ECONOMIC ANALYSIS

1. Introduction

1. The projects in CL comprise the strengthening of respective national SPS institutional performance across a broad range of public expenditure types (i.e., hardware and software investments, including the upgrade of academic education) designed to improve understanding and management of trade-related risks in plant health, animal health and food safety (i.e., covering the trade in agriculture, food and forest products – AFF). The projects also contain elements of regulatory improvement and institutional development, although not policy reforms *per se.*

2. The CL projects are typical of many SPS investments, in that: (i) they comprise a number of heterogeneous activities and deliver somewhat differentiated outputs; (ii) the created and enhanced physical capacities (e.g., laboratories) may only be a part of wider systems which undertake other tasks (i.e., beyond performing SPS functions alone); and, (iii) that major elements of information exchange (both between various domestic agencies and also across borders – with trading partners) and technical skills upgrading are very hard to quantify in terms of impact. In short, clearly identifying and quantifying the linkages between the specific project investments (i.e., the various types of activities undertaken and outputs delivered) and identifiable economic impacts is especially difficult for SPS investments.

3. Another dimension to the present economic analysis is that the CL SPS projects – although being national stand-alone investments – are envisaged as contributing to the wider GMS agenda of AFF trade facilitation and control of health risks; as such, they embody certain subregional characteristics. The creation and distribution of cross-border costs and benefits streams from a set of national investments is thus an issue that the economic analysis must address, and it must also consider whether incremental finance (public or private) comes to the subregion as a result of the CL investments.

4. A key feature of SPS investments in DMCs more generally is also that they tend to create the need for ongoing recurrent cost support that must typically be met from government budgets (in the absence of significant opportunities for cost recovery in the form of charges to enterprises, exporters or consumers). The identification and (to the extent possible) demonstration of the wider economic benefits (both potential and identifiable, from growth in trade and agriculture and livestock productivity, from human health status etc) from SPS investments so as to encourage national policy-makers to maintain financial sustainability from public budget resources is thus an important element of economic analysis in this area.

5. Based on these considerations, the economic analysis contained herein is therefore constructed in the following form:

(i) Firstly, is an overview of the literature describing the nature of links between typical SPS investments and their expected economic impacts, and description of attempts that have been made to establish and measure such linkages

(ii) Secondly, is a brief review of the literature describing the main features and outcomes of attempts at the quantitative economic analysis of SPS investments. This material essentially makes the case (for the kinds of reasons described in relation to difficulties with indicators definition) that traditional applications of cost-benefit analyses and estimation of economic rates of return to SPS investments are largely redundant (unless they focus on quite specific interventions with closely identifiable direct impacts and reliable data is available), that cost effectiveness analyses may be selectively

applicable where outputs are genuinely homogenous, but that - overall - these quantitatively oriented approaches need to be treated with considerable caution in SPS investments' review

(iii) Thirdly, is the establishment of the fundamental economic rationale for investment in SPS capacity-building in CL on both domestic and parallel/multi-country bases, given the nature of the public and near-public goods which are provided and also the subregional characteristics they embody (as contributors to overall GMS economic performance)

(iv) Fourthly, and before turning to the specific analyses of the individual projects themselves, the potential scale of impacts (e.g., on regional trade, on domestic health status etc) from investment in such public/near-public goods in CL is considered to provide a contextual background to possible economic returns. The importance of SPS as contributing to various national goals as manifest in, for example, countries' agriculture and natural resource planning (e.g., the rice export policy in Cambodia), is also considered to support the underlying economic rationale

(v) Lastly, is the economic analysis of each of the CL proposed projects. This describes (for each country in turn): (i) what benefits may be plausibly identified, quantified and valued; (ii) it demonstrates that least-cost approaches have been applied in the design of at least some project components; and, (iii) identifies the scale of ongoing funding that is implied by the respective proposed investments. In this context, and given the wider subregional environment and the nature of regional public goods characteristics described earlier, the analysis also explores what possibilities may exist for cross-border costs-sharing, given the positive externalities (i.e., the 'spillover effect') which may accrue to some other GMS countries (notably Thailand, Viet Nam and PR China).

6. This approach to the economic analysis is consistent with ADB's '*Guidelines for the Economic Analysis of Projects'.*[1]

2. SPS Investments and Their Impacts

7. SPS capacity refers to a country's ability to design, disseminate and implement SPS measures so as to achieve the appropriate level of protection against the risks faced. Such risks are defined in the original 1994 WTO SPS agreement, where SPS measures are intended to protect human, animal or plant life or health against risks arising from the entry, establishment or spread of pests, diseases, disease-carrying organisms or disease-causing organisms; or to protect human or animal health against risks arising from additives, contaminants, toxins or disease-causing organisms in foods, beverages or feedstuffs; or otherwise to prevent or limit damage from the entry, establishment or spread of pests.[2]

8. Potentially, therefore, the performance of SPS systems (and their enhancement) generally at the macro level could - in principle - be assessed in terms of any or all of the following types of impacts, *inter alia*: (i) human morbidity and mortality (from different causes, including food-borne diseases); (ii) livestock morbidity and mortality; (iii) extent and severity of plant pests and disease incursions; (iv) levels of AFF imports and exports (differentiated by markets and/or products); (v) transaction costs of importing and exporting; (vi) agriculture productivity (differentiated by different types of producers); and, (vii) employment, incomes and poverty levels (through production and trade effects, both directly and indirectly in response to private investment).

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[1] '*Guidelines for the Economic Analysis of Projects'.* ADB (1997) The approach to the economic analysis for the proposed project(s) herein was discussed with staff at ADB HQ in January 2011.

[2] WTO. 1994. SPS Agreement Annex A.

9. As well as SPS systems' capacity having an extremely wide range of possible impacts, the performance of individual national SPS systems is likely to be greatly influenced by numerous exogenous factors – such as rule of law, governance, the local investment climate, logistics and transportation infrastructure, etc – within a particular country. Such factors can be more or less enabling or disabling to private sector efforts in production, trade and investment. In addition, a national SPS system operates within: (i) a regional framework (e.g., GMS, ASEAN) that may include regional trade agreements (e.g., CBTA, AFTA) and SPS-related strategies or priorities, etc. defined by governments in that region; and, (ii) a wider international or global framework comprising the international standard-setting bodies (Codex, OIE, IPPC), the WTO SPS Committee, bilateral agreements with major trading partners (e.g., the USA), etc.

10. Given the multiple possible impact types and the numerous sources of influence on them, it is not surprising that country-specific circumstances are critically important determinants of SPS outcomes. For example:

(i) the size of a country (e.g. measured by area, population, size of the economy, size of the agriculture and food sector, volume of trade in agriculture and food products, etc.) will determine the scale of demand for SPS services – in general, demand increases with most measures of the size of a country. This aspect is especially important in cost-efficiency/economies of scale terms for Cambodia and Lao PDR; because small countries have relatively small volumes of trade to protect and to certify, the affordability of SPS capacities is thereby disproportionately challenging - certain lumpy capacities with high fixed costs which are basic and essential will require small countries to spend relatively more than bigger countries because of diseconomies of scale;

(ii) the degree of urbanization in a country also plays a part in driving SPS needs and performance - since urbanization results in more transport of food and agricultural products over long distances, often between areas with different pest and disease situations, and with producers and final users who do not know each other, health risks tend to increase and a stronger public management role is needed;

(iii) domestic income levels play a role, because higher-income societies tend to be more sensitive about health hazards and consequently, their SPS capacities need to be more comprehensive and advanced (notably the adoption of food safety standards is highly related to the level of income, and again is more evident in higher income GMS countries Thailand and PRC vis-à-vis Cambodia and Lao PDR);

(iv) similarly, differences in product-market combinations across countries are important: import restrictions and buyer requirements differ much between products, destinations, market segments and by origin of production, because of inherent risks of health hazards and the preference of buyers. Some countries apply high biosecurity standards over a broad range of products, while others are lenient. For example, supermarkets in OECD countries require high quality and food safety standards, which function as a threshold for large market segments. Such conditions may be hard for small developing countries to meet, but they may have comparative advantage in only a limited number of export products and their range of risky imports may also be limited. Overall, the need for SPS capacity depends on the SPS-sensitivity of product-market relations;

(v) geopolitical location is also a key factor. Membership of regional economic cooperation agreements or common markets can affect what SPS capacities should be in place, and what measures may need to be taken by individual

member countries. The EU, ASEAN and CIS all offer examples of such requirements in formal terms, although the demands of GMS are now being especially felt by CL; and - lastly,

(vi) possible disease impacts on plant health, animal health and food safety will differ according to the relative composition and importance of these different sectors in individual economies (and the extent to which countries are exporters, importers or both), and will drive the relative importance of the various SPS systems' components.

11. In sum, national SPS systems can be highly variable in their sophistication and technical constituency across countries, and can be extremely heterogeneous regarding the nature of their economic impacts within any one country.

12. Given such SPS systems' features, it is perhaps not surprising that attempts to specify the ways and means by which SPS investments deliver intended outcomes and produce economic benefits have tended to be incomplete, and are still evolving both in the academic literature and in international practice. The most recent review of literature on the subject is contained in a STDF/OECD paper[3] that attempts to construct indicators to assess national SPS systems' performance at the macro level, and distinguishes this effort from the more typical attempts to measure sectoral (i.e., plant health, animal health, food safety) performance of specific SPS projects.

13. Among the more specific/sectoral attempts to measure SPS performance cited therein are the following examples:

(i) FAO, the OIE and others are in the process of developing sector-specific indicators for food safety, animal and/or plant health interventions.[4] These indicators seek to measure capacity and performance within food safety, animal and plant health, and some focus directly on trade. Some of these sectoral indicators have been developed as part of SPS-related capacity evaluation tools to provide a measure of the capacity of national food safety systems, veterinary services, phytosanitary services, etc, while others have been developed in an effort to measure the performance of specific interventions to enhance capacity in food safety, animal and/or plant health, and trade.

a. Such sector-specific tools which have been developed to date (e.g., the Tool for the Evaluation of Performance of Veterinary Services - OIE-PVS Tool[5], the FAO Food Safety Indicators[6], the Commission on Phytosanitary Measures of the International Plant Protection Convention plant health indicators etc[7]) are recognized for being technically oriented towards inputs and outputs delivery and having little concentration on outcomes and development impacts. They are also non-prioritized (so it is not clear which are the more important impacts);[8] and,

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[3] *Indicators To Measure The Performance Of A National SPS System.* STDF / OECD Working Paper (Draft) Prepared by the STDF Secretariat In collaboration with OECD. Third revision, STDF / OECD Technical Working Meeting On SPS Indicators, Geneva (July 2010).

[4] STDF. 2008. *SPS-related Capacity Evaluation Tools: An overview of tools developed by international organizations:* www.standardsfacility.org/files/various/STDF_Capacity_Evaluation_Tools_Eng_.pdf

[5] http://www.oie.int/eng/oie/organisation/A_2010_PVSToolexcludingindicators.pdf

[6] http://www.fao.org/ag/agn/agns/files/CBIndicatorPaper.pdf

[7] IPPC. *Building National Phytosanitary Capacity* (Strategic Framework). February 2010. https://www.ippc.int/file_uploaded/1267093551_2010-DRAFT-IPPC_bnpc_strategy.doc

[8] The OIE emphasizes the need to recognize the challenges in "extracting" – out of context – particular sector-specific indicators and cautions that indicators from the OIE-PVS Tool should be considered only within the framework of the specific PVS evaluation, given that the number (and complexity) of indicators for each critical

b. bilateral donors (including CIDA, Danida, FDID, GTZ, Sida, USAID etc) who support trade-related SPS investments tend to develop *ad hoc* investment-specific logical frameworks and constituent indicator systems on a project-by-project basis. However, an OECD review[9] of such efforts notes that impact indicators in such frameworks tend to be poorly defined, and the problems of causality (e.g., in attributing trade performance changes to SPS investment) remain substantial.

14. More broad-based attempts at developing SPS system impact indicators presently include the following:

(i) the Inter-American Institute for Cooperation on Agriculture tool to assess the performance, vision and strategy for sanitary and phytosanitary services measures (IICA PVS SPS Tool);[10] [11] [12]
(ii) World Bank has developed a set of indicators of participation in international institutions relating to SPS and other technical measures. These are apparently part of methodological guidelines for country and product assessments of SPS requirements,[13] although they have not yet been widely applied;
(iii) the European Commission is currently developing indicators in the field of trade-related assistance and private sector development in which SPS indicators are also being explored;[14] and
(iv) some regional economic communities (e.g., COMESA) have initiated work to identify indicators to measure performance as part of SPS action planning, and UNIDO apparently intends (2009) to develop a set of SPS 'compliance' indicators.

15. However, what can be said of all these various broad-based approaches at present is that the vision for overall SPS systemic performance impact evaluation is still both incomplete and also still evolving. When the generic difficulties of assessing evolving institutions' performance as part of wider systems' operations are combined with the heterogeneity of SPS activities in a DMC context (i.e., often with limited and/or unreliable data sources), it is perhaps not surprising that attempts to properly capture the relationship between SPS investments (i.e., activities and inputs turned into project or program outputs) and development outcomes and impacts – especially at the macro level - tend to be partial at best.

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competency varies and that these indicators have been determined by accredited experts for the purpose of the PVS.

[9] OECD. 2007. *Trade-Related Assistance. What do recent evaluations tell us?* See: http://www.oecd.org/dataoecd/19/3/37326353.pdf.

[10] http://www.iica.int/Esp/organizacion/LTGC/Sanidad/Publicaciones%20de%20SAIA/B0744I.pdf

[11] This tool 'approaches the issue of sanitary and phytosanitary measures from an institutional, international, and horizontal perspective. Institutional and international because it focuses on the responsibility of national public and private entities of maximizing the benefits from and compliance with commitments made by the country to international standardization organizations and the World Trade Organization (WTO). In addition, the instrument is horizontal, because it analyzes all sectors rather than just one in particular'.

[12] IICA. 2008. *Performance, Vision and Strategy (PVS) for Sanitary and Phytosanitary Measures: An Institutional Vision.* Written by Eric Bolanos Ledezma and Ana Marisa Cordero Pena for the Inter-American Institute on Agriculture (IICA).

[13] Spencer Henson, Stenven Jaffee, Cees de Haan and Kees van der Meer. August 2002. *Sanitary and Phytosanitary Requirements and Developing Country Agro-Food Exports: Methodological Guidelines for Country and Product Assessments.* World Bank. August 2002. http://siteresources.worldbank.org/INTRANETTRADE/Resources/Topics/Standards/standards_challenges_methodologypaper.pdf

[14] EC Internal Working Paper on *Indicators in the Field of Trade Related Assistance and Private Sector Development*. (Undated).

3. The Economic Analysis of SPS Investments: An Overview

16. The literature covering the economic analysis of investments in SPS systems is limited, but the experience of applying cost-benefit (CBA) and cost effectiveness (CEA) analysis in this area is well summarized in a recent paper prepared for the Standards and Trade Development Facility (STDF).[15]

17. The essential finding of the STDF review is that – for the same reasons as apply to measuring impacts and defining SPS performance indicators - applications of cost-benefit analysis (CBA) tend to capture some specific first round of impacts only (e.g., economic impacts of disease reduction based on epidemiological models and hypothesized risk reduction) and with a high degree of uncertainty (e.g., because probabilities of disease reduction are essentially unknown), but that the indirect and longer term improvements in SPS systems' performance (e.g., reputational change, enhanced trade and market access potentials, reductions in human mortality and morbidity) are not well-captured, even though these may actually be more significant.

18. On the cost side, the available literature suggests that the various costs of SPS investments (i.e., real resource costs, social welfare losses - typically due to rises in prices of outputs as a result of meeting SPS standards, transitional costs - e.g., as firms close because they cannot meet standards, and regulatory costs - i.e., the costs of monitoring compliance with SPS standards) are generally well-identified and captured in CBA practice. In the case of the present analysis, the projects' costs estimates capture the first of these (i.e., real resource costs) but not the other costs types associated with SPS systems' enhancements.[16]

19. Regarding benefits estimation, however, the situation is significantly more complex. For example:

(i) In relation to the benefits of plant health investments, general experience seems to be that attention usually only focuses on immediate project site impacts and ignores wider economic impacts, that *ex ante* benefits estimates tend to be highly variable and *ex post* estimates are extremely unpredictable (i.e., there is little stability in estimating actual quantities or values of impacts at any stage in the project cycle). There is considerable experience[17] with estimating the impacts of fruit fly eradication projects in quantitative terms, and benefits have included not just changes in productivity, improved local market sales, but also improved nutritional status of households, and strengthened food security. Some studies divide benefits from plant health investments into 'realized' (i.e., improved market access, trade volumes etc) and 'prospective' benefits (i.e., biosecurity status, future exports), while others (e.g., the Belize Agricultural Health Authority work on mealybug) extrapolate (notional) benefits from investments based on crop loss and trade data from other countries. Many of these plant health project investments are essentially research-oriented, and the links between the money spent and impacts claimed are somewhat tenuous

(ii) In the area of animal health, CBA models tend to be combined with epidemiological models to investigate SPS programs designed (for example) to reduce FMD. Economic impacts are usually defined in terms of reductions in

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[15] *Guidelines on the Use of Economic Analysis to Inform SPS-Related Decision-Making;* Spencer Henson, et al. Prepared for STDF Workshop (2009).

[16] Nor the private costs needed to make use of publicly-provided SPS investments.

[17] For example, *Regional Management Of Fruit Fly in The Pacific*; McGregor (1996; 2007); Linder and McLeod work on ACIAR pest projects (2008), cited in *Henson.*

direct and indirect production losses resulting from morbidity and mortality reductions,[18] and in disease control costs avoided. The capturing of indirect benefits – such as reduced fertility avoided, improved market access status, reductions in quarantine costs etc – is usually not attempted. Partial equilibrium models of policy response alternatives to disease control have been applied to many countries[19] (e.g., the poultry industry in Thailand and its attempt to control avian flu is estimated to generate benefits of $1,3 billion),[20] but – apart from the fact that data demands are significantly beyond the scope of most individual investment analyses – the welfare losses on consumers, traders, input suppliers etc are not included in these approaches, and claimed benefits are probably overstated as a result. A framework for assessing the costs and benefits of TAD control has been developed by OIE that incorporates outbreak costs, 'indirect' supply-chain effects, and spillover effects on tourism. It has been widely applied, but it recognized that data quality is often very poor and underlying model assumptions are usually contentious. Animal health is the SPS area with most CBA experience to date, but even so the experiences have been of overall limited utility

(iii) In food safety, CBA applications (e.g., measuring the effects of Hazard Analysis and Critical Control Point) tend to focus on human health impacts, with wildly varying parameters and values applied to the worth of life in different situations (typically varying by standards of living across countries and for different occupational classes). The STDF review identifies numerous methodologies applied for benefits estimation (including widespread use of willingness to pay measures) in developed countries, although developing country applications are much scarcer. Studies cited of Bangladesh, Nicaraguan and Keralan shrimp industries estimated the costs to individual firms of gaining market access, but could not quantify benefits beyond the point of comparing resource and adjustment costs with total national shrimp exports, and

(iv) In terms of more general capacity building across various SPS areas, the literature is much more sparse. One STDF study[21] provides a framework to look (selectively) at the asparagus and fish exports of Uganda and Peru, but again only concentrates on direct (i.e., export) impacts and not the effects of overall systemic performance.

20. Overall, there are few applications of CBA on SPS issues in developing countries, and mostly they tend to concentrate on very context-specific issues (e.g., FMD in the Philippines) or else they apply very simple *ex ante* and *ex post* comparisons across multiple countries (e.g., fruit fly in the Pacific, mealybug in the Caribbean). There are typically data and resource limitations to undertaking CBA in poor countries, most studies concentrate on first-order impacts alone and ignore the indirect and longer-term effects (e.g., on reputation, on learning), and the resulting estimates unsurprisingly tend to suggest benefits from SPS systems' enhancement are very large. In sum, there is no evidence to suggest that CBA is employed either consistently or particularly rigorously in SPS capacity building investment decisions.[22]

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[18] Morbidity losses are measured in terms of reductions in milk production, while mortality losses are expressed in terms of premature death of milk, beef and draft animals. Indirect losses. See for example, Tambi *et al* (2006) 'Estimating the Costs of Contagious Bovine Pleuropneumonia (CBPP).

[19] Randolph et al (2002), cited in *Henson.*

[20] Thorpe et al (2007), cited in *Henson.*

[21] STDF 20, Agra CEAS (2006), cited in *Henson.*

[22] A possible approach to valuing the education upgrading by using the private returns accruing to veterinarians, plant health, and food safety specialists etc as a proxy for societal welfare is frustrated by: (i) a lack of private opportunities (e.g., in Lao PDR) from which to derive incomes, and (ii) the fact that any other identified benefits sources (e.g., in the form of trade gains, health status improvements) from wider systems' improvements would already have captured these.

21. Because of problems with CBA, some economic analyses of SPS interventions apply least cost analysis (typically cost-effectiveness analysis – CEA). It is important at the outset here to realize that while CEA may be less data-intensive than CBA, it can only be used where expected impacts are identical in both quantitative and qualitative terms – and this is not typically the case in SPS institutional capacity building investments as a whole, although it may apply to particular sets of SPS activities (e.g., animal disease control options).

22. The literature suggests that CEA – often based on quite sophisticated deterministic and epidemiological stochastic probabilistic modeling[23] – has been applied to SPS capacity building in developed countries, but no examples exist in developing country contexts. The use of CEA in these situations typically depends (because of the modeling demands) on a wide array of data surrounding alternative project or policy choices (e.g., on how best to deal with BSE), sometimes coming from multi-country comparisons; as such it does not provide a 'short-cut' alternative approach to economic analysis based on CBA. CEA can be used in data-intensive situations as a complement to CBA, in that initial CBA can be applied to determine *if* investments in disease control are likely to produce substantial net benefits, while CEA can help select from a range of options of *how* to achieve this. (In other words, CBA can help to tell decision-makers *whether* to invest, CEA can help in deciding *what* to invest in). Such an approach was applied in the World Bank analysis of options to control avian and human influenza in Viet Nam in 2007.[24]

24. The general conclusions from the literature and experience of applying economic analysis to SPS capacity building can therefore be summarized as follows:

(i) *ex post* analysis of existing SPS investments with a limited focus (e.g., fruit fly eradication) and based on reliable historical data can likely provide robust evidence about direct economic returns, and a CBA approach may well be able to demonstrate economic returns above any particular discount rate, although such studies do tend to focus on success stories to the wider neglect of less obvious interventions; and

(ii) *ex ante* analyses of SPS interventions with a range of constituents centered around wider capacity building at a national level are likely to be beset with data range and reliability problems, and any CBA or CEA analysis will likely only be able to cover a part of any investment program. As such it cannot alone be used for overall investment decision-making.[25]

4. SPS Projects in CL: Subregional Public Goods Analysis

25. The projects for CL are not subregional projects proper, covering 2 of the 6 GMS countries. Nevertheless, (i) the location of CL countries in GMS; and, (ii) the fact that each of the projects' designs deliberately incorporate similar features to ensure that transboundary effects occur (e.g., regarding the management of TAD, supporting AFF trade among GMS countries and between GMS and the world) and may also offer some possibilities for costs-sharing, means that the projects do embody at least some subregional characteristics; thus their rationale and design can be considered using the framework of regional public goods analysis.[26]

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[23] e.g., on salmonella in Dutch pork, the Dutch broiler chicken industry, pathogens in slaughterhouses.

[24] cited in *Henson.*

[25] Because of this conclusion, some proponents of economic analysis of SPS projects advocate the use of multi- criteria decision analysis (MCDA) to guide investment selection, although this of course pre-supposes the pre-existence of a set of alternative intervention options being formulated to a fairly high level of detail. This is typically unlikely to be the case in PPTA exercises.

[26] For definitions and exposition of regional public goods in the GMS see Appendix 3 of the GMS Evaluation Study '*Maturing And Moving Forward*' (ADB, 2008).

26. The GMS is a case of activity-based (as opposed to institutional – i.e., legal or rules-base) integration, where member states have an incentive to supply public goods on a harmonized and regional basis. In terms of the degree of publicness which GMS goods exhibit, the control of communicable diseases and management of domestic food safety (for animals and humans) are classic examples of pure public goods (i.e., where there is non-rivalry in consumption, and it is not possible to separate and charge individual users – non-excludability). Many services designed to promote trade, support agriculture and livestock productivity etc by raising SPS standards and capacity would be classified as impure public goods to varying extents – in that there may be opportunities to charge for services (thus rationing or excluding some potential users, e.g., for vaccinations) and there will likely be some rivalry in consumption (exhibited through congestion or queuing for such services). Other SPS goods may be *de facto* toll goods – such as testing certificates issued through government monopolies. Table 1, over, summarizes the respective roles typically undertaken by public and private sectors in the provision of SPS services, and the additionality which SPS project investments can provide.

27. One point to note in this regard – and as the recent *Action Plan to improve SPS Capacity in Cambodia*[27] argues – is that elements of domestic and export orientation and relative extents of publicness of different SPS services get mixed together when considering overall SPS management capacity, for the reason that services aimed export development will not be credible with (potential) trading partners in the absence of functioning systems to control the production and consumption (of plants, animals and food) within the (typically wider) domestic market. The strength of this argument will differ between situations and market segments.

28. Regional public goods are also characterized by the conditions under which they are delivered (i.e., the 'aggregator technology'). This concept is useful for considering the rationale for SPS investments. Much SPS-type regional public goods supply is based on the 'weakest link' or 'weaker link' technology – where the performance of weaker (or simply the weakest) countries affects overall supply. Again, the obvious case in relation to SPS in GMS and CL may be TAD control, where if one or more countries are weak (e.g., Cambodia, Lao PDR) or does not cooperate this will affect the FMD situation of the (sub)-region as a whole (e.g., as animals cross porous national borders). Plant pests are another obvious case; the inability of one country to control the entry of new pests can affect the whole region. AFF trade facilitation (e.g., through SPS capacity building) is a clear case of a weaker link regional public good, although it may be somewhat impure if some countries' goods can be excluded – because they cannot participate in supply (and thus SPS capacity building can be further justified).

[27] *An Action Plan to improve SPS Capacity in Cambodia* (STDF 246); FAO (2010).

TABLE 1: PUBLIC AND PRIVATE ROLES IN MAIN SPS TASKS (AND THEIR FUNDING)

Tasks	Purpose	Public (i.e., State) role	Private sector role	Project additionality
Awareness raising at all levels	To alert public and private stakeholders about health and market access risks	Providing information, education and advocacy is mainly public role	Some private sector associations can perform specialized and modest roles in their domain	Regional and national workshops promote SPS issues' awareness
Setting legal and regulatory framework	Imposing rule of law, transparency (rules of the game)	State monopoly	Advocacy for update and changes	Modest engagement in regulatory / legal frameworks.
Standard-setting for health protection of crops, livestock, consumers	Typical mandatory standards for domestic markets; sometimes also for exports	State monopoly	Advocacy for updates and changes	Modest engagement, particularly in animal health area
Enforcement of safety standards	Protecting consumers, livestock and crops against health hazards	State monopoly	To some extent private providers can be used (as contractors, suppliers)	Virtually no direct involvement
Standard setting for market efficiency, grading and quality (not SPS, but TBT)	Provide transparency in markets, reduce transaction costs, increase transparency, protecting buyers	Adoption/recognition of standards is mostly public role; standards are mostly voluntary, but also for protection of consumers	Many commodity and industry standards have been developed by private sector organizations (ISO, commodity markets)	As above
Collecting information on transboundary animal diseases, quarantine and non-quarantine pests, safety of food and food handling	Information needed for: (i) meeting request of importing countries for access to their markets; (ii) justifying SPS restrictions to importers; (iii) risk analysis for managing plant and animal health, and food safety	Surveillance, testing, diagnostics, maintaining databases and providing information are basically public goods and their funding is public responsibility. *Transboundary issues clearly lend themselves to being addressed on subregional basis*	Private enterprises will not fund these services; however, private providers may be contracted for providing some of these services	Core activity of the project

Producers invest in GAP, GMP, HACCP (quality assurance systems)	Investment and management efforts to meet process and product standards of importing countries	Because of possible negative and positive spillover effects, State can use regulation, subsidy and investment in public goods provision to pursue optimal social welfare.	Basically private goods with possible spill-over effects; costs need to be largely borne by private enterprises	Project supports private sector through (i) awareness workshops, (ii) development of targeted GHP/GMP and, (iii) enterprise-based advice
Issuance of phyto, animal health and food safety certificates, assuring safety of products and/or absence of pests, diseases specific health hazards	Meeting certification requirements of trading partners based on international (e.g., IPPC, OIE and Codex) standards and requirements; for food products mostly not required	State monopoly, but since these are toll goods, private sector can be charged a fee	Some possibilities to contract private enterprises as service providers	Project not directly involved, BUT indirect role through improving quality of public services
Conformity assessments of traded goods	Many buyers require conformity assessments that assure safety and quality of products	Basically private goods, although State may regulate certification and accreditation of service providers	Private enterprises can be charged; mostly services can be privately provided	Conformity assessment to GHP/GMP standards introduced in tourist industry and maize and rice supply chains - not elsewhere. Indirect impact through improved testing capacities
Operating diagnostic and testing laboratories	Assessing the safety status of products; identification of pests and diseases	Food testing, and plant and veterinary diagnostic services for surveillance and inspection largely depend on public funding; Governments generally want to maintain their own capacities to support regulatory tasks and not be dependent on private providers and laboratories abroad;	Private sector laboratories can perform many testing services, but usually offer a limited range of services; they play very limited roles in diagnostics for plant, animal and human health	Project not directly involved in improving management of laboratories (Lao PDR and Cambodia have too small demand for private investment in laboratories)
Regulatory inspections, including sampling and testing	For issuing licenses, permits and verifying compliance with public requirements	State monopoly; there can be a tendency to use regulatory powers as para-fiscal instruments for funding publicly owned laboratories.	Some services could be subcontracted to private providers	Project will mitigate risk of using regulatory framework as para-fiscal instrument

29. At the most general level, there is a reputational dimension to weaker countries' performance – where trading partners and potential GMS tourists perceive all GMS goods and services to be affected by the features of weaker/poorer countries' goods and services.

30. The case for public intervention in SPS capacity building is clearly justified on a national basis simply by the publicness of most goods provided. However, it is also further supported on a subregional economic goods basis; without public intervention, SPS public (and varying impure public) goods supply will be suboptimum and under-provided – especially so where 'weaker' or 'weakest link' technology is involved and where the poorer member countries (especially Cambodia and Lao PDR vis-à-vis SPS capacity) lack the capacity to meet relevant standards (for health, for trade, etc).[28]

31. Because the CL SPS projects are prepared in parallel, contain similar interventions, and derive logically and technically from the GMS *SPS Action Plan,* they also embody characteristics that enable their economic analysis to consider two specifically subregional dimensions.[29] These dimensions are: (i) opportunities for cost sharing between countries if there are positive externalities (e.g., spillovers) which are not captured in financial flows; and, (ii) possibilities for attracting incremental finance into the subregion as a result of subregional capacity strengthening.

32. As regards the first point, if those countries that are weakest in terms of SPS capacity (i.e., Cambodia and Lao PDR) are strengthened, there will be some benefits which accrue to other countries (e.g., Thailand, Viet Nam, PR China) because, for example: (i) TAD will be reduced; (ii) risks of plant pests and diseases from AFF imports will be reduced; and, (iii) safety of food imports from Cambodia and Lao PDR into other GMS countries will be improved. The wider reputation of GMS products globally will also improve, as potential importers know how easy it is for (for example) traders and processors to mix Lao PDR and Cambodian produce with (for example) Thai and Vietnamese produce. In principle, although a full CBA of multi-country benefits streams cannot be calculated, these circumstances do provide a potential opportunity for Cambodia and Lao PDR to approach the more developed countries in the region for financial support – especially for recurrent financing to sustain SPS operations post-investment phase. (Such possibilities are examined in the 'financial sustainability' sections of the respective project's economic analyses).

33. Secondly, it may also be argued that improving the performance of weaker countries in SPS will attract more investment (public and private) into the GMS generally, as the location of the GMS to produce and export AFF products (and services – in the form of tourist services) from both to the region and to the rest of the world has been enhanced (again, the argument is that potential investors know how porous borders are and how the weaker countries' performance acts as a brake on the subregion generally). Again, to the extent that any evidence suggests this might occur, it is considered in the projects' economic analysis.

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[28] The only caveat to the economic logic and underlying rationale for the present CL projects within the GMS context is that in many areas (e.g., TAD control, but also broader AFF trade - given the porousness of borders) Myanmar also has limited SPS management capacity. To the extent that failure to improve SPS capacity in Myanmar impacts upon overall CL and GMS performance, the economic returns of present investments will be impaired.

[29] See the economic analysis of subregional projects as described in *'Handbook for the Economic Analysis of Subregional Projects'*, (ADB, 1999), and *'Economic Analysis of Subregional Projects'* (Adhikari and Weiss, EDRC Methodology Series Number 1, 1999), and also '*Towards Better Practice In The Economic Analysis Of Subregional Projects'* (EDRC draft, 2003)

34. Overall, the possible distribution of economic benefits between GMS countries can be a sensitive issue that needs to be approached via existing institutional frameworks (e.g., GMS, ASEAN) if it is to have practical manifestation.

5. The Potential Economic Benefits of SPS Investments In CL

35. Notwithstanding the previously-acknowledged difficulties of defining the relationships between the proposed CL SPS projects and their economic impacts, it is a reasonable hypothesis – and of course fundamentally embedded in the projects' design and technical rationale (i.e., the intervention hypothesis in DMF terminology) – that enhancing respective CL national SPS capacities will lead to improvements in: (i) AFF trade conditions, and (ii) in plant, animal and human health status.

36. It is therefore useful to consider the kinds of, and potential scale of, different types of benefits which may accrue to national trade-related SPS capacity building investments of the type being proposed. While there is a high degree of uncertainty surrounding any particular benefits levels which may be associated with, and attributed to, specific investments, providing an overall picture of potential benefits can help ground the project's economic rationale, and bring some more substance to the earlier 'public goods' economics arguments alone.

37. Firstly, regarding possible AFF trade benefits from SPS capacity improvement, the following points may be considered:

(i) the GMS *SPS Action Plan* reviewed the scale and nature of AFF trade. From that document, total annual intra-GMS trade[30] in 2007 was estimated at about $14 billion (i.e., $7 billion exports plus $7 billion imports), and CL value was about 6% of this (i.e., around $0.85 billion) – of which about 3.6% (0.5 $ billion) was Cambodia and 2.5% (0.35 $ billion) was Lao PDR. The large majority of CL trade was destined to other GMS countries. By 2009, updated WITS figures suggest total intra-GMS AFF trade was around $17.2 billion, i.e., growing by over 10% a year;

(ii) the largest share of AFF trade was food and animals, with about 40% being non-food and forest products,[31] and trade concentration is notably increasing (especially for non-food products); it was nearly 14%, and double that of a seven years previously

(iii) future AFF trade growth potential, predicated on differential comparative advantages within GMS, is reckoned to be substantial, but is presently constrained (in part) by weak SPS capacity. Over-cautious post-harvest treatment requirements, onerous inspections and license and approval procedures on both sides of the borders (with consequent long waiting times for paperwork and release procedures), SPS requirements not being based on proper risk analysis, and frequent use of precautionary SPS measures, etc are practices that raise the transaction costs of doing business for exporters, importers, producers and consumers;[32]

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[30] Trade data was accessed via the World Integrated Trade Solution (WITS) developed by the World Bank and United Nations Conference on Trade and Development (UNCTAD) to access and retrieve trade and tariff data compilations of UN Statistical Division (UNSD), UNCTAD and the WTO. The Action Plan utilized WITS to make use of the Commodity Trade (COMTRADE) database of UNSD.

[31] This latter group was up from around 20% of the total in 2007.

[32] Other examples include: (i) requirements of phytosanitary certificates for green coffee and rubber in most cases unnecessarily increase transaction cost of exports since trade arrangements for these products are not pathways for pests and disease; (ii) required export sanitary permits are often in unnecessary because the importing country and buyer do not require them; (iii) an investor in a banana plantation in one of the GMS countries finds out that export to another GMS country is not possible because the host government is not able to provide pest data on banana (import prohibitions based on exporting

(iv) if production and income gains could be made in the order of 1% as a result of SPS systemic improvement, the annual gain to CL (based on the *Action Plan* trade data) would be approaching $4.25 million annually;

(v) if it is the case that private sector exporter and importer compliance costs (in the form of waiting time, formal and informal fees, staff salaries etc – all of which raise transaction costs before and at borders) at present represent about 1-2% of the value of trade, potential benefits in the form of a 10% efficiency gain to CL due to SPS system improvements would be of the order of $0.9-$1.6 million a year. (Examples of SPS transaction costs in Lao PDR are summarized in Box 1; similar evidence from Cambodian freight forwarders is summarized in Box 2); and,

(vi) if incremental growth of AFF imports and exports was of the order of 1% a year as a result of SPS system capacity (i.e. investment climate) improvements, CL annual benefits would be of the order of $8 million.

38. Clearly, these kinds of figures are only indicative of the scale of potential benefits from increases in AFF trade efficiency, but it may be noted that they do rest on recorded trade figures that are almost certainly a significantly under-reporting of actual trade volumes. Some possible trade improvement benefits are thus not captured in the figures above; for example, as formal trade becomes regularized and transactions costs go down, it encourages *ceteris paribus* AFF trade to become more formal, and thus revenues to governments (from taxes and charges) to increase.

39. Secondly, as regards possible health benefits, SPS management capacities also directly affect income and human wellbeing through protection against trade-related health hazards.[33] Health hazards can be costly to people and national economies – the introduction of new pests and diseases may have dramatic impacts on domestic production and income of producers (and especially on poor farmers). Consumers' health and wellbeing are affected by adulterated, spoiled, contaminated, and sub-standard food products. Individuals lose work time and income because of illness, and they have to pay for medical treatment. The scale of the trade-related food safety impacts on human health alone can be considerable. Diarrheal diseases are often used as a general indicator of the food safety situation, and - measured by DALY[34] the situation in CL is far from satisfactory.

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country's lack of, or unreliable, pest data); (iii) no advance lodgment of import/export documentation with indication of entry point can be made; (v) import/export procedures between provincial and national entry points are not harmonized; (vi) sampling and inspection are conducted on all imported shipments, even for routine and low-risk products; (vii) some countries lack scientific expertise and data to negotiate/rebut unnecessary risk mitigation requirements, or to propose equivalent measures; (viii) lack of confidence in exporting country's pest-free status or pest outbreak exclusion zones leads to blanket bans; and (ix) informal payments are related to SPS control functions.

[33] Examples of significant known transboundary plant pests, animal diseases and food hazards affecting plant, animal and human health include: (i) plant health – for example, coconut hispid beetle, corn flee beetle, Brown Plant Hopper, and fruit flies; (ii) animal health hazards, such as Highly Pathogenic Avian Influenza (HPAI), Newcastle Disease (NCD), Food and mouth disease (FMD) Porcine Reproductive and Respiratory Syndrome (PRRS), Classical Swine Fever (CSF), rabies, and anthrax; (iii) food safety hazards - Sudan red additives (illegal colorants), Melamine in food, residuals of forbidden antibiotics (nitrofuran, chloramphenicol) and growth enhancers (glenbuterol), mycotoxins in nuts, corn and dried fruits, microbial, heavy metal and pesticide contamination, and the unauthorized presence of preservatives, additives and supplements (or in excess of legal limits).

[34] The Disability-Adjusted Life Year (DALY) rate indicates the number of healthy life years lost per 100,000 because of mortality and morbidity caused by various diseases and other debilitating factors. [http://www.who.int/healthinfo/global_burden_disease/metrics_daly/en/ accessed April 5, 2010]

Box 1: SPS Transaction Costs in Lao PDR

A recent report[1] by World Bank summarized the situation with respect to transaction costs related to SPS compliance that are borne by the private sector in Lao PDR. Because some costs borne by exporters and importers) are of a typical *ad hoc*, sometimes arbitrary, and partly informal nature, and because the application of formal procedures may in fact vary temporally and spatially (especially between provinces) the overall picture cannot be described with total confidence, but interviews with private sector businesses generated the following kinds of findings:

- Formal general export requirements for agriculture products vary by crop/commodity, and numerous formal fees and taxes may be payable to multiple ministries
- Formal requirements for imports of food products, animal-related products (including feed), and plant and plant-related (especially pesticides) items typically require pre-registration of importers with relevant ministries before permits are granted
- However, actual implementation practice varies across the country (e.g., a PAFO may issue a license to import live animals because of a lack of capacity within DOLF), and some businesses routinely import shipments on the basis of their business license alone (rather than shipment-by-shipment approvals, as formally required)
- A result of poor SPS regulation implementation is that (for example) pesticides used in northern Lao PDR are typically imported from China and Viet Nam and used in an unregulated and uncontrolled way – imposing significant economic and social costs
- Mandatory food sanitary certification for export under Lao PDR law is of mixed benefit (while imposing significant time and monetary cost – taking about a month and costing $55 each) as some importers typically demand more rigorous assurances from accredited laboratories and sometimes independent private laboratories and others none at all
- A similar situation applies to phytosanitary certification, where many GOL certificates are redundant because the material cannot carry pests or diseases and/or the importer has not asked for it
- Varying fees (one example charge is $14 for certification of a small rice shipment, and typically higher at the larger border posts) in excess of simple certificate issuance (official price of $1) can be charged for inspection. Formal and informal cost of inspection needed for phytocertification can vary highly; there is no clear official price.
- High levels of provincial autonomy and the lack of a unitary authority for either animal or plant health certification encourages variability in charges imposed on businesses. Examples cited include payments of Kip 150,000 ($20) for a phytosanitary certificate issuance and Kip 30,000 ($4) for same-day signing of MOIC Form A.
- Several of the present import requirements are insufficiently based on science and differentiated risk analysis, and lack proportionate controls. As such, they impose unnecessary cost (often simply in terms of time) on importers
- Border procedures are weak, and the absence of official guidance for transit goods (animals, plants, foods) means there is significant discretionary behavior by officials
- Charges made by local authorities on the movement of plant and animals to Lao PDR borders can be substantial; one Savannakhet cattle trader estimated the costs of 'animal movement' (in principle perhaps motivated by SPS concerns) permits from DOIC, District Tax and Commerce Offices, and PAFO etc to add $15 cost per animal

Overall, SPS compliance costs may not be the largest elements of the costs of doing trade-related AFF business, (for example, imports from and exports to China may incur fees - in addition to published tax rates - for registration with the Forestry Bureau, roads authority, PAFO, for trucks entering, for goods custody, for loading/unloading etc, together totaling hundreds of US$ per shipment), but they are clearly part of the broader problem of high administrative costs, low efficiency and weak orientation of public services, informal payments and levies of all kinds by agencies that together undermine profitability of AFF trade.

Box 2: SPS Transaction Costs In Cambodia

Informal discussions with a range of private sector freight forwarders in Cambodia in 2011 identified a number of issues affecting the business operations and costs of AFF exporters and importers. Among major issues identified and relevant points regarding ways to improve Cambodia's SPS performance capacity are the following:

- The situation regarding simple issuance of phytosanitary certificates for exports in Cambodia contrasts markedly with Thailand – where fees are low (Bt 2000 per certificate) and standard (in Cambodia they vary by shipment), applications can be submitted on-line (via software supplied free by Royal Thai Customs) and certificates can be collected within 48 hours at numerous locations (over 30) – in Cambodia they can only be processed and issued in Phnom Penh at higher cost and 10-15 days waiting time.
- While most fruit and vegetable exports going to Europe etc. have been allowed at destination (although one shipment of pepper to UK was stopped), there is an absence of information about what is really required by importing countries, very limited ability in-country to test for certain things (some tests cannot be done by RGC facilities, only Pasteur Institute), delays in issuing certificates (10 days is reckoned to be 'fast'), and actual practices applied by MAFF, Camcontrol etc seem to vary according to who is doing shipping, who the customer is, which forwarder is used, etc.
- There is only one (monopolistic) supplier of fumigation services, charges are high (e.g., $60-100 per container of raw cashews), and what needs to be fumigated using which chemicals is not clear (some fumigations are almost certainly performed unnecessarily, not being required by importing countries)
- Overall, there is a lot of non-transparency in SPS processes and consequent uncertainty about final costs, risk of shipment rejection (the cost of which may be borne by forwarders if shipper does not pay). Acquiring SPS documents reportedly requires considerable waiting and follow-up with RGC agencies, although not the 'sit and wait' approaches required for customs – but this may be extremely important issues for time-critical shipments (e.g., high-value fresh AFF products)
- Average SPS costs per container may be about $100-150, typically comprising 10% of the f.o.b. value (c.f. customs etc. may be several times this amount). As charges are applied per container, this impacts disproportionately on lower value AFF goods, and there is no economies of scale for large shipments
- Although Customs compliance costs still exceed SPS-associated costs, SPS is an increasingly serious area as more and more trade (especially AFF) is formalized – especially as China's requirements mature. Previous possibilities to avoid controls (including SPS) by informal and border trade opportunities are diminishing
- Some progress is being made on Certificate Of Origin (CO) processes via adoption of ASEAN standards, but this doesn't really help SPS requirements *per se*; for shipment of fresh produce it is a challenge to get the CO in time
- On the import front, actual practices reportedly applied by Camcontrol seem 'erratic', and arbitrary, and how much duty is paid, what prohibitions may be applied and/or what other information is asked for extremely variable. Importers who know the system are very careful and specific with declarations, especially if Camcontrol, MOH, MOIT etc. are all involved (as may be the case with a simple product like shampoo). There is no standard 'one-stop' shop to deal with
- While there is scope for some service to be performed by competitive private suppliers (e.g., some testing, fumigation etc.), there is wide recognition that documentation of national pest situation, dealing with TAD etc. are public goods, and pressure must be maintained on RGC to improve performance.
- For shipments to and from neighboring countries informal export and import is often an alternative to compliance with regulations. However, informal exports attract low prices and improved SPS processing is therefore important for competitiveness and adding value.

40. In Cambodia and Lao PDR the DALY lost to food safety conditions are anywhere between 4-8 times as much as in Thailand and Viet Nam (and 50-100 times as much as in Japan and the USA). In addition to estimates of DALY lost to the local population, health impacts (and consequent reputational damage to the subregion) are also felt on the (increasingly important) tourist industry.

41. There are attempts made to value potential economic impacts from food safety improvements, typically by capturing the costs of temporary illness (usually the number of days lost multiplied by average earnings, and sometimes including medical costs) and decreased morbidity by human capital (usually measured by Value of a Statistical Life – VSL, based on lifetime average earnings for the particular economy, or sometimes willingness to pay estimates) valuations.

42. Such approaches are methodologically fraught with difficulty regarding (for example) the application of discount rates, assumptions that are applied about future earnings capacities, and reliability of any WTP estimates, but nevertheless are sometimes used in DMC contexts. In this regard, a recent ADB staff estimate of the possible cost to Lao PDR of food safety related illnesses was of the order of $149 million annually,[35] for example. The SPS Action Plan also cites relative regional DALYs as evidence of the scope for realizing potential health-related benefits.

43. Thirdly, it is also worthwhile to locate SPS systems' capacity building investments in the contexts of national planning aspirations for the respective agricultural and natural resources sectors to understand how important – in strategic terms, if not directly measurable economic terms – it is to upgrade SPS systems so as to increase AFF exports, enter more value added market segments, improve agriculture and livestock productivity, to reduce human disease incidence.

44. In this regard, and considering the CL countries:

(i) in Cambodia, the *Strategy For Agriculture And Water 2010-2013* (SAW) recognizes the importance of SPS to export market development (mainly regarding EU and US access), and acknowledges Cambodia's current poor reputation in this regard (especially for issues like pesticides management). The SAW anticipates future TA and donor assistance to upgrade SPS capacity, and specifically claims that exports would increase by 10-20% for different types of AFF products. The recent '*Policy Document on the Promotion of Paddy Rice Production and Export of Milled Rice'* (2010) notably envisages Cambodia as a regional rice-basket with exports of 3 million tonnes, worth over $2 billion a year, but recognizes that SPS systems need to be enhanced in a major way if milled rice exports on such a scale are to be feasible. A special focus on SPS is suggested over the medium-term in rice policy planning; and

(ii) in Lao PDR, the recent *Strategy For Agricultural Development 2011-2020 (and Master Plan, 2010-2015)* has as one of its programs a focus on 'pro-poor and green value chains' with an inherent intention to upgrade export standards and capacity. Issues like ochratoxin in coffee have come to prominence with exports growth and value chain maturity, and it is explicitly recognized that if the large-scale land concessions which have been awarded in recent years are to become viable sources of exports (corn, sugar, *jatropha,* timber etc) SPS capacity (and other trade support services) has to be enhanced. World Bank

[35] See for example *Sector Assessment, Strategy And Road Map. Lao PDR - Trade And Industry (Small And Medium-Sized Enterprises* 2011-2014. SERD, ADB (2011.) It is not clear whether this estimate includes only Lao PDR citizens, or tourist populations as well.

has supported work on SPS in Lao PDR - an *Action Plan For Capacity Building* has existed since 2006.

45. Finally, it is useful to consider SPS systems' importance to GMS agriculture strategy. *The GMS Core Agriculture Support Program (2011-2015)* – (CASP, Phase II), has as its first of three pillars the building of competitiveness in food safety and agriculture trade. CASP-II recognizes consumers' (domestic, regional and international) concerns with food safety issues, underscores the GMS propensity to problems with mycotoxins and bacterial contamination due to high temperatures and humidity (risks are expected to increase with climate change), and recognizes current deficiencies in meeting international certification and trading standards. Investments under CASP Phase II will support the development of research in agricultural science-based technologies for enhancing regional food safety.[36]

46. These national and subregional planning materials clearly demonstrate the increasing awareness of, and importance of, AFF trade-related SPS issues to the GMS; there is comprehensive and inclusive understanding of the need to address the constraints to trade and development which limitations in SPS systems' capacity presently constitute. This provides a compelling technical and economic rationale for investments of the type proposed in the CL trade-related SPS projects.

47. Table 2, over, summarizes the various issues and approaches to the economic analysis of SPS investments, and also some of the country-specific AFF economic analysis for each of the three CL countries.

48. Following the table, the economic analyses of the proposed projects in each CL country are described in turn.

[36] These will include; (i) harmonizing GAP and biosafety standards among GMS member countries based on international standards. These include Good Management Practices (GMP), Good (Livestock) Husbandry Practices (GHP), Hazard Analysis and Critical Control Point (HACCP); and traceability systems.(particularly in support of SMEs in agro-industrial clusters); (ii) developing regional certification and accreditation systems, including community participation and accrediting of regional professionals, for monitoring and validating the sustainable harvesting of non-timber forest products (NTFPs) and the status of crop land (i.e., guaranteeing that it did not come from clearing natural forests); (iii) promoting public and private investments in science and technology related to regional food security, food safety, nutrition, and biofuel applications; and, (iv) strengthening the food safety standards for animal products (terrestrial and aquatic) - specifically those of OIE and Codex Alimentarius. Potential co-partners (i.e., as well as ADB) in a project investment (of about $0.8 million, and including training – *inter alia* covering organic practices, certification, technology support, business fora, drafting of GAP and food safety standards, etc) to address GMS food safety issues include the Trade Development Facility (TDF) SPS component, the WTO (Institute for Training and Technical Cooperation, Committee on Trade and Development), and bilateral agencies such as USAID, EU etc. There are other proposed private investments in E-commerce and food traceability systems and on food safety and trade facilitation issues more generally.

Table 2: ECONOMIC ANALYSIS SUMMARY: ISSUES IN APPROACH AND METHODOLOGY

Nature of the CL SPS projects' investments	Strengthening of national SPS institutional performance in Cambodia and Lao PDR across a broad range of expenditure types (i.e., packages of hardware and software investments in TA, training, planning and equipment) designed to improve understanding and management of trade-related risks in plant health, animal health and food safety (including tourism enterprises). Delivery of differentiated outputs, and enhanced physical capacities (e.g., laboratories) may only be a part of wider systems that also undertake other tasks (i.e., beyond performing SPS functions alone).
Expected economic benefits' sources	In principle, the performance of SPS systems could impact upon any or all of the following: (i) human morbidity and mortality (from different causes, including food-borne diseases); (ii) livestock morbidity and mortality; (iii) extent and severity of plant pests and disease incursions; (iv) levels of AFF imports and exports (differentiated by markets and/or products); (v) transaction costs of importing and exporting; (vi) agriculture output and productivity (differentiated by different types of producers); and, (vii) employment, incomes and poverty levels (through AFF production and trade effects – changes to product mix, products' quality, product volumes demanded and supplied etc).
Methodological issues[37]	**Costs estimation:** Costs of SPS investments may include all and any of the following: (i) real resource costs; (ii) social welfare losses (due to rises in prices of outputs as a result of meeting SPS standards);[38] (iii) transitional costs - e.g., firms close because they cannot meet standards; and, (iv) regulatory costs - i.e., costs of monitoring compliance with SPS standards). ***Present analysis captures the first of these.*** **Benefits estimation**: Benefits estimation: (i) cost benefit analysis (CBA) may be possible in small, targeted interventions (e.g., fruit fly eradication programs); (ii) may rely on partial equilibrium models (e.g., livestock morbidity and mortality modeling) or willingness to pay (WTP) estimates (e.g., food safety) if primary data is available; and/or, (iii) cost effectiveness analysis (CEA) approaches may be applied if genuine alternative designs exist - BUT generalized systemic SPS enhancement does not lend itself to robust benefits identification/quantification. ***No EIRR/FIRR calculated, BUT indicative potential benefits scales are illustrated***.
SPS capacities and public goods	Economic case for investment by CL governments rests on public goods nature of many SPS services: the control of communicable diseases and the management of domestic food safety are pure public goods (i.e., there is non-rivalry in consumption, and it is not possible to separate and charge individual users – in other words, non-excludability). Some services designed to promote trade, support agriculture and livestock productivity etc by raising SPS standards may be impure public goods – there are opportunities to charge for services (rationing or excluding some potential users, e.g., for vaccinations) and there will be rivalry in consumption (exhibited through congestion or queuing for such services). NB> however, even where some specific SPS *services* may be provided by private sector (e.g., testing for presence of diseases, residues) etc in laboratories, market access agreements and acceptance of AFF product shipments by trading partners may still depend upon *information* which can only credibly be provided by the public sector (e.g., national pest lists, national animal disease situations etc), and in several cases recognition of public authorities as competent authority.
GMS, regional public goods and SPS	'Aggregator technology' determines the supply of regional public goods; poor SPS performance in any or all of CL (i.e., as 'weak, 'weaker', or 'weakest' links) thus affects GMS as a whole (through reputational risk, externalities/spillovers, incremental finance flows etc – respective examples being where GMS tourism reduces because of food safety problems in one country, TAD, and increased FDI to GMS countries as weaker ones improve)[39]

37 For a comprehensive summary of literature covering economic analysis of SPS investments, see *Guidelines on the Use of Economic Analysis to Inform SPS-Related Decision-Making;* Spencer Henson, et al. Prepared for STDF Workshop (2009)

38 To the extent that products meeting SPS standards thereby become genuinely differentiated from products that do not meet such standards this point may not apply. In terms of changes to the distribution of consumer and producer surplus that result from a new (i.e., genuinely differentiated) product being available, this will ultimately depend upon consumers' willingness to pay for such differentiation (e.g., in the form of safer fruits, meat etc).

39 See Appendix 3 of the GMS Evaluation Study '*Maturing And Moving Forward*' (ADB, 2008) for a discussion of regional public goods supply characteristics

Table 2: ECONOMIC ANALYSIS SUMMARY: IMPACTS AND BENEFITS (continued)

SPS and national / GMS trade and investment climate	SPS management performance is a component of national investment climates; as such, it can facilitate or preclude domestic and international private investment aiming at expanding market access, promoting product and market diversification etc. SPS capacity is a necessary – but not sufficient – component to ensure continued growth in AFF trade in GMS. There are three major points in this regard: (i) without adequate SPS services, AFF trade in CL will remain (largely) informal, low value and risk-prone, and current GMS AFF trade growth levels could be compromised; weaker countries in particular will be condemned *ceteris paribus* to more marginal markets, lower average product prices, and generally constrained economic returns. (This will become increasingly important over time as larger countries' (particularly China in the GMS context) SPS requirements intensify); and, (ii) SPS capacity can be seen as an insurance-oriented service aimed at protecting against current and possible future/unknown sources of risk; capacity developed now will more likely respond better to future plant, animal and food safety problems. (iii) the subregional public goods argument ensures that SPS capacity in one or more GMS countries can affect the overall GMS AFF trade and investment climate.	
Scale of potential benefits - some examples	Total GMS AFF export plus import trade is now valued at over > $18 billion p.a.; impact of reduction in SPS-related transactions costs and dynamic SPS performance-related growth in GMS AFF is trade likely to be at least tens of millions $ annually. *Some recent specific examples of SPS benefits estimation in the GMS include the following:* (i) The World Bank SPS Action Plan for Viet Nam (2006) states that "While it is not possible to estimate total losses to the economy (of Viet Nam) with any degree of precision, it is safe to say that human health costs of food-borne diseases, production losses from pests and diseases, and foregone markets resulting from recent pest and disease introductions, easily surpass US$ 1 billion per year, about food safety (public health) and agricultural health causes." (ii) Human health impacts (DALY-based estimates) from food safety $149m p.a. Lao PDR estimated in *Sector Assessment, Strategy And Road Map. Lao PDR - Trade And Industry (Small And Medium-Sized Enterprises* 2011-2014. SERD, ADB (2011.)	
Country-specific trade-related AFF concerns	**CAM:** (i) rice export policy; rice as leader for other crops—cassava, maize, cashew; (ii) export market diversification (especially China), and adding value; (iii) development of regular bovine exports; (iii) no dumping ground for unsafe AFF products; (v) reduced risk exposure; (vi) tourism development; (vii) harmonization and regional economic integration	**LAO:** (i) exports to China (e.g., corn, fruits and vegetables etc) under stable trade agreements; (ii) strengthened value chains/formalization of exports – including from large concessions; (iii) development of formal bovine exports from areas with much reduced disease burden; (iv) avoiding risk and dumping; (v) tourism development; (vi) harmonization and regional economic integration
Financial sustainability issues	Recurrent cost issue is extreme and systemic – implication for RGC of $430,000 a year for project?	Recurrent cost issue is extreme and systemic – implication for GOL of $400,000 a year for project?
Cost effectiveness design aspects	(i) TA scheduling; (ii) use of regional TA; (iii) use of rapid test kits; (iv) construction and use of shared microbiology laboratory	(i) use of rapid test kits for food safety surveillance; (ii) construction and use of shared teaching laboratory

CAMBODIA

1. Introduction

1. The proposed project in Cambodia is fundamentally an institutional strengthening investment, whose purpose is to strengthen capacity in national SPS management. It is undertaken as a necessary (although in isolation, in many cases not sufficient) intervention primarily to support and make sustainable AFF trade and to reduce human, animal and plant health risks. Investments in SPS capacity building are largely justifiable on a public goods basis, and – in DMC contexts such as in Cambodia – are typically part of long-term programs to establish capacity which has hitherto been largely absent.

2. The project comprises packages of fairly generic activities of different types (i.e., provision of hardware – such as laboratory equipment and rapid test kits, training – on-the job and under scholarships, technical assistance – international, regional and domestic, and regional interaction and harmonization – through participation in GMS fora, bilateral working groups, and information generation – e.g., by completing market access studies etc) in plant health, animal health, food safety and academic education (plus project management to support these four technical components).

3. The scale of the project intervention is modest in absolute terms (at something around $12 million over 5 years), given the relatively small need for investment in civil works and equipment. Nevertheless, given that for many activities that the project supports (e.g., systematic field-based surveillance, conduct of market access studies) there is almost no activity at all at present, the project does represent a qualitative change in the approach to national SPS management; in fact, overall in Cambodian terms it constitutes something of an attempt at paradigm shift - in that encourages moves away from operating largely in conditions of uncertainty (e.g., about plant and wood pests, TAD incidence, and as regards border practices) and towards more risk-based SPS management systems.

4. The outcome of the project is defined as 'enhanced SPS management capacity', and it is from the achievement of this enhanced capacity that the project's economic benefits derive. Based on the composition of activities undertaken and the outputs delivered by the ADB and RGC investment resources, 'enhanced SPS management capacity' specifically incorporates dimensions such as: (i) increased testing and diagnostic ability and information on the pest, disease and food safety situation (based on more comprehensive skills to identify pests, diseases, and food safety hazards, and to manage the storage of data); (ii) increased response capability to outbreaks (to pest and animal diseases, food safety problems, etc); (iii) greater opportunities for Cambodia to participate in AFF trade; (iv) risk-based, WTO-compliant improved import handling procedures (covering plant, animal and food products); (v) upgraded regional relationships and sub-regional harmonization; (vi) fuller and more contemporary official and public awareness of SPS issues; and, (vii) more productive human resource use (as staff have been trained and have better information). Clearly, this constitutes a range of manifestations of institutional strengthening and capacity building, and the possible ways these may affect consumption, production, trade and wider welfare conditions in the Cambodian economy are similarly diverse.[40]

[40] As well as the mechanisms by which such effects may be felt, there are also numerous contemporaneous influences that contribute to economic welfare conditions (such as the level of national economic growth, attitudes and practices of GMS neighbors, climatic events and natural disasters, etc), and which must in principle, be disentangled from impact and benefit estimation.

5. Because of this kind of indirect relationship between the project outcome and potential impacts, and given the quality of data typically available in a developing country such as Cambodia, virtually all of the points regarding the difficulties surrounding both performance indicators definition and the estimation of economic benefits from broad-based SPS investments that were described earlier[41] apply in the current project context.

6. It is also the case that the nature of the economic analysis has been restricted to capturing the real resource costs of the proposed intervention only. Because the impacts of project interventions on particular products or processes are unspecified, and because the project does not encompass major legislative changes, associated (potential) social welfare losses, transitional costs and regulatory/compliance costs have not been estimated, nor have the costs of private efforts necessary to make beneficial use of improved public capacities.

2. Identifying Economic Benefits

7. From the characteristics of the project's outcome it is quite possible to anticipate a number of consequent impacts – and thus identify the economic benefits associated with them - and to develop methods for their economic valuation, yet almost impossible to undertake any quantification. This is fundamentally because:

(i) many of the present features of current plant and animal disease situations (i.e., their scope, severity, incidence) are fundamentally unknown, as is the situation with pesticides adulteration and contamination, animal feeds safety, food poisoning outbreaks, etc (i.e., there is little in the way of any baseline information about the conditions which the project may affect) from which change and impact can be measured); and,

(ii) the scale of increases in productivity resulting from plant and animal health improvement as a result of better surveillance and response systems are unknown;

(iii) the trade-related impacts from better information (e.g., on plant pests, from market access studies) will be *ad hoc* (and depend on case-by-case consideration by trading partners – e.g., rice and cassava to China), and the health consequences for humans (Cambodian nationals and tourists) of safer food (and less exposure to animal drug and pesticides residues) are difficult to quantify with any precision; and,

(iv) the dynamic impact of improved SPS services for the private sector constitute an improvement in the investment climate which leads to increased investment in production in general and value adding activities in particular, but which is impractical to try and measure quantitatively

8. Table 1, over, summarizes for a number of 'enhanced SPS management' impacts in Cambodia what their potential impacts might be, how such impacts could be valued in economic terms, and some of the issues surrounding their quantification.

9. Overall, what is immediately clear is that the causal relationship between project outcome and impacts (and thus economic benefits) is complex, and that - while it is possible to provide a reasonably comprehensive qualitative description of expected benefits - quantification is entirely different.

[41] In the STDF/OECD Working Paper, and Henson; *ibid.*

Table 1: Enhanced SPS Management Capacity And Benefits Identification, Valuation, Quantification

Enhanced SPS management capacity – example impacts	Potential Benefit Types Identification	Benefits' Economic Valuation Basis	Benefit Quantification Issues
Improved plant and forest/wood health diagnosis and information base (pest lists)	• Trade diversification (product and market). More trading partners accept Cambodia plant and wood products • Reduced risk for investors in production for exports that market access is denied.	• Crop and forest/NTFP losses avoided; border price equivalent valuation (BPEV), incremental or non-incremental basis • Export parity (border price basis equivalent basis), incremental / non-incremental valuation (i.e., demand or supply-price bases)	• Current plant and wood pests and disease situation is not understood or documented (range of diseases, incidence, severity etc) • Trading partners' responses (e.g., to pests list development) will be *ad hoc* (crop/product and time-specificity) – impossible to predict *ex ante*
Improved agrochemicals management 3	• Human exposure to hazardous chemicals reduced • Nature exposure to hazardous chemicals reduced • Agriculture productivity increase as result of efficient agrochemical use, and reduced risk of fake pesticides • Reduced risk of market access denial	• Human death and illness costs avoided (DALY, and medicines and treatment costs) • Costs of production savings and/or increased output. Valued at border price equivalent, incremental or non-incremental (i.e., demand or supply-price bases)	• Extent and composition of pesticides adulteration and contamination problem - and the impacts of this on human health - is not known at present • Potential cost savings through proper applications have not been assessed or modelled
Improved livestock TAD diagnosis and response	• Reduced mortality and mortality from FMD, CSF, HS, PRRS etc • Increase in Cambodia formal livestock exports and/or domestic production	• Export parity valuation for live animals; import parity for meat as an input to animal food products)	• Current livestock disease incidence, severity etc is largely unknown • Response-based livestock productivity impact level is not known
Improved management of veterinary drugs, animal feed and animal food products	• Improvements in animal health • Improvements in human health • Agriculture productivity increase as a result of reduced risk of fake drugs • reduced exposure of nature to biotics	• Export or import parity pricing for animals, plus adjustment for any differential in improved drug and feed costs • DALY (and medicine and treatment costs) for humans	• Extent of adulteration, contamination, residue situation etc is not known/documented at present • Extent of potential animal and human health impacts are unknown

Table 1: Enhanced SPS Management Capacity And Benefits Identification, Valuation, Quantification (cont.)

Enhanced SPS management capacity – example constituents:	Potential Benefit Types Identification	Benefits' Economic Valuation Basis	Benefit Quantification Issues
Improved food safety surveillance systems (including response capacity)	• Better awareness of food safety issues • Fewer food poisoning and other outbreaks	• Willingness To Pay estimates for improved food safety; AND/OR • DALY, medicine and treatment costs	• Extent of food safety problems is unknown (most incidents/ outbreaks are unreported)
Improved food handling in tourist establishments	• Fewer cases of tourist food poisoning and other outbreaks • Strengthened image of tourist services sold, more arrivals, lower risk of outbreaks that reduce arrivals	• Tourist DALY, medicine, treatment • Average tourist spending in Cambodia, food-related tourist arrivals	• Extent of food safety problems in tourist establishments is unknown (many outbreaks are unreported)
Improved first-time market access for AFF products – study undertaken	• Cambodia avoids high cost of assessment of safety of new products and/or access of products with unknown safety • Cambodia allows imports on basis of GMS and other countries' assessments	• Border price (incremental) basis • Import-substitution (border price, non-incremental)	• Cannot identify products, markets, partners' responses prior to study / *ex ante*
Improved border handling of plant, animal, and food products	• Reduced SPS-related transaction costs • Less exposure of plants, animals and humans to health hazards (risk reduction)	• Transaction costs savings (financial and economic prices; both cash and time costs) • Crop and animal production potential losses avoided • Human health status (DALYs)	• Some sporadic information on scale of costs, BUT time release studies typically insufficient for measuring SPS transaction cost • Current risk exposures are not known, and impossible to price current exposure (e.g., no crop insurance markets)
Increased SPS human resource capacity	• Technical and SPS management productivity gains (increased range of knowledge, skills, responsibilities, depth of competence etc)	• Private earnings as proxy for social welfare (e.g., following on the job training and/or academic training)	• Absence of private market (e.g., for vets) in Cambodia – numbers of staff trained are very small and/or atypical of labour market generally

10. As was apparent from the literature review, this kind of situation regarding benefits estimation in (relatively small) multi-sectoral SPS institutional strengthening projects is quite typical. The result is that it is not appropriate to estimate an Economic Internal Rate of Return (EIRR) based on essentially unrealistic and unjustifiable assumptions about extent of impact and economic benefits, but rather it is more plausible to provide a qualitative description of anticipated benefit types.[42]

11. Notwithstanding this description of the difficulties associated with quantifying project benefits, it can still be useful to attempt to add some estimate of scale to the benefits that the project investments make possible. Table 2, over, summarizes some estimates of the scale of different sorts of benefits from the project's components[43] and the assumptions which underlay the estimates.

12. Though they are dependent on many factors outside the area of the project's manageable interest, they can all be plausibly linked quite directly to specific project activities – it is thus legitimate to refer to them as potential benefits, even if a formal EIRR calculation based on them is not attempted. What is notable is that the scale of such benefits is clearly more than enough to generate very positive economic returns to an investment of around $12 million.

13. What is perhaps of most relevance to the Cambodia context in terms of an economic analysis is to consider the without-project scenario. In the absence of investments to increase national Cambodia SPS capacity it is likely that:

(i) the overwhelming majority of Cambodia's AFF trade will remain relatively small-scale, informal (and thus unrecorded, unregulated and not generating any tax revenues), unprocessed, unsuited for value adding processes, and destined to low-end markets;
(ii) specific AFF export opportunities (like rice and other exports to China, cashew nut, fruit and vegetables to high end markets etc) will be lost (or will at best stalled, and dependent upon other countries' ability and willingness to inspect and approve Cambodia's primary produce);
(iii) Cambodia will be at a greater risk from various forms of pest invasions, transboundary animal disease outbreaks, and food safety risks (in relation specifically to tourist establishments, but also more widely);
(iv) Cambodia may become a dumping ground of some sub-grade agricultural inputs and consumer products in the region; and,
(v) the country will remain a weak link in subregional aggregator technology terms, and will thereby contribute to increased reputational risk to GMS trade in AFF products and services (i.e., tourism).

[42] In the absence of any cost benefit calculation it is therefore similarly impossible to estimate a Financial Internal Rate of Return – FIRR - or attempt quantitative poverty impact estimation – calculation of Poverty Impact Ratio – PIR, or to undertake any quantitative/probabilistic risk analysis.

[43] The estimated benefits from project components/subcomponents are not exhaustive; i.e., they do not cover all possible benefits sources – notable omissions include benefits accruing to improved reputational risk, benefits from improved feed, drugs, pesticides, imports handling, direct benefits to international tourists in Lao PDR etc.). Also: note that any figures cited are not discounted into present value terms.

Table 2: Indicative Scales Of Economic Benefits From Project Components

Component	Sources of Potential Economic Benefit	Basis of Economic Benefit Quantification	Potential Economic Benefits Scale
Plant Health	1. Proportion of rice exports become SPS-compliant	1. 50,000 tonnes of rice becomes SPS-compliant and formally traded (as opposed to border trade) – net increment (allowing for SPS costs) of $50 per tonne;	1. $50/tonne @ 50,000 tonnes = $2.5 million
	2. Trade agreements with neighboring countries covering rice and cassava made possible by pest lists development	2. 10,000 tonnes each of incremental rice and cassava at (approximate 2011) Cambodia border prices - $300, $100/tonne respectively[44]	2. $3 million + $1 million = $4 million annually of gross export revenues (= $0.8million net economic benefit, based on prevailing enterprise budgets/gross margins analysis?) *Expected beneficiaries are smallholder crop-producing households throughout Cambodia (i.e. rice growers, plus cassava, cashews, fruits and vegetable producers).*
Animal Health	1. Reduced livestock mortality[45] from surveillance visits and outbreak responses regarding FDM and CSF in Kampong Cham, Takeo and Svay Rieng provinces	1. Farmgate price of cattle ($500 average head @$1 per kg) and pigs ($75 average head @$1 per kg),[46] and combined provinces' animal populations of 900,000 and 500,000 cattle and pigs respectively.[47] Likely about 200,000 buffalo and 2,000 goats in the two provinces	IF project sustains provincial livestock (cattle, pigs) populations by 1%, annual economic benefit is $2.25 million (cattle) + $0.19 million (pigs) = $2.44 million for both; IF project sustains these populations by 0.5%, annual economic value is $1.22 million annually. Including buffalo and goats may increase this estimate by a further 15-20%, based on populations and current farmgate prices

[44] World Bank commodity price data, adjusted to an estimated value at Lao PDR/PRC border; http://siteresources.worldbank.org/INTPROSPECTS/Resources/334934-1111002388669/829392-1304528907776/Pnk_0511.pdf

[45] The effects of these diseases on animal health manifest themselves in various forms as regards economic impact; animals lose weight (thus reducing sale price), are incapacitated for draught purposes and require farmers to hire alternative sources, die sooner, and necessitate medicines being purchased for treatment. (See: *Realised and Potential Economic Benefits of the Southeast Asia Foot and Mouth Disease Campaign* 'by Ross McLeod, eSys Development – 2011 for a discussion of these types of impacts). In the absence of detailed information on current FMD and CSF incidence in Cambodia and the range and extent of individual impacts anticipated, 'reduced livestock mortality' incidence among these provincial populations is thus a proxy for the sum of these various effects.

[46] Live animal prices vary greatly by farm and market locations, season, health of animal, current alternative meat supplies and retail prices, and even FMD outbreak incidence itself (see for example '

[47] Current average domestic market prices adjusted back to farmgate; provincial animal populations based on MAF/DAHP figures (2010)

			Expected beneficiaries are smallholder households owning livestock in three provinces (plus likely spillovers). *Estimates from studies in Cambodia in 2006 (Maclean, cited in McLeod) suggested costs of $34 due to wet season FMD infection per household – or about 80% of a rural family income at that time.*
Food Safety	1. Reduction in DALYs from improved national food safety situation; current estimated food safety-related losses are $ 562 million annually[48]	1. Proportion of current economic losses due to food safety which can be avoided through project interventions	1. IF project reduces national losses by 1%, = $5.62 million annually; IF project reduces national losses by 0.5% = $2.81 million annually *Expected beneficiaries are potentially all Cambodia population, but mainly in urban areas (restaurant and food establishment users)*
Project	**Potential economic benefits from these sources could be of the scale of up to $10 million annually**		

[48] LAO PDR: Trade And Industry (Small And Medium-Sized Enterprises) 2011-2014 Assessment, Strategy And Roadmap; SERD, ADB (2011); this estimate for Lao PDR is adjusted to Cambodia by the relative amounts of respective national DALYs/100,000 (i.e., 1442 for Lao PDR and 2843 for Cambodia) and then by *per capita* GDP proportionality (i.e., $960 for Lao PDR and $792 for Cambodia at 2010 current prices), and then by population ratios (6.3 m for Lao PDR and 14.4m for Cambodia.

3. Alternatives Analysis

14. A supplementary approach to the economic analysis of SPS management projects when cost benefit analysis is clearly inappropriate sometimes employs least-cost analysis to demonstrate relative economic efficiency. However, unless the project under consideration delivers entirely homogenous outputs (e.g., hospital beds, clinics, tubewells, school places) by different means this is also problematic.

15. In the present context, there are possible alternative approaches to delivering outputs that have been considered in investment design, and though the specific alternative outputs are not entirely identical in qualitative terms in the ways that hospitals, schools etc may be, it is possible to argue that an overall least cost approach (e.g., to strengthening plant, animal and food safety surveillance systems) has been adopted, in that choices of approach and technology have been employed to minimize costs per unit of expected output.

16. The approach to project design has considered alternative options with differing costs structures in three areas; these are: (i) the use of consultants; (ii) the sharing (where technically possible) of newly constructed microbiology laboratory facilities; and, (iii) recourse to regional testing laboratories and the use of rapid test kits.

17. Firstly, as regards the use of consultants, the proposed structure - Option A - is (broadly) about 4:1 regional: international in terms of composition of the total of non-domestic person months for the non-project management functions. For most of the envisaged SPS functions across all technical components, and given the desirability of drawing on specialist regional knowledge (especially in the development of academic curricula for RUA) regional consultant skills are assessed as appropriate and save over 50% of the total cost that would be incurred if all international consultants were to be used (i.e., Option B). The average costs per person month being $8,000/10,000 to $21,750 for Options A and B, respectively. The total costs of consultants for the four technical components under the proposed design option is thus about $1.7 million; under the option of using entirely international consultants, this cost would be almost exactly double - at some $3.35 million. Of the possible alternatives, Option A is the most cost effective for the proposed project design in this respect. In several cases, a small amount of international consultancy is combined with regional consultancy in order to combine full access to international good practice with regional expertise.

18. National consultants are also used to the extent possible in order to promote broad cost effectiveness – 21 months is allocated to specific tasks under the technical components, and a further 40 months is 'unallocated' under project management[49]– and this accounts for about 10% of all consulting costs.

19. Secondly, as regards the use of laboratory facilities, Option B, would have been to construct three laboratories (i.e., one for plant health, one for animal health, one for food safety) at RUA, likely costing around $1.2 million, estimated on construction costs of 3 * $250,000 each plus equipment costs averaging $150,000 each (using comparable estimates for the laboratory equipment purchased under the other technical components). The base cost of the proposed shared microbiology laboratory under the chosen Option A (including civil works and equipment) is about $620,000; actual costs savings are the difference between these two Options/amounts (i.e., something under $600,000), less a very modest

[49] For project implementation management, there is assessed to be no alternative to international technical assistance for overall project implementation and financial management/procurement support, and 32 months of international consultants for this purpose cost just under $700,000.

amount for increased management and administration to ensure ongoing coordination between departments arranging different faculty usage.

20. Thirdly, recourse to regional laboratories (Option A) is made where it is more cost-effective to send a small number of samples out of Cambodia to regional laboratories (e.g., in Thailand) rather than establish such capacity within country (Option B). In animal health, for example, regional reference testing costs $10,000 – compared to hundreds of thousands of dollars in capital costs for the required laboratory equipment. Likewise, the approach taken to large-scale sampling in food safety has also been to use rapid test kits (at a total cost of around $160,000) as opposed to much more expensive analytic laboratory services.

21. This is not a cost effectiveness argument *per se* as regards choice of technology, in that there are qualitative differences in the ranges of tests that can be performed by the rapid test kits and the analytic equipment. The latter can handle more specific, more precise tests (especially when quantitative determination is required, over and above simple qualitative outcomes), and in some cases (e.g., drug formulation testing) the analytic option is the only one available. However, as long as the rapid test kit approach is supported by access to analytic testing – as may be required – this does constitute a genuinely more cost effective approach (in that an identical outcome is achieved by the two alternative options).

22. As well as choices between discrete alternatives, overall strategic choices in design have also supported least-cost approaches. For example: (i) in the case of the plant health component, the scale and timing of TA inputs has been designed to correspond to, and coincide with, the completion of annual pest survey cycles' field work so that individual consultants will be involved with taxonomic identification work as well as more general training, and will thus provide effective in-depth mentoring functions in an on-the-job context, as opposed to providing stand-alone training in a more generalized environment; and, (ii) the animal health component has incorporated a reliance on vaccines from SEACFMD in outbreak response as way of both developing regional links but also as a cost effective source of supply.

4. Financial Sustainability And Fiscal Analysis

23. A major feature of the economic analysis of SPS projects must be the consideration of financial sustainability and the fiscal implications for RGC.

24. The issue of financial sustainability of SPS projects is particularly acute because of their reliance on recurrent funding to maintain surveillance and testing systems through annual cycles where those systems require continual consumption of testing/sample consumables, laboratory equipment (glassware, chemicals) etc. In Cambodia – where government budget for such cost items is almost entirely absent at present –the situation is extreme, but must be addressed in project design.

25. A recent study[50] of the minimum costs necessary to undertake basic SPS tasks in neighboring Lao PDR estimated that around $1 million was needed annually to conduct plant health, animal health and food safety surveillance, diagnosis and tests (using cost effective approaches including using rapid testing, as per the current design). This compared with (then) government annual budget of around $50,000 for operational costs (supplemented by specific donor projects addressing particular issues). The situation in Cambodia is directly comparable with these circumstances, if not worse.

[50] Lao PDR: *Operational Costs of Trade-Related Sanitary and Phytosanitary Activities.* An assessment undertaken resourced by the Trade Development Facility Multi Donor Trust Fund' World Bank (2010).

26. As far as SPS systems are concerned, recurring expenditures can be broadly grouped into two categories; (i) those costs that support institutions' laboratory systems; and, (ii) those costs that are directly related to (seasonal or annual) plant, animal and food safety surveys.

27. In some more detail, the two expenditure categories may include such items as, firstly – vis-à-vis laboratory systems:

(i) out-sourcing of testing and diagnostics to other laboratories (e.g., regional/neighboring countries),
(ii) laboratory equipment servicing and calibration, training, documentation, proficiency testing, and accreditation;
(iii) purchase of standards, columns, chemicals/reagents and glassware - which may last for a few years; and,
(iv) the management and storage of survey data, laboratory records etc.

28. Secondly – regarding operational and survey costs), such items may include:

(i) the purchase and collection cost of samples (i.e., plant, animal, food);
(ii) rapid test kits (e.g., for aflatoxin, pest residues, formalin in seafood etc);
(iii) staff travel and per diems for survey field work; and,
(iv) other non-staff survey and inspection costs (e.g., small equipment items, stationery, communications etc).

29. The first category of costs need not be incurred in any particular year, and are thus not 'recurrent' in a traditional accounting sense; nevertheless, these expenditures must be incurred routinely/periodically in order to support national technical capacity. If these items of the first category are not regularly replaced and renewed, and if the laboratory has no steady stream of samples to be tested (this is where category 2 costs are incurred), national capacities and proficiencies erode rapidly, and rebuilding them is expensive. Notably also, inadequate operational costs funding for university faculties implies that classroom education cannot be complemented by the necessary practical training in laboratories and in the field.

30. In the current proposed project, the first category of costs to support laboratory systems in addition to the investment costs total $1.2 million (base costs estimate) over the five years across all components (i.e., about $243,000 a year). The base costs associated directly with the surveys programs total $2.05 million (i.e., some $410,000 a year).

31. By component, animal health accounts for account almost half of 50% of project costs to support laboratories – the implication would be that DAHP would need additional resources of about $550,000; plant health (under DGA) needs $350,000, while RUA needs about $300,000. For the (truly recurrent) operational and survey costs, animal health is about $950,000, food safety just under $500,000, plant health about $425,000, and RUA/academic education is $175,000 – all over the life of the project. Total annual departmental costs thus vary between about $110,000 for RUA to around three times this for DAHP.

32. These figures are summarized in Table 3, below.

Table 3: Supporting National SPS System Capacity: Summary Of Likely Non-Capital Costs Per Year

	Plant Health (DGA)	Animal Health (DAHP)	Food Safety (MOH/ Camcontrol)	Academic Education (RUA)	TOTAL ($m per year)
National laboratory capacity	> $70,000	$110,000	< $3,000	$60,000	**$0.243**
Operations and survey costs	$85,000	$190,000	$100,000	>$35,000	**$0.41**
Total	< $160,000	$310,000	>$100,000	<$110,000	**>$0.67m**

33. The potential for costs recovery through the charging of fees for services (e.g., testing of feeds, pesticides, food etc) is extremely limited in Cambodia for two reasons. Firstly, the private sector is small and the capacity of small-scale domestic producers (e.g., family livestock owners) and businesses to pay for commercial testing services is very limited. There may be a few Cambodian producers, traders etc who wish to test plant, animal and food products for purposes of certifying (to potential purchasers) that products are 'safe', 'organic', 'certified', 'uncontaminated' etc, but many of these will continue to access laboratories and certification providers in Thailand and Viet Nam.

34. Secondly, and even more fundamentally, however, is the almost complete absence of any incentives for testing of plant, animal or food products on the part of the private sector. Most agriculture and livestock inputs (fertilizers, pesticides, drugs, feed) are imported unofficially from neighboring countries, and both Cambodian and non-Cambodian producers, traders etc simply have no incentive to incur incremental formal marketing and access costs for a small, marginal market for their produce; they will be happy to let products be supplied informally and without scrutiny. Unless and until a regulatory and enforcement regime is in place that requires manufacturers and importers to demonstrate product quality standards' compliance, the possibilities for cost recovery through service charges are very remote. However, with introduction of regulatory testing there is a major risk that State services use regulatory powers as a para-fiscal instrument to generate income for inspectorates and laboratories. In such situations, the considerations of risk-based controls and low cost of doing business can be subjugated to bureaucratic interests. In this context, protecting farmers and consumers against contagious animal diseases, introduced pests, and unsafe, fraudulent products in the market largely remains a public good for which it is virtually impossible to recover costs from fees.

35. The main exception to this situation at present is in the tourist industry, where private enterprises do have incentives to upgrade their food safety practices - if a grading system is in place and through which they can more than offset any compliance (including testing) costs. This situation (i.e., of the existence of potential incentives) is why food safety in the tourist industry is included in the project scope – in that it affords an entry point into upgrading all formal and relatively formal food handling establishments and the food production and management environment more widely. The project aims to facilitate the introduction of a tourist enterprise food safety grading system, and thus cost recovery – if introducing a grading system is successful – becomes a possibility.

36. In the meantime, the question arises as to what can be done to ensure financial sustainability of the project investments in enhanced SPS capacity. The foregoing analysis suggests the following key points, which have implications for project design and operations:

(i) there is a need to maintain a dialog with senior RGC policy makers to ensure that benefits of SPS investments are understood and budget allocations to project investments are sustained post-investment phase;

(ii) RGC may decide to consolidate the scattered and under-funded laboratory infrastructure and halt further proliferation of the infrastructure for testing of food and agricultural inputs. This would allow for better utilization of capacities and result in savings of operational costs. In this context RGC should prepare medium-term business plans for major (perhaps consolidated) laboratory services, such that – based on both a growth in demand from the private sector and increased regulatory compliance pressure – increased scope for cost recovery through commercial or quasi-commercial charging can be applied in future;

(iii) ongoing project monitoring and evaluation should include identification and documentation of both generalized and specific impacts (i.e., on trade, on health, on tourism) arising from improved SPS capacity, so as to demonstrate to both national and subregional fora the economic benefits of enhanced capacity. Specific impacts may relate to exports which may not have happened in the absence of (for example) improved plant pest or wood/forest pests information, and also to the implementation of a food safety grading system in tourist establishments; and,

(iv) based on the identification of specific impacts on trade in goods and services and clear demonstration of a case that a 'weaker link' has been somewhat strengthened (in terms of a generalized but identifiable reduced reputational risk, and – if possible – that the GMS now represents a better destination for non-subregional finance inflows), the project should explore all possible ways to encourage more developed GMS neighbors to contribute to further SPS capacity strengthening in Cambodia through (for example) improved information availability, technical support (equipment and staff), financial resources etc. This can be achieved via the bilateral working groups and also wider GMS and/or ASEAN mechanisms.

5. Regional Analysis

37. The project has a significant regional orientation. Of the total technical base costs (i.e., the costs of the four technical components, and excluding the necessarily domestic and unavoidable overhead of project implementation) regional costs account for about 15% of all the project's costs - at some $1.38million. This regional expenditure includes some exclusively regional subcomponents (e.g., the Wood Products GMS Study subcomponent in the Plant Health Component, the Regional Scholarship Subcomponent in the Academic Education Component), plus a range of activities, including:

(i) participation in specific bilateral meetings, working groups and staff exchanges across all subcomponents (totalling about $136,000);

(ii) expenditure on regional consultants (around half of whom are visiting academics and cost $8,000-10,000 per month, or around $1.17m, and

(iii) study tours, reporting to regional agencies, and regional scholarships totalling $277,000 (the last of which on its own accounts for about $92,000.

LAO PDR

1. Introduction

1. The proposed project in Lao PDR is fundamentally an institutional strengthening investment, whose purpose is to strengthen capacity in national SPS management. It is undertaken as a necessary (although in isolation, not sufficient) intervention to support and make sustainable AFF trade and to reduce human, plant and animal health risks. Investments in SPS capacity building are largely justifiable on a public goods basis, and – in DMC contexts such as in Lao PDR – are typically part of long-term programs to establish capacity which has hitherto been largely absent.

2. The project comprises packages of fairly generic activities of different types (i.e., provision of hardware – such as laboratory equipment and rapid test kits, training – on-the job and under scholarships, technical assistance – international, regional and domestic, and regional interaction – through participation in GMS fora, bilateral working groups, and information generation – e.g., by completing market access studies etc) in plant health, animal health, food safety and academic education (plus project management to support these four technical components).

3. The scale of the project intervention is modest (at something around $15 million over 5 years), given the wider institutional context of AFF trade and health circumstances. Nevertheless, given that for many activities the project supports (e.g., field-based surveillance through rapid testing, conduct of market access studies) there is almost no activity at all at present, the project does represent a qualitative change in the approach to national SPS management; in fact, overall in Lao PDR terms it constitutes something of an attempt at paradigm shift - in that encourages moves away from operating largely in conditions of uncertainty (e.g., about plant and wood pests, TAD incidence, and as regards border practices) and towards more risk-based SPS management systems.

4. The outcome of the project is defined as 'enhanced SPS management capacity', and it is from the achievement of this enhanced capacity that the project's economic benefits derive. Based on the composition of activities undertaken and the outputs delivered by the ADB and GOL investment resources, 'enhanced SPS management capacity' specifically incorporates dimensions such as: (i) increased testing and diagnostic ability (based on more comprehensive, recent and accessible data); (ii) increased response capability (to pest and animal diseases, food safety problems, etc); (iii) greater opportunities for Lao PDR to participate in AFF trade; (iv) risk-based, WTO-compliant import handling procedures (covering plant, animal and food products); (v) stronger regulatory arrangements (based on revised/updated regulations); (vi) upgraded regional relationships; (vii) fuller and more contemporary official and public awareness of SPS issues (including specific support to public and private sectors for major cross-border crop value chains); and, (viii) more productive human resource use (as staff have been trained and have better information). Clearly, this constitutes a range of manifestations of institutional strengthening and capacity building, and the possible ways these may affect consumption, production, trade and wider welfare conditions in the Lao PDR economy are similarly diverse.[51]

5. Because of this kind of relationship between the project outcome and potential impacts, and given the quality of data typically available in a developing country such as Lao

[51] As well as the mechanisms by which such effects may be felt, there are also numerous contemporaneous influences that contribute to economic welfare conditions (such as the level of national economic growth, attitudes and practices of GMS neighbors, climatic events and natural disasters, etc), and which must in principle, be disentangled from impact and benefit estimation.

PDR, virtually all of the points regarding the difficulties surrounding both performance indicators definition and the estimation of economic benefits from broad-based SPS investments that were described earlier[52] apply in the current Lao PDR project context.

6. It is also the case that the nature of the economic analysis has been restricted to capturing the real resource costs of the proposed intervention only. Because the impacts of project interventions on particular products or processes are unspecified, and because the project does not encompass major legislative changes, (potential) social welfare losses, transitional costs and regulatory/compliance costs have not been estimated, nor have the costs of private efforts necessary to make beneficial use of improved public capacities.

2. Identifying Economic Benefits

7. From the characteristics of the project's outcome it is quite possible to anticipate a number of consequent impacts – and thus identify the economic benefits associated with them - and to develop methods for their economic valuation, yet almost impossible to undertake any quantification that could be used for EIRR calculations. This is fundamentally because:

(i) many of the present features of current plant and animal disease situations (i.e., their scope, severity, incidence) are fundamentally unknown, as is the situation with pesticides adulteration and contamination, animal feeds safety, food poisoning outbreaks, etc (i.e., there is little in the way of any baseline information about the conditions which the project may affect) from which change and impact can be measured); and,

(ii) the actual scale of increases in productivity resulting from plant and animal health improvement as a result of better surveillance and response systems are unknown;

(iii) the trade-related impacts from better information (e.g., on plant pests, from market access studies) will be *ad hoc* (and depend on case-by-case consideration by trading partners – e.g., corn, rice and cassava to China), and the health consequences for humans (Lao PDR nationals and tourists) of safer food (and less exposure to animal drug and pesticides residues) are difficult to quantify with any precision; and,

(iv) the dynamic impact of improved SPS services for the private sector constitute an improvement in the investment climate which leads to increased investment in production in general and value adding activities in particular, but which is impractical to try and measure quantitatively.

8. Table 1, over, summarizes for a number of 'enhanced SPS management' impacts in Lao PDR: (i) what their potential impacts might be; (ii) how such impacts could be valued in economic terms; and, (iii) and some of the issues surrounding their quantification. What is immediately clear from the table is that the causal relationship between project outcome and impacts (and thus economic benefits) is complex, and that - while it possible to provide a reasonably comprehensive qualitative description of expected benefits – robust quantification is a different matter.

[52] In the STDF/OECD Working Paper, and Henson; *ibid.*

Table 1: Enhanced SPS Management Capacity And Benefits Identification, Valuation, Quantification

Enhanced 3SPS management capacity – example impacts	Potential Benefit Types Identification	Benefits' Economic Valuation Basis	Benefit Quantification Issues
Improved plant and forest/wood health diagnosis and information base (pest lists)	• Trade diversification (product and market). More trading partners accept Lao PDR plant and wood products • Reduced risk for investors in production for exports that market access is denied.	• Crop and forest/NTFP losses avoided; border price equivalent valuation (BPEV), incremental or non-incremental basis • Export parity (border price basis equivalent basis), incremental / non-incremental valuation (i.e., demand or supply-price bases)	• Current plant and wood pests and disease situation is not understood or documented (range of pests, diseases, incidence, severity etc) • Trading partners' responses (e.g., to pests list development) will be *ad hoc* (crop/product and time-specificity) – impossible to predict *ex ante*
Improved agrochemicals management	• Human exposure to hazardous chemicals reduced • Nature exposure to hazardous chemicals reduced • Agriculture productivity increase as result of efficient agrochemical use, and reduced risk of fake pesticides • Reduced risk of market access denial	• Human death and illness costs avoided (DALY, and medicines and treatment costs) • Costs of production savings and/or increased output. Valued at border price equivalent, incremental or non-incremental (i.e., demand or supply-price bases)	• Extent and composition of pesticides adulteration and contamination problem - and the impacts of this on human health - is not known at present • Potential cost savings through proper applications have not been assessed or modelled
Improved livestock TAD diagnosis and response	• Reduced mortality and mortality from FMD, CSF, HS, PRRS etc • Increase in Lao PDR formal livestock exports and/or domestic production	• Export parity valuation for live animals; import parity for meat as an input to animal food products)	• Current livestock disease incidence, severity etc is largely unknown • Response-based livestock productivity impact level is not known with any precision
Improved management of veterinary drugs, animal feed and animal food products	• Improvements in animal health • Improvements in human health • Agriculture productivity increase as a result of reduced risk of fake drugs • Reduced exposure of nature to biotics	• Export or import parity pricing for animals, plus adjustment for any differential in improved drug and feed costs • DALY (and medicine and treatment costs) for humans	• Extent of adulteration, contamination, residue situation etc is not known/documented at present • Extent of potential animal and human health impacts are unknown

Table 1: Enhanced SPS Management Capacity and Benefits Iden444tification, Valuation, Quantification (cont.)

Enhanced SPS management capacity – example constituents:	Potential Benefit Types Identification	Benefits' Economic Valuation Basis	Benefit Quantification Issues
Improved food safety surveillance systems (including response capacity)	• Better awareness of food safety issues • Fewer food poisoning and other outbreaks	• Willingness To Pay (WTP) estimates for improved food safety; AND/OR • DALY, medicine and treatment costs	• Extent of food safety problems is unknown (most incidents/ outbreaks are unreported)
Improved food handling in tourist establishments	• Fewer cases of tourist food poisoning and other outbreaks • Strengthened image of tourist services sold, more arrivals, lower risk of outbreaks that reduce arrivals	• Tourist DALY, medicine, treatment • Average tourist spending in Lao PDR, food-related tourist arrivals	• Extent of food safety problems in tourist establishments is unknown (many outbreaks are unreported)
Improved first-time market access for AFF products – study undertaken	• Lao PDR avoids high cost of assessment of safety of new products and/or access of products with unknown safety • Lao PDR allows imports on basis of GMS and other countries' assessments	• Border price (incremental) basis • Import-substitution (border price, non-incremental)	• Cannot identify products, markets, partners' responses prior to study / *ex ante*
Improved border handling of plant, animal, and food products	• Reduced SPS-related transaction costs • Less exposure of plants, animals and humans to health hazards (risk reduction)	• Transaction costs savings (financial and economic prices; both cash and time costs) • Crop and animal production potential losses avoided • Human health status (DALYs)	• Some sporadic information on scale of costs, BUT time release studies typically insufficient for measuring SPS transaction cost • Current risk exposures are not known, and impossible to price current exposure (e.g., no crop insurance markets)
Increased SPS human resource capacity	• Technical and SPS management productivity gains (increased range of knowledge, skills, responsibilities, depth of competence etc)	• Private earnings as proxy for social welfare (e.g., following on the job training and/or academic training)	• Absence of private market (e.g., for vets) in Lao PDR – numbers of staff trained are very small and/or atypical of labour market generally

9. As was apparent from the literature review, this kind of situation regarding benefits estimation in (relatively small) multi-sectoral SPS institutional strengthening projects is quite typical. The result is that it is not appropriate to estimate an Economic Internal Rate of Return (EIRR) based on essentially unrealistic and unjustifiable assumptions about extent of impact and economic benefits, but rather it is more plausible to provide a qualitative description of anticipated benefit types.[53]

10. Notwithstanding this description of the difficulties associated with quantifying project benefits, it can still be useful to attempt to add some estimate of scale to the benefits that the project investments make possible. Table 2, over, summarizes some estimates of the scale of different sorts of benefits from the project's components,[54] as well as the assumptions on which their estimation is based.

11. Though they are dependent on many factors outside the area of the project's manageable interest, they can all be plausibly linked quite directly to specific project activities – it is thus legitimate to refer to them as potential benefits, even if a formal EIRR calculation based on them is not attempted. What is notable is that the scale of such benefits is clearly more than enough to generate very positive economic returns to an investment of around $15 million.

12. What is perhaps of even more relevance to the Lao PDR context in terms of the nature of economic analysis than attempting to specify benefits is to more explicitly consider the without-project scenario. In this regard, and in the absence of investments to increase national Lao PDR SPS capacity, it is likely that:

(i) the overwhelming majority of Lao PDR AFF trade will remain relatively small-scale, informal (and thus unrecorded, unregulated and not generating any tax revenues) and unprocessed;
(ii) specific AFF export opportunities (like corn exports to China) will be lost (or will at best stalled, and dependent upon other countries' ability and willingness to inspect and approve Lao PDR primary produce);
(iii) Lao PDR will be at a greater risk from various forms of pest outbreaks, transboundary animal disease outbreaks, and food safety risks (in relation specifically to tourist establishments, but also more widely);
(iv) Lao PDR may become a dumping ground of some sub-grade agricultural inputs and consumer products in the region, and
(v) The country will remain a weak link in subregional aggregator technology terms, and will thereby contribute to increased reputational risk to GMS trade in AFF products and services (i.e., tourism).

[53] In the absence of any cost benefit calculation it is therefore similarly impossible to estimate a Financial Internal Rate Of Return – FIRR - or attempt quantitative poverty impact estimation – calculation of Poverty Impact Ratio – PIR, or to undertake any quantitative/probabalistic risk analysis.

[54] The estimated benefits from project components are not exhaustive; i.e., they do not cover all possible benefits sources – notable omissions include benefits accruing to improved reputational risk, benefits from improved feed, drugs, pesticides, imports handling, direct benefits to international tourists in Lao PDR etc.). Note that figures cited are not discounted into present value terms.

Table 2: Indicative Scales Of Economic Benefits From Project Components

Component	Sources of Potential Economic Benefit	Basis of Economic Benefit Quantification	Potential Economic Benefits Scale
Plant Health	1. Three trade agreements with neighboring countries covering rice, corn and cassava made possible by pest lists development 2. Strengthened corn and rice cross-border value chains	1. 10,000 tonnes each of incremental rice and corn, and 5,000 tonnes of cassava at (approximate 2011) Lao PDR border prices - $300, $200, $100/tonne respectively[55] 2. 50,000 tonnes of corn becomes SPS-compliant and formally traded (as opposed to border trade) – net increment (allowing for SPS costs) of $50 per tonne; same for rice	1. $3 million + $2 million + $0.5 million = $5.5 million annually of gross export revenues (= $1 million net economic benefit, based on prevailing enterprise budgets/gross margins analysis?) 2. $2.5 million + $2.5 million = $5 million annually net economic benefit *Expected beneficiaries are smallholder crop-producing (i.e. rice and corn) households, mainly in the northern provinces (trading with PRC), but also other lagely southern provinces adjoining Viet Nam.*
Animal Health	1. Reduced livestock mortality[56] from surveillance visits and outbreak responses regarding FDM and CSF in Xieng Khouang and Savannakhet provinces	1. Farmgate price of cattle ($500 average head @$1 per kg) and pigs ($75 average head @$1 per kg)[57], and combined provinces' animal populations of 525,000 and 350,000 cattle and pigs respectively.[58]	**IF** project sustains provincial livestock (cattle, pigs) populations by 0.5%, annual economic benefit is $1.31 million (cattle) + $0.13 million (pigs) = $1.43 million for both; **IF** project sustains these populations by 0.25%, annual economic value is $0.72 million annually.

[55] World Bank commodity price data, adjusted to an estimated value at Lao PDR/PRC border; see *http://siteresources.worldbank.org/INTPROSPECTS/Resources/334934-1111002388669/829392-1304528907776/Pnk_0511.pdf.*

[56] The effects of these diseases on animal health manifest themselves in various forms as regards economic impact; animals lose weight (thus reducing sale price), are incapacitated for draught purposes and require farmers to hire alternative sources, die sooner, and necessitate medicines being purchased for treatment. (See: *Realised and Potential Economic Benefits of the Southeast Asia Foot and Mouth Disease Campaign* 'by Ross McLeod, eSys Development – 2011 for a discussion of these types of impacts). In the absence of detailed information on current FMD and CSF incidence in Lao PDR and the range and extent of individual impacts anticipated, 'reduced livestock mortality' incidence among these provincial populations is thus a proxy for the sum of these various effects.

[57] Live animal prices vary greatly by farm and market locations, season, health of animal, current alternative meat supplies and retail prices, and even FMD outbreak incidence itself (see for example '*Lao Voices'* of April 8 2011).

[58] Current average domestic market prices adjusted back to farmgate; provincial animal populations based on MAF 2010 Census figures (and also accord with ADB Livestock Review of 2003 and adjusted for recent growth).

		Likely about 350,000 buffalo and 70,000 goats in the two provinces	Including buffalo and goats may increase this estimate by a further 50-60%, based on populations and current farmgate prices *Expected beneficiaries are smallholder households owning livestock in two provinces (plus likely spillovers).* *Estimates from studies in Lao PDR in late 1990s (Perry et al, cited in McLeod) suggest costs of half a tonne of rice to hire alternative animals for draught – perhaps $70 in 2011 prices. Other economic costs at household level would be medicines and reductions in sale values*
Food Safety	1. Reduction in DALYs from improved national food safety situation; current estimated food safety-related losses are $149 million annually[59]	1. Proportion of current economic losses due to food safety which can be avoided	**IF** project reduces national losses by 1%, = $1.49 million annually; **IF** project reduces national losses by 0.5% = $0.75 million annually *Expected beneficiaries are potentially all Lao PDR population, but mainly in urban areas (restaurant and food establishment users)*
Project	**Potential economic benefits from these sources could be of the scale of up to almost $10 million annually**		

[59] Trade and Industry (Small And Medium-Sized Enterprises) 2011-2014 Assessment, Strategy And Roadmap; SERD, ADB (2011).

3. Alternatives Analysis

13. A supplementary approach to the economic analysis of SPS management projects when cost benefit analysis is clearly inappropriate sometimes employs least-cost analysis to demonstrate relative economic efficiency. However, unless the project under consideration delivers homogenous outputs (e.g., hospital beds, clinics, tubewells, school places) by different means this is also problematic.

14. In the present context, there are alternative approaches to providing outputs that have been considered in investment design, and though alternative outputs are not entirely identical in qualitative terms, it is possible to argue that an overall cost effective approach (e.g., to strengthening plant, animal and food safety surveillance systems) has been adopted.

15. In general, the project design has employed the option (A) of extensive use of rapid test kits as a more cost effective approach to strengthening surveillance and diagnostic capacity than would be the case through the option (B) of using capital-intensive analytical equipment capable of handling large volumes of more expensive conventional tests annually. Option A (i.e., using rapid test kits) is complemented through budgeting for small numbers of specific tests (e.g., on veterinary drug formulation, for screening of feeds for pesticides (such as organochlorines and pyrethroids) and heavy metals to be carried out in neighboring countries (most likely Thailand or Viet Nam). Option A suits Lao PDR surveillance circumstances, where anticipated testing volumes and demand for high precision in measurement are low. Option B - investment in equipment for residues of pesticides that can detect low levels of residues demanded for by OECD countries - can each cost up to one million dollar in equipment and up to $100,000 in annual operational costs. Comparable investments for veterinary drugs residues would be $750,000 and annual operational costs around $50,000. Obviously, such investments are not justifiable for Lao PDR, given the partial alternative of rapid test kits and, if needed, additional formal testing abroad.

16. It is however important to note that this choice between options is not a pure cost effectiveness argument *per se* as regards choice of technology, in that there are qualitative differences in the ranges of tests which can be performed by the rapid test kits and the analytic equipment. The latter can handle more specific, more precise tests (especially when quantitative determination is required, over and above simple qualitative outcomes), and in some cases (e.g., drug formulation testing) the analytic option is the only one available. However, as long as the rapid test kit approach is supported by access to analytic testing – as may be required – this does constitute a genuinely more cost effective approach (in that an identical outcome is achieved by the two alternative approaches).

17. As well as the approach to surveillance testing which has been employed in the design, the project has also adopted other cost effective approaches, most notably and significantly with (Option A) the construction of the shared core facility at FA-NUOL, as compared to a more expensive approach (Option B) of building specialist laboratories and teaching facilities for each of the three departments. Adopting Option A - the core approach - costs about $631,000 for civil works (laboratory and teaching demonstration building) and shared equipment compared to around double this for Option B (i.e., three individual facilities). Under Option A, student throughput per square meter is maximized, building costs per student are minimized, and economies of scale are realizable. (This is the case as long as a coordinated and collaborative management approach, that implies a small but manageable administrative overhead, is applied by faculty administration).

4. Financial Sustainability And Fiscal Analysis

18. A major feature of the economic analysis of SPS projects must be the consideration of financial sustainability.

19. The issue of financial sustainability of SPS projects is particularly acute because of their reliance on recurrent funding to maintain surveillance and testing systems through annual cycles where those systems require continual consumption of rapid test kits, laboratory equipment (glassware, chemicals) etc. In the situation of Lao PDR – where government budget for such cost items is almost entirely absent at present – the situation is extreme but must be addressed in design.

20. A recent study[60] of the minimum costs necessary to undertake basic SPS tasks in Lao PDR estimated that around $1 million was needed annually to conduct plant health, animal health and food safety tests based on the most cost effective approaches (mainly using rapid testing, as per the current design). This compared with (then) government annual budget of around $50,000 for operational costs (supplemented by specific donor projects addressing particular issues).

21. As far as SPS systems are concerned, recurring expenditures can be broadly grouped into two categories: (i) those costs that support institutions' laboratory systems; and, (ii) those costs that are directly related to (seasonal or annual) plant, animal and food safety surveys.

22. In some more detail, the two expenditure categories may include such items as, firstly – vis-à-vis laboratory systems:

(i) out-sourcing of testing and diagnostics to other laboratories (e.g., regional/neighboring countries);
(ii) laboratory equipment servicing and calibration, training, documentation, proficiency testing, and accreditation;
(iii) purchase of standards, columns, chemicals/reagents and glassware - which may last for a few years; and,
(iv) the management and storage of survey data, laboratory records etc.

23. Secondly – regarding operational and survey costs), such items may include:

(i) the purchase and collection cost of samples (i.e., plant, animal, food);
(ii) rapid test kits (e.g., for aflatoxin, pest residues, formalin in seafood etc);
(iii) staff travel and per diems for survey field work; and,
(iv) other non-staff survey and inspection costs (e.g., small equipment items, stationery, communications etc).

24. The first category of costs need not be incurred in any particular year, and are thus not 'recurrent' in a traditional accounting sense; nevertheless, these expenditures must be incurred routinely/periodically in order to support and maintain national technical capacity. If these items of the first category are not regularly replaced and renewed, and if the laboratory has no steady stream of samples to be tested (this is where category 2 costs are incurred), national capacities and proficiencies erode rapidly, and rebuilding them is expensive. Notably also, inadequate operational costs funding for university faculties implies that classroom education cannot be complemented by the necessary practical training in laboratories and in the field.

25. In the proposed project, the first category of costs to support laboratory systems in addition to the investment costs total slightly over $1 million (base costs estimate) over the five years across all components (i.e., about $200,000 a year). The base costs associated directly with the surveys programs total $2.0 million (i.e., some $400,000 a year).

[60] World Bank. 2010. *Operational Costs of Trade-Related Sanitary and Phytosanitary Activities.*

26. By component, animal and plant health each require about $440,000 each (i.e., about $85,000 a year) to support laboratories with the remainder (some $127,000, or $25,000 a year) being accounted for by food safety. For the operational and survey costs, animal health is about $0.85 million, food safety about $325,000), plant health about $550,000, and academic education is just over $310,00 – all over the 5-year life of the project. Annual departmental costs vary between about $60,000 for FA-NUOL to over four times this for each of DOLF and MOH.

27. These figures are summarized in Table 3, below.

Table 3: Supporting National SPS System Capacity: Summary Of Likely Non-Capital Costs Per Year

	Plant Health (DOA)	Animal Health (DOLF)	Food Safety (MOH)	Academic Education (FA-NUOL)	TOTAL ($m per year)
National laboratory capacity	> $85,000	>$85,000	< $25,000	$0	**$0.20**
Operations and survey costs	$<110,000	$170,000	$65,000	$60,000	**$0.40**
Total	< $200,000	$255,000	$90,000	$60,000	**>$0.6m**

28. The potential for costs recovery through the charging of fees for services (e.g., testing of feeds, pesticides, food etc) is extremely limited in Lao PDR for two reasons. Firstly, the private sector is small and the capacity of small-scale domestic producers (e.g., family livestock owners) and businesses to pay for commercial testing services is very limited. There may be some few Lao PDR producers, traders etc who wish to test plant, animal and food products for purposes of certifying (to potential purchasers) that products are 'safe', 'organic', 'certified', 'uncontaminated' etc, but many of these will continue to access laboratories and certification providers in Thailand and Viet Nam.

29. Secondly, and even more fundamentally, however, is the almost complete absence of any incentives for testing of plant, animal or food products on the part of the private sector. Most agriculture and livestock inputs (fertilizers, pesticides, drugs, feed) are imported unofficially from neighboring countries, and both Lao PDR and non-Lao PDR producers, traders etc simply have no incentive to incur incremental formal marketing and access costs for a small, marginal market for their produce; they will be happy to let products be supplied informally and without scrutiny. Unless and until a regulatory and enforcement regime is in place that requires manufacturers and importers to demonstrate product quality standards' compliance, the possibilities for cost recovery through service charges are very remote. However, with introduction of regulatory testing there is a major risk that State services use regulatory powers as a para-fiscal instrument to generate income for inspectorates and laboratories. In such situations, the considerations of risk-based controls and low cost of doing business can be subjugated to bureaucratic interests. In this context, protecting farmers and consumers against contagious animal diseases, introduced pests, and unsafe, fraudulent products in the market largely remains a public good for which it is virtually impossible to recover costs from fees.

30. The main exception to this situation at present is in the tourist industry, where private enterprises do have incentives to upgrade their food safety practices - if a grading system is in place and through which they can more than offset any compliance (including testing) costs. This situation (i.e., of the existence of potential incentives) is why food safety in the

tourist industry is included in the project scope – in that it affords an entry point into upgrading all formal and relatively formal food handling establishments and the food production and management environment more widely. The project aims to facilitate the introduction of a tourist enterprise food safety grading system, and thus cost recovery – if introducing a grading system is successful – becomes a possibility. A second exception is the export of corn, rice, and cassava to China, where regulatory control increases incentives for traders to upgrade their supply chains.

31. In the meantime, the question arises as to what can be done to ensure financial sustainability of the project investments in enhanced SPS capacity. The foregoing analysis suggests the following key points, which have implications for project design and operations:

(i) there is a need to maintain a dialog with senior GOL policy makers to ensure that benefits of SPS investments are generally understood and that budget allocations to support project investments are sustained post-investment phase;
(ii) specific laboratories may be encouraged to prepare medium-term business plans, such that – based on both a growth in demand from the private sector and increased regulatory compliance pressure – increased scope for cost recovery through commercial or quasi-commercial charging can be applied in future. Such planning may realistically target specific products, services or export markets;
(iii) ongoing project monitoring and evaluation should include identification and documentation of both generalized and specific impacts (i.e., on trade, on health, on tourism) arising from improved SPS capacity, so as to demonstrate to both national and subregional fora the economic benefits of enhanced capacity. Specific impacts may relate especially to exports which may not have happened in the absence of (for example) improved plant pest or wood/forest pests information, and also to the implementation of a food safety grading system in tourist establishments; and,
(iv) based on the identification of specific impacts on trade in goods and services and clear demonstration of a case that a 'weaker link' has been somewhat strengthened (in terms of a generalized but identifiable reduced reputational risk, and – if possible – that the GMS now represents a better destination for non-subregional finance inflows), the project should explore all possible ways to encourage more developed GMS neighbors to contribute to further SPS capacity strengthening in Lao PDR through (for example) improved information availability, technical support (equipment and staff), financial resources etc. This can be achieved via both bilateral working groups and also wider GMS and/or ASEAN mechanisms.

5. Regional Analysis

32. The project has a significant regional orientation. Of the total technical base costs (i.e., the costs of the four technical components, and excluding the necessarily domestic and unavoidable overhead of project implementation) regional costs account for just under 20% of all the project's costs - at some $2.3 million.

33. This regional expenditure includes some exclusively regional subcomponents (e.g., the Wood Products GMS Study subcomponent in the Plant Health Component, the Regional Scholarship Subcomponent in the Academic Education Component), plus a range of activities, including:

(i) participation in bilateral meetings, working groups and staff exchanges (in all these exceed 80 in number) across all subcomponents (and totalling just over a quarter of a million dollars);
(ii) expenditure on regional consultants (around half of whom are visiting academics and cost $8,000-10,000 per month, or around $1.16 million, and
(iii) study tours, reporting to regional agencies, and regional scholarships totalling $672,000 (the last of which on its own accounts for about $370,000 and covers over 20 places on different courses at Asian institutions).