



# Completion Report

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Project Number: 36304  
Loan Number: 2283  
September 2014

## Viet Nam: Agriculture Science and Technology Project

This document is being disclosed to the public in accordance with ADB's Public Communications Policy 2011.

**Asian Development Bank**

## CURRENCY EQUIVALENTS

Currency unit – dong (D)

		<b>At Appraisal</b> (5 October 2006)	<b>At Project Completion</b> (30 June 2013)
D1.00	=	\$0.0623	\$0.0476
\$1.00	=	D16,050	D21,028

## ABBREVIATIONS

ADB	–	Asian Development Bank
AST	–	agriculture science and technology
DMF	–	design and monitoring framework
DSTE	–	Department of Science, Technology and Environment
EIRR	–	economic internal rate of return
MARD	–	Ministry of Agriculture and Rural Development
PMU	–	project management unit
PSC	–	project steering committee
RRP	–	report and recommendation of the President
SDR	–	special drawing right
TA	–	technical assistance

## NOTES

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

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## BASIC DATA

### A. Loan Identification

1.	Country	Viet Nam
2.	Loan number	2283
3.	Project title	Agriculture Science and Technology Project
4.	Borrower	Socialist Republic of Viet Nam
5.	Executing agency	Ministry of Agriculture and Rural Development
6.	Amount of loan	SDR20,198,000
7.	Project completion report number	PCR: VIE 1479

### B. Loan Data

1.	Appraisal	
	– Date started	15 March 2006
	– Date completed	28 March 2006
2.	Loan negotiations	
	– Date started	6 November 2006
	– Date completed	8 November 2006
3.	Date of Board approval	11 December 2006
4.	Date of loan agreement	14 March 2007
5.	Date of loan effectiveness	
	– In loan agreement	12 June 2007
	– Actual	13 June 2007
	– Number of extensions	0
6.	Closing date	
	– In loan agreement	30 June 2012
	– Actual	13 August 2014
	– Number of extensions	1
7.	Terms of loan	
	– Interest rate	1% per annum during the grace period and 1.5% thereafter
	– Maturity (number of years)	32
	– Grace period (number of years)	8
8.	Terms of relending (if any)	None
9.	Disbursements	
a.	Dates	

Initial Disbursement	Final Disbursement	Time Interval
14 August 2007	1 June 2013	69.6
Effective Date	Original Closing Date	Time Interval
13 June 2007	30 June 2012	60.6

## b. Amount (in SDR)

Cat. No.	Category	Original Allocation <sup>1</sup>	Last Revised Allocation	Amount Cancelled <sup>2</sup>	Amount Disbursed
1	Civil works	809,000	700,000	(206,671)	906,671
2	Vehicles	5,123,000	8,500,000	331,748	8,168,252
3	Equipment	24,000	14,000	904	13,096
4	Materials	1,429,000	0	0	0
5	Training	4,276,000	4,100,000	141,298	3,958,702
6	Research, extension contracts	5,315,000	4,700,000	(590,037)	5,290,037
7	Consulting services	661,000	1,169,000	406,337	762,663
8	Incremental operating cost	446,000	600,000	63,570	536,430
9	Interest charge	415,000	415,000	0	415,000
10	Unallocated	1,700,000	0	0	0
<b>Total (SDR)</b>		<b>20,198,000</b>	<b>20,198,000</b>	<b>147,149</b>	<b>20,050,851</b>
<b>Total (\$) <sup>3</sup></b>		<b>30,000,000</b>	<b>31,098,548</b>	<b>225,606</b>	<b>30,872,942</b>

<sup>1</sup> Based on the Loan Financial Information System (Loan Ledger – Summary by Category) as of 11 December 2006.

<sup>2</sup> The only cancellation was for SDR147,149.38 (\$225,606.49 equivalent) on 4 August 2014.

<sup>3</sup> The exchange rate at approval was \$1 = SDR1.148526 and during project completion review is \$1 = SDR1.53968.  
( ) = negative

10. Local costs (financed) – 0%. ADB local cost financing is not applicable to this loan.

## C. Project Data

## 1. Project cost (\$'000)

Cost	Appraisal Estimate	Actual
Foreign exchange cost	30,000.00	30,872.94
Local currency cost	10,000.00	10,230.03
<b>Total</b>	<b>40,000.00</b>	<b>41,102.97</b>

## 2. Financing plan (\$'000)

Cost	Appraisal Estimate	Actual
Implementation costs		
Borrower financed	10,000.00	10,230.03
ADB financed	29,384.00	30,232.94
<b>Total</b>	<b>39,384.00</b>	<b>40,462.97</b>
IDC costs		
Borrower financed	00.00	00.00
ADB financed	616.00	640.00
<b>Total</b>	<b>40,000.00</b>	<b>41,102.97</b>

ADB = Asian Development Bank, IDC = interest during construction.

## 3. Cost breakdown by project component (\$'000)

Component	Appraisal Estimate	Actual <sup>a</sup>
1. Client-oriented agricultural research and capacity strengthening	15,740.00	18,530.47
2. Grassroots agricultural extension improvement	7,800.00	10,292.64
3. Rural-based technical and vocational training	9,040.00	8,024.53
4. Project management support	3,240.00	3,615.33
Contingencies	3,564.00	0.00
Interest during implementation	616.00	640.00
<b>Total</b>	<b>40,000.00</b>	<b>41,102.97</b>

<sup>a</sup> Actual costs are total costs including contingencies.

## 4. Project schedule

Item	Appraisal Estimate	Actual
Date of contract with consulting firm	2Q 2008	8 September 2008
Civil works contract <sup>a</sup>		
First procurement	1Q 2009	25 November 2009
Completion of work	4Q 2011	21 May 2010
Equipment and supplies <sup>b</sup>		
First procurement	1Q 2009	12 November 2009
Last procurement	2Q 2011	22 October 2012
Completion of equipment installation	4Q 2011	22 May 2013

Q = quarter.

<sup>a</sup> Fourteen small-scale civil works for the renovation of teaching facilities and laboratories were done under the project.

<sup>b</sup> Includes 133 contracts for research, laboratory, library, and office equipment of the research institutes and technical and vocational training schools.

## 5. Project performance report ratings

Implementation Period	Ratings	
	Development Objectives	Implementation Progress
From 31 December 2006 to 30 April 2010	Satisfactory	Satisfactory
From 1 May 2010 to 31 December 2010	Satisfactory	Satisfactory
From 1 January 2011 to 30 June 2013	Satisfactory	Satisfactory

**D. Data on Asian Development Bank Missions**

<b>Name of Mission</b>	<b>Date</b>	<b>No. of Persons</b>	<b>No. of Person-Days</b>	<b>Specialization of Members<sup>a</sup></b>
Inception	5–11 May 2007	2	10	a, b
Loan Review No. 1	25–28 Sep 2007	1	3	a
Loan Review No. 2	17–26 Mar 2008	2	12	a, c
Loan Review No. 3	20–27 Oct 2008	2	14	a, d
Loan Review No. 4	8–17 Mar 2009	2	18	a, b
Loan Review No. 5	1–8 Oct 2009	1	7	a
Loan Review No. 6	5–13 May 2010	3	24	a, e, f
Loan Review No. 7	15–23 Dec 2010	1	6	g
Loan Review No. 8	21–28 Apr 2011	1	7	g
Loan Review No. 9	1–8 Dec 2011	2	11	a, d
Loan Review No. 10	6–13 Apr 2012	1	7	a
Loan Review No. 11	28 Aug–7 Sep 2012	2	12	a, h
Loan Review No. 12	8–13 May 2013	2	11	a, h
Project completion review	15–26 Apr 2014	4	27	a, h, i, j

<sup>a</sup> a = senior agriculture economist, b = assistant project analyst, c = national officer, d = associate project analyst, e = financial due diligence specialist, f = associate operations analyst, g = natural resources and agriculture economist, h = project analyst, i = senior social development specialist, j = staff consultant.



## **I. PROJECT DESCRIPTION**

1. At the time of appraisal in 2006, the economy of Viet Nam was performing well. Gross domestic product per capita had grown by over 20% in the previous year (2005). Poverty incidence had declined to 23%, from almost 60% in the early 1990s.<sup>1</sup> However, poverty still remained a critical issue, particularly in upland and remote areas. In 2005, the agriculture sector accounted for 21% of gross domestic product after growing at an annual average rate of 4.1% over the preceding 10 years. The sector also accounted for around 30% of the value of exports and 60% of employment. The sector's growth was largely due to market-oriented reforms that recognized farm households as the key unit of production, liberalized land use rights, and increased investment in irrigation. Improvements to agriculture science and technology (AST) also played an important role, though their focus was more on increasing the quantity of production and less on quality and marketing. With globalization, trade in agricultural products was becoming diverse, and the technological base for agriculture was increasingly dependent on advanced AST to improve competitiveness. However, the AST system in Viet Nam was highly fragmented and characterized by duplication of effort and programs. In 2003, the Asian Development Bank (ADB) assisted the government in formulating a road map for AST aimed at (i) increased emphasis on client-oriented agricultural research and extension, (ii) coordination and partnership with key stakeholders in public and private sectors, and (iii) provision of comprehensive and quality services with increased focus on poor and disadvantaged farm households.<sup>2</sup> Realizing the goals of the road map would require capacity building through upgraded skills and capacity of human resources and improved equipment and facilities, and new management approaches and research and extension delivery systems, focusing on the needs of farmers and traders through client-oriented management of AST resources and institutions.

2. The Agriculture Science and Technology Project (footnote 1) was designed to strengthen the national AST system in Viet Nam. The project impact was sustainable and equitable agricultural growth, and the outcome a strengthened national AST system. The project aimed to address shortcomings in AST development, such as the low level of integration between key AST functions (agricultural research, extension, and training) and the limited capacity of physical and human resources within the national AST system. The project scope comprised (i) client-oriented agricultural research and capacity strengthening, (ii) grassroots agricultural extension improvement, and (iii) rural-based technical and vocational training. Activities related to extension were designed to cover mainly upland or remote areas in five provinces with a focus on the central region.

## **II. EVALUATION OF DESIGN AND IMPLEMENTATION**

### **A. Relevance of Design and Formulation**

3. At the time of project design in 2006, the government's National 10-Year Socioeconomic Development Strategy (2001–2010) sought to enhance the contribution of the agriculture sector to sustainable and equitable growth. The government realized that more effective AST was necessary for technological advancement to ensure food security, promote agricultural diversification, and improve the quality of high-value agriculture and agro-based products, which would ease Viet Nam's entry into highly competitive international markets. Given the government's focus on strengthening the contribution of AST to sector growth, the project design is considered highly relevant. The project was also consistent with ADB's policy on

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<sup>1</sup> ADB. 2006. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Socialist Republic of Viet Nam: Agriculture Science and Technology Project*. Manila.

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

agriculture and natural resources research<sup>3</sup> and the country strategy and program.<sup>4</sup> ADB policy aimed to contribute to (i) poverty reduction, (ii) sustainable management of agriculture and natural resources, and (iii) increased agricultural productivity. The country strategy and subsequent updates highlighted Viet Nam's need for rural development through improved agricultural productivity and diversification. The project's emphasis on stakeholder participation in research and extension design, enhancement of production technology, and support for upland and remote areas makes it particularly relevant to ADB agricultural policy and strategy in Viet Nam.

4. The project was formulated under project preparatory technical assistance (TA).<sup>5</sup> The TA was approved on 9 October 2003 with an original closing date of 31 October 2004. The consultants' final report was received on 21 March 2005. To accommodate additional inputs for institutional and social assessments, the TA was extended to 31 May 2006 and again to 31 March 2007. The design of the project at appraisal closely reflected the design proposed in the final report of the TA,<sup>6</sup> and both ADB and the Ministry of Agriculture and Rural Development (MARD), the executing agency, rated the TA satisfactory. But the many extensions led to an overall rating of partially satisfactory in the ADB TA performance report of 31 December 2007.

5. While the aim and overall scope of the project was consistent with government and ADB objectives for agriculture sector development, the project design was ambitious in its inclusion of five geographically dispersed provinces under the grassroots extension component, and nationwide coverage for 10 research institutes and 10 rural technical and vocational training schools under the research and training components. Since this was an innovative approach to research and extension delivery, a more focused effort in selected agroecological zones and fewer provinces would have been preferable. As such, the design posed a risk to effective project implementation and achievement of project outputs and outcome. Also, proposing such a limited amount of international consulting services to support the introduction of new research and extension systems, and new curriculum development, was inappropriate. While the amount of national consulting time was significant, transfer of international best practices was limited.

6. The project design and monitoring framework (DMF)—Appendix 1 of the report and recommendation of the President (RRP, footnote 1)—was not well formulated. It listed six outputs that did not directly reflect the project outputs stated in the main text of the RRP. Further, the performance targets and indicators proposed for these outputs were largely qualitative and their achievement therefore open to interpretation. In 2009, a baseline and monitoring system with a more detailed set of indicators was adopted to facilitate project monitoring. Outputs were amended to closely reflect both outputs and sub-outputs specified in the RRP main text. Targets and indicators were specified for the project outcome and made more relevant to individual sub-outputs with more clearly defined quantitative targets.

## **B. Project Outputs**

7. The following discussion is based on the DMF created for monitoring purposes.<sup>7</sup> Appendix 1 summarizes the achievements. The tables in Appendix 2 analyze the achievements by output.

<sup>3</sup> ADB. 1995. *The Bank's Policy on Agriculture and Natural Resources Research*. Manila.

<sup>4</sup> ADB. 2002. *Country Strategy and Program, 2002–2004: Viet Nam*. Manila.

<sup>5</sup> ADB. 2003. *Technical Assistance to the Socialist Republic of Viet Nam for Preparing the Agriculture Science and Technology Project*. Manila. Approved on 9 October 2003 for \$900,000. The amount disbursed was \$837,884.

<sup>6</sup> ADB. 2006. *Viet Nam: Agriculture Science and Technology (Financed by the Japan Special Fund)*. Manila.

<sup>7</sup> Figures presented are derived from the databases and/or progress reports of the central and provincial project management units (PMUs); and national, provincial, and district statistical departments.

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

8. **Client-oriented research programs.** These were designed to promote knowledge, information, and technologies relevant to the agroecological zones serviced by regional research institutes, according to selection criteria to reflect client needs, strategic relevance, and sustainability. Bidding to undertake the research programs was to be open to both public sector institutes and private sector organizations. This yielded 550 research proposals, from which 125 programs were selected. Given the innovative nature of identifying research proposals at the field level through extension service providers and farmers, it was inevitable that initial proposals followed a more traditional approach to research program design. The ADB review mission of March 2009<sup>8</sup> found the initial batch of 58 research programs to be overly focused on productivity increases and intensification rather than being (i) oriented toward market links for the poor, food safety, and environmentally sensitive production systems; and (ii) capable of producing short-term results at low cost that could be readily extended to farmers. This was taken into account in the design of a second batch of 67 programs funded by the project.

9. All 125 programs were fully completed under the project through 42 separate organizations, comprising 26 research institutes and 16 other agencies (e.g., schools, extension stations, farmer's unions). The breakdown of contracts by institute is in Appendix 2. Women researchers managed 50 programs (40%). Of the 125 research programs, 74% related to mountainous and remote areas, 52% included climate change adaptation and mitigation,<sup>9</sup> and 65% addressed poverty reduction and food security. Seventy-nine programs were applicable for extension to farmers, of which 70 were developed into farmer-managed on-farm trials and demonstrations for further extension. Research programs covered the introduction of 198 new crop and livestock varieties, 244 new production practices or processes, and 292 trials or demonstrations. It is estimated that productivity gains resulting from these activities are in the range of 10% to 55%. Of 6,540 farm households that participated in project research activities, 3,164 (48%) were managed by women and 2,432 (37%) were ethnic minority households. Of 875 research staff engaged in the programs, 40% were women. The 125 research programs cost D92,190.00 million (\$4.39 million),<sup>10</sup> averaging D737.50 million (\$35,120) per program. The highest individual program cost was D1.35 billion (around \$76,000 at the average rate of exchange in 2009, when the contracts were awarded). This is well below the ceiling of \$100,000 specified in the RRP. The value of contracts aimed at upland or remote communities accounted for 76% of the total value, which significantly exceeds the target of 40% specified in the DMF (output 2). Given these results, which indicate the scale, diversity, and outreach of project research activities, the project's aim to make agricultural research activities more responsive to client needs (DMF output 2) and support diversification and equitable sector growth consistent with government policy (para. 3) was fully achieved.

10. **Training of research staff.** It was proposed to overcome the shortage of qualified research staff by providing on-the-job training and postgraduate study programs for staff of agricultural research institutes and other institutions related to the AST system. By the end of the project, nine PhD, 34 master's degree, and four postdoctoral students had completed their courses, one master's degree and seven PhD students were continuing their courses, and two PhD students had withdrawn. Women candidates accounted for 23% of participants in overseas study programs. Of the students who undertook overseas studies, all have returned to

<sup>8</sup> Aide-mémoire of ADB loan review mission, 9–17 March 2009.

<sup>9</sup> Climate change adaptation and mitigation was not one of the research areas foreseen at appraisal. It was incorporated after MARD adopted a climate change adaptation and mitigation action plan in 2009.

<sup>10</sup> The central PMU's database records contract values in dong only. Conversions to US dollars are made at the exchange rate prevailing at the time of project completion review, except where specifically stated. Dollar values are therefore indicative.

government service though not necessarily in their original institutes. Besides assisting formal academic studies abroad, the project supported overseas study tours and short-term training courses.<sup>11</sup> Details of the study tours are in Appendix 2. Local training consisted of (i) 54 courses on various subjects delivered by the Viet Nam Academy of Agricultural Science to 1,673 researchers, of which 47% were women; and (ii) four short courses in 2013 for 145 participants on building research skills, evaluation of research results, and measures to reduce greenhouse gas emissions in agriculture. The project has clearly enhanced the technical capacity of staff at the research institutes supported (DMF output 1), though the long-term goal of ensuring that the knowledge and skills obtained bring about equitable growth cannot be evaluated at this time.

11. **Upgrade of research and laboratory equipment.** It was proposed to provide essential research and laboratory equipment to 10 high-priority institutes identified by MARD as having mandates and core functions relevant to national agriculture goals, and staff competent to effectively use the equipment provided. Equipment was provided to 13 institutes<sup>12</sup> at a total cost of D148,418.8 million (\$7.07 million). Details of equipment procured are in Appendix 2. It is estimated that 355 researchers have accessed this equipment, that 92% of equipment is in use, and is on average used to 80% of its capacity. Researchers surveyed indicated that research quality has improved and that the scope of research has been expanded thanks to access to equipment procured under the project. Also, the need for research institutes to outsource sample analyses had fallen by 68% by the end of the project, thereby improving the efficiency of analyses. The project has therefore helped improve the physical capacity of research institutes (DMF output 1) and the capacity of their staff.

## 2. Grassroots Agricultural Extension Improvement

12. This was designed to improve farmers' access to participatory, pro-poor extension services and to strengthen the link between agricultural research and extension. It was proposed to implement the activity in the five project provinces where poverty incidence was high.

13. **Pro-poor provincial agricultural extension services.** These were to be formalized through the development of provincial agricultural extension plans. Forty extension staff from the five provinces were to be trained to train grassroots and commune-level trainers. In total, 270 programs for 100 provincial extension, 400 district staff, and 5,500 commune extension workers were envisaged. An overseas study tour and in-country visits were also proposed. Finally, a nationwide mass media campaign was proposed to deepen farmer awareness of both the project and selected extension messages. The five provincial extension plans were approved in March 2009. Five training-of-trainer groups were established comprising 121 trainers (rather than the 40 envisaged), including 33 women (27%). These in turn delivered 1,193 training courses including (i) 66 courses for provincial and district extension staff covering 2,023 trainees, including 604 women (30%); and (ii) 977 courses for commune extension workers and 123 courses for extension service providers, which together covered 27,244 trainees, including 8,277 women (30%). Farmer-oriented workshops were provided for 6,946 people, including 1,813 women (26%) and 1,921 people from ethnic minorities (28%). Training on how to establish market links for the poor was included in 30% of training courses, and 60% of courses covered gender mainstreaming; participatory methods; climate change; and environmental, social, and health implications of agricultural technologies. Overseas study tours

<sup>11</sup> Study tours were undertaken to Korea, Malaysia, Thailand, and Taiwan (three tours). The subject matter on certain tours included both research and extension. In addition, a short-term course on climate change for 10 participants was undertaken to the United States in 2012.

<sup>12</sup> It was originally proposed that 10 research institutes would be provided with equipment under the project. Three other research institutes were later added, as agreed with ADB in February 2009, November 2009, and July 2011.

(footnote 11) were conducted to provide exposure to extension systems in the region. Details are in Appendix 2. In-country study tours involved 244 participants from provincial, district, and commune extension services, including 45 women (18%). The project supported the establishment of a small media studio at the National Agriculture Extension Center for the mass media campaign, which comprised national television and radio programs, provincial television programs, and the distribution of DVDs. The campaign also built awareness of the project and disseminated extension messages. Details are in Appendix 2. Overall output achievement exceeded appraisal estimates.

14. **Promotion of extension contracts.** This was proposed to facilitate competition in the delivery of extension services. To strengthen the link between research and extension built into research contract arrangements (para. 8), extension contracts were to include regional or national research institutes. Further, contractual arrangements were intended to mobilize the trained grassroots extension workers (para. 13) as a source of private sector extension provision. To ensure pro-poor and gender-equal service delivery, the extension programs were to be implemented in communes where at least 30% of households were classified as poor, and at least 40% of service beneficiaries would be women. Service proposals were also to incorporate consideration of participation by and practices of ethnic minorities, although no targets were stipulated. Project beneficiaries were identified in a participatory process involving the poor. Once consensus was achieved on which poor households were to receive support from the project, their needs were voiced and extension contracts were announced for bidding. Across the five provinces, 240 service providers participated in the bidding for extension contracts, of which 164 were successful. After 2010, as awareness of the project and the bidding process grew, the range of bidders increased and involved a larger number of nongovernment service providers, including social organizations, professional associations, and agricultural service companies. A total of 615 extension contracts was awarded. The distribution of contracts by province and by type of service provider is in Appendix 2. Provincial agricultural extension centers and district agricultural extension stations, as may be expected, were the dominant type of provider with around 55% of all contracts, though their share declined over the project period. Agricultural research institutes were awarded 40 contracts (32%). The share of private sector firms that received contracts remained low, at around 4%. The 615 contracts comprised 579 demonstration models and 36 research trials; 389 related to livestock husbandry, 175 to crop production, 36 to fisheries, and 15 to other activities. A total of 21,000 households received extension advice under the project, of which 18,694 (89%) were poor households. Individual recipients numbered almost 104,700, with women accounting for 53% and ethnic minorities for 36%. The total value of extension contracts awarded was D83,493.00 million (\$3.98 million), averaging D135.76 million (\$6,465). The largest individual contract was for D196.46 million (\$9,355), which is below the ceiling proposed at appraisal. Details of contract values by service provider are in Appendix 2. Extension contracts focusing on upland or remote communities accounted for 66% of the total value of contracts, which exceeds the target of 40% specified in the DMF (output 3). An independent evaluation of the contracts by local agencies estimated that 502 contracts (82%) resulted in productivity increases of 6%–25%. The competitive bidding system led to greater efficiency, which in turn yielded achievements that exceeded the targets.

15. Project extension activities have significantly improved farmers' access in the five provinces (DMF output 3) and, through the direct involvement of research institutes in extension activities, strengthened the links between research and extension (DMF output 4). Concerns remain, however, that training conducted and extension materials produced could have been more gender-responsive, with greater sensitivity to language and literacy characteristics of target groups, particularly for indigenous people, who form a large part of project beneficiaries.

### 3. Rural-Based Technical and Vocational Training

16. To support AST activities, the project proposed to strengthen 10 rural technical and vocational training schools by improving the technical knowledge and the educational and managerial skills of teaching and administration staff; by improving school curricula; and by upgrading laboratory and library equipment and materials, teaching and laboratory facilities, and office equipment. Thirty curricula (compared with 15 proposed at appraisal) and 244 approved sets of training materials were developed or revised, involving 177 people from private sector companies and agencies outside the school system. Training in the design and development of training programs, and the delivery of the new curricula, was provided to 629 teaching and administration staff of the 10 schools, including 222 women (35%). In addition to in-country training, three study tours were arranged (footnote 11). Details are in Appendix 2. By developing more focused curricula and training materials, the project has improved the quality of training and better aligned it with agriculture sector policy and goals. It also improved the consistency of teaching materials—which previously had been prepared on a largely improvisational basis by individual teaching staff—and, by involving third parties from the private sector, made them more market-oriented and responsive to client needs (DMF output 5). Civil works, equipment, and training also helped bolster the training capacity of the 10 schools supported under the project (DMF output 6). As a result, MARD later elevated eight of them to college status.

### 4. Project Management Support

17. Support for project management was to be provided through one central and five provincial project management units (PMUs). The option to establish project implementation units within the research institutes and technical and vocational training schools was also incorporated into the design. The central and provincial PMUs were established as required, and 20 institute-based PMUs<sup>13</sup> were also set up, one for each of the research institutes and training schools supported by the project (section F: Implementation Arrangements). The proposed project management arrangements made no specific reference to the establishment of a project performance monitoring system. The lack of a well-defined performance monitoring system proved to be a shortcoming in project implementation. The RRP defined both a gender action plan and an indigenous peoples action plan.<sup>14</sup> It specifically proposed to include a social development officer in the central PMU in charge of implementing the action plans, especially with regard to the gender and ethnic minority perspective in monitoring and evaluation. A gender focus was built into the five provincial extension plans, and gender-disaggregated data were collected. Although the gender and indigenous peoples action plans were not diligently followed, 13 of 14 gender targets (92%) were achieved, and the target of including at least 20% indigenous people in research and extension activities was exceeded. Appendix 3 details the status of implementation of the gender action plan.

### C. Project Costs

18. The cost of the project was estimated at \$40.00 million at appraisal. Actual project costs amounted to \$41.10 million.<sup>15</sup> ADB financed \$30.87 million under Loan 2283-VIE(SF) and the government financed \$10.23 million. Details of project costs by component and expenditure category are in Appendix 4. A reallocation of financing by expenditure categories was approved on 10 December 2010, owing chiefly to (i) an increase in equipment costs from \$7.80 million to \$12.41 million to include two additional research institutes, (ii) an increase in equipment costs

<sup>13</sup> The RRP refers to implementation units at research institutes and technical and vocational training schools as institute project implementation units. During implementation they became known as institute PMUs.

<sup>14</sup> RRP, Supplementary Appendix E, Social Assessment.

<sup>15</sup> Including financing charges of SDR415,000 (\$640,000 equivalent) under Loan 2283-VIE(SF).

due to value-added tax, (iii) an increase in the scope of curricula development at the 10 technical and vocational training schools, and (iv) an increase in individual consultant inputs. Details of the reallocation are in Appendix 4.

#### **D. Disbursements**

19. Under the ADB loan, total disbursements amounted to \$30,872,942 equivalent, compared with an estimated \$30,000,000, equating to 102.9% of the estimated amount.<sup>16</sup> The increase derives from the appreciation of the special drawing right (SDR) against the US dollar over the project period. The first disbursement took place on 14 August 2007, the final disbursement (interest charge) on 1 June 2013. A breakdown of annual disbursements under the loan is in Appendix 5. The schedule of disbursements at appraisal projected much more rapid disbursement than actually occurred. It was estimated that cumulative disbursement would be 28% by the end of 2008 and 57% by the end of 2009. Actual cumulative disbursements were 4% and 23%, owing largely to slower than envisaged disbursement for training, research, and extension contracts, which did not start in earnest until 2009.

20. For the ADB loan, a first-generation imprest account was opened at Viet Nam Bank for Agriculture and Rural Development on 5 July 2007 with a limit of \$1.0 million. An initial disbursement of \$1.0 million was made to the account on 14 August 2007. Second-generation imprest accounts with a ceiling of \$50,000 each were opened in the bank's provincial branches for the use of provincial and institute PMUs. In 2009, ADB's review mission took note that since a total of \$0.65 million from the first-generation imprest account had been distributed to the second-generation accounts of the provincial and institute PMUs, there was limited availability of funds for use by the central PMU. To solve this problem, the imprest account ceiling was increased to \$3.0 million in March 2009. Statement of expenditure procedures were also adopted. Together, these measures resulted in the project consistently meeting its disbursement targets from 2009 to the end.

#### **E. Project Schedule**

21. The project was designed to be implemented over 5 years from January 2007 to December 2011. The ADB loan was approved on 11 December 2006. The date of the financing agreement was 14 March 2007. The date of loan effectiveness was 13 June 2007, a day after the date anticipated in the financing agreement. The loan was scheduled to close on 30 June 2012. Loan effectiveness was achieved 6 months after the proposed project start date due to the time taken for completion of legal requirements and the establishment of a project steering committee (PSC) and provincial PMUs, which were conditions of loan effectiveness. Implementation during the first 18 months was late due to (i) a delay in consultant recruitment (para. 29), (ii) slow project start-up, (iii) a delay in the allocation of counterpart funds, (iv) slow approval of institute and provincial PMUs' investment plans, and (v) weak capacity of all PMUs.<sup>17</sup>

22. Implementation of the client-oriented research component was delayed because of the time it took to set up the committee to review and select research proposals (para. 25). The committee was established on 2 May 2008, and MARD approved operational regulations and procedures on 20 June 2008. ADB endorsed the first 58 proposals in February 2009. The first contracts were awarded in February 2009, 20 months after loan effectiveness. The start-up of research activities was also affected by the slow procurement of equipment for the upgrade of

<sup>16</sup> The loan amount under the loan agreement was SDR20,198,000 and actual disbursements were SDR20,050,851.

<sup>17</sup> Aide-mémoire of ADB loan review mission, 9–17 March 2009.

research institute laboratories (para. 11). Delays were encountered in the overseas study program due to difficulty in finding qualified staff for whom the proposed training was appropriate and who had sufficient language skills. The first 18 students were selected in January 2008 and began their courses in May 2008.

23. The innovative nature of competitive bidding for extension services, the lack of established procedures, and the need to build the capacity of staff to implement the system resulted in early delays to the grassroots agricultural extension component. MARD did not approve the five provincial extension plans (para. 13) until March 2009, 21 months after loan effectiveness. A lack of counterpart funds in some provinces to finance extension activities (para. 26) added to initial implementation delays in those provinces.

24. Improvements were put in place in 2009, and from the fourth quarter of 2009, project implementation improved significantly and created no further problem. In May 2010, MARD requested a project extension by 1 year due to (i) the delay in start-up and the initial limited capacity of implementing agencies, (ii) additional time needed for research results to be incorporated into extension services, (iii) more time needed to revise the curricula and prepare training programs, and (iv) the need for project-supported students to complete overseas studies. ADB approved the extension of the project closing date from 30 June 2012 to 20 June 2013 on 10 December 2010. By project completion, physical progress had reached 100%.

## **F. Implementation Arrangements**

25. The government was required to establish the PSC before loan effectiveness to provide policy guidance and coordination. The PSC was to be chaired by the vice minister of MARD responsible for AST and to include representatives of central government ministries and agencies, project provinces, and stakeholders. The PSC was established on 4 June 2007. It held its first meeting in September 2007, and met twice annually thereafter; the final meeting took place on 19 December 2012. MARD was designated as the executing agency of the project. It was required to create a central project management unit (PMU) under its existing Agricultural Projects Management Board, plus a provincial unit in each of the five provinces. The central unit was established on 9 March 2007 and the director, deputy director, and chief accountant were appointed on 10 April 2007. The five provincial units were set up between April and May 2007. The 10 agricultural research institutes and 10 technical and vocational training schools established their separate PMUs in 2007. MARD set up a science and technology committee on 2 May 2008 to assess and select agricultural research proposals. It established a committee to select candidates for overseas training on 7 April 2007.

26. A complex project management structure—i.e., a large central unit, five provincial units (in five geographically dispersed provinces), and 23 institute-based units across the nation—posed a challenge to project implementation. This was exacerbated by the limited capacity of project management staff. However, once the capacity issue had been solved, the decentralized nature of project management facilitated efficient project implementation, leading to target-exceeding achievement of some project outputs. For the extension activities, project funds were allocated equally across the five selected provinces without regard for the absorptive capacity and availability of counterpart funds in each province. This not only delayed implementation in some provinces, it required a reallocation of funds between provinces.

27. Notwithstanding the issues raised, implementation of the project, particularly from 2009 onward, was highly satisfactory.



## **G. Conditions and Covenants**

28. No problems were encountered with loan effectiveness, which was achieved within one day of the date specified in the loan agreement. A summary of compliance with loan covenants is in Appendix 6. No major issues arose with regard to compliance, but some other concerns exist:

- (i) Neither the central nor the provincial PMUs engaged monitoring and evaluation officers (loan agreement, schedule 5, para. 3). This undermined project monitoring and evaluation.
- (ii) The indigenous peoples action plan (loan agreement, schedule 5, para. 14) was not implemented as diligently as envisaged. In practice, because the focus and location of research and extension activities were in mountainous and remote areas, the activities were actually sensitive to indigenous peoples' issues.

## **H. Consultant Recruitment and Procurement**

29. At appraisal it was proposed to provide a team of consultants comprising 29.0 person-months of international and 96.0 person-months of national input. Advance action on consultant recruitment was proposed but the contract with the consultants was not signed until 8 September 2008. By project closing, 24.5 person-months of international and 147.3 person-months of national consultant input had been utilized. Appendix 7 breaks down the proposed and actual inputs by expertise. Several consultants were replaced during implementation, largely stemming from the delay in fielding the consultant team, which meant that certain inputs were less relevant than they would have been at the start of the project. Details of the replacements are in Appendix 7. The recruitment of consultants and replacements under contract variations followed ADB's Guidelines on the Use of Consultants using quality- and cost-based selection, and individual consultant selection.

30. The project awarded 904 contracts in total, among them 14 civil works contracts with a value of \$1.40 million for small-scale works at technical and vocational training schools. Civil works contracts were awarded using the national competitive bidding or shopping methods. Equipment for upgrading laboratories, teaching facilities, or project management offices was procured through 141 separate packages, with a value of \$12.64 million. Equipment supply contracts were awarded under shopping or national competitive bidding procedures. Agricultural research contracts (125) and agricultural extension contracts (615) together amounted to a value of \$8.13 million. Eight consulting service contracts for a value of \$1.24 million were awarded using quality- and cost-based or individual consultant selection.

## **I. Performance of Consultants, Contractors, and Suppliers**

31. The delay in recruiting the consulting team meant that support during project start-up had to be provided by consultants engaged under another ADB TA.<sup>18</sup> When the project implementation consultants started work in September 2009 it was difficult for them to establish a good working relationship with the central PMU. International consultants provided only intermittent inputs, some key positions were not filled, and several changes in key personnel and duration of inputs occurred during implementation. This undermined the quality of consulting support in key project areas. Notwithstanding the concerns over the performance of the international consultants, MARD was highly appreciative of the support provided by national consultants. The performance of consultants is rated *partially satisfactory*.

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<sup>18</sup> ADB. 2005. *Technical Assistance to the Socialist Republic of Viet Nam for Strengthening Agriculture Science and Technology Management*. Manila.

32. No issues were reported regarding the 14 civil works contracts, and the performance of these contractors is considered *satisfactory*. No issues arose from the supply of equipment, and the performance of suppliers is deemed *satisfactory*. For both civil works and equipment supply and installation all necessary certifications were obtained upon completion.

33. Research institutes contracted had adequate capacity and performed well. Institutes collected baseline and impact monitoring data, but the central PMU and Department of Science, Technology and Environment (DSTE) did not establish a central project monitoring system for data on each research project. Extension service providers' performance is assessed to have improved after the introduction of competition in extension delivery. The providers effectively monitored the implementation of contracts, but the monitoring of impacts on beneficiaries was less effective.

#### **J. Performance of the Borrower and the Executing Agency**

34. During the initial stages of the project, delays occurred in formalizing implementation arrangements within MARD, counterpart funds in some provinces were limited, and the capacity of central and (particularly) provincial staff was limited. Although the latter was overcome with training provided through the project, a more thorough assessment of capacity and of capacity-building needs at appraisal could have prevented the delays in the first 2 years. ADB repeatedly expressed concern over the lack of effective monitoring of project performance as required by loan covenants. MARD did not take adequate steps to address ADB's concern, though an improved monitoring framework with quantified targets and indicators was developed and incorporated into the project reporting system according to ADB instruction. Notwithstanding the initial problems and the extension to project closing, the implementation of the project ran smoothly and achieved 100% physical and financial completion. Especially in view of the fact that MARD was required to implement an innovative approach to research and extension and to adopt new procedures for this purpose (for which inadequate time was foreseen at appraisal), and provided good cooperation with ADB, the performance of the borrower and the executing agency is rated *satisfactory*.

#### **K. Performance of the Asian Development Bank**

35. ADB supervised the project extensively with an inception mission in May 2007 and 12 review missions from September 2007 to May 2013. The ADB project officer changed only once, in the fourth quarter of 2008. The midterm review mission took place in May 2010, and the project completion review mission in April 2014. ADB assigned staff with in-depth technical expertise in agricultural research, extension, curriculum development, and strong country experience, which ensured effective project supervision. MARD expressed no concerns with respect to any dealings with ADB and was appreciative of the pro-active support it received. Overall, ADB's performance is rated *highly satisfactory*.

### **III. EVALUATION OF PERFORMANCE**

#### **A. Relevance**

36. At the time of appraisal, the project was relevant to government and ADB goals and strategies in the agriculture sector, in particular with respect to research and extension (para. 3). The government had recently (September 2005) issued Decree 115, which required all research institutes of the government, including those in the agriculture sector, to become financially autonomous by the end of December 2009. While the principles of financial autonomy were defined in the decree, the practicalities of how it was to be achieved were not clear. Indeed, the

deadline for achieving financial autonomy was subsequently extended to the end of 2011. When the project was designed, the implications of and mechanisms to implement Decree 115 were not considered in detail.<sup>19</sup> As it progressed, the project supported both the principles and implementation of Decree 115 through the competitive bidding mechanism it introduced for research activities. Clear criteria were identified for both the bidding process and evaluation and selection of successful bidders. The central PMU also stipulated new contractual arrangements and clear financial reporting procedures. The significant achievement in this respect is reflected in the fact that 550 proposals were received for research funding under the project and that 46 separate institutes participated in research activities (para. 8). In the context of extension, the project also facilitated a more market-oriented approach through the participation in competitive bidding of a range of service providers. Although not foreseen at project design, this supported the “privatization” of extension services, which was subsequently defined as part of government policy through Decree 2 of 2010.<sup>20</sup> As such, the project remains highly relevant both to national sector goals and, in the context of AST, to the principles of Decree 115 and Decree 2. Overall, the project is rated *highly relevant*.

## **B. Effectiveness in Achieving Outcome**

37. By completion, the project had clearly achieved the outcome of strengthening the national system of agriculture science and technology. As the project progressed, greater focus was placed on responding to the needs of the target clientele—i.e., the poor, women, ethnic minorities, and those living in upland and mountainous areas. Closer links were forged between research and extension by (i) identifying research needs at field level and (ii) involving research institutes in the delivery of extension services. A key feature of a market-oriented, client-responsive extension service, which is fundamental to the goals of the agriculture sector, is a multiplicity of service providers. Although the share of traditional government service providers (provincial and district agricultural extension units) financed by project extension contracts was 55% in terms of contract numbers and value, this was to an extent inevitable given the innovative approach promoted under the project and the virtual monopoly such providers had previously enjoyed in extension delivery. As the project progressed, their share in contract awards declined, and by completion a wide spectrum of provider types engaged in extension delivery prevailed (Appendix 2, Table A2.6). Overall, the project was *effective* in achieving the outcome.

## **C. Efficiency in Achieving Outcome and Outputs**

38. During project preparation, no overall project economic analysis was undertaken. The viability of the project was predicated on the results of various studies on investment in AST that estimated economic internal rates of return (EIRRs) between 30% and 50%, and evaluation of research programs conducted in Viet Nam that indicated EIRRs of 26%—47% (Appendix 8). Given the limited scope for a project completion review, EIRRs have been recalculated for the three main components using the structure of an impact analysis undertaken in 2011/12 but with actual project costs and updated project benefits. The individual EIRRs are: 3% (client-oriented research), 28% (promotion of grassroots extension), and 37% (technical and vocational training). The EIRR of the project as a whole is estimated to be 20% (Appendix 8). This suggests that the project was efficient. As for efficiency of process, the implementation delays and problems noted at the start undermined project efficiency and necessitated an extension to the implementation period. However, due to the subsequent recovery in progress, the project rating

<sup>19</sup> Government of the Socialist Republic of Viet Nam. Decree 115/2005/ND-CP, 5 September 2005. The only reference to Decree 115 in the RRP is in the context of implementation arrangements, which the report said would not be affected by the provisions of the decree.

<sup>20</sup> Government of the Socialist Republic of Viet Nam. Decree 2/2010/ND-CP, 8 January 2010.

remains *efficient*.

#### **D. Preliminary Assessment of Sustainability**

39. Studies during project implementation suggested impressive gains in productivity and incomes as a result of beneficiaries' participation in project activities (paras. 8 and 14). It is likely that such improvements in farmers' productivity and incomes will be sustained. Less certain is institutional sustainability. The project has without doubt contributed to the establishment of competitive bidding in research and extension, and boosted the capacity of participating agricultural research institutes and technical and vocational training schools. It has also demonstrated the value of assessing research and extension needs in a participatory process involving the poor, and adoption of competitive bidding systems to serve their needs. However, as MARD is yet to institutionalize this successful model in the national system, it is uncertain if research institutes and extension providers will maintain the focus on the poor, ethnic minorities, and farmers in remote areas beyond the project. The value of contracts aimed at such groups is likely to be low and the transaction costs of implementing them high. This suggests that such contracts will be less attractive to all but local providers, whose capacity may be more limited than that of national providers. This could undermine the quality of research and extension delivery and the attainment of the sector goals of sustainable and equitable growth. Long-term sustainability and equity in research and extension delivery will require the government to (i) build on the start made under the project in introducing market mechanisms, (ii) replicate the lessons from implementation in five project provinces across Viet Nam, and (iii) ensure that vulnerable groups are not disadvantaged in their access to extension once project-based funding, targeting, and monitoring are removed. Notwithstanding these concerns and based on the achievement of the project in developing mechanisms for more market-oriented research and extension, the sustainability of the project is rated *likely*.

#### **E. Impact**

40. The project has demonstrated that more market-oriented, demand-driven agricultural research and extension can have a positive and immediate impact on productivity and incomes of farm households. The wider economic impact should be assured by the dissemination of extension messages delivered through the project and the likely sustainability of productivity and income increases of farms. The related poverty and social impacts are especially significant among ethnic minority communities and those living in remote upland and mountainous areas. The introduction of climate change adaptation and mitigation into research programs also offers the potential to manage environmental issues that are of particular concern to vulnerable households in remote areas. Institutionally, the project (i) facilitated the participation of multiple institutes in the competitive bidding mechanism for agricultural research, (ii) instigated the participation of multiple service providers of varying types in extension delivery, and (iii) strengthened the capacity of selected agricultural research institutes and technical and vocational training schools through staff training and the upgrade of facilities.

41. **Gender impact.** As for gender, the project achieved 13 of 14 targets (a success rate of 92%). Implementation of the gender action plan addressed both the strategic and practical needs of female farmers, extension workers, and researchers or lecturers on equality issues. Priority was given to participation by and benefits for disadvantaged groups such as poor or ethnic minority households and/or households headed by women, as well as single and disadvantaged women. The project gave poor female farmers the scope for identifying extension needs and priorities, developing extension models (such as cow and hybrid goat raising), and visiting demonstration and pilot models to enhance their knowledge on production activities. Appendix 3 discusses these impacts at more length.

42. **Impact on indigenous peoples.** The project target was to have at least 20% participation from indigenous peoples in research and extension activities. Indigenous people accounted for 37% of beneficiaries in the research and 36% in the extension program. Training conducted under the research program and workshops conducted in the extension program both included 28% indigenous people. Even though the project exceeded its goal in including indigenous people as beneficiaries, training programs and extension materials could have been more sensitive to culture, language, and the level of literacy of people. Coverage of indigenous people in monitoring and evaluation was limited.

#### IV. OVERALL ASSESSMENT AND RECOMMENDATIONS

##### A. Overall Assessment

43. Based on the assessment of the project as *highly relevant, effective, efficient, and likely sustainable*, the project overall is rated *successful*. Concerns exist over the ambitious design of the project with diverse technical, implementation, and geographic coverage; the design of the DMF and its targets and indicators; the quality and implementation of the project performance monitoring system, and the initial delays in project implementation. However, these do not detract from the level of success that the project achieved, especially between 2009 and mid-2012, in establishing and testing mechanisms to improve the links between agricultural research and extension and to make the AST system in Viet Nam more market-oriented and responsive to farmer demand, particularly the demand of poor farmers in remote and mountainous areas.

##### B. Lessons

44. Major lessons from the project are:

- (i) Ambitious project design including diverse technical and geographic coverage combined with innovative project procedures can delay implementation until all implementing agencies fully understand the process.
- (ii) Competitive bidding for agricultural research based on clear selection criteria that prioritize marginal areas and are formulated jointly by researchers and extension workers can lead to more user-responsive and demand-driven research, which also can be immediately extended to poor farmers. Preliminary impacts reveal more efficient use and more equitable distribution of public research funds.
- (iii) Competitive bidding for extension contracts based on demand-driven proposals generated at field level through a participatory process involving the poor can have a significant impact on (a) the timeliness and transparency of decision making, (b) the variety of extension messages delivered, and (c) the number and range of institutions and organizations providing extension services.
- (iv) Inadequate assessment during project preparation of implementing agencies' financial and human resources capacity, especially when introducing innovative implementation mechanisms, can lead to delays in project implementation.
- (v) Unrealistic estimates of the time required for students to complete PhD programs can result in having to extend the project closing date.
- (vi) Insufficient or inappropriate design of consulting services, and delays in recruiting them, can cause problems early in project implementation and a failure to provide adequate support for key project activities in which project management has limited experience.
- (vii) Requiring the collection of gender-disaggregated data for all project activities is an effective means to improve gender mainstreaming in project implementation. Monitoring of and regular reporting on the participation of indigenous people in project activities can also lead to better awareness of special measures required

- for indigenous people.
- (viii) The lack of an effective project performance monitoring system risks undermining the success of a project by failing to properly report project outputs and outcomes.

## **C. Recommendations**

### **1. Project Related**

45. **Future monitoring and institutionalization.** DSTE should continue to work with the research institutes that undertook research projects—in particular the 70 projects that developed technologies extended to farmers—to monitor project impacts. Provincial PMUs should continue to monitor and evaluate the impact of extension activities on farm productivity and household incomes to demonstrate that such gains are sustained.

46. MARD should monitor and review the extent to which competitive bidding mechanisms developed under the project are being replicated in research and extension funding beyond project completion and project funding. As appropriate, MARD should revise the mechanisms developed under the project to enable their institutionalization and replication throughout the agricultural research and extension system. Without MARD's concerted effort to promote these mechanisms, the significant progress made under the project could be lost.

### **2. General**

47. General recommendations are:

- (i) Where project activities are clearly innovative in nature, greater emphasis should be placed during preparation on (a) geographical coverage, (b) assurance on counterpart funding, and (c) capacity of implementing agencies, especially at field level. The design of consulting services should include adequate expertise and inputs to provide effective implementation and monitoring support.
- (ii) Many projects, particularly those in the agriculture and natural resources sector, are faced with implementation delays in their first year. The phasing of project activities and costs should reflect this probability.
- (iii) The DMF should be designed so that the project impact is more readily attributable to what can be realistically achieved as a result of project activities, and not broad impacts such as poverty reduction, which depend on many other factors. DMF outputs should closely reflect the outputs defined in the RRP, and output indicators should as far as possible be quantified so that indicators can be more easily monitored and achievements assessed.
- (iv) Given the project's positive impact on efficiency and distribution of public funds for research and extension, and given heightened awareness among developing member countries of the need to increase investment in agricultural research and extension to manage climate change issues, ADB, through TA implemented by its Regional Sustainable Development Department, should continue to work with MARD to document successful experiences under the project as knowledge products and to share them with the international development community, particularly with governments of developing member countries, for possible inclusion in future ADB projects.
- (v) The Viet Nam Resident Mission of ADB, along with development partners, should engage with the government to discuss how to avoid implementation issues such as (i) a large and complex project management system with weak initial capacity, (ii) late release of counterpart funds, and (iii) limited institutionalization of successful implementation arrangements into national systems.

- (vi) Project management should include expertise on gender and indigenous peoples to provide technical inputs in addition to monitoring the results of the respective action plans. Workshops to sensitize project management staff on gender and indigenous peoples, including action plan orientation, should be conducted at the start of the project.

## PERFORMANCE INDICATORS AND ACHIEVEMENTS

### A. Design and Monitoring Framework

Design Summary	Target Specified at Appraisal	Actual Achievement <sup>a</sup>
<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>	<p>During 2006–2010, value addition increased by an annual average of 3.8% and exports increased by an annual average of 14.8%.</p> <p>Rural poverty incidence was estimated to be 16% in 2011.</p>
<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>	<p>System and mechanisms tested successfully.</p> <p>Links established.</p> <p>Multiple providers have delivered extension in project provinces.</p>
<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>	<p>92% of equipment procured has been used, with an estimated capacity utilization of 80%.</p> <p>The use of external laboratories has fallen by 67%.</p> <p>In the 10 research institutes participating in the project, the proportion of research staff with postgraduate qualifications stood at 38% in 2008 and 53% in 2011.</p>
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 agro-ecological regions.</li> </ul>	<p>125 research and 615 extension contracts were distributed through the five project provinces, which covered a variety of agro-ecological zones.</p>



Design Summary	Target Specified at Appraisal	Actual Achievement <sup>a</sup>
	<ul style="list-style-type: none"> <li>• Not less than 40% of the value of research contracts addressing needs of upland or remote communities.</li> </ul>	<p>93 of the 125 research contracts financed (74%) were implemented in remote or poor areas. These 93 contracts represented 76% of the total value of research contracts awarded.</p>
<p>3. Farmers' access to participatory and pro-poor agricultural extension improved.</p>	<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>	<p>Provincial plans for needs-based extension were approved by provincial planning committees in each of the five project provinces and by the Asian Development Bank in 2009.</p> <p>By value, 66% of the 615 extension contracts were implemented in upland and remote areas of the five project provinces.</p> <p>Extension contracts in upland and remote areas accounted for 66% of the total value of extension contracts awarded.</p>
<p>4. Improved linkage of agricultural extension services with research strengthened.</p>	<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>	<p>Provincial agricultural extension centers undertook 43 extension contracts (7% of total), and district agricultural extension stations undertook 297 (48%).</p> <p>Links established.</p> <p>Mechanisms established.</p>
<p>5. Rural-based technical and vocational training made more responsive to national sector goals.</p>	<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>	<p>177 people from outside the 10 technical and vocational training schools supported under the project were engaged in training program and curriculum development.</p> <p>Curricula were standardized and reflect sector goals.</p>

Design Summary	Target Specified at Appraisal	Actual Achievement <sup>a</sup>
6. Capacity of rural-based technical and vocational training strengthened.	<ul style="list-style-type: none"> <li data-bbox="612 235 1010 380">• Average usage of school and laboratory equipment in the schools selected under the Project increased substantially.</li> <li data-bbox="612 506 1010 619">• Average of about 90% of the graduates of the targeted schools enter into full-time employment.</li> </ul>	<p data-bbox="1034 235 1427 348">Around 16,000 teaching staff and research staff have used equipment procured under the project.</p> <p data-bbox="1034 380 1344 468">The libraries of all project-supported schools are networked.</p> <p data-bbox="1034 499 1224 531">Not determined.</p>

<sup>a</sup> At physical project closing unless otherwise stated. Data are derived from the database and/or progress reports of the central and provincial project management units; and national, provincial, and district statistical departments.

## B. Project Monitoring System

Design Summary	Monitoring Indicators/ Targets	Achievement
Impact Sustainable and equitable agricultural growth achieved.	Five years after the Project completion: <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 year from 2006–2010 in line with the 5-Year Socio-economic Development Plan.</li> <li>Poverty incidence in rural areas decreased from 45% (2003).</li> </ul>	During 2006–2010, aggregate value addition increased by 3.8% per annum, and exports of the agriculture sector increased by 14.8% per annum, in line with the Five-Year Socioeconomic Development Plan.  Poverty incidence in rural areas fell from 45% (2003) to 16% (2011).
<b>Outcome</b> National system of agriculture science and technology (AST) strengthened.	<ul style="list-style-type: none"> <li>Income of 20,000 farmer households increased from 5–10% by applying new varieties and technique.</li> </ul>	38,528 farm households increased their income by 10%–30% by applying new varieties and techniques.
	<ul style="list-style-type: none"> <li>50,000 poor farmers supported and advised from project extension services.</li> </ul>	93,204 poor farmers were supported and advised by project extension services.
	<ul style="list-style-type: none"> <li>Average of about 70% of graduates from 10 Project schools enter into full-time employment.</li> </ul>	Average share of students (in 10 schools) who found a job within 6–12 months of graduation increased from 75% in 2009 to 77% in 2011.
	<ul style="list-style-type: none"> <li>Average applicants to 10 colleges increase by 25%.</li> </ul>	Not determined.
	<ul style="list-style-type: none"> <li>50% of research projects and extension models reduced at least 10% of chemical fertilizer and pesticide.</li> </ul>	65% of research projects and 50% of extension models reduced chemical fertilizer and pesticide use by at least 10%.
<b>Outputs</b>		
<b>1. Client-oriented Research and Capacity Strengthening</b>		
1.1 Client-oriented research program	<ul style="list-style-type: none"> <li>125 research programs are properly implemented.</li> </ul>	100% implemented properly.
	<ul style="list-style-type: none"> <li>40% of the research investments are in mountainous and remote areas.</li> </ul>	75% of the research investments are in mountainous and remote areas.
	<ul style="list-style-type: none"> <li>More than 60% of research projects that address poverty reduction and food security.</li> </ul>	65% of research projects addressed poverty reduction and food security.

Design Summary	Monitoring Indicators/ Targets	Achievement
	<ul style="list-style-type: none"> <li>Productivity of 180 new varieties, 242 processes and 270 trials increased higher 10-25% compared to control.</li> </ul>	Productivity of 198 new varieties, 244 processes, and 292 trials increased by 10%–55% compared to control trials.
	<ul style="list-style-type: none"> <li>At least 50% of research projects produce short-term results at a relatively low cost that can easily be extended to poor farmers.</li> </ul>	61% of research project results can be easily extended to poor farmers.
	<ul style="list-style-type: none"> <li>3,000 farmer households participating in research project activities including 30% women head households and 20% of ethnic minorities.</li> </ul>	6,538 farm households participated in research activities, of which 3,164 are headed by women (48%) and 2,432 are ethnic minority households (37%).
	<ul style="list-style-type: none"> <li>1,200 farmers and extension staff or other users that have been trained under research projects about the technology or process including 30% of women and 30% of ethnic minorities.</li> </ul>	2,023 extension staff participated in training. 27,244 farmers participated in training; of those, 8,277 were women (30%) and 7,747 were ethnic minority farmers (28%).
	<ul style="list-style-type: none"> <li>30% of research projects that have strengthened linkages with private sector and have established a link with companies for marketing.</li> </ul>	34% of research projects have links with or are oriented to the private sector.
	<ul style="list-style-type: none"> <li>100% of research projects increase from 10-20% of profitability in comparison with reality.</li> </ul>	100% of projects evaluated increased profitability by 10%–50%.
	<ul style="list-style-type: none"> <li>25% of research projects address climate change adaptation and mitigation and environmental improvement.</li> </ul>	65 of 125 (52%) research projects incorporated climate change adaptation and mitigation, and environmental improvement.
	<ul style="list-style-type: none"> <li>At least 600 researchers participating in implementation of 125 research projects including 40% of female.</li> </ul>	875 researchers participated in implementation of 125 research projects, 40% of them were women.
1.2 Training of research staff	<ul style="list-style-type: none"> <li>Research staff with relevant postgraduate increased from 20% in 2007 to 30% in 2010.</li> </ul>	Share of researchers in the 10 project-supported institutes who have a master's degree or higher increased from 38% in 2008 to 53% in 2011.
	<ul style="list-style-type: none"> <li>1,250 researchers and laboratorial officers participating in training courses including 30% of female.</li> </ul>	1,673 participants, of whom 47% were women.

Design Summary	Monitoring Indicators/ Targets	Achievement
	<ul style="list-style-type: none"> <li>100% of training course are evaluated and result reported in progress report.</li> </ul>	100% of training courses were evaluated and results reported in progress reports.
	<ul style="list-style-type: none"> <li>18 PhDs, 32 Master's Degrees and 5 Post-docs awarded (55 total).</li> </ul>	9 PhD courses completed; 7 courses ongoing; 2 PhD candidates withdrew. 34 master's degrees completed; 1 master's ongoing. 4 postdoctoral courses completed. (Total of 57)
	<ul style="list-style-type: none"> <li>At least 10% of overseas candidates are women.</li> </ul>	23% of candidates were women.
	<ul style="list-style-type: none"> <li>25% of overseas study programs include environmental subjects.</li> </ul>	29% of candidates' overseas study programs covered environmental subjects.
	<ul style="list-style-type: none"> <li>100% of candidates return to their organization after completion of training program.</li> </ul>	100% of candidates who have finished their training program have returned to their organizations.
1.3 Upgrade research and laboratory equipment	<ul style="list-style-type: none"> <li>At least 75% of equipment installed and utilized effectively.</li> </ul>	92% of procured equipment has been utilized effectively.
	<ul style="list-style-type: none"> <li>100% of equipment and machines meet Government of Viet Nam environmental standards.</li> </ul>	100% meet government environmental standards.
	<ul style="list-style-type: none"> <li>70% of equipment utilization capacity.</li> </ul>	Utilization of equipment stands at over 80% of capacity.
	<ul style="list-style-type: none"> <li>% of number of samples sent for analysis in external laboratories decrease by 50%.</li> </ul>	Percentage of samples sent for analysis to external laboratories reduced by 68%.
<b>2. Grassroots Agriculture Extension Improvement</b>		
2.1 Pro-poor Provincial Agricultural Extension Services	<ul style="list-style-type: none"> <li>At least 6,000 people participating in workshops including 25 % of women and 25% of ethnic minority.</li> </ul>	6,946 participants: 1,813 women (26%). 1,921 ethnic minority people (28%).
	<ul style="list-style-type: none"> <li>Five provincial extension plans approved by MARD on March 2009.</li> </ul>	5 provincial extension plans approved by provincial planning committees and submitted to central project management unit and ADB in 2009.
	<ul style="list-style-type: none"> <li>5 TOT group established in 5 provinces with 43 members.</li> </ul>	5 training of trainer (TOT) groups comprising 121 persons established.

Design Summary	Monitoring Indicators/ Targets	Achievement
	<ul style="list-style-type: none"> <li>Organized 500 training course at 5 provinces.</li> </ul>	1,193 training courses, including: 66 courses for provincial and district extension staff, 977 courses for commune agricultural extension workers, and 123 courses for extension service providers.
	<ul style="list-style-type: none"> <li>Training for 500 provincial and district extension staff and 5,500 service providers and agricultural extension workers at commune including 40% of women.</li> </ul>	Training provided for: 2,023 provincial and district extension staff, including 604 women (30%). 27,244 communal service providers and agricultural extension workers, including 8,277 women (30%).
	<ul style="list-style-type: none"> <li>80% of training course are evaluate input and output questionnaires and result report.</li> </ul>	90% of training courses were evaluated and the results reported.
	<ul style="list-style-type: none"> <li>30% of training courses incorporate market linkages for the poor.</li> </ul>	30%.
	<ul style="list-style-type: none"> <li>60% of training courses incorporate training on: gender mainstreaming, participatory method, and climate change, environmental, social, and health implications of agricultural technologies.</li> </ul>	60%.
	<ul style="list-style-type: none"> <li>Organize agricultural extension study tour to overseas for staff of 5 PPMUs, MARD and CPMU.</li> </ul>	Study tours in: Thailand and Taiwan with 44 people; 9 (20.5%) participants were women.
	<ul style="list-style-type: none"> <li>At least 200 provincial, district staff participated in country study tour including 15% of women.</li> </ul>	244 participants; 45 of them (18%) were women.
	<ul style="list-style-type: none"> <li>Number of extension information.</li> <li>6 national television programs (VTV).</li> <li>7 broadcast programs (VOV).</li> <li>20 provincial television programs in 5 provinces.</li> <li>10 DVDs.</li> </ul>	Numerous television and radio programs broadcast (Appendix 2). 10 DVDs produced.
	<ul style="list-style-type: none"> <li>At least 70% of poor and ethnic households in 157 project communes have access to information broadcast by project communication channel.</li> </ul>	Not determined.
2.2 Promotion of extension	<ul style="list-style-type: none"> <li>At least 500 extension contracts</li> </ul>	615 agricultural extension contracts

<b>Design Summary</b>	<b>Monitoring Indicators/ Targets</b>	<b>Achievement</b>
contracts	will be awarded in 157 poor communes in 5 provinces.	implemented.
	<ul style="list-style-type: none"> <li>At least 40% of the value of extension contracts addressing need of upland or remote communities.</li> </ul>	66% of the value of extension contracts.
	<ul style="list-style-type: none"> <li>At least 10,000 households participate in extension models.</li> </ul>	21,000 households participated in agricultural extension models.
	<ul style="list-style-type: none"> <li>At least 50% of participants in the extension models are rural poor households.</li> </ul>	89% of households (18,694) participating in agricultural extension models were poor households.
	<ul style="list-style-type: none"> <li>At least 50% participants of extension models are women.</li> </ul>	53% of participants (52,630) in extension models were women.
	<ul style="list-style-type: none"> <li>At least 20% beneficiaries of extension models are ethnic minorities.</li> </ul>	36% of beneficiaries (37,190) of extension models were from ethnic minorities.
	<ul style="list-style-type: none"> <li>At least 10% extension contracts will be research trial model in the field.</li> </ul>	Not determined.
	<ul style="list-style-type: none"> <li>80% of extension contracts increase over 10% of profitability in comparison with reality.</li> </ul>	502 contracts (80%) resulted in productivity gains of 6%–25%
<b>3. Rural -based Technical and Vocational training</b>		
3.1 Strengthening of management, teaching and curriculum improvement	<ul style="list-style-type: none"> <li>Conduct a study tour overseas for representatives of 10 schools and DOP and CPMU including 20% women.</li> </ul>	23 participants, including 6 women (26%).
	<ul style="list-style-type: none"> <li>At least 20 curricula programs improved for 10 schools.</li> </ul>	30 curriculum programs have been developed.
	<ul style="list-style-type: none"> <li>Number of curriculum boards with private sector participation as a board member.</li> </ul>	177 people from outside the school system (private companies and agencies) participated in the development of curricula.
	<ul style="list-style-type: none"> <li>300 teacher/administrator trained in teaching methods, systems and procedures for compiling training materials including 30% women.</li> </ul>	629 teachers and administrators have been trained on curriculum development and training program development, including 222 women (35%).
	<ul style="list-style-type: none"> <li>100 % of training course are</li> </ul>	100% of training courses were

<b>Design Summary</b>	<b>Monitoring Indicators/ Targets</b>	<b>Achievement</b>
	evaluated and result reported in project progress report.	evaluated and results reported.
	<ul style="list-style-type: none"> <li>100% schools networked through electronic library.</li> </ul>	100% of project-supported school libraries are networked.
	<ul style="list-style-type: none"> <li>Number of subjects utilizing equipment increase by 20%.</li> </ul>	16,020 teaching staff and researchers have used project-financed equipment.
	<ul style="list-style-type: none"> <li>Average number of applicants increase by 25%.</li> </ul>	Not determined.
3.2 Invest in upgrading facilities, technology, equipment, books and teaching materials	<ul style="list-style-type: none"> <li>At least 80% of equipment installed and utilized effectively.</li> </ul>	92% of procured equipment has been utilized.
	<ul style="list-style-type: none"> <li>100% of machinery, equipment and other construction projects meet the environmental standards of the Government of Viet Nam.</li> </ul>	100% of machinery, equipment, and other construction projects meet government environmental standards.
	<ul style="list-style-type: none"> <li>70% of equipment utilization capacity.</li> </ul>	Utilization of equipment at over 80% of capacity.
	<ul style="list-style-type: none"> <li>At least 80 % of laboratories and libraries effectively utilized.</li> </ul>	Over 90% of laboratories and libraries effectively utilized.
	<ul style="list-style-type: none"> <li>% of number of samples sent for analysis in external laboratories decrease by 50%.</li> </ul>	Decreased by 68%.



## ANALYSIS OF OUTPUTS

## A. Research Activities

**Table A2.1: Research Contracts Awarded by Institute**  
(Main text reference para. 9)

<b>Institute</b>	<b>Contracts Awarded</b>	<b>Total Value (D million)</b>	<b>Total Value (\$)<sup>a</sup></b>
Agricultural Extension Station of Dam Ha District – Quang Ninh	1	350.00	16,667
Agricultural Genetics Institute	1	550.00	26,190
Agricultural Sciences Institute of South Central Coast of Viet Nam	6	4,000.00	190,476
Can Tho University	1	430.00	20,476
Center of Informatics and Statistics	1	480.00	22,857
Centre for Advanced Science Technology of Nghe An	1	1,150.00	54,762
Centre for Application of Advanced Science and Technology of Cam Xuyen – Ha Tinh	1	470.00	22,381
Centre for Information and New Technology Transfer of Ha Giang	1	900.00	42,857
Centre for Plant Natural Resources	2	1,550.00	73,810
Cuu Long Delta Rice Research Institute	6	4,600.00	219,048
Food Crops Research Institute	14	11,790.00	561,429
Forest Science Institute of Viet Nam	7	5,550.00	264,286
Fruit Research Institute	3	1,400.00	66,667
Ha Noi University of Agriculture No 1	2	1,450.00	69,048
Hong Duc University	1	400.00	19,048
Hue University of Agriculture and Forestry	2	900.00	42,857
Hung Phat Green Technology Company	1	300.00	14,286
Institute for Variety Improvement and Forest Products Development	1	430.00	20,476
Institute of Agricultural Environment	5	4,050.00	192,857
Institute of Agricultural Science	1	600.00	28,571
Institute of Agricultural Science of Southern Viet Nam	6	4,900.00	233,333
Institute of Animal Husbandry	5	3,470.00	165,238
Institute of Mountainous Agriculture Research and Rural Development	1	1,000.00	47,619
Institute of Pharmaceutics, Ministry of Health	1	850.00	40,476
Maize Research Institute	2	1,600.00	76,190
Northern Central Agricultural Science and Technology Institute	5	3,470.00	165,238
Northern Mountainous Agriculture and Forestry Science Institute	2	1,720.00	81,905
Oil Plant Institute of Viet Nam	1	550.00	26,190
Plant Protection Research Institute	7	4,950.00	235,714
Research Center for Seafish Technology Transfer	1	480.00	22,857
Research Centre for Clean Agricultural Implementation	1	300.00	14,286
Research Institute of Fruit and Vegetables	5	5,150.00	245,238

<b>Institute</b>	<b>Contracts Awarded</b>	<b>Total Value (D million)</b>	<b>Total Value (\$)<sup>a</sup></b>
Secondary School for Mechanics, Agricultural Technique and Rural Development	1	700.00	33,333
Soil and Fertilizer Institute	3	1,650.00	78,571
Soil and Fertilizer Research Institute	2	2,250.00	107,143
South Central Coastal Region Fruit and Vegetable Research Institute	1	1,200.00	57,143
Southern Agricultural Science Institute	1	450.00	21,429
Southern Fruit Research Institute	4	3,120.00	148,571
Thai Nguyen University of Agriculture	1	500.00	23,810
Thanh Tay University	1	1,150.00	54,762
The Northern Mountainous Agriculture and Forestry Science Institute	4	4,550.00	216,667
The Viet Nam Seed Trade Association	1	500.00	23,810
University of Engineering and Technology - VNU	1	580.00	27,619
Viet Nam Forestry University (No 2)	1	550.00	26,190
Viet Nam Gardening Association	2	920.00	43,810
Viet Nam Institute of Agricultural Engineering and Post-Harvest Technology	1	550.00	26,190
Water Research Centre	1	450.00	21,429
Western Highland Agro-forestry Science and Technology Institute	5	3,280.00	156,190
<b>Total</b>	<b>125</b>	<b>92,190.00</b>	<b>4,390,000</b>

<sup>a</sup> Dollar values are indicative—they are based on the exchange rate prevailing at the time of project completion review.

**Table A2.2: Equipment Procured by Research Institute**  
(Main text reference para. 11)

<b>Institute and Equipment Procured</b>	<b>Cost (D)</b>
<b>1. Northern Mountainous Agriculture and Forestry Science Institute</b>	
Equipment for tea production pilot (26 items)	8,973,900,000
Equipment for laboratory of agricultural products process and storage (21 items)	4,930,100,000
Equipment for laboratory of agricultural products process and storage (21 items)	3,636,000,000
Substation (1 item)	506,000,000
Electric generator (1 item)	664,400,000
Extra-clean water filter equipment (1 item)	252,000,000
<b>Subtotal (6 packages)</b>	<b>18,962,400,000</b>
<b>2. Plant Protection Research Institute</b>	
Laboratory equipment for pesticide residue (2 items)	2,990,000,000
Laboratory equipment for pest and disease diagnostic, identification and conservation (33 items)	3,831,188,385
Laboratory equipment for agricultural insect pests (24 items)	2,332,530,000
Equipment for research and technology transfer	2,558,000,000

<b>Institute and Equipment Procured</b>	<b>Cost (D)</b>
Equipment for nematode laboratory	1,990,680,000
<b>Subtotal (5 packages)</b>	<b>13,702,398,385</b>
<b>3. Soils and Fertilizers Research Institute</b>	
Spectrum equipment, product quality analysis equipment (7 types )	5,280,600,000
Physio-chemistry analyzing equipment and glassy and chemical tools (17 types)	2,979,145,000
Auxiliary equipment (23 types)	2,506,218,000
Software, office equipment (8 types)	534,575,000
Auxiliary equipment 1 (25 items)	3,512,165,000
Auxiliary equipment 2 (13 items)	2,996,000,000
Quick scene analysis equipment	1,975,985,000
Equipment for supporting information publication and technology science transfer	1,962,960,000
Equipment for remote training	1,183,000,000
<b>Subtotal (9 packages)</b>	<b>22,930,648,000</b>
<b>4. Field Crops Research Institute</b>	
Equipment for variety selection and multiplication (32 items)	6,281,978,286
Equipment for supporting production and technology science innovation transfer (8 items)	1,144,381,000
Additional equipment for supporting technology science innovation research and transfer (13 items)	2,518,109,000
<b>Subtotal (3 packages)</b>	<b>9,944,468,286</b>
<b>5. Forest Science Institute of Viet Nam</b>	
Equipment for specialized analysis (5 types)	2,979,668,000
Equipment for environment and soil experiment, auxiliary equipment (23 types)	3,299,868,000
Laboratory furniture (3 types)	750,590,000
Additional equipment	2,979,050,000
Additional equipment in 2013	980,000,000
<b>Subtotal (5 packages)</b>	<b>10,989,176,000</b>
<b>6. Institute of Policy and Strategy for Agriculture and Rural Development</b>	
Equipment and software supporting professional research	3,717,812,600
Server system and network equipment	1,045,582,500
Office equipment (21 types)	2,355,120,900
Office furniture (15 types)	2,995,175,700
E-library equipment, audio system, and other equipment (32 types)	2,698,773,000
<b>Subtotal (4 packages)</b>	<b>12,812,464,700</b>

<b>Institute and Equipment Procured</b>	<b>Cost (D)</b>
<b>7. Southern Fruit Research Institute</b>	
Equipment for quality product research and auxiliary equipment (38 items)	2,707,370,000
Equipment for biology technology research (12 items)	2,255,500,000
Equipment for fruit preservation research and other auxiliary equipment of high performance liquid chromatography (18 items)	1,765,318,600
<b>Subtotal (3 packages)</b>	<b>6,728,188,600</b>
<b>8. Cuu Long Delta Rice Research Institute</b>	
Experimental equipment for biology technology group 1 (24 items)	2,198,513,713
Experimental equipment for biology technology group 2 and auxiliary equipment (10 items)	4,199,195,000
Experimental equipment for biology technology group 3 (4 items)	3,264,381,000
Experimental equipment for biology technology group 4 (10 items)	3,027,837,500
Photosynthesis Measurement System, UPS 10 KVA, furniture, chemical and experimental tools (4 items)	917,750,000
Experimental equipment for biology technology group 5	2,970,000,000
<b>Subtotal (6 packages)</b>	<b>16,577,677,213</b>
<b>9. Institute of Agricultural Science of South Viet Nam</b>	
Auxiliary equipment + tools, chemical (Dong Thap Muoi Center) (40 items)	617,304,000
Equipment for soil and plant protection research (Dong Thap Muoi Center) (19 items)	1,564,700,000
Equipment for veterinary and health, livestock physiology department (Biology Technology Center and Animal Health Department) (37 items)	4,182,836,800
Additional equipment for Animal Health Department (9 items)	1,287,342,000
<b>Subtotal (4 packages)</b>	<b>7,652,182,800</b>
<b>10. Western Highland Agro-Forestry Science and Technology Institute</b>	
Equipment for soil, fertilizer, and agricultural products analysis department (4 items)	1,569,333,000
Experimental equipment for biology technology (26 items)	3,108,668,000
Equipment for analysis department of Lam Dong Agriculture And Forestry Experimental Research Center (7 items)	593,500,000
<b>Subtotal (3 packages)</b>	<b>5,271,501,000</b>
<b>11. Agricultural Environment Institute</b>	
Research equipment for Agricultural Environment Institute (62 items)	6,911,464,228
Additional equipment for Agricultural Environment Institute	2,996,631,000
<b>Subtotal (2 packages)</b>	<b>9,908,095,228</b>
<b>12. Central Northern Agriculture and Science Institute</b>	
Research equipment for Central Northern Agriculture and Science Institute (28 items)	6,943,600,000
<b>Subtotal (1 package)</b>	<b>6,943,600,000</b>

Institute and Equipment Procured	Cost (D)
<b>13. Southern Coastal Central Agricultural Science Institute</b>	
Research equipment for Southern Coastal Central Agricultural Science Institute (12 items)	5,996,000,000
<b>Total (1 package)</b>	<b>5,996,000,000</b>
<b>Total (52 packages)</b>	<b>148,418,800,212</b>

## B. Extension Activities

**Table A2.3: Extension Contracts Awarded by Year, Province, and Type of Service Provider**

(Main text reference para. 14)

Year/Province	Service Provider Type								Total
	PAEC	DAES	Ag Res Inst	School/ College	Tech Transfer Org	Soc Org	Prof Assoc	Ag Service Co	
<b>2008</b>									
Thanh Hoa		20			2				22
Nghe An		19							19
Quang Nam									0
Ninh Thuan	8		3		4	1	3		19
Dak Nong									0
<b>Total</b>	<b>8</b>	<b>39</b>	<b>3</b>	<b>0</b>	<b>6</b>	<b>1</b>	<b>3</b>	<b>0</b>	<b>60</b>
Share (%)	13.3	65.0	5.0	0.0	10.0	1.7	5.0	0.0	100
<b>2009</b>									
Thanh Hoa	4	25	1		14	1	8	6	59
Nghe An	2	39		1				1	43
Quang Nam		37							37
Ninh Thuan			1		5	1	2	1	10
Dak Nong		15							15
<b>Total</b>	<b>6</b>	<b>116</b>	<b>2</b>	<b>1</b>	<b>19</b>	<b>2</b>	<b>10</b>	<b>8</b>	<b>164</b>
Share (%)	3.7	70.7	1.2	0.6	11.6	1.2	6.1	4.9	100
<b>2010</b>									
Thanh Hoa	4	57	2		17	2	19	14	115
Nghe An		18			4		1		23
Quang Nam	5	15			23		2		45
Ninh Thuan	3		9		15	2	5	2	36
Dak Nong		1	7	1	6			5	20
<b>Total</b>	<b>12</b>	<b>91</b>	<b>18</b>	<b>1</b>	<b>65</b>	<b>4</b>	<b>27</b>	<b>21</b>	<b>239</b>
Share (%)	5.0	38.1	7.5	0.4	27.2	1.7	11.3	8.8	100
<b>2011</b>									
Thanh Hoa	1	10			3			6	20
Nghe An	3	21	6	1			10	6	47

Year/Province	Service Provider Type								
Quang Nam	8								8
Ninh Thuan			6		10	4	3	2	25
Dak Nong			2	4					6
<b>Total</b>	<b>12</b>	<b>31</b>	<b>14</b>	<b>5</b>	<b>13</b>	<b>4</b>	<b>13</b>	<b>14</b>	<b>106</b>
Share (%)	11.3	29.2	13.2	4.7	12.3	3.8	12.3	13.2	100
<b>2012</b>									
Thanh Hoa	1	13			3		1	4	22
Nghe An		3	1	1			1	3	9
Quang Nam	4	3							7
Ninh Thuan									0
Dak Nong		1	2	5					8
<b>Total</b>	<b>5</b>	<b>20</b>	<b>3</b>	<b>6</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>7</b>	<b>46</b>
Share (%)	10.9	43.5	6.5	13.0	6.5	0.0	4.3	15.2	100
<b>Total</b>	<b>43</b>	<b>297</b>	<b>40</b>	<b>13</b>	<b>106</b>	<b>11</b>	<b>55</b>	<b>50</b>	<b>615</b>
Share (%)	7.0	48.3	6.5	2.1	17.2	1.8	8.9	8.1	100

Ag Res Inst = agricultural research institute; Ag Service Co = agricultural service company; DAES = district agricultural extension station; PAEC = provincial agricultural extension center; Prof Assoc = professional association; Soc Org = social organization; Tech Transfer Org = technology transfer organization.

**Table A2.4: Extension Contracts Awarded by Province and Type of Service Provider**  
(Main text reference para. 14)

(main text reference para: 11)										
Service Provider Type										
Province	PAEC	DAES	Ag Res Inst	School or College	Tech Trsfr Org	Soc Org	Prof Assoc	Ag Service Co	Total	Share (%)
Thanh Hoa	10	125	3	0	39	3	28	30	238	38.7
Nghe An	5	100	7	3	4	0	12	10	141	22.9
Quang Nam	17	55	0	0	23	0	2	0	97	15.8
Ninh Thuan	11	0	19	0	34	8	13	5	90	14.6
Dak Nong	0	17	11	10	6	0	0	5	49	8.0
Total	43	297	40	13	106	11	55	50	615	100.0
Share (%)	7.0	48.3	6.5	2.1	17.2	1.8	8.9	8.1	100	

Ag Res Inst = agricultural research institute; Ag Service Co = agricultural service company; DAES = district agricultural extension station; PAEC = provincial agricultural extension center; Prof Assoc = professional association; Soc Org = social organization; Tech Trsfr Org = technology transfer organization.

**Table A2.5: Value of Extension Contracts Awarded by Province and Type of Service Provider (D million)**  
(Main text reference para. 14)

Province	Service Provider Type								Total	Share (%)
	PAEC	DAES	Ag Res Inst	School or College	Tech Transfer Org	Soc Org	Prof Assoc	Ag Service Co		
Thanh Hoa	1,377	16,354	379	0	4,894	368	3,866	4,087	<b>31,324</b>	37.5
Nghe An	738	14,534	1,166	244	474	0	1,796	1,540	<b>20,492</b>	24.5
Quang Nam	2,085	6,785	0	0	2,527	0	299	0	<b>11,696</b>	14.0
Ninh Thuan	1,960	0	2,665	0	4,780	993	1,874	808	<b>13,080</b>	15.7
Dak Nong	0	2,110	1,541	1,643	948	0	0	660	<b>6,901</b>	8.3
<b>Total</b>	<b>6,161</b>	<b>39,783</b>	<b>5,751</b>	<b>1,887</b>	<b>13,621</b>	<b>1,361</b>	<b>7,834</b>	<b>7,095</b>	<b>83,493</b>	100.0
Share (%)	7.4	47.6	6.9	2.3	16.3	1.6	9.4	8.5	100.0	

**Table A2.6: Extension Contracts Awarded by Year and Type of Service Provider**  
(Main text reference para. 14)

Year	Service Provider Type								Total	Share (%)
	PAEC	DAES	Ag Res Inst	School or College	Tech Transfer Org	Soc Org	Prof Assoc	Ag Service Co		
2008	8	39	3	0	6	1	3	0	<b>60</b>	9.8
2009	6	116	2	1	19	2	10	8	<b>164</b>	26.7
2010	12	91	18	1	65	4	27	21	<b>239</b>	38.9
2011	12	31	14	5	13	4	13	14	<b>106</b>	17.2
2012	5	20	3	6	3	0	2	7	<b>46</b>	7.5
<b>Total</b>	<b>43</b>	<b>297</b>	<b>40</b>	<b>13</b>	<b>106</b>	<b>11</b>	<b>55</b>	<b>50</b>	<b>615</b>	100.0
Share (%)	7.0	48.3	6.5	2.1	17.2	1.8	8.9	8.1	100.0	

Ag Res Inst = agricultural research institute; Ag Service Co = agricultural service company; DAES = district agricultural extension station; PAEC = provincial agricultural extension center; Prof Assoc = professional association; Soc Org = social organization; Tech Transfer Org = technology transfer organization.

**Table A2.7: Mass Media Programs Supported**  
(Main text reference para. 13)

Subject Matter	Broadcast Program – Channel	Date Broadcast	Duration (min, sec)
Technique of raising <i>Bostrichthys sinensis</i>	Friend of Farmers– VTV2	10 Nov 2011	30'
Technique of hand-milking	Friend of Farmers – VTV2	27 Sep 2011	30'
Technique of rice direct seeding	Agriculture extension – VTC16	2 Apr 2011	15'
Phu Tho: Model of raising effective baby fishes. Technique of selecting breed butterflyfish with yellow fin	Agriculture extension – VTC16	15 May 2011	15'
Quang Ninh: Model of effective rare ripe litchi	Agriculture extension – VTC16	4 Jun 2011	15'

<b>Subject Matter</b>	<b>Broadcast Program – Channel</b>	<b>Date Broadcast</b>	<b>Duration (min, sec)</b>
Technique of choosing breed goat. Prevention of some common diseases of goat	Agriculture extension – VTC16	1 Aug 2011	15'
Technique of using biogas finished product for effective vegetable growing – Model of vegetable growing using biogas finished product in Me Linh, Ha Noi	Agriculture extension – VTC16	10 Sep 2011	15'
Cultivating methods of preventing Scirpophaga incertulas. Instruction on chemical method of preventing Scirpophaga incertulas	Agriculture extension – VTC16	19 Nov 2011	15'
Technique of planting Momordica	Friend of Farmers – VTV2	10 Jan 2012	30'
Technique of raising french pigeon	Friend of Farmers – VTV2	2 Feb 2012	30'
Final of Combine Harvesters competition in northern provinces	Rural News – VTC16	27 Sep 2012	2'30"
Forum of preventing cold for animals in northern mountainous provinces	Rural News – VTC16	21 Dec 2012	2'30"
Linkage between production and market of agriculture products	Rural News – VTC16	15 Dec 2012	2'30"
Ha Noi: development of Red Pitaya	Rural News – VTC16	23 Jun 2012	2'30"
Solution for developing orange in northern provinces	Rural News – VTC16	21Dec 2012	2'30"
Development of sustainable cassava in northern mountainous midland region	Rural News – VTC16	18 Dec 2012	2'30"
Ben Tre: improving sustainable cacao	Rural News – VTC16	24 Dec 2012	2'30"
Applying mechanization tending to production of clean tea	Rural News – VTC16	12 Dec 2012	2'30"
Linkage between development of sustainable coffee and tea in north-west region	Rural News – VTC16	15 Oct 2012	2'30"
Fair of Agriculture and Trade in northwest region	Rural News – VTC16	16 Oct 2012	2'30"
Competition of cross-bred cow raisers	Rural News – VTC16	19 Oct 2012	2'30"
Forum on agriculture: reasonable usage of fertilizers	Rural News – VTC16	15 May 2013	2'30"
Forum on prevention of diseases for fresh-water fish in northern provinces	Rural News – VTC16	28 May 2013	2'30"
Extension forum on agriculture: development of sustainable rubber	Rural News – VTC16	28 May 2013	2'30"
Documentary film: Agriculture extension – 20 years of building and development		Shown at conference on 27 Feb 2013 in Ha Noi	30'
Technique of raising pig using biosafety procedures in household level	Friend of Farmers – VTV2		30'
Technique off raising breed cow	Friend of Farmers – VTV2		30'



<b>Subject Matter</b>	<b>Broadcast Program – Channel</b>	<b>Date Broadcast</b>	<b>Duration (min, sec)</b>
Technique of operating, maintaining, repairing multi-purpose earthworking machine in mountainous midland	Friend of Farmers – VTV2		30'
Technique of operating, maintaining, repairing earth-working machine, sugarcane care	Friend of Farmers – VTV2		30'
Technique of cultivating tea, processing bud by machine	Friend of Farmers – VTV2		30'
Technique of production, preliminary treatment of some kinds of mushroom	Friend of Farmers – VTV2		30'
Documentary film introducing transferred technology advance in Red River Delta – North-center region		Shown at conference on 13 Sep 2013 in Thanh Hoa	20'
Documentary introducing transferred technology advance in Center – Highland		Shown at conference on 28 Jun 2013 in Binh Dinh	20'
Documentary introducing transferred technology advance in East-South – Mekong Delta		Shown at conference on 18 Sep 2013, in Can Tho	20'

### C. Project-Supported Study Tours

**Table A2.8: Project-Supported Study Tours – Country, Subject Matter, and Participants**  
(Main text reference paras. 10, 13, and 16)

<b>Country</b>	<b>Subject</b>	<b>Dates</b>	<b>Participants</b>		
			<b>Total</b>	<b>Female</b>	<b>Female (%)</b>
China	Experience in establishing the school/college development strategy, improvement of curriculum and compilation of textbooks (10 schools or colleges)	29 Mar–4 Apr 2008	18	4	22
Thailand	Experience in extension implementation and management (5 provinces)	20–29 Dec 2008	24	6	25
Korea	Exchange of experience between research/management staff of Viet Nam and Korea (10 institutes)	20–27 Sep 2009	20	6	30
Taiwan	Exchange of experience of extension model implementation and management (5 provinces)	6–14 April 2011	19	3	16
Thailand	Exchange of experience in training methods and market-oriented rural-based vocational training	2–8 April 2012	30	7	23
Taiwan	Organic cultivation and commerce	6–14 August 2011	30	8	27
Taiwan	Climate-change adaptation in agricultural production	20–28 August 2011	30	13	43

Country	Subject	Dates	Participants		
			Total	Female	Female (%)
Malaysia	Agricultural technology transfer	24–30 March 2013	29	7	23
<b>Total</b>			<b>200</b>	<b>54</b>	<b>27</b>

**Table A2.9: Project-Supported Study Tours – Number of Participants by Organization or Institute**

(Main text reference paras. 10, 13, and 16)

Country	MARD	Ministry of Finance	CPMU & APMB	Project Provinces	Agricultural Research Institutes	Technical and Vocational Training Schools	Total
China	5		3			10	18
Thailand	8	1	7	8			24
Korea	5		4		11		20
Taiwan	7		3	9			19
Thailand	6		6			18	30
Taiwan	3		2	3	12	10	30
Taiwan	3		2	5	14	6	30
Malaysia	3	2	5		9	10	29
<b>Total</b>	<b>40</b>	<b>3</b>	<b>32</b>	<b>25</b>	<b>46</b>	<b>54</b>	<b>200</b>

APBM = Agricultural Projects Management Board, CPMU = central project management unit, MARD = Ministry of Agriculture and Rural Development, PPMU = provincial project management unit.

**D. Civil Works, Equipment Procured in Technical and Vocational Training Schools****Table A2.10: Procurement of Civil Works and Equipment by School**

(Main text reference para. 16)

<b>School or College</b>	<b>Civil Works</b>		<b>Equipment</b>	
	(D million)	(\$)	(D million)	(\$)
Hanoi Technology and Economics College (Soc Son – Hanoi)	4,879.48	232,356	8,795.25	418,821
Northern Agricultural and Rural Development College (Xuan Mai – Hanoi)	3,543.03	168,716	15,244.67	725,937
Central College of Economics and Water Resources (Hoi An – Quang Nam)	1,910.53	90,977	11,640.67	554,318
Southern College for Mechanics, Agricultural Technology and Rural Development (Can Tho)	3,156.28	150,299	17,725.87	844,089
Northern Water Resources College (Ha Nam)	5,208.08	248,004	15,930.30	758,586
Da Nang Food College	4,115.76	195,988	17,789.49	847,118
Southern Agricultural College (Tien Giang)	237.90	11,329	20,586.49	980,309
Bao Loc College of Technology and Economics (Lam Dong)	6,659.90	317,138	14,059.46	669,498
Ho Chi Minh City Secondary Food Technology School	2,042.56	97,265	11,430.15	544,293
Hai Phong Secondary Technical School for Food and Foodstuff Management	1,529.82	72,848.57	12,702.30	604,871
<b>Total</b>	<b>33,283.33</b>	<b>1,584,920</b>	<b>145,904.65</b>	<b>6,947,840</b>

## SUMMARY OF GENDER EQUALITY RESULTS AND ACHIEVEMENTS

### I. PROJECT DESCRIPTION

1. The Agriculture Science and Technology Project was to cover (i) 13 agricultural research institutes; (ii) five central provinces—Thanh Hoa, Nghe An, Quang Nam, Dak Nong, and Ninh Thuan; and (iii) 10 colleges and technical and vocational secondary schools under the Ministry of Agriculture and Rural Development. Its impact was to contribute to the country's sustainable and equitable agricultural growth, and its outcome was to strengthen the national system of agriculture science and technology (AST). The project was to have four outputs: (i) client-oriented agricultural research and capacity strengthening, (ii) grassroots agricultural extension improvement, (iii) rural-based technical and vocational training, and (iv) project management support.

2. The project's intended beneficiaries were 104,000 people—(i) the poor, ethnic minorities, and women through capacity building and income generation activities; (ii) the lecturers, researchers, and academic scholars of 10 agricultural research institutes and colleges who would receive scholarships for PhD and master's degree studies and would attend international and domestic study tours and short courses; and (iii) extension workers in the Central Highlands whose capacity for and knowledge of extension methods would be improved.

3. The project gender classification was effective gender mainstreaming. A gender action plan (GAP) was formulated as part of the social assessment (Supplementary Appendix E to the report and recommendation of the President [RRP]), and proposed several actions to mainstream gender issues in project activities.<sup>21</sup> The implementation results are in Table A3.1.

### II. GENDER ANALYSIS AND PROJECT DESIGN FEATURES

#### A. Gender Issues and Gender Action Plan Features

4. The GAP specified the following gender issues: (i) women lack access to extension services because men are considered the main target for training and demonstration and little importance is given to agricultural activities traditionally performed by women; (ii) research and extension practitioners lack capacity to mainstream gender issues in agricultural extension and research activities; at the same time, knowledge and awareness of key gender concepts and the capacity to mainstream gender equality are limited among civil servants in the Ministry of Agriculture and Rural Development (MARD) system; and (iii) educational curricula, including in agriculture and rural development, and technical and vocational training programs rarely mainstream gender into teaching. In addition, the social assessment pointed out that while women account for more than 50% of farmers, they have (i) less access to and (especially) less control over agricultural resources such as water and land, which limits their access to credit, extension services, and information; and (ii) there is gender imbalance in favor of men when it comes to extension work and research.

5. The RRP reflected the project's priority of encouraging women's participation in all activities by proposing (i) a quota (10%) for women's participation in the overseas study program; (ii) inclusion of special sections for women and ethnic minorities in provincial plans; (iii) a 40% share of women beneficiaries in all extension services and demonstration trials; (iv) a

<sup>21</sup> ADB. 2006. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Socialist Republic of Viet Nam: Agriculture Science and Technology Project*. Manila.

50% share of women beneficiaries in extension contracts to be awarded in the final year of the project. However, these targets were not included in the design and monitoring framework (DMF).

6. The GAP had the following key targets:
  - (i) at least 10% of people (6 out of 55) trained in agriculture research are women;
  - (ii) development of technologies that are suitable for women;
  - (iii) gender-responsive focus during farmer needs assessment and planning;
  - (iv) increase in female farmers' participations in project activities;
  - (v) at least 40% of farmers receiving extension services are women and at least 50% of beneficiaries of extension services in the final year of the project are women;
  - (vi) inclusion of gender issues in the agriculture curriculum guide; and
  - (vii) a gender-disaggregated scoring system for the evaluation of research proposals.

## **B. Overall Assessment of Gender-Related Results and Achievements**

7. The project has achieved 13 of 14 targets, which equates to a success rate of 92%. GAP implementation met the practical and strategic needs of women farmers, extension workers, and researchers or lecturers for equality, giving priority to participation by and benefits for poor ethnic minorities, and single and disadvantaged women. The project provided access to long-term and short-term training for 1,276 women, i.e., 45% of 2,849 researchers, lecturers, and staff from 17 research institutes and 10 agricultural colleges and technical and vocational schools. The project assisted both men and women in identifying extension needs and priorities, and 1,815 women farmers (or 26.1% of 6,954 farmers overall) participated in consultations and workshops. The project gave women the opportunity to participate in the development of extension models (e.g., raising of cows and hybrid goats), and 11,680 women (55.6% of 20,999 farmers overall) took part in demonstration models, pilot models in the field, and in the transfer of knowledge about production activities. In total, the project had 104,701 direct beneficiaries—including 52,630 women (50.3%) and 37,190 ethnic minorities (35.5%).

## **C. Gender Equality Results**

### **1. Participation, access to project resources, and practical benefits**

8. The project delivered the following key results related to targets:
  - (i) 13 women out of 55 participants sent abroad for master of science, PhD, and postdoctoral degrees (23.6%); 54 women out of 200 participants on study tours abroad (27%); 788 women out of 1,673 scientists or researchers in 17 institutes and research centers received short training courses (47.1%); 391 female teachers or staff out of 921 teachers or staff in 10 agricultural colleges and secondary technical and vocational schools were trained in different subjects (42.5%).
  - (ii) 65 out of 125 research topics under the project were particularly suitable for women for income generation and job creation—e.g., selection of peanut species and application of new techniques to reduce seeding costs and improve peanut yield (topic no. 65); or measures to improve productivity of special summer paddy rice (*Tai nguyen duc*) in Soc Trang and Bac Lieu provinces (topic no. 18). Out of 6,946 participants in workshops to establish farmers' needs and priorities and to plan project extension services, 1,813 were women (26.1%).

- (iii) 11,680 women (55.62% of 20,999 farmers) participated in research and training activities to boost their knowledge of production, and in other extension services. Many women also received agricultural inputs such as livestock and seedlings. As a result, many women have improved family incomes and living conditions, which in turn helped improve their children's education. See Ms. Luc's and Ms. Dao's stories below.

**Nguyen Thi Luc**—single mother, Village 6, Nam Thai commune, Nam Dan, Nghe An:



*"I was given a cow and I was trained how to grow it. This is a great asset for me and my child. The cow grew quickly and gave birth to calves, and I have gradually escaped out of poverty. My son has the opportunity to access higher education and will not be poor like me. I also share my experience with other women in the village so that they have the same knowledge."*



Ms. Nguyen Thi Dao receiving her cow from the project

**Nguyen Thi Dao**—Thanh Son village, Binh Dinh Nam:

Ms. Dao also received a cow under the project and was trained on how to raise animals. Her income increased to D32,000,000 per year (from D15,000,000 per year before the project), allowing her to escape poverty in 2012.

- (iv) Two out of 10 criteria in the project's scoring system for evaluating research proposals concern gender issues in AST.

## 2. Strategic changes in gender relations

9. By encouraging women's participation in extension and other project activities, the project contributed to women's economic empowerment. It helped them access knowledge to improve their productivity. The training provided encouraged them to voice their needs and concerns and also improved their confidence in developing agriculture techniques that meet their specific needs, and promoted women's roles as researchers and research leaders.

- (i) The project has empowered women economically, especially women farmers who participated in applying agriculture extension models at their homes and

were able to increase their incomes, which gave them more power at home and in their community. This is evident in the following story:

Mrs. Vi Thi Huong (Thai woman) in Thai Son 2 village, Mon Son commune, Con Cuong district, Nghe An, who chairs the Women's Union in her village, said: *"In this project, women are encouraged to participate in the project activities. Whereby we feel more confident to participate in community activities and more equal with men. In the family, we are also more respected by husband and children because of additional income from participating in the agricultural extension models."*

- (ii) The project encouraged women farmers to voice their extension needs and take part in experiments with agriculture extension techniques that meet their specific needs. This built their confidence in experimenting with and applying new agriculture techniques for themselves.

10. The project was successful in promoting women's role as researchers and research leaders. Out of 125 research project directors, 40 (or 32%) are women. The criteria for evaluating research proposals included one on promoting women's involvement in research, which along with the project's financial support to the development of technology suitable for women farmers has contributed to these results.

### 3. Contribution of gender equality results to overall loan outcome and effectiveness

11. The project has been successfully completed, achieving the outcome of strengthening the national AST system. Satisfactory implementation of the GAP also contributed to achieving loan outcome and effectiveness. Specifically, the GAP helped achieve two outcome targets:

- (i) **Client-oriented system with more effective dissemination mechanisms.** As women account for more than 50% of the AST system's clients, the project opted to boost their capacity as AST researchers and extension workers with a view to meeting women's specific needs and to developing an effective technology dissemination mechanism. This was a strategic approach to ensure that the AST system is oriented toward and responsive to women.
- (ii) **Closer link between research and extension activities.** The project involved farmers (male and female) in identifying extension needs and participating in extension pilots together, under the guidance of women extension workers and researchers. This forged a close link between research and extension activities that would serve the needs of farmers.

12. GAP implementation helped achieve satisfactorily two outcome targets and hence contributed to greater effectiveness of the overall loan outcome.

## III. LESSONS AND RECOMMENDATIONS

13. Several factors were critical to the successful achievement of GAP targets:

- (i) The project had a good system in place to monitor and evaluate gender- and ethnicity-disaggregated quantitative data and to capture and report on GAP implementation. It enormously helped project review missions to spot gaps in GAP implementation. This is a good practice and highly recommended for all projects.

- (ii) The project team leader was supportive of GAP implementation. Review missions in the last 2 years of the project regularly included a review of GAP implementation progress and provided recommendations. This was an important factor in achieving many of the GAP targets.
14. Constraints encountered in GAP implementation include:
- (i) Gender awareness, gender equality, women's empowerment, and gender mainstreaming are still new concepts for most communities and even extension workers, especially for those living in rural and remote settings and where communities have had little or no opportunity to benefit from foreign-funded projects. The project had no activities to raise awareness of gender issues in agriculture or agricultural research and science. Therefore, it faced some challenges in mobilizing women to participate in project activities such as workshops on extension needs.
  - (ii) The project's social development officer, who was tasked with overseeing and reporting on GAP implementation from the central project management unit (PMU), had no gender expertise, so the project missed a critical opportunity to achieve gender targets (e.g., in developing an agricultural curriculum guide to include gender-related contents, or in planning extension programs that included gender-related activities).
  - (iii) The monitoring and evaluation (M&E) system collected sex-disaggregated data. Despite being quite comprehensive, the M&E system still failed to fully capture some qualitative data or targets (such as the provincial plan with a special section for women-oriented activities), and sex-disaggregated data consolidated at project level was not always readily available..
15. **Sustainability.** The project invested in the development of human resources for the AST system, especially female staff and farmers who would continue beyond the project to work for or receive the services. The following elements help ensure sustainability of the project gains:
- (i) Female research workers and extension staff, as well as research leaders who benefited from the research contracts awarded by the project, have gained substantial capacity.
  - (ii) Female farmers have learned to research and to use agricultural technologies that were developed with a view to their needs, and they now have the capacity to continue to apply these technologies in their households. Their confidence and empowerment will continue beyond project life.
  - (iii) The project's criteria for evaluating research proposals, which take into account gender-related aspects, will likely be applied beyond project life when assessing whether a research proposal might be eligible for financial support from MARD's AST department.
16. Recommendations include:
- (i) **Improvement of GAP design.** For future projects, the GAP targets need to be more specific and aligned with DMF outcomes, and some key GAP targets could be included in the DMF to ensure achievement (such as a guide for developing agricultural curricula with gender-relevant content).
  - (ii) **Improvement of GAP implementation arrangements.** The project needs to ensure that the central PMU's social development officer has gender expertise, or have her or him supported by a part-time gender specialist, to provide technical inputs beyond quantitative GAP monitoring and reporting.



- (iii) **Gender sensitization workshops.** Central and provincial PMUs ideally should attend gender sensitization workshops, including GAP orientation, at the beginning of the project cycle. It is recommended to include such workshops in the GAP design to increase the chance of achieving all realistically set targets.

**TABLE A3.1: GENDER ACTION PLAN MONITORING TABLE UPDATES**

Project number: 36304

Name: L2283-VIE: Agriculture Science and Technology Project

Project team leader: Sununtar Setboonsarng

Implementation period: June 2007–June 2013

Date of Updates: 8 May 2014

Output	Proposed Gender Activities <sup>a</sup>	Results
1. Capacity of physical and human resources for agricultural research improved	<ul style="list-style-type: none"> <li>Human capacity strengthening for female scholars: at least 10% (6 out of 55) persons trained on agricultural research will be women</li> <li>Development of technologies suitable for female farmers</li> </ul>	<p><b>Achieved:</b> 13 out of 55 participants sent abroad for master of science, PhD, and post-doctoral degrees were women (23.6%); 54 out of 200 participants in study tours abroad were women (27%); 788 women from among 1,673 scientists or researchers in 17 institutes and research centers received short training courses (47.1%); 391 female teachers or staff out of 921 teachers or staff in 10 agricultural colleges and secondary technical and vocational schools were trained in different subjects (42.5%); 25,118 extension workers trained, of whom 7,173 were women (28.55%).</p> <p><b>Achieved:</b> 65 out of 125 research topics under the project particularly suited female farmers' income generation and job creation needs.<sup>b</sup> In many of the research and experimental activities, women farmers played a key role and substantially benefited from it. Typical examples were experiments with a new peanut variety, potato growing, local sow (<i>Mong Cai</i>) raising, and a new summer paddy rice variety (<i>Tai Nguyen Duc</i>).</p>
2. Agricultural research activities made more responsive to client needs	<ul style="list-style-type: none"> <li>Gender focus during farmers' needs assessment</li> <li>Special section for women-oriented activities in provincial plan</li> <li>Strengthening of capacity to implement on-the-job or</li> </ul>	<p><b>Achieved:</b> The project held 129 workshops to prioritize and plan extension services for 6,946 participants, of whom 1,812 (26.1%) were women. Women were encouraged to articulate their issues and interests. Based on this, a list of extension service and research topics was formulated for implementation.</p> <p><b>Achieved:</b> Provincial plans prepared under the project contained a section for women-oriented activities, including research topics of special interest to women.</p> <p><b>Achieved:</b> 390 women (41.5%) from among 940 agriculture extension staff used the</p>

Output	Proposed Gender Activities <sup>a</sup>	Results
	<p>experience training</p> <ul style="list-style-type: none"> <li>Increased participation of woman farmers in project activities</li> </ul>	<p>results of research projects directly in their work.</p> <p><b>Achieved:</b> 11,481 (52%) of 22,037 farmers participating in training on research skills were women. In addition, 6,538 farmers participated directly in implementing their research project's results at home, of whom 3,164 (48.4%) were women.</p>
3. Farmers' access to participatory and pro-poor agricultural extension improved	Extension contracts to be funded under the project will have provisions that at least 40% of beneficiaries of extension services are women; and 50% in the final year of the project	<b>Achieved.</b> Women farmers participated in the development of extension models (e.g., cow raising, hybrid goat raising) at a ratio of 55.62% (11,680 out of 20,999 participants). The activities gave women the chance to take part in extension model demonstrations and pilots, and boosted their knowledge of various production techniques.
4. Improved linkage of agriculture extension services with research strengthened	Closer linkage forged between research and extension activities	<b>Achieved:</b> The project allowed farmers (male and female) to determine extension needs and take part in extension model pilots together, under the guidance of female extension workers and researchers. This forged a closer link between research and extension activities that serve the needs of farmers. This contributed highly to enhancing the relevance of technologies and research to farmer clients, of whom more than 50% are women.
5. Rural-based technical and vocational training made more responsive to national sector goals"	Inclusion of gender issues in the development of agriculture curriculum guides	<b>Not achieved:</b> Agriculture curriculum guides developed did not include gender issues.
6. Capacity of rural-based technical and vocational training strengthened	Female staff included in training courses supported by the project	<b>Achieved:</b> The project organized 30 training courses for 921 management and teaching staff in 10 colleges; 391 of them were women (42.45%).
Project management	<ul style="list-style-type: none"> <li>Social development officer recruited in CPMU</li> <li>Adoption of a gender-disaggregated scoring system for evaluation of proposals</li> <li>Gender-disaggregated M&amp;E system</li> <li>MTR includes review of</li> </ul>	<p><b>Achieved:</b> The central project management unit had one social development officer who acted as gender focal point but had no specific gender expertise.</p> <p><b>Achieved:</b> Among the criteria for evaluating research proposals were: (i) the topic addresses environmental impacts and gender issues (maximum score: 20 points) and (ii) the topic involves women in research and training activities (maximum score: 10 points).</p> <p><b>Achieved:</b> M&amp;E system disaggregated data by gender, including all statistics on training participants, research leaders, research participants, proposal evaluation criteria.</p> <p><b>Achieved:</b> Loan review missions in the last</p>

Output	Proposed Gender Activities <sup>a</sup>	Results
	gender action plan implementation and capacity of AST activities to address gender issues	2 project years regularly updated assessment of gender action plan implementation and recommendations for future improvement actions—aide-mémoires dated May 2010 (MTR), April 2011, April 2012, September 2012, and May 2013.

AST = agriculture science and technology, M&E = monitoring and evaluation, MTR = midterm review.

<sup>a</sup> A list of these activities was derived from pp. 32–37 of the gender action plan under Supplementary Appendix E (Social Assessment) of the report and recommendation of the President.

<sup>b</sup> Two examples are: Selection of a particular peanut species and application of new technology to reduce seeding costs and improve peanut yields (topic no. 65); measures to improve productivity with special summer paddy rice (*Tai Nguyen Duc*) in Soc Trang and Bac Lieu provinces (topic no. 18).

## PROJECT COSTS

**Table A4.1: Costs by Component Estimated at Appraisal and Actual Costs Incurred**  
(\$ million)

Item	Appraisal Estimate			Actual Cost		
	Financing		Total Cost	Financing		Total Cost
	ADB Loan	Government		ADB Loan	Government	
Client-oriented agricultural research and capacity strengthening	14.092	2.776	<b>16.868</b>	14.499	4.032	<b>18.530</b>
Grassroots agricultural extension improvement	5.998	2.955	<b>8.953</b>	6.171	4.122	<b>10.293</b>
Rural-based technical and vocational training	7.343	2.502	<b>9.845</b>	7.555	0.470	<b>8.025</b>
Project management support	1.952	1.767	<b>3.719</b>	2.008	1.607	<b>3.615</b>
<b>Total Project Cost</b>	<b>29.385</b>	<b>10.000</b>	<b>39.385</b>	<b>30.233</b>	<b>10.230</b>	<b>40.463</b>
Interest during implementation	0.616	-	<b>0.616</b>	0.640	-	<b>0.640</b>
<b>Total Cost</b>	<b>30.000</b>	<b>10.000</b>	<b>40.000</b>	<b>30.873</b>	<b>10.230</b>	<b>41.103</b>
(%)	75.0	25.0	100.0	75.1	24.9	100.0

ADB = Asian Development Bank.

Notes:

1. Figures are total costs including contingencies.
2. Figures may not sum due to rounding.

Sources: Appraisal estimates from: ADB. 2006. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Socialist Republic of Viet Nam for the Agriculture Science and Technology Project*. Manila. Actual costs from ADB Loan Financial Information System, and estimates by the central project management unit.

**Table A4.2: Costs by Category Estimated at Appraisal and Actual Costs Incurred**  
(\$ million)

Item	Appraisal Estimate			Actual Cost		
	Financing		Total	Financing		Total
	ADB Loan	Government	Cost	ADB Loan	Government <sup>a</sup>	Cost
1. Civil works	1.462	0.487	<b>1.949</b>	1.404	0.499	<b>1.903</b>
2. Equipment	7.804	2.550	<b>10.354</b>	12.586	2.591	<b>15.177</b>
3. Vehicles	0.036	0.036	<b>0.072</b>	0.020	0.037	<b>0.057</b>
4. Materials	2.589	0.863	<b>3.452</b>	-	0.901	<b>0.901</b>
5. Training	7.016	1.952	<b>8.968</b>	6.100	1.997	<b>8.097</b>
6. Research or extension contracts	8.688	2.401	<b>11.089</b>	8.120	2.457	<b>10.577</b>
7. Consulting services	0.982	-	<b>0.982</b>	1.176	-	<b>1.176</b>
8. Incremental operating cost	0.807	1.711	<b>2.518</b>	0.826	1.749	<b>2.575</b>
9. Interest charge	0.616		<b>0.616</b>	0.640	-	<b>0.640</b>
<b>Total project cost</b>	<b>30.000</b>	<b>10.000</b>	<b>40.000</b>	<b>30.872</b>	<b>10.230</b>	<b>41.103</b>
(%)	75.0	25.0	100.0	75.1	24.9	100.0

ADB = Asian Development Bank.

<sup>a</sup> The Central Project Management Unit does not record costs by category. Total government costs are allocated to categories as estimated at appraisal. Figures are, therefore, indicative.

Notes:

1. Figures are total costs including contingencies.

2. Figures may not sum precisely due to rounding.

Sources: Appraisal estimates from: ADB. 2006. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Socialist Republic of Viet Nam for the Agriculture Science and Technology Project*. Manila. Actual costs from: ADB Loan Financial Information System, and estimates by the central project management unit.

**Table A4.3: Reallocation of Loan Funds by Category**

<b>Category</b>	<b>Loan Agreement</b>	<b>After Reallocation<sup>a</sup></b>	
	(SDR)	(SDR)	(\$) <sup>b</sup>
Civil works	809,000	700,000	1,084,741
Equipment	5,123,000	8,500,000	13,099,672
Vehicles	24,000	14,000	21,478
Materials	1,429,000	-	-
Training	4,276,000	4,100,000	6,319,314
Research or extension contracts	5,315,000	4,700,000	7,209,736
Consulting services	661,000	1,169,000	1,804,572
Incremental operating costs	446,000	600,000	925,619
Interest charge	415,000	415,000	640,000
Unallocated	1,700,000	-	-
<b>Total</b>	<b>20,198,000</b>	<b>20,198,000</b>	<b>31,105,132</b>

SDR = special drawing right.

<sup>a</sup> Reallocation approved by the Asian Development Bank on 10 December 2010.<sup>b</sup> \$1.0 = SDR1.54001.

### ANNUAL DIBSRSEMENTS UNDER LOAN 2283-VIE(SF) (\$)

Category	2007	2008	2009	2010	2011	2012	2013	2014	Total
Civil Works	0	0	211,968	791,575	359,096	41,556	0	0	1,404,195
Equipment	365,052	104,514	690,082	4,478,984	4,045,699	2,564,179	0	0	12,248,510
Vehicles	20,081	0	0	0	0	0	0	0	20,081
Materials	0	0	0	0	0	0	0	0	0
Training	229,012	112,648	1,376,142	1,042,905	2,084,344	1,255,387	0	0	6,100,438
Research/Extension Contracts	262,119	82,661	2,918,581	2,265,715	2,132,352	795,995	0	0	8,457,423
Consulting Services	9,180	2,941	398,957	224,620	235,857	304,283	0	0	1,175,838
Incremental Operating Cost	114,556	49,039	156,923	53,621	212,461	239,859	0	0	826,459
Interest Charge	3,095	10,667	38,091	105,101	206,040	265,823	11,180	0	639,997
Unallocated									
Imprest Account	0	0	0	0	25,186	200,420	0	(225,606)	0
<b>Total Funds Disbursed</b>	<b>1,003,095</b>	<b>362,470</b>	<b>5,790,744</b>	<b>8,962,521</b>	<b>9,301,035</b>	<b>5,667,502</b>	<b>11,180</b>	<b>(225,606)</b>	<b>30,872,941</b>
<b>Cumulative Disbursements</b>	<b>1,003,095</b>	<b>1,365,565</b>	<b>7,156,309</b>	<b>16,118,830</b>	<b>25,419,865</b>	<b>31,087,367</b>	<b>31,098,547</b>	<b>30,872,941</b>	
<b>Cumulative Disbursements (%)</b>	<b>3.2</b>	<b>4.4</b>	<b>23.2</b>	<b>52.2</b>	<b>82.3</b>	<b>100.7</b>	<b>100.7</b>	<b>100.0</b>	
<b>Cumulative Disbursements against Original Loan of \$30 million (%)</b>	<b>3.3</b>	<b>4.6</b>	<b>23.9</b>	<b>53.7</b>	<b>84.7</b>	<b>103.6</b>	<b>103.7</b>	<b>102.9</b>	

Categories as specified in the loan agreement.

Source: Asian Development Bank Loan Financial Information System.

### STATUS OF COMPLIANCE WITH LOAN COVENANTS

Covenant	Reference in Loan Agreement	Status of Compliance
<p>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.</p>	<p>Section 4.02 (a)</p>	<p>Complied with.</p> <p>(i) Separate accounts were maintained for the project: (a) first-generation account at the central project management unit (CPMU) and (b) second-generation accounts at the five provincial project management units (PPMUs) and 20 institute project management units (IPMUs)—i.e., at 10 agricultural research institutes and 10 technical and vocational training schools.</p> <p>(ii) Project accounts were audited and financial statements prepared. Audit opinions generally stated that loan proceeds were used for the purpose intended, and that the project complied with financial covenants and statement of expenditure procedures.</p> <p>(iii) Annual financial statements were submitted to the Asian Development Bank (ADB) on a timely basis.</p> <p>Since only 1% of project funds had been disbursed in 2007, ADB agreed to waive the audit of 2007 accounts and agreed that they could be submitted along with the accounts for 2008. The accounts for 2007 and 2008 were submitted to ADB on 20 July 2009.</p>
<p>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.</p>	<p>Section 4.02 (b)</p>	<p>Complied with.</p>



<b>Covenant</b>	<b>Reference in Loan Agreement</b>	<b>Status of Compliance</b>
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.	Section 4.03	Complied with.
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.	Schedule 4, para. 7 (a)	Complied with.
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 7 (a) of Schedule 4.	Schedule 4, para. 7 (b)	Complied with.
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 industrial property or intellectual property right or claim of any third party.	Schedule 4, para. 8	Complied with.
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 Director, 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).	Schedule 5, para. 3	<p>Partially complied with.</p> <p>The CPMU under the Agricultural Projects Management Board of the Ministry of Agriculture and Rural Development (MARD) was established on 9 March 2006 under MARD Decision No. 651/QĐ/BNN-TCCB.</p> <p>The CPMU did not engage a monitoring and evaluation officer.</p>
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,	Schedule 5, para. 4	<p>Partially complied with.</p> <p>In accordance with MARD Decision 455/QĐ-BNN-DANN, dated 1 February 2008, PPMUs were established between April and May 2007, and project implementation units were established in the 10 agricultural research institutes and</p>

<b>Covenant</b>	<b>Reference in Loan Agreement</b>	<b>Status of Compliance</b>
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.		10 technical and vocational training schools.  All PPMUs engaged a local staff member to support general technical assistance (TA) activities, though not exclusively for monitoring and evaluation activities.
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.	Schedule 5, para. 2	Complied with.
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.	Schedule 5, para. 5	Complied with.
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.	Schedule 5, para. 6	Complied with.  The committee was established under MARD Decision No. 1322/QĐ-BNN-KHCN dated 2 May 2008.
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	Schedule 5, para. 7	Complied with.  Selection criteria and procedures for research projects were approved by the deputy minister of MARD on 20 June 2008 under Decision No.1874/QĐ-BNN-KHCN and approved by ADB on

<b>Covenant</b>	<b>Reference in Loan Agreement</b>	<b>Status of Compliance</b>
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 (viii) not more than \$100,000 for each research proposal.		7 July 2008.
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.	Schedule 5, para. 8	Complied with.
The Borrower shall ensure that at least 10% of the trainees are women.	Schedule 5, para. 9	Complied with.
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.	Schedule 5, para. 10	Complied with.
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.	Schedule 5, para. 11	Complied with.
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	Schedule 5, para. 12	Complied with.  Provincial action plans for extension reflected gender issues in accordance with the gender

<b>Covenant</b>	<b>Reference in Loan Agreement</b>	<b>Status of Compliance</b>
agricultural extension to be developed under the Project.		action plan (GAP), but the requirements of the GAP were not specifically dealt with or implemented in other components.
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.	Schedule 5, para. 13	Complied with.
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.	Schedule 5, para. 14	Partially complied with.  Although the project exceeded its goal in terms of involving indigenous people in project activities, extension materials produced were too technical and participation of indigenous people in monitoring and evaluation was limited.
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.	Schedule 5, para. 16	Complied with.
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.	Schedule 5, para. 17	Complied with.

# PROPOSED AND ACTUAL INPUTS OF CONSULTING SERVICES

(person-months)

Expertise	Proposed			Actual		
	Int'l	Nat'l	Total	Int'l	Nat'l	Total
<b>Original</b>						
Agricultural research management	16.0	34.0	<b>50.0</b>	15.9	41.8	<b>57.7</b>
Agricultural extension management	5.0	22.0	<b>27.0</b>	1.7	22.0	<b>23.7</b>
Agricultural vocational training	1.0	11.0	<b>12.0</b>	0.1	13.0	<b>13.1</b>
Social development	2.0	6.0	<b>8.0</b>	1.9	4.2	<b>6.1</b>
Environmental assessment	2.0	11.0	<b>13.0</b>	0.0	11.0	<b>11.0</b>
Financial management	1.0	8.0	<b>9.0</b>	0.9	8.0	<b>8.9</b>
Monitoring and evaluation	2.0	4.0	<b>6.0</b>	2.0	4.0	<b>6.0</b>
<b>Subtotal</b>	<b>29.0</b>	<b>96.0</b>	<b>125.0</b>	<b>22.5</b>	<b>104.0</b>	<b>126.5</b>
<b>Additional</b>						
<i>Impact assessment<sup>a</sup></i>		3.0	<b>5.0</b>	2.0	3.0	<b>5.0</b>
Extension communication		2.0	<b>2.0</b>		2.0	<b>2.0</b>
Value chain development		6.0	<b>6.0</b>		6.0	<b>6.0</b>
E-library development		4.5	<b>4.5</b>		4.5	<b>4.5</b>
Communications		11.0	<b>11.0</b>		11.0	<b>11.0</b>
Baseline survey/project evaluation		3.0	<b>3.0</b>		3.3	<b>3.3</b>
Project evaluation		2.0	<b>2.0</b>		2.0	<b>2.0</b>
Project evaluation		6.5	<b>6.5</b>		6.5	<b>6.5</b>
Equipment effectiveness		5.0	<b>5.0</b>		5.0	<b>5.0</b>
<b>Subtotal</b>	<b>0.0</b>	<b>43.0</b>	<b>45.0</b>	<b>2.0</b>	<b>43.3</b>	<b>45.3</b>
<b>Total</b>	<b>29.0</b>	<b>139.0</b>	<b>168.0</b>	<b>24.5</b>	<b>147.3</b>	<b>171.8</b>

Int'l = international, Nat'l = national.

<sup>a</sup> The impact assessment consultant provided inputs on economic impact assessment and was a replacement for the original environmental assessment consultant.

Italics denote expertise not included in the original consulting services contract.

Source: Asian Development Bank estimates.

1. Several replacements took place during implementation. The key international agricultural extension management specialist was contracted for 5.00 person-months but completed only 1.67 person-months; the balance of funds was reallocated to the national consultant budget. The position of the international agricultural vocational training specialist was terminated after 0.13 person-months of the contracted 1.00 person-months. The international environmental assessment specialist was replaced twice, and the input was ultimately converted from environmental assessment to economic impact assessment. The international monitoring and evaluation consultant was replaced and the replacement not fielded until August 2009. The project also financed the recruitment of individual consultants to support the central and provincial project management units (PMUs). These comprised a central PMU coordinator and a training specialist contracted for 24 person-months each, which were fully utilized, and 156 person-months for five extension specialists, of which 135 person-months were used. In addition, one international consultant for 2 person-months, and two national consultants for 8 person-months in total were contracted to undertake impact evaluation studies to document lessons from the project.

## ECONOMIC ANALYSIS

### A. Introduction

1. The economic analysis for the project completion report (PCR) is based on the replication of an analysis undertaken by the Ministry of Agriculture and Rural Development (MARD) in late 2011–early 2012, using the same methodology, to assess the impact of the project.<sup>1</sup> The 2011/12 analysis covered the three technical project components (client-oriented research, grassroots extension, and technical and vocational training) and two subcomponents (overseas training and equipment upgrade):

- (i) **Client-oriented research.** Benefits were assessed from a survey of improvements in productivity and incomes accruing to the households that participated in the research trials. The survey covered 25 of the 125 research contracts awarded under the project, and included 110 respondents.
- (ii) **Grassroots extension.** Benefits were estimated on the basis of incremental crop and livestock production within a sample of households participating in project-financed extension contracts.
- (iii) **Technical and vocational training.** Benefits were assumed to derive from the increase in income that students who attended the project-supported technical and vocational training schools would enjoy in their working careers.<sup>2</sup>
- (iv) **Overseas training of research staff.** Benefits were assumed to equate to the expected incremental income over the economic life (period of employment) of students who completed overseas studies.<sup>3</sup>
- (v) **Upgrade of research institutes' equipment.** Benefits were assessed based on income earned by institutes using equipment procured under the project and cost savings resulting from not having to outsource that research to other institutes.<sup>4</sup> Five of the 13 institutes supplied with equipment under the project provided benefit data.

2. The 2011/12 assessment report pointed to several shortcomings in the analysis on which it was based, for example in its estimation of the benefits to project beneficiaries, which was based on surveys for which sample sizes were small and not, therefore, representative. Given the nature of these shortcomings and the somewhat tenuous link between project activities and benefits for some components or subcomponents, benefit estimates should be considered at best indicative. There is also a concern that some of the benefits identified at the component level double up on the benefits assumed at the subcomponent level, especially with respect to research activities. Equipment provided to research institutes may well be used to

<sup>1</sup> Ministry of Agriculture and Rural Development. 2012. *Loan 2283-VIE(SF): Agriculture Science and Technology Project: Project Impact Assessment Report*. Hanoi.

<sup>2</sup> This was the basis for the economic analysis of technical and vocational training undertaken at appraisal. It applied the methodology used in previous Asian Development Bank (ADB) education projects. The appraisal stated that the analysis was conservative because the valuation of benefits does not include other benefits accruing to the economy from technical and vocational education, e.g., in the form of increased profits earned by students' employers.

<sup>3</sup> Relatively few students expressed an expectation of an income increase as a result of overseas study. This, along with the low level of incremental income expected, was considered to significantly underestimate the economic benefit of overseas studies. The analysis therefore used the expected level of incremental income in Viet Nam for the first years (to 2020) and thereafter used the expected incremental income in the countries in which students have studied as the expected incremental income.

<sup>4</sup> The economic value of cost savings is difficult to assess with any accuracy since cost savings by project-supported institutes represent a loss of income to institutes that no longer receive work previously outsourced. The level of income loss depends on the ability of the institutes concerned to replace it.

support activities under client-oriented research and, therefore, contribute to farm-level productivity and income benefits. Similarly, training of research staff will eventually also result in farm-level benefits. As such, it is difficult to isolate subcomponent from component benefits.

3. Investment cost estimates for the 2011/12 analysis were derived from both actual and projected expenditures during project implementation. Estimates of actual costs incurred were derived from government expenditure records from 2007 to 2011 provided by the central project management unit (CPMU). Projected costs were based on CPMU expenditure plans for 2012. All costs were converted to 2011 prices using gross domestic product (GDP) deflator data derived from the Asian Development Bank (ADB). Recurrent costs were specifically included for the equipment upgrade subcomponent and the technical and vocational training component. These were based on staff and operation and maintenance cost estimates for operating the newly acquired equipment. There is no indication whether recurrent costs for other components or subcomponents are included in the analysis. They do not appear in cash flows presented in the assessment report. The estimate of project costs for the overall economic analysis does not include the costs of project management or the cost of interest incurred on the ADB loan. As such, the economic internal rates of return (EIRRs) tend to overstate the actual situation. Given the uncertainty surrounding both benefit and cost estimates, no attempt was made to convert estimates in financial terms to economic values.

4. The EIRRs estimated in the 2011/12 assessment report for the components and subcomponents analyzed were 50% for client-oriented research contracts, 2% for overseas training for research institute staff, minus 2% for upgrading research institute equipment, 68% for promotion of grassroots extension, and 41% for technical and vocational training.

## **B. Project Completion Review Methodology**

### **1. Benefit Estimates**

5. There was no scope within the PCR either to undertake new fieldwork to assess project benefits or to replicate the surveys undertaken during the 2011/12 assessment. The PCR analysis therefore assumed that the source and scale of the benefits estimated in 2011/12 were the same at project completion. It then updated the value of these benefits to 2014 prices.<sup>5</sup> Given the concern over the quality and accuracy of benefit estimates, and the difficulty in differentiating the elements of benefit values that would allow conversion into economic analysis, the PCR analysis made no attempt to convert financial values into economic values. This was also the approach of the 2011/12 assessment, except that it assumed that benefits (under certain benefit streams) would continue for 40 years. The PCR analysis thought this unrealistic and thus applied a 30-year period to all benefit streams. This makes little difference to the resulting EIRRs once values so far into the future are discounted.

6. Benefits in the 2011/12 analysis were estimated for the years in which they accrued and were updated to 2011 values based on the implicit GDP deflator. The PCR analysis updated these 2011 values to 2014 values (also on the basis of the GDP deflator).<sup>6</sup>

### **2. Cost Estimates**

7. The estimate of actual project costs is derived from actual annual disbursements

<sup>5</sup> The Vietnamese dong (D) is used as the unit of account for the analysis.

<sup>6</sup> ADB. 2013. *Key Indicators for Asia and the Pacific 2013*. Manila. This provides implicit GDP deflator figures up to 2012. In the absence of other sources, the figure for 2013 is assumed to be equal to the figure for 2012.

recorded in the ADB Loan Financial Information System (LFIS) and estimates of annual government expenditures provided by the CPMU. Both sources provide cost figures according to expenditure categories (e.g., civil works, equipment, research extension contracts, training). Since no reallocation of funds between components occurred during implementation, costs by component have been estimated from costs by expenditure category on the basis of the allocation of costs by expenditure category to components estimated at appraisal. ADB-financed costs recorded in the LFIS in dollar terms have been converted to the Vietnamese dong (D) at the average annual rate of exchange. These and government-financed costs recorded in D have been updated to 2014 values using the implicit GDP deflator.

8. The 2011/12 analysis did not include the costs of project management or interest during implementation (IDI). Project management is a key cost that facilitated the implementation and therefore the attainment of benefits in each of the three main components. Project management costs have been converted and updated in the same manner as the costs of other components. IDI represents a cost to the government and to the economy as a whole and is therefore included in the economic analysis. IDI costs are recorded in the ADB LFIS in dollar terms. Annual IDI costs have been converted to dong (D) costs at the average annual exchange rate.

### C. Economic Analysis

9. Based on cash flows derived from estimated benefit and cost streams, the EIRR for the project is estimated at 19.7%. EIRRs for individual components and the results of sensitivity analysis are in Table A8.1. Given the shortcomings in the analysis, in particular with respect to benefit estimates, all rates of return are regarded as indicative.

**Table A8.1: Results of Economic and Sensitivity Analyses**

Item	EIRR	Variable	SV
<b>Project</b>	19.7	<b>Benefits</b>	
		Client-oriented research	177
		Grassroots extension	135
<b>Components</b>		Technical–vocational training	56
Client-oriented research	3.0	Total	32
Grassroots extension	28.0		
Technical–vocational training	37.3	<b>Costs</b>	
		Client-oriented research	111
		Grassroots extension	203
		Technical–vocational training	257
		Total investment cost	51
		Project management	557
		Interest during construction	867

EIRR = economic internal rate of return, SV = switching value.

Source: Asian Development Bank estimates.

10. Sensitivity analysis for the whole project suggests that it is robust with respect to adverse changes in costs and benefits of project components and variables. Total benefits of the three technical components combined could fall by 32%, or total investment costs could increase by 51%, before the EIRR falls to the assumed economic opportunity cost of capital of 12%. Analysis of individual components suggests that grassroots extension and technical and vocational training are economically viable. Client-oriented research does not appear to be viable. However, the research component EIRR is adversely affected by the negative or low



rates of return on the overseas training and equipment subcomponents.<sup>7</sup> If the cost of these activities is omitted from the cash flow, the EIRR of the research component rises to 7%.

11. The economic analysis was extended to determine the impact on project viability of ADB financing using ADB's ordinary capital resources (OCR) as opposed to special funds (SF). Two additional cash flows were estimated, including all financial inflows (loan disbursements) and outflows (interest payments and principal repayment) along with estimated project costs and benefits. The financing terms used in the analyses were (i) for OCR an interest rate based on the prevailing London interbank offered rate (LIBOR) plus a spread of 0.75%, a loan period of 15 years and a grace period of 3 years with the same interest rate throughout, and (ii) for SF a loan period of 32 years and a grace period of 8 years, and interest rates of 1.0% (grace period) and 1.5% (amortization period). The resulting EIRRs of the project as a whole were estimated at 38.5% under SF financing and at 28.4% under OCR financing. The type and cost of funds has a significant impact on the project EIRR, although it remains viable.

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<sup>7</sup> Assumed on the basis of the 2011/12 impact analysis. No separate analysis of these subcomponents was possible in the PCR.

**Table A8.2: Project Economic Cash Flow**  
(D million)

	1	2	3	4	5	6	7	8	9	10	20	30
<b>Benefits</b>												
<b>Component</b>												
Client-oriented Agricultural Research and Capacity Strengthening	-	812	1,488	4,375	54,977	56,772	57,535	57,980	58,425	58,957	8,802	4,677
Grassroots Agricultural Extension Improvement	-	-	8,186	31,136	66,044	85,038	85,038	85,038	85,038	85,038	-	-
Rural-based Technical and Vocational Training	-	-	-	-	14,716	42,649	76,372	111,602	147,189	178,143	207,690	-
<b>Total</b>	-	812	9,674	35,511	135,738	184,459	218,944	254,620	290,652	322,139	216,491.99	4,676.64
<b>Costs</b>												
<b>Component Investment Costs</b>												
Client-oriented Agricultural Research and Capacity Strengthening	17,152	11,875	108,612	163,216	148,919	88,346	2,488					
Grassroots Agricultural Extension Improvement	7,368	7,335	38,679	106,052	90,381	47,766	3,295					
Rural-based Technical and Vocational Training	8,937	3,031	44,894	73,531	68,849	34,762	55					
<b>Subtotal</b>	33,457	22,241	192,185	342,799	308,149	170,874	5,838	-	-	-	-	-
<b>Component Recurrent Costs</b>												
Client-oriented Agricultural Research and Capacity Strengthening	-	134	343	343	343	343	343	343	343	343	343	343
Grassroots Agricultural Extension Improvement	-	-	-	-	-	-	-	-	-	-	-	-
Rural-based Technical and Vocational Training	-	219	726	726	726	726	726	726	726	726	726	726
<b>Subtotal</b>	-	352	1,070	1,070	1,070	1,070	1,070	1,070	1,070	1,070	1,070	1,070
<b>Project Management</b>	2,792	11,120	19,255	27,502	27,269	15,794	2,757	-	-	-	-	-
<b>Interest during Implementation</b>	117	378	1,182	3,289	6,138	6,747	234	6,162	9,243	9,243	9,243	9,243
<b>Total Costs</b>	36,366	34,092	213,691	374,660	342,625	194,484	9,899	7,232	10,312	10,312	10,312	10,312
<b>Net Cash Flow</b>	(36,366)	(33,280)	(204,017)	(339,149)	(206,887)	(10,026)	209,046	247,388	280,340	311,826	206,180	(5,636)
<b>EIRR (%)</b>	<b>19.7</b>											

EIRR = economic internal rate of return.

Source: Asian Development Bank estimates.

**Table A8.3: Project Economic Cash Flow based on Financing Alternatives**  
(D million)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2026	2036
<b>Inflow</b>												
Loan disbursements	14,264	5,177	99,896	169,153	84,130	116,796	234					
<b>Outflows - Special Funds</b>												
Interest payments	117	378	1,182	3,289	6,138	6,747	234	6,162	9,243	9,243	9,243	9,243
Loan repayment	-	-	-	-	-	-	-	-	25,674	25,674	25,674	25,674
<b>Net Cash Flow - Special Funds</b>	(22,103)	(28,103)	(104,121)	(169,995)	(22,757)	106,771	209,280	247,388	254,666	286,152	180,505	(31,310)
<b>EIRR - Special Funds (%)</b>	<b>38.5</b>											
<b>Outflows - Ordinary Capital Resources</b>												
Interest payments	210	284	1,492	5,028	7,893	9,243	9,243	9,243	9,243	9,243	9,243	9,243
Loan repayment	-	-	-	51,348	51,348	51,348	51,348	51,348	51,348	51,348	51,348	51,348
<b>Net Cash Flow - Ordinary Capital Resources</b>	(22,196)	(28,009)	(104,430)	(223,083)	(75,861)	52,926	148,922	192,959	228,991	260,478	154,831	(56,984)
<b>EIRR - Ordinary Capital Resources (%)</b>	<b>28.4</b>											

EIRR = economic internal rate of return.

Source: Asian Development Bank estimates.