision of extension services was affected by a strong gender-bias. Little importance was given to the agricultural activities traditionally performed by women. Men were considered the main target for training and demonstration. While women represent above half to three quarters of the workforce in animal husbandry, depending on the region, only 20% of extension training course on animal husbandry have women participation. Similarly, although 80% of rural women work in cultivation, they only represent 10% of participants in horticulture training courses of MARD. As a result, women are not provided with the development capacity to use more advanced technologies and are less able to contribute to development objectives.

127. Strengthening the capacity of research and extension practitioners to mainstream gender concepts in their activities is one of the key gender actions of the proposed AST Project. In the current situation, failure to mainstream gender issues in agricultural research and extension relates to social and cultural norms which give more importance to the activities and role of men within the households. At the same time, it is important to point out that knowledge and awareness of key gender concepts and the capacity to mainstream gender equality are rather limited among civil servants in the MARD system. With a few exceptions, national and provincial level civil servants have limited knowledge of basic gender concepts; skills of gender analysis, gender planning, gender budgeting, and concept of engendering policies, programs, and services are also limited.

128. The Strengthening of Rural-Based Technical and Vocational Training component of the AST Project also includes a strong gender rationale. In Viet Nam, educational curricula, including university programs, management schools and other professional development and retraining programs, rarely mainstream gender into teaching of socioeconomic development concepts and theories, technical concepts and skills and management development. Teaching of in-depth concepts related to gender is generally absent from the educational system. On this issue, the MARD Gender Strategy argues that vocational training courses should specifically target women to both raise their technical knowledge and enhance their self-confidence. At the same time, gender issues in agriculture and rural development must be considered a compulsory subject in education programs of all education and training institutions in the sector.

### **C. Review of Proposed Actions by Component**

129. A group of actions are hereby proposed, and are regarded as essential for mainstreaming gender issues in the project activities. The actions are categorized according to each project component, namely (i) Client-oriented Agricultural Research and Capacity Strengthening, (ii) Grassroots Agricultural Extension Improvement, and (iii) Rural-based Technical and Vocational Training. The gender aspects in the activities to support project management are also considered.

#### **Component 1: Client-Oriented Agricultural Research and Capacity Strengthening**

130. **Rationale 1.1: Reduction of household vulnerability.** Intervention under the Sub-Component to provide key equipment and facilities to support the agricultural research system can be considered as functional to the scope of reducing vulnerability and improving food security of farm households, including more vulnerable female-headed households. The interventions listed under this sub-component aim at producing a positive impact on household resilience to crop losses through support to crop production and biotechnology research,

livestock diseases through support to veterinary and epidemiological research, and market risks through improved post-harvest handling and dissemination of market information.

131. **Action 1.2: Human capacity strengthening for female scholars—Screening.** The AST Project includes a special intervention aimed at strengthening technical and practical skills in agricultural research. Under the Project, at least 10% (more than 6 persons) of the total trainees (55 persons) will be women. This will be achieved through a screening procedure for evaluation of applications, which can give higher weight to female candidates. The Government assured to give favorable consideration for female applicants.

132. **Action 1.3: Development of technologies suitable for female farmers—Screening.** In the provision of competitive research funds, the Project will have a special focus on strengthening of applied and adaptive agriculture research linkages which aims at enhancing the cooperation between farmers, extension, applied and adaptive research and policy making, thereby promoting client-oriented agricultural research based on improved linkages between research and extension. The rationale behind this sub-component relates to the objective of making research activities more responsive to stakeholder needs. A fund is created to finance applied and adaptive research that has a focus on development of appropriate technologies for the regions serviced by the regional research institutes. Special emphasis may be given to technologies appropriate for activities traditionally performed by women.

## **Component 2: Grassroots Agricultural Extension Improvement**

133. **Action 2.1: Gender focus during the farmers' needs assessment".** In compliance with a bottom-up approach to the development intervention, elaboration of the provincial plan for agricultural extension services will extensively rely on an in-depth needs assessment, which will be conducted during the first year. The exercise will be conducted at the provincial level in order to take into consideration the social and environmental differences within the country. The exercise will serve as an input for selecting appropriate contents and methods in the delivery of extension services. Special care will be given to identifying needs and priorities of farmers operating in upland and remote areas. A special set of interventions will be identified for activities within the farm households implemented by women.

134. **Action 2.2: Special section for women-oriented activities in the provincial plan.** The provincial plan will include a special section, which focuses on activities traditionally performed by women. The actions will be organized at the provincial level in order to take into account the social and agro-economic differences across the country. The provincial plan's section for women-oriented interventions will identify the targets, objectives, methodologies, contents and schedule of extension activities. Also, the actions needed for enhancing communications and training capacity will be specified. Particularly relevant to this purpose will be the strengthening of extension staff capacity to adopt on-the-job or experimental training approach.

135. **Action 2.3: Strengthening of capacity to implement on-the-job or experimental training.** The RRAs conducted during the PPTA showed that agricultural extension services often did not provide benefits since the training was too theoretical and did not provide practical information. On-the-job or experimental training methodology was instead identified during RRA as the training methodology more suitable to the educational and inter-personal attitudes of

female farmers. Under this action, capacity of extension service providers in conducting on-the-job or experimental training will be enhanced.<sup>30</sup>

136. **Action 2.4: Increased participation of women farmers in the project activities.** The extension contracts to be funded under the Project will have provisions that at least 40% of beneficiaries of these services are women. The contracts to be awarded in the final year of project implementation will have provisions that at least 50% of beneficiaries are women.

### **Component 3: Rural-based technical and vocational training**

137. **Action 3.1: Inclusion of gender issues in the development of agricultural curriculum guides.** The revision of agricultural curricula at the secondary technical and vocational level will include a special focus on gender issues. By doing so, a better understanding of the social and agro-ecological heterogeneity of the country will be developed in the rural-based training programs.

### **Component 4: Project Management**

138. **Action 4.1: Creation of a social development officer position in the CPMU.** A social development officer position will be included in the CPMU. In general, the officer is responsible for monitoring of project activities with respect to their capacity to address social development and poverty reduction. In the first year, the social development officer will supervise the execution of the needs assessment exercise and ensure focus on gender issues. (S)He will support the development of provincial plans by ensuring the inclusion of specific extension interventions for women. In the course of project implementation, the officer will monitor the schedule of all the AST activities and their compliance with the Country Poverty Reduction Strategy and the "Gender Strategy in Agriculture and Rural Development". (S)He will be also responsible for an ongoing control of the inclusion of women and indigenous people in the research, extension and training activities promoted by the AST Project. The recruitment procedure will encourage application of female candidates or people from ethnic origins.

139. **Action 4.2: Adoption of a gender-disaggregated scoring system for evaluation of proposals.** The Project will adopt a scoring system for screening and selection of funding proposals under the extension and research components. The system will attribute higher weight to those proposals, which explicitly address gender issues.

140. **Action 4.3: Gender-disaggregated M&E System.** The Project will adopt a gender-sensitive approach to monitoring and evaluation, which consists of the identification of gender-disaggregated indicators and targets for monitoring and evaluation of project activities. This will be supported by a data gathering system, which will extensively rely on participatory techniques,

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<sup>30</sup> The on-the-job approach requires regularly scheduled training (...) and is provided by the superior officer or the subject-matter specialists to the subordinate field staff. This training is generally problem- or technology- oriented and may include formal presentations, informal discussion, and opportunities to try out new skills and knowledge in the field. The superior officer, administrator, or subject-matter specialist of each extension department must play a role in providing on-the-job training to the staff while conducting day-to-day normal activities (Halim, A. and Ali, M., "Training and Professional Development" in FAO. 2003. *Handbook of Agricultural Extension*). The experiential approach is based on the idea that the trainer incorporates experiences where the learner becomes active and influences the training process. Unlike the traditional academic approach, experiential training emphasizes real or simulated situations in which the trainees will eventually operate. In this model, the objectives and other elements of training are jointly determined by the trainers and trainees. Trainers primarily serve as facilitators, catalysts, or resource persons (ibid.)

client-satisfaction analysis, etc. The reporting of project achievements in terms of impact and benefits will also be constructed on a gender-disaggregated basis.

141. **Action 4.4: Review of the Action Plan at Mid-Term.** This gender action plan has been designed in a way compatible with a demand-driven approach to development intervention, and is considered adequate to mainstream gender issues in project activities. However, a fairly detailed assessment of project impact on gender is recommended for inclusion in the project mid-term review. This will be based on the gender disaggregated data provided by the M&E system. The evaluation will focus on the capacity of AST activities to address gender issues and the overall performance of the gender action plan. The findings of the analysis will be utilized for reviewing the plan and to identify new corrective actions where needed.

#### IV. INDIGENOUS PEOPLES ACTION PLAN

##### A. Introduction

142. This Indigenous Peoples Action Plan (IPAP) aims at identifying the rationale and actions required for directing AST project activities towards the benefits of ethnic minorities. The design of the AST project started from the consideration that growth alone is not sufficient to significantly reduce poverty. The project design therefore includes a strong pro-poor focus, which will assist in ensuring that farmers of ethnic minority groups can benefit from project activities.

##### B. Risk of Exclusion

143. Development of IPAP is based on the findings of the social assessment conducted during project formulation. By considering the characteristics of the project, the IPAP is based on the concern that social exclusion may prevent indigenous people from benefiting from the project activities and therefore perpetuate their status of poverty and vulnerability. Social exclusion is the process through which social groups are wholly or partially excluded from full participation in society (i.e. economic, cultural and/or social life). The Vietnamese Constitution grants all the citizens equal rights and obligations, and the Government has actively sought to include ethnic minorities, the poor, and the people of different social and religious backgrounds, in the development process. However, despite these efforts, economic and social gaps are widening and ethnic minority groups are partly excluded from the process of economic growth. With respect to the provision of extension services, the risk of exclusion of indigenous population can be seen as the outcome of physical, social, economic and institutional constraints as follows:

- **Physical Constraints.** Ethnic minorities live in remote areas physically disconnected from the rest of the economy. The Rapid Rural Appraisal (RRA) conducted during the PPTA have demonstrated that the lack of infrastructure and transportation facilities constitute a crucial barrier for extension service providers to reach indigenous people. This is especially true when physical constraints are combined with resource constraints.
- **Social and Cultural Constraints.** Ethnic minority people participating in training programs often have passive behavior, which prevents an effective transfer of knowledge and information. At the same time, the use of the Vietnamese language in training creates obstacles in communication and understanding because many ethnic minority people do not speak Vietnamese.

- **Economic and Production Constraints.** Livelihood of indigenous people tends to differ substantially from the one that characterizes lowland households from the Kinh majority. Differences relate to cropping patterns and priorities, access to inputs, availability of infrastructure and farming technology. Such differences may hamper ethnic minorities in benefiting from extension services, which are often more suitable for lowland farming than upland farming systems.
- **Resource Constraints.** RRA found that some indigenous farmers have never seen any extension staff or workers, or received any training. One of the reasons is that the number of extension personnel at provincial and district levels is very limited and, in many cases, there are no extension workers at the commune level. In addition, farmers felt that the people working in the extension center seldom possess adequate communication and training skills.
- **Institutional Constraints.** Extension models are often identified through a top-down approach. By doing so, they do not fully address the needs of local ethnic minorities. The RRA also reported that in many cases, extension services are only limited to the provision of notional information. In contrast, poor people (especially from indigenous groups) need more practical assistance, in-field models and systematic follow-up activities.

### C. Poverty Reduction Strategy for Ethnic Minorities

144. The review of the debate on the ethnic dimension of household poverty in Viet Nam has pointed out a very important policy implication. In order to close the gap between minority and majority living standards, in respect of all the ethnic identities, it should be considered that livelihoods of minority households are sometimes different from those of the majority. Therefore, anti-poverty programs that are geared to minority groups will in general have to look differently from those geared to the majority.

145. This will presumably require a considerable amount of inputs from minority groups themselves and from those who have a thorough knowledge of ethnic minority societies. On the basis of the constraints and the risk of social exclusion discussed above, the proposed AST Project has been designed following four inter-related approaches to poverty reduction. These are consistent with the Poverty Reduction Partnership Agreement between Viet Nam and ADB: inclusive social development, improved governance, sustainable development and regional development.

- **Inclusive Social Development.** The investment in research and extension services will have special measures to address the needs of ethnic minority groups in Viet Nam. Inclusion of the ethnic minority groups will be secured by these measures, which have been formulated through a series of consultative processes.
- **Improved Governance.** The proposed investments in research and extension have a strong element of improved grassroots participation in agriculture science and technology. In particular, the extension component reflects the concept of decentralization of service delivery and decision making. A decentralized system increases the likelihood that research and extension will be conducted on topics that are relevant to the needs of client farmers.
- **Sustainable Development.** The investment and the activities promoted by the proposed AST Project will be in conformity with the environmental characteristics of the site and will pay special attention to the risk of environmental degradation

associated with a non-appropriate use of pesticides, fertilizers and other agrochemicals inputs.

- **Regional Development.** The AST Project has a strong geographical focus on the relatively impoverished central region, and upland and remote areas. The five project provinces have been selected among those provinces, which presented the highest poverty incidence associated with the presence of ethnic minorities.

#### **D. Actions for Enhancing Involvement of Indigenous Population**

##### **Component 1: Client-oriented agricultural research and capacity strengthening**

146. **Rationale 1.1: Reduction of indigenous household vulnerability.** The interventions listed under this component aim at producing a positive impact on household resilience to crop losses (through support for improved crop production and biotechnology research), livestock diseases (through support to veterinary and epidemiological research), market risk (through improved post-harvest handling and dissemination of market information). It contributes to reduction in the vulnerability of poor and indigenous farmers.

147. **Action 1.2: Human capacity strengthening for scholars of ethnic origins – Screening.** The AST Project includes special interventions aimed at strengthening technical and practical skills in agricultural research. Provision of higher priority for the applications from scholars of ethnic minority groups may be considered when other curriculum, qualification and motivation conditions are fulfilled. The provincial project management unit (PPMU) may disseminate all the information regarding training opportunities particularly among organizations of indigenous people and scholars of ethnic origins. These measures can be considered during project implementation.

148. **Action 1.3: Development of technologies suitable for poor population – Screening.** Under the research funding schemes, special emphasis may be given to technologies appropriate for the poor and ethnic minority households in the selection criteria for research programs. The AST research component will also enhance cooperation between farmers, extension, applied and adaptive research, and policy making.

##### **Component 2: Grassroots agricultural extension improvement**

149. **Action 2.1: Farmers' needs assessment.** In compliance with a bottom-up approach to the development intervention, elaboration of the provincial plan will extensively rely on an in-depth needs assessment exercise, which will be conducted during the first year. The exercise will be conducted at the provincial level in order to take into consideration the social and environmental differences within the country. The exercise will serve as inputs for selecting appropriate contents and methods in the delivery of extension services. Special measures will be considered to address technical, economic, social and environmental characteristics of the indigenous farming system.

150. **Action 2.2: Special section for ethnic minorities in the provincial plan.** The provincial plans will include a special section, which exclusively focuses on extension interventions for ethnic minorities. This section will focus on targets, objectives, methodologies, contents and schedule of extension activities. Special care will be given to identifying contents of extension, which are technically and economically feasible, socially acceptable, and environmentally sustainable. The extension plan for ethnic minority should specify if the training is conducted in the local language or, alternatively, if a local person is needed as a facilitator. In

addition, on-the-job or experimental training approach may be introduced in compliance with the social and cultural characteristics of beneficiaries.

151. **Action 2.3: Awareness and information dissemination.** The Project will establish a system of dissemination aimed at ensuring that ongoing and planned activities are broadly known to the general public. Special care will be given to target awareness campaigns to communes characterized by a high presence of indigenous peoples. Grassroots and nongovernment organizations already operating with indigenous people (where available) need to be actively involved in the design and implementation of awareness campaigns.

152. **Action 2.4: Adoption of indigenous local languages.** In the provincial plan, a section dedicated to ethnic minorities and special care will be given to the identification of trainers to be involved in the provision of extension services to ethnic minorities. These should have knowledge of indigenous idioms. Alternatively, the extension center may identify consultants, who will facilitate the conduction of in-field demonstration in local languages. The expansion of delivery of local services in the main minority languages is regarded by the Poverty Task Force as one of the indicators for the ethnic minority development.

153. **Action 2.5: Strengthening of capacity to implement on-the-job or experimental training.** The RRA conducted during the PPTA showed that agricultural extension services often did not provide benefits to poor and indigenous farmers since the training was too theoretical and did not provide practical information. Under this action, capacity of extension service providers in conducting on-the-job or experimental training will be enhanced.

### **Component 3: Rural-based technical and vocational training**

154. **Action 3.1: Inclusion of ethnicity issues in development of agricultural curriculum guides.** Revision of agricultural curricula at the secondary technical and vocational level will include a special focus on ethnic issues. By doing so, a better understanding of the social and agro-ecological heterogeneity of the country will be developed in rural-based training.

155. **Action 3.2: Materials on indigenous people.** Investment in laboratory, library, and teaching facilities will include a special section on indigenous knowledge and agricultural activities. In compliance with the training objectives of the institutions, special laboratories will be organized for learning of minority languages and culture.

### **Component 4: Project management support**

156. **Action 4.1: Creation of a social development officer position in the CPMU.** A social development officer position will be included in the CPMU. In general, the officer is responsible for the monitoring of project performance with respect to its impact on ethnic minority population. In the first year, the officer will supervise the execution of the needs assessment exercise. (S)He will identify indigenous farmers, who will be included in the AST activities of the Project. (S)He will support the development of provincial plans for extension by ensuring inclusion of specific extension interventions for indigenous population. In the course of project implementation, the officer will monitor the schedule of all the AST activities and their compliance with the Country Poverty Reduction Strategy. (S)He will also promote the participation of ethnic minority population in the overall AST activities.

157. **Action 4.2: Adoption of an ethnic disaggregated scoring system for evaluation of proposals.** In the selection of research and extension proposals, the Project may adopt a

scoring system, which will give higher priority to the proposals to address the issues of ethnic minorities. This might be the case of contract-based extension proposals coming from communities characterized by high presence of ethnic minorities, or research proposals that explicitly identify actions, which will have a direct or indirect positive impact on indigenous people.

158. **Action 4.3: Ethnic disaggregated M&E system.** The Project may adopt an ethnic-sensitive approach to monitoring and evaluation, which consists of the identification of ethnic-disaggregated indicators and targets for monitoring and evaluation of project activities. This will be supported by a data-gathering system based on participatory techniques, client-satisfaction analysis, etc. The reporting of Project achievements in terms of impact and benefits will also be constructed on an ethnic-disaggregated basis.

## **V. GUIDELINES FOR THE PREPARATION OF THE PROVINCIAL PLAN**

### **A. Socially Oriented Interventions**

#### **1. Background**

159. One of the objectives of AST Project is to improve access of farmers to competent grassroots extension services and to increase the impact of extension services through more client-oriented planning and implementation. For this purpose, the proposed AST Project includes (i) the development of training of trainers (TOT) teams in the project provinces; (ii) adoption of participatory, farmer-centered methods in extension services with an approach to best fit the local environment; (iii) promotion of alternative extension resources, such as nongovernment organizations, private enterprises, cooperatives, and mass organizations, including the provision of fee-based extension services.

160. At project inception, a provincial plan for agricultural extension services will be developed in each of the five project provinces through a series of stakeholder consultations. The plan needs to outline all the activities that will be implemented by the AST Project at the provincial level. In particular, it will establish all the training interventions required for improving the capacity of grassroots extension providers to disseminate technologies, farming and management practices, market information, etc. For each planned intervention, the plan will identify the target beneficiary groups, the schedule, the expected results as well as the final impact evaluation indicators.

161. The plan will contain a special section in which the socially oriented interventions will be identified. This section will be elaborated by the social development officer operating in the CPMU with assistance of loan implementation consultants. The plan is developed at the provincial level in order to take into account the country's agro-ecological and social heterogeneity.

#### **2. Objectives**

162. The overall objective of the provincial plan is to set up in a coherent and rational way all the socially oriented activities at the provincial level that will be implemented under the AST Project. Socially oriented interventions are those activities likely to have a positive and focused impact on women, ethnic minorities, and the poor.

### 3. Specific Contents

- (i) Summary of key findings from the farmers' needs assessment and service providers' training needs assessment and their implications for the socially oriented AST activities. These assessments will be conducted at the beginning of the first year in each province covered under the extension component of the AST Project. The CPMU social development officer will ensure that poor communities, women and ethnic minority groups will be included in the survey. The plan for socially oriented interventions will summarize the main findings of the survey and points out a set of extension priorities, which should be regarded as relevant and suitable for poor people, women, and ethnic minority groups.
- (ii) Identification of extension service providers at the grassroots and district levels to be involved in AST capacity strengthening activities. The proposed AST Project includes training programs for service providers in each of the five project provinces. It is expected that approximately 6,000 service providers, including 500 provincial and district staff in the project provinces will participate in this training. The socially oriented interventions included in the provincial plans will identify the extension providers operating in the province whose activities are considered as important for poorest population strata. Classification will be based on the location, and ethnic and gender characteristics. Adoption of gender and ethnic-sensitive procedures for evaluation of the application promotes the participation of socially-oriented service providers. Also, the awareness campaign to be held at the provincial level will provide incentives for pro-poor allocation of training activities.
- (iii) Development of training agenda and training materials with relevant implications for the poor, women, and ethnic minority groups. The findings of the service providers' training assessment will constitute the main input for developing the training agenda of TOT, the service providers participatory extension methodology training, and service provider smallholder/farmer group business management training. Among the various training topics, the provincial plan will carefully detect those training topics, which have specific relevance for poor farmers and indigenous people. The identification of socially oriented training topics include farming practices, technologies, market issues, livelihoods analysis, indigenous languages, participatory and experimental training methodologies, on-the-job training methods, etc.
- (iv) Identification of a group of socially oriented interventions among the provincial extension priorities. The RRAs conducted during the PPTA pointed out that in the current situation, extension emphasis has been directed towards commercial or semi-commercial farmers, including those who specialize in production for export and cash income. This is because the adoption of new technologies requires significant cash investment and exposure to risk and therefore is out of the reach of poor farmers. The section of the provincial plan for agricultural extension dedicated to the provincial extension priorities will identify a group of socially oriented interventions whose target is the poorest population strata and, in particular, indigenous people. The intervention listed under this module should be considered as economic, technical, social, and environmentally suitable.
- (v) Identification of agricultural research topics relevant for ethnic minorities and poorest population strata. The analysis of farming practices and agricultural activities at the provincial level will help detect a set of research programs, which are considered as relevant with respect to the farming practices and agricultural activities of the poorest population strata, in particular indigenous people. The

involvement of the provincial extension center in the identification of these research topics is strongly recommended. The provincial plan will also formalize a schedule of contacts between the research institutions involved in the plan and the provincial extension center in order to guarantee an ongoing exchange of information and feedback on the appropriateness of research programs.

- (vi) Design of awareness and information dissemination campaigns to be held to ensure participation of women, ethnic minorities, and farmer groups from poorest villages in AST contract-based extension projects. The provincial plan will specify the information dissemination and awareness campaigns needed for guaranteeing that the AST activities will have a positive impact on poorest population strata. The plan will specify the resources, the main stakeholders involved, the location, and the schedule of such activities.
- (vii) Monitoring and evaluation (M&E) of extension impact. Current extension M&E is limited to monitoring expenditures on demonstration models and farmer training programs. There is little evaluation of impact of extension activities other than general assumptions that extension contributes to the growth in agricultural production in Viet Nam. For this reason, the plan will specify the activities, to be implemented at the provincial level, which will serve as inputs for the AST M&E system. At the same time, it is necessary that impact monitoring methodologies will be introduced in the normal function of extension service providers. The plan will therefore identify a set of activities to be implemented in the course of the project years aimed at mainstreaming impact monitoring methodologies among the grassroots extension service providers. This may include: a pilot impact evaluation of extension activities, the organization of workshops, training courses on impact monitoring methodologies, etc.

## VI.      TERMS OF REFERENCE

### **Social Development Officer (Location: CPMU)**

163. **Experience and Qualifications:** Higher degree in social sciences, preferably economics, sociology, or anthropology; at least 5 years working in the field of social development in relevant donor projects; experiences in working in rural provinces of Viet Nam in particular in ethnic minority areas and in working with participatory approaches.

164. **Duties and Responsibilities:** The CPMU social development officer is responsible for ensuring that the activities implemented under the AST Project will constantly encompass a social focus, which mainly relates to the improvement of living standards of women and ethnic minority farmers. In particular, the main duties of the social development officer include:

- (i) Ensure design and implementation of research, extension and rural-based training activities are participatory and inclusive, including farmers of all categories (all strata, ethnic groups and women). Ensure local and indigenous knowledge is included in all research, extension and rural-based training activities and that local and indigenous knowledge is surveyed and analyzed.
- (ii) Coordinate the implementation of the farmers' needs assessment and service providers' training assessment, in particular with respect to the inclusion of the poor, women and ethnic minority people in the survey.
- (iii) Supervise the analysis of the farmers' needs assessment in each province and control the detection of the socially oriented interventions, which should be

- regarded as relevant and suitable for the poor, women, and ethnic minority groups.
- (iv) Supervise the analysis of the service providers' training assessment in each province and the identification of gaps in knowledge, functioning, practices, and techniques of extension providers, which impede a pro-poor delivery of extension services.
  - (v) Facilitate the cooperation among provincial extension center, PPMU, and agricultural research institutes with respect to a group of research programs regarded as socially-sensitive.
  - (vi) Coordinate the execution of the socially oriented awareness campaigns. This includes: identification of the methods for disseminating information, detection of stakeholders to be involved in the campaigns, collection of relevant information for succeeding campaigns relating to constraints, information dissemination methodologies, etc.
  - (vii) Facilitate the linkages between the farmers of all categories and the research, extension and rural-based training system, allowing farmers to have an influence on the system based on their perspectives, needs, and priorities and to contribute with their knowledge and experiences.
  - (viii) Facilitate and coordinate the exchange of information and collaboration among the social development officers operating at the provincial level;
  - (ix) Evaluate the performance of each provincial plan with respect to their capacity to involve poorest population strata. Producing a special section of the Project progress reports in which the activities, outcome and impact of the socially oriented interventions of the AST Project are presented. On the basis of the information gathered, identify the measures needed by poorest beneficiaries to absorb new knowledge and be able to apply it in a sustainable way.

165. Level of effort: Full Time during all the Project Years.

## SUMMARY INITIAL ENVIRONMENTAL EXAMINATION

### A. Introduction

1. The purpose of this supplementary appendix is to present the summary of the initial environmental examination (IEE) of the proposed Agriculture Science and Technology (AST) Project. Environmental implications are based on the review of Project documents, the Asian Development Bank and the Government of Viet Nam environmental assessment policies and guidelines, comparison with precedents set by agriculture loans in other Asian countries, consultation with farmers, and personal meetings with staff of the Viet Nam Bank for Agricultural and Rural Development; (VBARD), the Ministry of Agriculture and Rural Development (MARD), and the Ministry of Natural Resources and Environment (MONRE). The assessment presents potential environmental impacts (both positive and negative), mitigation measures for potential negative impacts, and when appropriate, proposals for measures to further enhance positive Project impacts.

### B. Description of the Project

2. **Project Cost and Operation Period:** The Project cost is \$40 million. It will be partially financed through a \$30 million loan from the Asian Development Fund. The remaining \$10 million will come from the Government. The implementation period of the AST Project is five years from 2007 to 2011.

3. **Project Components:** The Project will have three components: (i) client-oriented agricultural research and capacity strengthening, (ii) grassroots agricultural extension improvement, and (iii) rural-based technical and vocational training.

- (i) **Client-oriented Agricultural Research and Capacity Strengthening** (hereafter known as the research component) consists of three sub-components: (a) client-oriented research programs; (b) training of agricultural research staff; and (c) upgrading of research and laboratory equipment of selected agricultural research institutes.
- (ii) **Grassroots Agricultural Extension Improvement** (hereafter known as the extension component) consists of two sub-components: (a) strengthening of pro-poor provincial agricultural extension services; and (b) promotion of contractual agricultural extension services.
- (iii) **Rural-based Technical and Vocational Training** (hereafter known as the training component) consists of two sub-components: (a) improvement of technical and managerial skills of teaching and administrative staff; and (b) upgrading of equipment and facilities for teaching and learning purposes.

### C. Description of the Environment

4. This section provides information on the physical and socioeconomic environmental characteristics of the five project provinces that will receive support from the Project: Thanh Hoa, Nghe An, Quang Nam, Ninh Thuan, and Dak Nong. The discussion also identifies trends in environmental conditions in these five provinces where relevant, with a particular emphasis on issues related to agricultural activities and production.

## 1. Physical and Ecological Environment

5. All five provinces have a typical monsoonal climate with a wet season between May and October and a dry season between November and April. The provinces are subject to varying degrees of natural disaster risks. Of particular note, there is a high risk of typhoons in Thanh Hoa, Nghe An, and Ninh Thuan provinces.

6. Data collected in the study area found that air quality is generally good and within relevant Tiêu Chuẩn Việt Nam (TCVN—national standards of Viet Nam) criteria for total suspended particulate, NO<sub>x</sub>, SO<sub>x</sub>, CO, and other pollutants. The most likely parameters to exceed TCVN standards are total suspended particulate and noise—especially in urban areas and areas near major roadways.

7. In Thanh Hoa and Nghe An provinces, there is low erosion susceptibility near the coast, with larger areas of high erosion susceptibility in the western, mountainous parts of the provinces. Throughout the remaining provinces, erosion susceptibility is generally medium to low with localized areas of high erosion susceptibility in Dak Nong province.

8. The five provinces are located wholly or partially in four major river basins: Ma-Chu River (Thanh Hoa province); Ca River (Nghe An province); Thu Bon River (Quang Nam province); and Sre Pok River (Dak Nong Province). They are subject to droughts and there is often low water availability during the dry season, when demand for irrigation and domestic use is highest. Low irrigation efficiency means that water distribution losses are high, resulting in increased pressure on scarce water resources during periods of high demand.

9. Surface water quality is generally considered to be within TCVN criteria for total suspended solids, dissolved oxygen, pH, biological oxygen demand, and other simple biochemical parameters. The poorest surface and ground water quality tends to be near urban centers and coastal areas—the latter being due to a combination of salinity intrusion, coastal development, and upstream pollution.

10. The five provinces all contain areas identified as key biodiversity areas and/or conservation corridors. A number of terrestrial ecoregions are represented in the provinces and there are 25 gazetted or proposed protected areas present in the five project provinces. Collectively, the five provinces contain representatives of a number of globally and/or nationally threatened mammal, primate and bird species.

## 2. Socioeconomic Conditions

11. The land area of the five provinces ranges from the smallest province, Ninh Thuan with an area of 3,400 km<sup>2</sup> to the largest province, Nghe An, with an area of 16,500 km<sup>2</sup>. Forest cover (natural and plantation) is the main land use in all five provinces. The proportion of land covered by forests in all of the provinces is above the national average. Agricultural land use is the second most predominant land use type and ranges from a maximum of 22% in Thanh Hoa province to a minimum of 10% in Quang Nam Province. Despite increases in the area of agricultural land in all provinces in the last 5 years, pressures on agricultural land use are increasing. Most of the easily developable land has already been utilized and there is ongoing pressure for conversion of agricultural land to urban and industrial development, particularly in areas of high population density.

12. The total population across five provinces is 8,971,000 persons (2002), ranging from the smallest population in Dak Nong province of 388,000 persons to the largest in Thanh Hoa province with 3,637,000 persons. The average population density across the five provinces is 187 persons/km<sup>2</sup> (8,971,000 persons/47,915 km<sup>2</sup>) ranging from a minimum of 60 persons/km<sup>2</sup> in Dak Nong province to a maximum of 328 persons/km<sup>2</sup> in Thanh Hoa province. In all five provinces, the majority of the population is rural. The poverty rate in the rural area across the five provinces ranges from 46% in Quang Nam to 63% in Ninh Thuan provinces.

13. There are 18 ethnic groups found in the five provinces. The distribution of these groups across the five provinces is as follows:

- (i) Thanh Hoa Province: Kinh, Muong, Thai, H'Mong and Tho
- (ii) Nghe An Province: Kinh, Kho Mu, Tho, Thai, H'Mong
- (iii) Quang Nam Province: Kinh, Co Tu, Xo Dang, M'Nong, Co (Cor)
- (iv) Ninh Thuan Province: Kinh, Cham, Rai Gia, Co Ho, Hoa
- (v) Dak Nong Province: Kinh, E De, Nung, M'Nong, Tay

14. Access to electricity throughout four of the five provinces is high (90% in Quang Nam to 98% in Ninh Thuan), except in Dak Nong (69%). Based on the 1999 data, access to safe water supply varies between provinces from 58% in Ninh Thuan province to 88% in Thanh Hoa and Nghe An provinces. Similarly, based on 1999 data, access to sanitation varies from 34% in Ninh Thuan province to 82% in Thanh Hoa province.

15. Agriculture is an important contributor to the provincial economy across the five provinces. The percentage of provincial production derived from agricultural activities ranges from 76% in Dak Nong<sup>1</sup> to 40% in Thanh Hoa. Household incomes also rely strongly on agriculture. In 2002, the average proportion of household incomes derived from agriculture, forestry or fishery activities ranged from 55% in Dak Nong<sup>2</sup> to 33% in Quang Nam.

## **D. Screening of Potential Environmental Impacts and Mitigation Measures**

16. The Project was screened for environmental impacts using: (i) matrices developed in consultation with stakeholders, and (ii) impact significance criteria consistent with ADB's Environmental Impact Assessment Guidelines (2003). The screening revealed that potential environmental impact of project activities are generally minor, and that the project scope to support the strengthening of the national AST system would have mainly indirect positive impact on agricultural production.

### **1. Environmental Impacts Associated with Civil Works**

17. Under the research and training components, there will be minor upgrading and new construction at research institutes, and technical and vocational training schools. A likely scope of upgrading and new construction work covers small-scale civil works in the amount of \$20,000–\$30,000 per contract at a research institute (a greenhouse and a pilot tea plantation), and those in the amount of \$200,000–\$300,000 per contract for each school for libraries, classrooms and laboratories. The total amount of civil works for the whole Project is about \$1.6 million excluding contingencies. Related civil works will be done on the existing compounds and will not require land acquisition and resettlement.

<sup>1</sup> Based on 1999 data for Dak Lak province before the creation of Dak Nong province.

<sup>2</sup> Based on 1999 data for Dak Lak province before the creation of Dak Nong province.

18. The small-scale civil works may cause potential negative impacts such as noise, dust, and demolition wastes. Those negative impacts are likely to be minor and short-term, and can be mitigated with the proposed mitigation measures including restricted hours for work and transportation of materials and appropriate waste disposal and management. Old insulation materials and pipes may contain asbestos and lead, and on-site environmental management plan for the civil works will be developed as part of the overall project management to ensure appropriate disposal of hazardous wastes. A chemical management at the laboratories of the selected ten technical and vocational training schools will also be strengthened through developing and implementing the laboratory management manuals to improve the laboratory operation. During the design phase, any environmental work will be done prior to civil works in order to obtain certification from provincial department of natural resources and environment (DONRE), if necessary, and comply with the relevant regulations.

## **2. Environmental Impacts Associated with Procurement**

19. All components have the procurement of equipment and materials. The research component will procure essential laboratory equipment of the selected agricultural research institutes of MARD in the areas of crop production, livestock, post-harvest technology, natural resources management, and agricultural policy planning. The extension component will procure office and training equipment. The training component will procure laboratory and office equipment, books, and furniture. New equipment and materials are mainly for improved performances at research laboratories and in the field. Improved operation of research laboratory activities and extension services are unlikely to cause adverse environmental impacts.

20. Environmental criteria will be included as part of the procurement criteria to ensure that (i) procured goods are not listed in the prohibited items in the national laws and regulations, and do not include luxurious, military or extremely hazardous items not related to the project activities; and (ii) energy conservation, and reuse and recycling considerations for new office equipment will be taken into account as appropriate.

## **3. Environmental Enhancement Measures**

21. The environmental screening did not find any significant negative impacts generated from the proposed project activities. There are numerous opportunities to introduce environment enhancement measures at the project activity level. Minor or insignificant positive impacts can be expected when increased attention on environmental issues is given to the research, extension and training programs. For the research component, minor positive environmental impacts are expected with inclusion of environmental considerations in research grant allocation and post graduate training. For the extension component, integrating environmental considerations in training for extension staff, farmers and service providers could contribute to improved understanding of sustainable agricultural practices. Increased attention to environmental issues in the curriculum development for technical and vocational training schools could promote improved knowledge on the linkages between agriculture and environment, and facilitate application of gained skills in the agriculture sector. A scope of environmental enhancement measures will be determined during the detailed design.

## **E. Institutional Requirement and Environmental Monitoring Plan (EMP)**

22. MARD will be the executing agency (EA) for the Project and responsible for overall project implementation. MARD established a central project management unit (CPMU) in the

Agricultural Projects Management Board (APMB), and appointed a project director to head the CPMU before loan negotiations. CPMU will oversee overall project implementation and coordination within MARD and with other government institutions such as MONRE. A provincial project management unit (PPMU) will be established under the provincial department of agriculture and rural development in each of the five project provinces and will be responsible for overall management and supervision of the project activities related to agricultural extension in the province. The Government will also establish an inter-ministerial project steering committee (PSC) for the central-level coordination within the Government. Table F1 describes the overall environmental responsibilities.

**Table F1: Institutional Responsibilities for the Environmental Monitoring Plan**

<b>Institutions</b>	<b>Responsibility</b>
PSC	An interministerial project steering committee, including MONRE, to facilitate interministerial coordination and provide overall policy guidance for project implementation
MARD (EA)	Overall supervision of project including EMP
CPMU	CPMU Head, aided by international consultants, is responsible for (i) obtaining any necessary environmental certification from MONRE; (ii) supervision of EMPs, coordination with MONRE, and reporting to PSC
PPMU	PPMU, aided by international and domestic consultants, is responsible for implementation of EMP at the provincial level and reporting to CPMU Head on the progress
MONRE	Advisory role to provide overall guidance for project implementation with regard to environmental issues
DONRE	Oversee and issue environmental certificate for upgrading work of ten technical and vocational training schools, if necessary, and provide guidance on the local EMPs

23. The implementation of EMP will be a key responsibility of the CPMU Environment Officer. The EMP will focus on: (i) procurement of civil works, equipment and materials; and (ii) implementation of environmental enhancement measures. In each area, international (2 person-months) and domestic (11 person-months) environmental consultants will assist CPMU and PPMUs to develop site-specific EMP and monitor the progress of EMP on a regular basis. The total cost for implementing the EMP for the Project is tentatively estimated at about \$140,000, including expenses for (i) environmental assessment works for classrooms, school laboratories and libraries (\$20,000); (ii) required staff and consultants (\$110,000); and (iii) miscellaneous costs for equipment and field trips (\$10,000). The cost of implementing EMP represents about 0.4% of the total Project cost, and mainly consists of expenditures for human resources to implement the EMP.

## **F. Public Consultation and Information Disclosure**

24. Extensive consultation was conducted for the period of April 2004 through February 2005. During the first phase, the consultant team carried out the task of sector review, issue

identification and draft component design based a multi-stakeholder participatory approach. This involved an extensive series of consultative activities including key informant interviews, participatory rural appraisals, requests for comments, workshops, focus group meetings and surveys with more than 400 individuals, ranging from the ministerial level to grassroots stakeholders at the farm household level. This has involved working in 28 of Viet Nam's 64 provinces, covering all eight of the agro-ecological zones of the country and the selected project provinces.

25. In addition, a market information needs survey was carried out during project formulation in 8 agro-ecological zones in 9 provinces. This is the first of its type undertaken in Viet Nam. The objectives of the survey was to obtain information from farmers and traders on (i) the current sources of market information, (ii) preferred sources of information, (iii) importance of different information types, (iv) frequency of information needs, (v) willingness to pay for information, and (vi) content of user-pays information services.

26. Environment and natural resources management was an integral aspect of the project formulation exercise. During project implementation, close consultations particularly with farmers will need to continue in relation to the introduction of improved AST information and knowledge, and any concerns among farmers and other key stakeholders will be incorporated into the project activities for successful project implementation.

## **G. Conclusions**

27. The Project will contribute to sustainable and equitable growth of the agriculture sector and poverty reduction through strengthening of the national AST system. It will facilitate technology development and dissemination, and improve the quality of agriculture and agro-based products for domestic and export markets. The Project was formulated based on the investment needs of the relevant agricultural research institutes, organizations involved in agricultural extension, and technical and vocational training schools, and will complement the ongoing and planned activities of other external funding agencies and NGOs.

28. The environmental screening of the Project yielded (i) no significant negative impacts, (ii) some minor negative impacts that can be mitigated, (iii) some neutral impacts, (iv) some minor positive impacts that can be further enhanced, and (v) some potentially significant positive impacts. Recommendations to mitigate negative impacts, maximize positive impacts, and monitor the effectiveness of recommendations are found within the EMP. IEE concluded that no further preparatory environmental studies were required to complement the IEE.