STDF PROJECT GRANT DOCUMENT

Project Title	Safer spices: boosting food safety and market access for the peppercorn value chain in Viet Nam, Lao PDR and Cambodia
Objective	To increase financial returns, improve productivity, safety and market access for smallholder pepper growers & processors and grower/processor groups by improving compliance with international food safety requirements in high value markets such as EU, USA and Japan, for production and to restore food manufacturing industry confidence in peppercorn sourced from the region.
Budget approved from STDF	**$ 711,096**
Total project budget	**$ 917,846**
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Project end date	**30 September 2023**

Abbreviations

ACIAR	Australian Centre for Agriculture Research
CABI	Centre for Agriculture and Biosciences International
DOA	Department of Agriculture
FDA	Food and Drug Authority
FAO	Food and Agricultural Organization
KMT	Kilo Metric Ton
GDA	General Directorate of Agriculture
GAP	Good Agriculture Practice
GHP	Good Hygiene Practice
GMP	Good Manufacturing Practice
MAF	Ministry of Agriculture and Forestry
MAFF	Ministry of Agriculture, Forestry and Fisheries
MARD	Ministry of Ministry of Agriculture and Rural Development
MRL	Maximum Residue Limit
NEA	National Executing Agencies
NCU	National Coordination Unit
NWG	National Working Group
PEA	Project Executing Agency
PGS	Participatory Guarantee System
PM	Project Manager
PPSPSD	Plant Protection, Sanitary and Phytosanitary Department
RASFF	Rapid Alert System for Food and Feed
SPS	Sanitary and Phytosanitary Standards
STDF	Standards and Trade Development Facility
TOR	Terms of Reference
VEW	Village Extension Workers
VL	Village Leaders
VPA	Vietnam Pepper Association
WASI	Western Highlands Agriculture and Forestry Science Institute

I. BACKGROUND & RATIONALE

1. Relevance for the STDF

Spices, including peppercorn, are associated with complex and diverse supply chains with products being sourced from a variety of businesses ranging from large-scale producers to small-scale farmers from around the world. Following harvest, the product will often pass through many intermediaries from farmer, collector, to middle-man before arrival at the processor/shipper. The aggregation and redistribution of these products at various stages along the supply chain contributes to a high food safety risk profile. Spices are vulnerable to a number of food safety risks: excessive pesticide residue levels; pathogen contamination (i.e. *Salmonella*); adulteration and substitute. In Turkey 3.3% of black peppercorn samples collected at retail in one study were contaminated with Salmonella (Hampikyan et. Al., 2009), 18% in Brazil (Moreira et.al. 2009). In a report published by FDA on pathogens and filth in spice, 6.7% of pepper shipments tested positive for Salmonella (FDA, 2017). Further, many spices are grown in developing countries by small-scale farmers under conditions where sanitation and food handling practices are sometimes inadequate exposing the product to dust, dirt, insects, and animal waste before and after harvest. Following harvest there are many opportunities for the introduction of pathogenic microorganisms and filth, during primary processing and storage[1].

EU Rapid Alert system for food and feed products (RASFF) notification reported five notifications for Vietnamese pepper within the last two years (see below).

Date	Country	Reason for rejection
25/02/2020	Spain	BORDER REJECTION: Salmonella in black pepper from Brazil
21/01/2020, 09/01/2020, 08/01/2020, 14/02/2020	Germany	BORDER REJECTION: Salmonella enterica ser. Javiana (presence /25g) and Salmonella enterica ser. Poona (presence /25g) in black pepper from Brazil
23/12/2019	Spain	BORDER REJECTION: Salmonella (in 3 out of 5 samples /25g) in black pepper from Brazil
12/12/2019	Netherlands	BORDER REJECTION: Salmonella (presence /25g) in black pepper from Brazil
08/11/2019	Poland	INFO FOR ATT: Salmonella (presence /25g) in black pepper from Vietnam
5/11/2019, 7/11/2019	Germany	BORDER REJECTION: Salmonella (presence /25g) in black pepper from Brazil
25/10/2019	Spain	BORDER REJECTION: Salmonella (presence /25g) in crushed pepper from India
18/10/2019	Poland	ALERT: Salmonella (present /25g) in ground black pepper from Vietnam, packaged in Poland
21/12/2018	Spain	INFO FOR ATT: Salmonella (present /25g) in ground black pepper processed in Spain, with raw material from Vietnam
18/05/2019 & 08/08/2018	Spain	BORDER REJECTION: Salmonella (presence /25g) in black pepper from Vietnam

Poor farming practices impact on the livelihoods of small-scale farmers: (i) environment and health risks associated with the overuse of pesticides and fertilisers are a persistent threat; (ii) lost income resulting from threats to market access due to poor compliance of customer standards; and (iii) potential health risk to consumers (including farmers), particularly with spices such as peppercorn that are widely used in most savoury recipes. With respect to peppercorn production, risks relating to contamination and threats to productivity have been highlighted, particularly from imports into the EU and other global markets.

Vietnam's peppercorn export industry will be used to develop a proof of concept for an inclusive market model that can be rolled out to other spice supply chains. A regional approach will be taken including neighbouring countries Cambodia and Lao PDR as Vietnam sources a substantial amount of the production in these neighbouring countries.

[1] ASTA (2017) Clean, Safe Spices: Guidance from the American Spice Trade Association

The proposed project is targeted at peppercorn supply destined for markets where there is increasing consumer concern. Improving the capacity of producers and traders to guarantee quality safe peppercorn that ultimately meets food safety and hygiene standards can help to boost exports, improve competitiveness and safe-guard the industry's future. Improving food safety for exports is also expected to have a positive spill over effect on domestic public health. Spices, including peppercorn, are widely consumed by local population in the three countries.

Analysis of SPS issues in exported peppercorn suggests that all the **main food safety and hygiene related non-compliances** (i.e. high MRL, bacterial and physical contamination), result from either **poor farm level decisions or handling practices.** In all cases, food safety and hygiene non-compliances can be corrected with **improved famer education and practical training**, assuming a **conducive environment can be created to encourage participants** to adopt the improved practices.

Analysis of the peppercorn value chain identified village level activities as the point of breakdown in SPS control. With respect to ensuring high levels of food safety and hygiene, **exporters and processors are capable of controlling value chain participants post village level**. This is demonstrated by some of the major firms in the target countries, however they all struggle to source sufficient volumes of high quality raw material, despite having active farmer programmes in-place. Given the shortage of "clean" raw material, many of the local buyers (traders, processors exporters) are reluctant to differentiate on product quality, further disincentivizing adoption of quality production practices at the village level.

Farmer reluctance to implement quality systems such as good agricultural practices and safe handling practices are, in part, due to the relatively high costs of such programmes, in terms of implementation and maintaining certification. Farmers also find current options, such as national GAP, complicated to implement.

The proposed project aims to **combat SPS issues related to food safety and improve the quality and traceability** in the production, post-harvest, processing and trade of peppercorn. This will be achieved by identifying, developing and disseminating good practices that focus on village level peppercorn production. A code of practice will be designed around **codex standards** and will **address identified key bottleneck to food safety and hygiene control** of peppercorn.

A weakness of past projects/initiatives designed to improve peppercorn quality in the region is that they are dependent on paying farmers a premium above market price as a means to incentivise farmer participation. Unfortunately, this also negatively impacted marketability of the peppercorn due to higher prices, as a result farmers were not able to sell the quantity of product initially envisaged. Addressing this identified weakness, the proposed STDF peppercorn project will adopt a novel approach of including, in the code of practice, a farm management component designed to lower cost of pepper production and/or improve productivity of pepper plants. Thereby incentivising the adoption of the code of practice.

The code of practice will therefore be composed of 2 sections:

1. Practices supporting adoption of codex based approaches to address the identified SPS issues
2. Good farm management practices.

The project will develop an implementation model for the code of practice, which is suitable for the spice sector, **based on** the **Participatory Guarantee System (PGS).** The PGS system, despite originally being designed to support development of organic farming by small-scale farmers, has also been used as a tool for production of safe produce, for example some of the **PGSs in Vietnam use the codex based Vietnam Basic Gap standard**. The PGS approach was selected because, in addition to contributing to production of safe produce, PGS also builds social cohesion, peer-to-peer learning and awareness of responsibility towards the community. **Social control/peer pressure is thought to be a useful means to control input suppliers/collectors, the key weak link in the peppercorn value chain**. Such control is demonstrated, albeit informally, within the Kampot pepper community to ensure quality of their product. PGS projects in Vietnam (detailed later in this proposal) have also built support from local authorities at the commune, district or provincial level. This support may cover infrastructure and human resources and sometimes finance.

The PGS model will be adapted to take into consideration: (i) the unique features of the spice sector; (ii) requirements for SPS control detailed in the code of practice; and (iii) farm

management elements also detailed in the code of practice. The PGS based model will be designed to foster a collaborative approach to moving towards a solution.

The proposed project addresses the question of "how to upgrade the basic level of safety and quality of peppercorn traded in regional markets". It is recognised that some exporters have implemented supplier control programmes. However, they still struggle with raw material supply as only a small proportion of their supply base, within country, is under such control and none of the pepper traded across borders is controlled. The proposed project will pilot test approaches to control peppercorn quality and safety so that a wider base of safe, traceable product can be created across the three countries.

A regional approach to support upgrading SPS quality of peppercorn will be adopted by: (i) developing and promoting harmonized standards across the project countries as practical standard specific to peppercorn does not currently exists; (ii) leveraging WASI's position as leader in research on peppercorn production; and (iii) building on lessons learnt by Vietnam in developing its peppercorn industry into a global leader. The project will also strengthen formal linkages and trade in peppercorn within the region.

The proposed project will seek to align with current initiatives and planned programmes to ensure that the overall support for the industry is cohesive, particularly relating to cross-cutting topics of common interest such as gender and climate change. For example, the project will seek to complement the current IDH project "sustainable peppercorn initiative"; and Australian Centre for International Agricultural Research (ACIAR) who are developing a research programme to support both coffee and pepper industries.

Methodology

This proposal emanates from an STDF support project preparation grant.[2] The proposal is based on an analysis of previous studies by WASI, CABI and other relevant organizations. Based on the findings of these studies, an initial outline of proposed outputs and activities was prepared. The initial outline of outputs and activities were further modified following discussion with development agencies active in the target countries, namely FAO, GIZ, ACIAR and IDH. Information was also obtained in the field through broad consultation with relevant public and private sector stakeholders in Cambodia and Vietnam. Knowledge sharing activities were held in Vietnam and Cambodia involving extensive consultation with potential local partners in the two countries. In planning for the workshops it was acknowledged that the cultivation area and production volumes for pepper in Lao PDR are extremely small, it was therefore thought more useful for the Lao PDR participants to attend workshops in the other 2 countries.

Based on the information obtained through feedback and in the field, a draft proposal was prepared in close collaboration with the above national partners and international agencies. This document was shared with STDF and presented at a validation workshop attended by representatives from potential focal point agencies in Cambodia, Lao PDR and Vietnam. Based on feedback the document was further modified taking into consideration the comments and shared again with key stakeholders for final comments.

2. SPS context and specific issue/problem to be addressed

A. Background

Global production of peppercorn has increased in recent years, reaching 531 KMT in 2017, of which about 360 KMT were traded. During the same period, production from the South-East Asian Nations increased significantly including an increase in output for Vietnam of over 35% to 210 KMT and Cambodia of 67% to 20 KMT.

The majority of the quality pepper finds its way to Europe and the U.S, which are the prominent markets for close to 30% of the world's pepper output. Southeast Asia (SEA) is the largest supplier of pepper to the EU and USA. In the past few years, consumption and production of pepper have remained in balance, which has helped to stabilize price. However, starting in the 2016/17 season, output started to significantly outweigh demand, pressuring prices. The shift in

[2] See: https://www.standardsfacility.org/PPG-619

the balance between production and demand has resulted in prices dropping from a high of USD 10,908 to levels below USD 4,050 per ton.

It has been estimated that production costs for peppercorn is costing farmers between USD 2.5 and 3.0/kg. When the selling price was at least 3 times higher the farmers' financial position was strengthened, encouraging them to shift from other crops to grow peppercorn. With current market prices, farmers are under financial pressure, a situation further compounded by the fact that peppercorn farmers are smallholders who are not in a position to absorb losses or store pepper for extended periods.

Premium quality pepper still attracts higher prices, for example pepper that complies with European regulations on pesticides is offered at a 10-50% premium. The development of the premium market should therefore help farmers to improve their economic status, contributing to reducing poverty.

Crushed or ground pepper offers opportunities for value addition in the country of origin. European countries are increasingly buying crushed pepper directly from producer countries. Over the past five years, these imports have grown by 2% annually. At the same time, imports of whole pepper from third countries were stable. These products present significant opportunity as long as producers comply with quality and buyer requirements.

Vietnam and India are currently the only producer countries that supply large amounts of crushed or ground pepper to Europe. Both countries are increasingly focusing on exports of crushed pepper. From 2012 to 2016, European imports of crushed pepper from Vietnam decreased by 2% annually, while imports from India grew by 9% annually. One reason for the change is claimed to be due to lowering of peppercorn quality originating from Vietnam and that "cleaner" product can be sourced from India.

Vietnam Peppercorn production

Established in the 17th century as a perennial industrial crop of Vietnamese agriculture, pepper has grown into a significant industry. After liberalizing trade relations in 1986, Vietnam has managed to build a dominant position in global black peppercorn markets.

The cultivation area for pepper has continuously increased in recent years, reaching 152,668 hectares in 2017. According to Department of Agriculture and Rural Development, pepper is mainly grown in Western Highlands, Central Vietnam with 91,977 hectares, including Dak Lak, Gia Lai, and Dak Nong, and Kon Tum provinces. Southern East of Vietnam is ranked the second with 48,576 hectares, mostly in Dong Nai, Binh Phuoc and Ba Ria- Vung Tau.

In parallel to the increase in production area, productivity has also increased. Between 2010 and 2017, productivity increased from 2.5 tons/ha to 2.9 tons/ha.

Total production in 2018 was **218** KMT up from **210** KMT in 2017. Production in 2019 is predicted to be at an all-time high of around **270** KMT.

For many years, Vietnam has been the world's main exporter of pepper. In 2018, local consumption was about **7 KMT** and exports accounted for about **97%** of total pepper output (2019 is predicted to be at a similar level) including substantial amounts of re-exported product (official sources - include Brazil, Indonesia and Ecuador and un-reported material from Cambodia and Lao PDR).

In 2018, exports of pepper from Vietnam accounted for 25 % of the global market. In the same year, Vietnam's total pepper production was nearly 40% of the world's total pepper output. Since 1998 Vietnam's pepper exports have grown at an annual rate of 15-20%. In 2001, Vietnam became the main global exporter with 56.5 KMT, accounting for 28% of global exported volume. By 2018, Vietnam Pepper exports had increased to 241.5 KMT, accounting for nearly 60% in global trade. Vietnam pepper is exported to nearly 109 countries and territories. In particular, the export of high quality product to the US and EU countries is increasing.

Based on interview with government officials and industry experts it is claimed that there is extensive un-recorded border trade with Cambodia and Lao PDR accounting for imports of about 20 KMT from Cambodia and 5.5 KMT from Lao.

There are a number of reasons contributing to the growth of the peppercorn industry in Vietnam, including development of an experienced and adaptive human capital and increasing application of technology in production and processing. Natural conditions are also key to the success of the industry. Pepper growing regions are characterized by fertile basaltic soil, subtropical climate, high

humidity and rainfall. The industry is further supported by the Government of Vietnam and local scientists. Processors and exporters actively expand the market, invest in modern processing facilities and diversify products.

A large number of Vietnamese and foreign direct investment enterprises are active in the peppercorn business and maintain a competitive position in terms of trading, processing and exporting peppercorn. Despite the strong growth of the Vietnam Peppercorn industry, a number of challenges had to be overcome.

In recent years, Vietnam's pepper industry has started to show signs of unsustainable development. The most significant problems faced by farmers are related to food safety: microbial contamination (e.g. *Salmonella*) and exceeding of MRLs (due to improper use of pesticides). A dramatic fall in peppercorn price compounds the problem as farmers tend to reduce costs by cutting back on farm maintenance.

Driven by perceived financial benefits of pepper production, many farmers have extended their pepper production area and/or adopted more intensive pepper production practices. Expansion of the growing area to pepper in some districts has involved reducing area under rubber, cashew and coffee, as well as cutting down forest trees. In general, farmers have expanded the pepper growing area too quickly driving a trend of growing pepper on unsuitable lands. This has resulted in:

- overutilization of chemical fertilizers that negatively impact sustainability of returns and lead to environmental deterioration and increased risk to human health.
- increased pepper plant susceptibility to pests and disease with associated increase in disease outbreaks and chemical use.
- Adoption of postharvest practices that lead to microbial contamination

Overall, the unplanned pepper cultivation has resulted in a decrease in productivity.

Pepper is grown mostly by small-scale famers and is mainly harvested from January to April. There are about 200 enterprises involved in processing and trading in pepper with the top 15 enterprises accounting for 70% of the country's pepper exports.

In 2001, Vietnam established the Vietnam Pepper Association[3] (VPA) to promote the country's development of the pepper sector. The association serves as a bridge linking producers, organisations and businesses to support production, trade and export. VPA implements major national programmes on trade promotion, updates information about pepper products domestically and internationally, encourages the production of clean pepper, connects enterprises with farmers to invest and develop the production and creates a stable, high-quality and clean material resource for the processing industry.

Cambodia peppercorn production

Cambodia pepper production has increased rapidly in recent years from **12 KMT** in 2016 to **24 KMT** in 2018. Production in 2019 is on target to register a further increase to **30 KMT**. The country is actively pursuing policies to increase export sales of pepper, although official exports account for nearly 8 % of total production in 2018, an increase of about 8% of export volume from the previous year. Despite the relatively small quantities, Cambodia is the 6th largest producers of peppercorn. Local consumption accounts for about **1 KMT**.

Yields in Cambodia are about 6-8 tons per hectare, which is significantly higher than in other countries such as Vietnam (2.5-3 tons/ha) and Indonesia or Malaysia, (1 ton/ha). Pepper is grown mostly by smallholders and is mainly harvested from February to May.

About 90% of Cambodia's pepper production is Memot, Tbong Khmum Province, located next to the Western border of Vietnam. With the expansion of cultivated farmland from 600 to 2,400 hectares, Memot has become one of the largest cultivated pepper plantation areas in the world.

[3] The VPA is a key NGO in Vietnam, representing the peppercorn industry. VPA organizes and combines enterprises and units of production and trade, and other organizations related to the peppercorn industry aiming at creating a general power for stable and effective development and for enhanced competition of the peppercorn industry in local and in the world. It is mostly driven by the private sector (thus an NGO) but with a government mandate.

The number of pepper growing households has increased from 1,730 households in 2013 to 4,500 households in 2017.

Cambodia's Kampot pepper was awarded Protected Geographical Indication designation (PGI) in 2016, allowing it to be sold in EU countries as "Kampot pepper" as originating from the designated region in southern Cambodia that includes Kampot and neighbouring Kep province. In 2010, Cambodia's Commerce Ministry took a first step toward protecting Kampot pepper by giving it a domestically issued geographical indication status. The government applied to the EU in 2014 to expand the status to the European bloc. In 2015, the region produced 60 tons of Kampot pepper, of which 70% was exported, mostly to the EU, the United States and Japan. Production increased to 65 tons in 2017 and is expected to be 80 tons in 2018.

Lao PDR peppercorn production

Lao PDR pepper production is very small compared to Cambodia and Vietnam, estimates suggest about **6 KMT** in 2018. The country is actively pursuing policies to increase export sales of pepper, although official exports account for only about 0.05 KMT or less than 1% of total production in 2018. Domestic consumption accounts for only 0.5 KMT.

Official export of pepper from Lao PDR is low (US$0.02 million in 2015) but investors in Sekong province plan to increase production and exports, with a particular interest in exporting 90% of their production to Vietnam (250 tons by 2018). Most of the pepper production crosses the border to Vietnam through the central highlands including Kon Tum, Gia Lai and Dak Lak provinces along the border of Vietnam and Lao PDR.

Regional peppercorn trade

A significant amount of peppercorn produced in Cambodia and Lao PDR unofficially crosses the borders into Vietnam and Thailand. The largest proportion of the informal border trade is with Vietnam, which accounts for about 85% of Cambodia's production and 90% of Lao production. Lesser amounts of Cambodian peppercorn is also informally traded with Thailand (<5%). Un-recorded Vietnamese border trade with Cambodia and Lao PDR results in imports of 20 KMT from Cambodia and 5.5 KMT from Lao PDR.

There are also un-substantiated reports of unspecified amounts of pepper crossing the Cambodian border into Vietnam, being processed by Vietnamese factories; before the finished product subsequently re-enters Cambodia for export as Cambodian product.

Given the economic incentives for keeping the borders "open", it is unlikely that informal border trade will stop in the near future. Cambodia has drafted legislation that will help tackle informal border trade through inspection by MAFF, customs and MOC, but there seems to be limited political will to finalise and incorporate this piece of legislation.

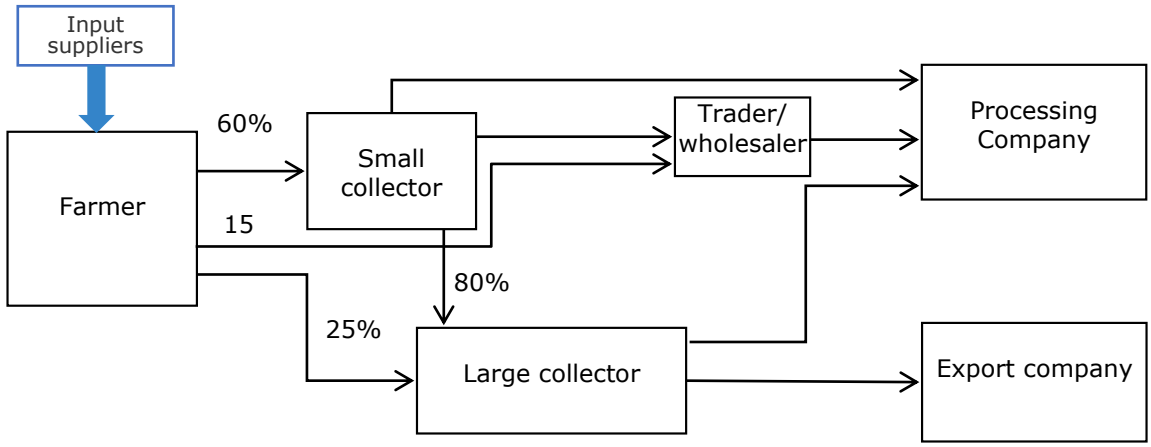
In terms of SPS, informal border trade has a substantial negative impact. Phytosanitary inspections are not performed and traded material is impossible to be traced back to the producing farm. There is little or no incentive for the farmers to produce a quality product as traders pay the minimum price for all grades. Investment in regulatory oversight is also stifled as local governments in areas where pepper is produced and informally traded with Vietnam regard any associated SPS/food safety issues to be the problem of the receiving country.

At a regional level, governments are beginning to address this issues. Measures to remove barriers to trade among the 13 provinces sharing border lines between the three countries were discussed during the 12th conference on trade, investment and tourism promotion for the Cambodia-Laos-Vietnam development triangle area (Cambodia on March 9, 2019). Despite the positive steps to address border trade issues between Vietnam, Lao PDR and Cambodia there remain inadequacies including administrative procedures at border gates, changes in import-export policies, among others.

B. Typical peppercorn value chain

An overview of the farm-to-export value chain for peppercorn is shown below. This figure illustrates the **main players** involved in primary production and secondary processing of pepper. Travelling through the value chain, pepper can follow a number of routes depending on local factors.

Figure 1: Generic pepper value chain



National and regional differences exist, but in general the value chain can be described as follows.

Input providers and agricultural support

Pepper plants are normally grown from a stem or terminal cuttings, rarely from seeds. Farmers expand or create new plantations by cutting off stems from existing pepper vines.

Pesticide and fertiliser retailers located in villages supply farmers. Usually these retailers are also collectors. The main problems that they supply chemicals for pepper are: *Phythopthora capsici*, mealy bugs and nematodes. The pesticide and fertiliser retailers supply product to farmers in addition to giving advice and training. With respect to pesticides, a large number of products supplied are mixes of chemicals such as Alpha Cypermethrin and Chlorpyrifos. The retailers often extend credit.

Farmers

Typical across the 3 countries, small-scale farmers account for 95% of total pepper production. Pepper is grown from cuttings, mainly on wooden supports or concrete posts. A small number of farmers, mainly in Vietnam, use live supports. After about 5 years vine are pruned and the pruned material used to produce cuttings. Trees will remain for 20-30 years depending on the management of the crop and integrity of the support. Plants will start to yield pepper after about 3 years and optimal production reached after 10 years. Optimal yields will be maintained for 5-10 years depending on the management of the vine.

In addition to growing and harvesting pepper, farmers also carry out on-farm processing, namely threshing, sorting and drying.

Harvesting: Whole spikes of pepper berries are harvested when ripe or when yellow pepper berries start to appear. *Threshing:* Berries are either stripped from the spikes by machine at harvest or pepper spikes are stacked for 2-3 days before berries are removed. The time delay depends on the amount of pepper being harvested and availability of labour. To facilitate removal of the berries, farmers often place the spikes either in closed bags or make a pile of spikes and cover with canvas. After 12-24 hours the berries are more easily removed. *Drying:* Pepper is dried on a cement yard covered with a canvas/plastic sheet to help keep peppercorns clean and to limit the opportunity for contamination with sand or stones. A 2m high fence is erected around the yard to prevent animals entering. Pepper berries are spread to a depth of 2-3cm, turned about 4 or 5 times/day and will be dry within 3-4 sunny days (depending on the weather conditions). The product is deemed to be dried when the peppercorns are wrinkled, black and reach a moisture content of 12-13%. *Sorting:* Extraneous matter, such as debris and plant material, is removed

either by using a fan to blow away impurities or sieving using a bamboo sieve. *Packing:* Once the peppercorns are cooled, they are packed into bags to maintain the moisture content. Farmers are encouraged to use bags with an inner layer of nylon and outer jute layer. The nylon layer prevents pepper from absorbing moisture and mould growth.

Small-scale farmers do not store pepper for extended periods but sell it within two to three months after harvest. This can be explained by the fact that farmers need immediate cash for survival. They also do not have the facilities needed to store their harvested pepper. Farmer households that stock pepper for more than three months are often high and middle-income households or have incomes from other agricultural and non-agricultural activities. Large producers include private farms and state companies, which together produce only 5% of total pepper production in the region. These farms own storing facilities which enable them to stock pepper when pepper prices go down and sell pepper when prices go up again to make bigger profits.

Trading and marketing

There is a complex network of trading and marketing actors. The key roles are collectors, traders, processors and exporters. Typically, collectors are regarded as either "small" or "large". It is estimated that around 60% of all the pepper produced by farmers is sold to small local collectors, 25% to large collectors, and just 15% to traders directly.

Small collectors are entrepreneurs located in villages (often the same person/family selling inputs to the farmer) who will travel to remote areas to collect pepper in small quantities. Transactions with farmers in terms of volume can be as small as 10 kg.

Large collectors will buy pepper from small collectors or directly from villagers and sell to traders and companies. To ensure an adequate supply, large collectors also establish their own network of small collectors. Despite higher selling prices, farmers have limited access to large collectors or traders because transportation to the city or town markets is difficult to find and their supply is often small and unreliable.

Traders and wholesalers play a central role in the value chain, linking production and market. They source pepper from a network of collectors located in villages, communes and then deliver it to local and export markets. Traders often rely on large collectors for a large and stable supply of pepper. Transactions are carried out on a basis of trust and long- term personal relationships; therefore in several cases traders offer advance payment to large collectors. Trader will clean and grade pepper according to buyer requirements, and sell to wholesalers and export companies. Wholesalers typically have 10 -15 tons storage capacity, and with have their own transport or arrange transport with a third party. They sell to processors and export companies.

Pepper collected by traders enters either of two target market channels: local and export markets. The bulk (90%) of the production is transported to export companies and about 5% to processors.

Exporters and processors clean and grade the pepper based on quality criteria of different markets. An increasing amount (mainly in Vietnam and still only 5%) is ground by processor, filth and bacterial reduction steps may take place at this stage. Typically the processing also function as exporters.

In recent years, companies have upgraded their production moving towards international standards, a trend in-line with the Vietnam Pepper Association initiative to promote production of quality pepper products (from growing to processing products).

Value chain levels

Structurally, two distinct levels can be described for the peppercorn value chain; village level and outside the village.

- Village level actors include: (i) input providers; (ii) farmers; and (iii) small collectors.
- Value chain actors outside the village include: (i) large collectors; (ii) traders; (iii) processors; and (iv) exporters.

Value chain analysis, field interviews and workshop discussion, further verified by key industry players, such as VPA and sector experts, confirm that **village level actors are, at this point in time, the main reason for the failure to fully control safety and quality of peppercorn** produced in the three target countries. For this reason, the proposed project will focus on village level activities.

Interviews with industry players, and sector experts such as VPA, suggest that expanding the raw material supply base for safe, quality peppercorn will eventually incentivize more exporters / processors to upgrade their quality systems, including more stringent raw material quality criteria.

C. SPS Issues in peppercorn production

Food safety, phytosanitary and sustainability issues are linked with peppercorn and its production.

Food safety control

Weak food safety control measures are the major barrier to exports of peppercorn from the region. This is also a key issue in Europe and American legislation. Linked closely to food safety is the need for product traceability through the value chain. Lack of chain wide food safety control and traceability have been noted by importing countries and have led to product rejection or alerts (see below).

Microbial contamination: Presence of *Salmonella* spp. is the main reason for banning pepper from export markets. Research shows that about 6.7% of all whole pepper, and 6% of all white ground pepper imported into the United States were contaminated with *Salmonella*, including imports from Vietnam. There have been 16 notifications on the European Commission's Rapid Alert System for Food and Feed (RASFF) for *Salmonella* spp. in black and white pepper from January 2016 – June 2018. The products were from multiple countries, including 3 notifications related to Vietnam.

Imported food compliance data from the Imported Food Inspection Scheme of the Australian Department of Agriculture and Water Resources for January 2007 – May 2016 showed that of 10,079 *Salmonella* spp. tests applied to dried paprika and pepper, there were 126 fails, a 1.3% failure rate. The failed samples were from multiple countries and included chili powder, paprika and pepper. A survey in Turkey isolated *Salmonella* spp. from 3.3% of black pepper samples collected at retail (Hampikyan et al. 2009). Similarly, in a survey in Brazil in 2004/2006 – *Salmonella* spp. were isolated from 18.2% black pepper samples (Moreira et al. 2009).

Salmonella contamination may occur at all stages in the pepper value chain. A variety of animal hosts may introduce *Salmonella* into a pepper production site. *Salmonella* can survive in the natural environment (outside of an animal host) for extended periods and can persist in some food production areas for years. *Salmonella* can also survive for extended periods (exceeding 1 year) in low moisture foods including pepper. The magnitude of the *Salmonella* population reduction rate in pepper depends on the water activity of the pepper (or equivalently, the humidity of the pepper environment) and temperature, when the water activity/humidity is elevated.

Research has also demonstrated that *Salmonella* can survive on wet ground pepper (no additional nutrients needed), such as might occur if pepper is improperly processed, packaged or stored. For example, *Salmonella* has been found in an unopened bag of imported whole white peppercorns suggesting contamination of the spice took place before packing. The whole white peppercorns originated from Vietnam and the lot was accompanied by a Certificate of Analysis (COA) that indicted that the lot had tested negative for *Salmonella* before export. The sensitivity of the screening test used for the COA is not known so it is possible that the lot could have contained a low concentration of *Salmonella* which multiplied post packing.

In addition to *Salmonella*, a number of microorganisms can be found contaminating pepper, including: (i) *Bacillus* spp.; (ii) *Clostridium perfringens*; and (iv) *Staphylococcus aureus*.

In the European Union, steam sterilization is the preferred method to combat *Salmonella* as well as other types of microbial contamination. The approach by the main pepper exporters in the project countries is to focus on steam sterilization as the sole means of controlling *Salmonella* contamination. However it should be noted that less than 15% of exporters use steam sterilization.

Pesticides: Pesticide residues beyond the permitted levels and presence of banned substances have been detected in traded pepper. The EU has set maximum residue levels (MRLs) for pesticides and detection above permitted levels is an important issue threatening access to these markets. Some traders state that in 2015 around 75% of Vietnamese peppercorn production did not meet EU requirements concerning pesticide MRLs. Growing peppercorn as an intensive monoculture system is a major reason for high pesticide use as the trees are more susceptible to multiplication of pests and diseases. Pesticides are less of an issue for countries such as Indonesia where peppercorn is grown in mixed cropping systems. The US market, which imports about 40,000 tonnes of pepper from Vietnam a year, is also setting new rules on the quality of imported agricultural produce, including pepper from Vietnam.

Although Vietnam is still the main supplier of pepper to Europe, industry experts indicate that it is becoming harder to source quality pepper from Vietnam. The country has difficulties in complying with European legislation on pesticide residue levels as a large share of Vietnam's crop does not comply. Insufficient transparency is a contributing factor as there are many small pepper suppliers in the value chain. Some buyers are increasingly sourcing from other sources to decrease their dependency on Vietnam.

Some of the pesticides, which have been involved in EU RASFF notifications and MRL exceedances reported to the European Food Safety Authority (EFSA), are not authorised in the EU, for example *hexaconazole, flusilazole, diniconazole, profenofos, carbofuran*, *dichlorvos, phenhtoate, methidathion, acephate, diazinone, chlorfluazuron, isoprothiolane*. A few have never been notified in the EU, i.e. *fenobucarb, dinotefuran, crotoxyphos.* However, most of these are authorised for use in Vietnam.

There are active substances which are authorised in Cambodia and Lao, but banned in the EU, such as *carbofuran*, identified in EU RASFF notifications, or *dichrotophos*, both of which are contained in plant protection products (PPPs) authorised for restricted use in Cambodia.

MRL is placed at the zero limit of detection (mere presence) if a pesticide is not authorised in Europe, even if it is authorised in the exporting country. This is quite problematic as, generally, EU based laboratories are able to detect lower levels compared to laboratories in the region. Hence, a consignment may be cleared for export by a regional laboratory (i.e. no pesticide residue detected) but on further testing by an EU based laboratory, residue may be detected and the consignment rejected.

Excessive amounts of *metalaxyl* have been found in pepper exported to the EU. In 2016, the European Spice Association (ESA) the VPA and the Ministry of Agriculture and Rural Development (MARD) discovered that from 799 samples of black pepper imported by the EU market from Vietnam and analysed, only 17% had the permitted MRL of under 0.05 ppm. This was predicted to impact about 80% of Vietnam's pepper. However, in the face of opposition from Vietnam and India, the EC finally decided to maintain the Metalaxyl MRL at 0.1 ppm until the **end of 2018** after negotiations with Vietnam's Ministries of Agriculture & Rural Development (MARD) and Industry & Trade (MOIT).

Lack of knowledge on disease such as wilt (*Phytophthora* spp.) often leads to heavy crop losses and inappropriate pesticide spray application and overdosing. Pesticides, particularly fungicides are also used in peppercorn storage and the chemicals used during processing and cultivation often contribute to product contamination and hence, rejection.

Mycotoxins: These are toxic secondary metabolites produced by various fungi, e.g. Aflatoxins (produced by *Aspergillus* spp.) and Ochratoxins (produced by *Penicillium* spp. and *Aspergillus* spp.). Preventative measures taken by all stakeholders in the supply chain from field to fork are the best way to prevent growth of these fungi and thus enhance spice safety. Authorities in many consuming countries have already set maximum permitted levels for aflatoxins in spices and are currently discussing limits for Ochratoxin A (OTA). The presence of these toxins above the permitted levels will result in the rejection of shipments and subsequent destruction of the contaminated product.

There have been 4 notifications on the European Commission's Rapid Alert System for Food and Feed (RASFF) for aflatoxins in black and white pepper from January 2016 – June 2018. The products were from multiple countries, and included 2 notifications from Vietnam.

Physical contaminants: Analysis of US Food and Drug Authority (FDA) surveillance sampling data for FY2007-FY2009 showed that the average prevalence of filth adulteration of shipments of imported pepper was about 2%, in addition 6 RASFF alerts have been raised against filth in pepper over the period. Prevalence of filth adulteration of imported shipments of ground and whole spice were similar.

The most common types of filth adulterants were insect fragments, whole/equivalent insects, and animal hair. Nearly all of the insects found in spice samples were stored product pests, indicating inadequate control, packing or storage conditions. The presence of rodent hair (without a root) in spices generally is generally indicative of contamination by rodent faeces. Direct evidence of animal faecal and/or insect faecal contamination was found in a small number of the samples. The presence of these filth adulterants is indicative of insanitary conditions and failures in the application of Good Manufacturing Practices (GMPs).

Phytosanitary and sustainability issues

Farmers in the region face phytosanitary and sustainability issues, which they find difficult to manage.

A number of factors account for these production risks, including (i) shift towards intensive farming systems that cause land degradation, pollution and erosion; (ii) dominance of monoculture systems that result in trees being more susceptible to pest and disease attack; (iii) limited farmer capacity and skills leading to overuse and misuse of pesticides; (iv) A majority of farmers using unnecessary amounts of fertilisers and pesticides, weakening natural resistance and requiring even higher doses of the chemicals for subsequent crops, resulting in diminishing returns.

The main plant diseases affecting pepper are Phytophthora foot rot disease causing slow/quick wilt disease and slow decline disease.

- **Phytophthora foot rot disease** – caused by *Phytophthora capsici* and spread mainly by run-off water from infected gardens and poor soil management; other factors include incorrect fertilizer use, lack of weeding, susceptible cultivars and mealy bug infection.
- **Slow decline disease**- caused mainly by Nematodes e.g. *Meloidogyne incognita, Radopholus similis*, mealy bug and infection from soil borne fungi such as *Fusarium solani*

Long term contamination of land by diseases and use of planting material already infected with disease are significant issues in Vietnam. In one study, over **80%** of farmers cited pepper plant disease as a major problem. Other pest are less of a problem and include: scales, mealy bugs and nematodes.

D. Specific challenges associated with peppercorn production

Challenge 1. Lack of quality planting material

It is logical to begin with planting material that starts the crop with the best available genetic resistance/vigour. In general, **regional smallholders and even large growers do not buy quality planting material** from breeders, but rather propagate from cuttings from year to year. This has significant disadvantages including risks of using virus or bacteria infected material, which is common as farmers use cuttings from plants growing on infected land. Farmers in Laos and Cambodia are reportedly buying risky/unhealthy planting material from China, most of which is contaminated. Vietnam, "clean" planting material is available from WASI, but despite being of a competitive price, only a small proportion (30-40%) of farmers take advantage of this source of planting material, the majority opting instead to taking cutting from existing plant stock on the farm or from neighbours.

While pepper plant diseases are recognized to be a major issue, disease-resistant varieties exist only in trial fields and are not widely used in farmers' fields. There remains a lack of selection for superior traits capable of protecting the crop on a genetic level and improving organoleptic qualities. Disease free planting materials is not always used to produce plants, and poor nursery hygiene practices often lead to infection being transferred into the field.

Challenge 2: Poor farm management

In many areas, and for various reasons, **a major problem cited by farmers and researchers is that farm land and pepper plants are poorly managed**. In part, this is the result of limited income, but also effective farming techniques or technology. Poor farm management and production techniques are known to be responsible for many of the issues faced by farmers, not least plant disease. Disease management is a major challenge in pepper production, the highest incidence of disease occurs during the rainy season (May to November). Besides that, parasitic nematodes as *Meloidogyne incognita, Radopholus similis* are emerging problems. Known as slow decline, the symptoms include slow growth, leaves turn to yellowish green, then pale yellow leaves gradually drop from the lower to the upper parts of the plant, it could be said that a complex exhibiting by mixed symptoms of *Fusarium solani, Colletotrichum gleosporioides, Rhizoctonia solani, Cephaleuros mycoides* and *Rosellinia sp*.

Combination of poor farm management and traditional practices have contributed to increasing the risk of disease and pest outbreaks, which in-turn results in higher amounts of pesticide used by the farmer.

A majority of farmers use unnecessary large amounts of fertilisers, a practice that overtime weakens the natural resistance of pepper plants and lowers productivity, thus necessitating even

higher doses of the chemicals for subsequent crops. Despite the long term negative consequences, some farmers, in search of short terms gains, use excessively high amounts of fertiliser, which in short term increases productivity. Vietnamese farmers, encouraged by input suppliers, can increase productivity per pepper tree from 3 to 6 kg using excessive levels of fertilizer; a practice, which in the short-term increases farm income, contributes to hidden losses. This approach does not consider the long-term health of the soil and crop, resulting in gradual decline in uniformity and productivity as soil health declines; this increases the risk of disease.

Very few producers differentiate between solid effective practices or simply following advice from vested interests such as fertilizer dealers and salesmen. As knowledge of new technologies, agronomic practices and research-proven innovations is limited, farmers remain heavily reliant on traditional techniques. Unfortunately, some traditional cultivation techniques are inadequate and will impact yields negatively and increase the vulnerability of pepper plants to disease.

Meanwhile, the US market, which has also been importing about 40,000 tons of pepper from Viet Nam a year for several years now, is also set to issue new rules on the quality of imported agricultural produce, including pepper from Viet Nam.

Challenge 3. Poor access to information
As detailed above, **a major problem cited by farmers and researchers is that farm land and pepper plants are poorly managed**. Part of this problem is related to access to information. In Cambodia and Laos information on improved management techniques is not available to farmers. In Vietnam, there is too much and sometimes divergent information available, much of which is generated by companies with vested interests. Therefor farmers have difficulty in identifying the most relevant information for their situation. Farmers in all 3 countries are also not aware of the requirements of export markets, basic information such as pesticide choice for specific markets is not available

Challenge 4. Lack of pre-harvest risk management
Despite the effectiveness of **pre-harvest risk management** as a tool to identify the true source of a problem and as a basis for developing targeted interventions, **this approach to controlling the farm environment is not followed**. Without pre-harvest risk management, it is difficult to develop sound and effective approaches for prevention and control of biological and chemical contamination (i) in the growing environment; and (ii) directly on pepper berries.

The ability of farmers to analyse their farm environment and evaluate associated risks is limited. Important is the ability to identify pests and pepper plant diseases, and based on this assessment select appropriate treatments or effective and efficient approaches to resolve the problem, for example pesticide spraying intervals based on presence of pests rather than calendar spraying.

Some farmers have implemented national GAP codes, however these codes are generally prescriptive and do not require the farmer to undertake risk assessment of the farm environment.

Challenge 5. Implementation of Good Practices is limited:
Good practices, including Good Agriculture Practice (GAP), Good Hygiene Practice (GHP) and Good Manufacturing Practice (GMP) provide the basis for controlling the environment and process in order to prevent contamination. **All forms of pepper contamination can be controlled by an appropriate Good Practice**. Yet in the 3 target countries, there are **few farmers, collectors, or traders following a relevant good practice scheme**. In cases where an establishment/farmer is supposedly certified to a good practice scheme they may not necessarily implement the code correctly.

Limited implementation of good practices can lead to:

- Biological contamination
- Presence of banned active compounds
- Excessive pesticide residues
- Physical contamination

Salmonella contamination, which can occur at all stages in the pepper production chain, is the main reason for banning pepper from export markets. Yet, general sanitation controls addressing most the common sources of contamination and pathways for cross-contamination are still poorly implemented. Risk of *Salmonella* contamination during village level handling of peppercorn is a particular concern.

Lack of suitable guidelines contribute to farmers not following instructions when applying pesticides or using non-approved chemicals. For example, farmers in Cambodia, Lao and remote areas of Vietnam source the cheapest pesticides, often buying from illegal sellers offering pesticides smuggled from neighbouring countries.

Across a number of public and private sector initiatives, inside and outside the countries, there are examples of (i) generic approaches for achieving high food safety standards and quality of fresh produce; and (ii) specific approaches targeting spices (examples include national GAP codes, ASTA – Clean, safe, spices guidance document; ASTA-GAP code; ASTA-GMP code; ASTA-HACCP guide for spices; IOSTA-general guidelines for GAP on spices and culinary herbs).

Third party and National good practice schemes are expensive, labour-intensive and require complex third-party certification which remains largely inaccessible to smallholders. Small-scale farmers often lack knowledge and experience on how to apply good agricultural practices that are compatible with food safety and organic standards. For these reasons, aspects of good agricultural practice are new for farmers in the target countries and the concept of good hygiene practices not understood by small collectors and other intermediaries. It is therefore not surprising that the number of GAP certified farms in the region is low, 2-3% in Vietnam and maybe even lower in Cambodia. Despite initiatives to promote GAP and provide training on its implementation, farmers still undertake practices that could be considered as not good practices. For example, the parallel use of two or more PPPs in one single application (which may account for the detection of multiple residues found and reported in EU member states).

The low adoption rate of good practice schemes suggests difficulties, in part because of the need to change human practices; a long process requiring continuous support and incentives, such as improved market access. Two important steps contributing to improving adoption are to: (i) build awareness; and (ii) provide practical, simplified and implementable solutions that take into consideration the capacity of the users and cultural practices.

A major barrier to implementation of good practices by farmers in the target countries can be linked to a lack of reward/incentives:

- Memot growers have indicated that Vietnamese buyers do not discriminate between GAP certified and non-certified pepper. In the three target countries, collectors are said to aggregate both good farmer and poor farmer produce (mix of good and bad quality);
- No price differentiation – in the target countries price for pepper sold on the open market is the same whether the product is offered for local & export;
- Memot farmers are discouraged from adopting GAP codes because of prior bad experience with projects as expectations of higher prices were not realised after applying.

Challenge 6. Complex supply chains and lack of traceability

In the region, peppercorn production **is fragmented with the involvement of very many small farmers and producers.** Average farm size is about 1 ha, but for a few cases, can be as low as 0.05ha.

To guarantee food safety and allow appropriate action in case of unsafe food, peppercorn must increasingly be traceable throughout the supply chain, which is not necessarily the case for most pepper produced in the region. About 95% of the region's pepper is produced by a vast number of small farmers and harvested product is moved through often complex value chains involving a large number of actors and different routes depending on a host of local factors. Little or no documentation is completed by famers and chain intermediaries, further complicating the ability to trace product through the value chain.

The origin of SPS problems in peppercorn supply chains are not always obvious, as the supply chains are complex and involve numerous intermediaries. An added complexity is that Vietnam exports include product produced in Cambodia and Lao PDR which is illegally traded. The interrelationship between actors within the supply chain in the different countries is not clearly defined making traceability and accountability a challenge.

Supply chain complexity thus makes it difficult to identify the critical points where contamination can occur, although there is evidence that contamination can occur at any point in the supply chain if proper practices are not followed. The distribution and processing chain for peppercorn is also highly complex and can span long periods of time and include a wide range of establishments.

Challenge 7. Breakdown of control at the village level
In the three countries, and for various reasons, the **value chain control is reported to breakdown at the village level**. It is acknowledged that exporters can control practices of traders, larger collectors and to some extent farmers, but **village level collectors and input supplier (often the same person) continue to present a challenging problem**. It is claimed that if the collectors/input traders can be controlled, and GAP implemented by farmers, the peppercorn value chain can be fully controlled. **Ultimately there is a need to control relationship between farmers and collectors.**

Village level collectors are also suppliers of inputs and often extend credit to the farmer by pre buying part of the crop. Input traders are also the main source of information as farmers prefer to consult the village level shops thinking they have the most relevant local knowledge. Clearly, information imparted is biased as these traders also want to sell more inputs.

Local government officials are unable to regulate the actions of village level traders/collectors as: (i) there is no legal basis for such control; (ii) local government does not have a sufficient number of officers; (iii) there is a lack of political will; or (iv) traders/collectors can move easily as they are not registered.

In Vietnam, approaches to improve the negotiating position of farmers is weak:

- Cooperatives are no longer viable options as they are bureaucratic and do not provide financial incentives to members (i.e inputs though bought in bulk are offered more expensively to members then from the open market). Management and members also lack knowledge and enthusiasm to find new information.
- Farmer groups are limited in number and remain unpopular with farmers.

Farmer groups are often organised around a family and often one of the family members is a collector, presenting an opportunity to control this step in the value chain. The VPA and Vietnamese government are keen to promote farmer groups, but have not achieved any significant success, partly because of problems faced by groups in connecting to markets. Some NGO and government projects have supported farmer groups but after the project the groups are not sustainable. Difficulty is finding approaches that encourage the group to work together.

Addressing village level production and processing practises, including service and input providers, is therefore key to strengthening the peppercorn value chain in terms of its ability to deliver a safe, high quality product.

E. Novel approaches for working with farmers in the target countries

i. Participatory Guarantee Systems (PGS)

Participatory Guarantee Systems (PGS) is a **low-cost quality assurance mechanism** based on the active participation of a wide range of stakeholders in the inspection and monitoring process.

A reliable and trustworthy **quality assurance** mechanism is a key condition to provide consumers with the confidence that quality standards are met. Third-party certifications are often the method of choice to certify safe food products. However, they are not always suitable for small-scale operators and local market channels because of the **high costs** involved, the paperwork required, and the **complexity** of their requirements. To address these challenges, farmers, NGOs, and their partners have sought alternative certification systems that are better adapted to the farmers' local contexts. Participatory Guarantee Systems were introduced to Vietnam about 10 years ago and are now implemented in 6 provinces and 9 districts. PGS are also implemented in Cambodia and Laos.

International Federation of Organic Agriculture Movements (IFOAM)[4] defines PGS as a "low-cost, locally based system of quality assurance with a **strong emphasis on social control and knowledge building**." It is a simple but effective **participatory certification system** that involves a wide range of stakeholders such as farmers, consumers, retailers, NGOs and local authorities in agricultural products' quality assurance. It has a **lower cost and complexity** than third-party certifications, making it more in line with the reality of smallholder farmers. The specific rules of each PGS are designed through contributions of all stakeholders and are adapted to fit the local context, taking into account individual communities, geographic area, cultural environment, and markets.

[4] See: https://www.ifoam.bio/en/organic-policy-guarantee/participatory-guarantee-systems-pgs

PGS was initially developed by IFOAM and is currently implemented in 66 countries worldwide, including Cambodia, Lao and Vietnam. In Vietnam, the PGS mechanism is implemented with either one of the two following sets of standards: **1) Vietnam PGS Organic Standards** which was officially admitted into the IFOAM Family of Standards in 2013 or **2) BasicGAP[5],** a codex based guidance document promulgated 2 July 2014 (Decision 2998/QĐ-BNN-NT, 2014) for vegetable production promulgated by the Ministry of Agriculture and Rural Development..

PGS emerged over 40 years ago, as "locally focused quality assurance systems […] based on the active participation of stakeholders and built on a foundation of trust, social networks and knowledge exchange." (IFOAM-Organics International, 2008). PGS is currently implemented in 66 countries around the globe, on every continent. In 2017, it was estimated that there were at least 241 PGS initiatives worldwide of which 116 were under development and 125 were fully operational. At least 307,872 farmers were involved, and 76,229 producers were certified (IFOAM, 2017). Although PGSs are adapted to the local conditions, they share a common set of core principles such as horizontality, participation, learning and transparency.

PGS are recognized as a suitable alternative to third-party certification for smallholders for several reasons: (i) the cost of participation is much lower, and mostly takes the form of voluntary time involvement rather than financial expenses (May, 2016); (ii) by developing trust and mutual understanding between farmers and other stakeholders, PGS help develop multi-stakeholder dialogue and collective learning processes (PGS is often characterized as "knowledge intensive"); and (iii) as a result, PGS are powerful instruments to stimulate local market development as they play a key role in developing consumer confidence in local produce.

In the region, PGS are supported under an **ALiSEA** Small Grant Facility:

- **Cambodia:** Promoting organic vegetable through customer engagement in PGS https://ali-sea.org/item/alisea-sgf-promoting-organic-vegetables-through-customer-engagement-in-participatory-guarantee-systems-pgs/
- **Myanmar:** Improvement of Organic – PGS Certification Awareness https://ali-sea.org/item/alisea-sgf-improvement-of-organic-pgs-certification-awareness/
- **Vietnam:** Capitalization of Participatory Guarantee System experiences in Vietnam for upscaling & institutionalization (https://ali-sea.org/item/alisea-sgf-capitalisation-of-participatory-guarantee-system-experiences-in-vietnam-for-upscaling-institutionalisation/)

In addition, **GRET** is also directly involved in promoting PGS:

- **Cambodia:** PGS for agroecological vegetable production in the province of Siem Reap (APICI Project, https://bit.ly/2mk9V4X)
- **Laos:** PGS on dried bamboo shoot (aiming at export market to Vietnam), Province of Houaphan
- **Myanmar:** PGS for good quality paddy seed in the Ayeyarwady Delta

In addition PGSs are supported by FAO, Ministries of Agriculture (Lao PDR, Cambodia), international partners such as IFOAM-international organics, Asian Development Bank (ADB), Earth Net Foundation (ENF) and many other local partners.

Vietnam

PGS was first implemented in Vietnam in Thanh Xuan commune, Soc Son district, in Hanoi. It was introduced by the Danish non- governmental organisation ADDA in 2008, following the model developed by IFOAM for organic agriculture. In 2010, Rikolto started using the same PGS mechanism with a food safety standard. By 2017, there were 10 intergroups organised in 5 PGSs located in 6 provinces: Hanoi, Hoa Binh, Phu Tho, Ha Nam, Quang Nam, and Ben Tre.

PGSs in Vietnam are currently supported by Vietnamese NGOs (Action for the City), international NGOs (Seed to Table, Rikolto, ADDA), and international agencies (Asian Development Bank).

Lao PDR

Three farmer groups (Huaphan, Xiengkhuang, and Savannaket) have been piloted as PGS operators and recognized by DOA in 2016.

[5] b) The "Basic GAP" is a simplified version of VietGAP providing a level of safety for fruit and vegetables based on 26 primary control points.

1. Huaphan Dried Bamboo Group

- 4 villages in Viengxay district, Huaphan province.
- 182 households (harvestors)
- Type of Produce: dried bamboo,
- Volume certified: 18 tons (fresh)/1 ton (dried)-2016
- Certified area: 281 ha

2. Xiengkhoang Organic Association

- 9 villages in Paek district, Xiengkhoaung province
- 74 households
- Produce: Fruits & Vegetables
- volume certified: 151 tons
- Certified area: 15.31 ha

3. Savannakhet Organic Group

- 4 villages in Kaisonphomvihanh district, Savannakhet province
- 24 households
- Produce: Fruit and vegetables
- Volume certified – 25 tons

Cambodia

PGS was first introduced in Cambodia in 2015, there are now:

- 20 farmer groups established, involving about 200 farmers, spread over 7 pilot sites in 4 provinces - supported by ADB TA 8163 –CASP2 project.
- 300 farmers registered and labelled as organic PGS (4 provinces).
- A PGS regulation has been drafted.

Social cohesion and community-building

In addition to contributing to production of safe produce, other cited benefit of PGS include its contribution to social cohesion, peer-to-peer learning and awareness of responsibility towards the community. For example:

- The Coordination Board of PGS Vietnam which brings together 5 intergroups in Hanoi, Hoa Binh and Ha Nam, regularly organizes fairs and community activities to enable farmers to exchange experiences and learn from each other.
- Within PGS Vietnam, Trac Van intergroup has organised collective production: farmers cultivate the same land and are paid according to their time contribution. According to one interviewee, this has increased **social cohesion** among farmers in the group. Farmers are not only trained in production techniques but also gain knowledge on food safety, healthcare, the environment and become aware of their responsibility towards the community.
- Three intergroups (Hoi An, Trac Van and Thanh Xuan) are involved in **awareness-raising** activities through agro-tours organised for students and families.

Approach

PGS target a number of different levels:

1. Farmers:
   - Each farmer signs a **pledge** whereby they commit to abide by the rules of PGS and the standard.

- **Products are produced according to the criteria of the food standard**.
- Farmers participate in cross-checking, inspection and relevant meetings.

2. Farmer groups:
- A PGS farmer group is usually composed of 5-10 farmers, often living in close proximity.
- The **groups carry-out the cross-inspection** plan designed by the intergroup and **inspect other groups' compliance with the standard**.
- Each group will organise member meetings and apply for PGS certification.
- Group leaders facilitate **internal inspections** to ensure that **members comply with the standard**.

3. Intergroups:
- The intergroups bring together multiple farmer groups in an area. Members usually include the heads of all producer groups and external stakeholders such as representatives of traders, local officials, consumers or NGOs.
- Intergroups develop cross-inspection plans, **coordinate cross- inspections at least twice a year,** check the peer-review documentation, and report on the inspection results.
- Manage certification applications from farmer groups and request the Local Coordination Board to approve certification for qualified groups.
- Sanction groups that do not comply with the rules.
- In some cases, they maintain a database of members, coordinate the production plans for farmer groups, and promote their produce to potential buyers.

4. Local Coordination Board (LCB):
- A local coordination board is usually composed of representatives of farmers, buyers, and local authorities who are selected for their **technical competence.** There is one LCB per PGS.
- LCBs review certification requests and inspection reports submitted by the intergroup.
- LCBs carry out random inspections when violations are suspected and sanctions intergroups when there are irregularities.
- LCBs approve PGS certification requests from qualified groups.
- LCBs help connect farmers and farmer groups to markets

In addition, PGSs are usually characterised by the following features:
- The PGS framework and norms are conceived by the stakeholders through a **participatory process,** in line with general PGS principles and the standard (either organic or safe).
- Certificates are granted to **farmer groups**, not individual farmers.
- PGSs' participatory nature allows **learning processes** to take place at different levels: within the farmer group, between farmer groups, and among various stakeholders.
- PGSs have their own l**ogo** and labels providing evidence of their quality status. Product information is available on the packaging.
- Clear warning and **sanction mechanisms** are in place for farmers who do not comply with the standards and/or procedures.

In several locations, PGSs have the **support of local authorities** at the commune, district or provincial level. This supports covers infrastructure and human resources, and sometimes finances.

Market access and income

Well-functioning PGSs in Vietnam have contributed to increased market access for their farmers. As a result, farmers' income from PGS vegetable production is higher than income from non- PGS vegetables and other crops. In Vietnam there are five intergroups supported by organizations such as ACCD, Seed to Table, ADDA, ADB, ALiSEA, Rikolto, etc. Between 2017 these five groups produced over 600 tons of fresh produce (see table below)[6]

[6] https://ali-sea.org/pgs-vietnam-the-10-years-anniversary-and-selection-of-the-board-of-coordination-committee-of-pgs-vietnam-for-the-period-2019-2020/

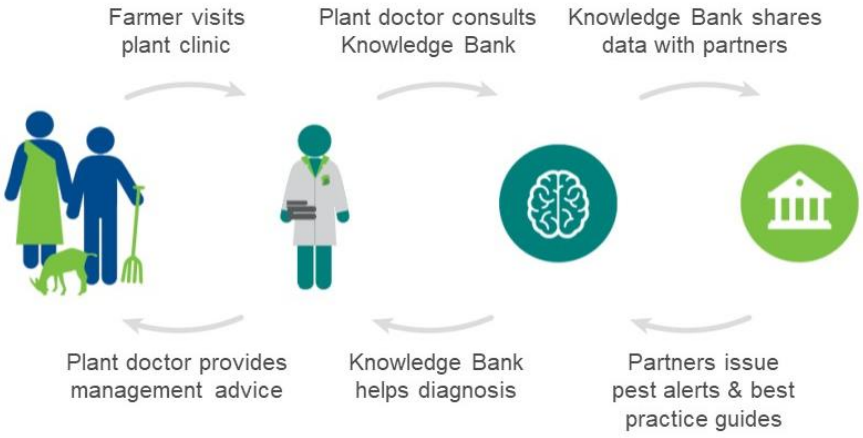
The number of farmers, production area and productivity of each PGS Intergroup in 2017 – 2018 (Jan – June)

Intergroup	Number of farmer member		Area (ha)		Productivity (Tons)	
	2017	2018	2017	2018	2017	2018 (From January to June)
Thanh Xuan Intergroup	120	108	14.3	13.3	405.14	167.59
Lương Sơn Intergroup	210	158	16.7	14.99	81.82	72.59
Trác Văn Intergroup	33	33	4	4	67	36.78
Đông Xuân Intergroup	20	19	1.3	1.3	2.56	9.57
Hiền Ninh Intergroup	30	2	3.76	1.28	45.22	10.85

A PGS certificate in Vietnam is **significantly more affordable** than a third-party certification. A PGS membership costs on average 50,000 VND/ year/farmer (USD 2.2). In addition, a small fee is often collected for each kilo of vegetables sold. In comparison, a VietGAP certificate can cost up to 800-1,500 USD for 2 years, while foreign organic and food safety certifications can be up to three times as expensive.

ii. Knowledge sharing

During consultation with stakeholders, many farmers complained that whilst there is a lot of information around, it is often conflicting and not reliable. It was also a challenge to know how to source evidence-based information that suits their needs. The Plantwise programme has successfully tackled this challenge in relation to plant health. This innovative global partnership, led by CABI, connects farmers to the information they need. Working closely with national agricultural advisory services CABI establishes and supports sustainable networks of plant clinics, run by trained plant doctors, where farmers can find practical plant health advice. Plant clinics work just like clinics for human health: farmers visit with samples of their crops, and plant doctors diagnose the problem and make science-based recommendations on ways to manage it. Plant clinics are reinforced by the Plantwise Knowledge Bank, a gateway to practical online and offline plant health information, including diagnostic resources, best-practice pest management advice and plant clinic data analysis for targeted crop protection.



Whilst this programme is focussed on plant health, a similar model for sharing knowledge with farmers can be developed to meet a wide range of knowledge types. In combination with advances in digital technology, and the growing benefits of social media to facilitate sharing information, the challenges faced by farmers in relation to accessing reliable, relevant information can be addressed. The model is also ideal for communicating and facilitating the adoption of new technologies, procedures and policies, as in the case of the introduction of a code of practice.

3. Links with national/regional development plans, policies, strategies, etc.

A diagnostic trade integration study (DTIS) has not been undertaken in Vietnam, but has been completed for Cambodia and Lao PDR.

In Cambodia's 2014 – 18 Trade Integration Strategy pepper is included in the list of export potential products and geographical indicators have been established for Kampot black pepper. Whilst pepper is not mentioned specifically, the National Export Strategy for Lao PDR includes encouraging the production of medicinal plants and spices for export.

A study carried out in 2013 titled: Using Multi Criteria Decision Analysis to Identify and Prioritise Export-Related Sanitary and Phytosanitary Capacity-Building Options in Vietnam[7], identified hygiene controls for spice exports as one of the 10 capacity-building option priorities and specifically highlighted exports of black pepper (and also some other spices) as having records of high levels of microbiological contamination, for example in the EU and US. A need for the widespread application of hazard analysis and critical control point (HACCP) or ISO 22000:2005 in the spice processing sector was also identified.

As part of the Vietnam Sustainable Development Strategy for 2011-2020, the government seeks to: develop quality agricultural products; combine production with local and foreign market in order to lift the efficiency of using natural resources (land, water, forests, labour and capital); heighten income per hectare of cultivated land and per working day; improve farmers' living standards; speed up the application of scientific and technological advances in production, processing, storage, particularly the application of biotechnology in creating crop plants and domestic animals varieties and production process that yield high productivity and quality; and to gradually formulate the system for management and control of food hygiene and safety so as to protect consumers' health and interests". Food safety of primary products falls under the Ministry of Agriculture and Rural Development in Vietnam. A legislative framework includes an Ordinance on Food safety but does not commit to the application of specific principles such as HACCP or ISO 22000:2005, a need identified in the 2013 MCDA referred to above.

Generally in Vietnam, government research and support is weak. WASI only started working on pepper in 2015, and its main focus is on cleaning old varieties, with no research on new varieties. There are no specific government strategy, policies or initiatives on pepper, a situation which worries VPA and the industry. Since 2014, the VPA submits a strategy to government each year, but no action.

4. Past, ongoing or planned programmes and projects

The FAO project on Capacity building and policy reform for pesticide risk reduction in Viet Nam (UNJP/VIE/041/UNJ) addressed the issue of indiscriminate use of chemical inputs, both fertilizer and pesticides that put agricultural production at risk. Activities in this project that will complement the proposed project include Integrated Pest Management (IPM) and Good Agricultural Practices (GAP) farmer training programmes in tandem with development of sustainable pest and pesticide management policies, to strengthen the regulatory framework to control the distribution and use of pesticides, and to enhance capacity for implementation of these policies and enforcement of pesticide legislation. The capacity of Division of Inspection and Division of Pesticide Management, the development of community level policies on Pesticide Risk Reduction and the lessons learnt from the farmer field schools that targeted vegetable, rice and fruit farmers, will be built on for the proposed project.

The FAO project: Food safety Information, Education and Communication (UNJP/VIE/043/UNJ) will provide a good foundation for learning in the proposed project as the curriculum developed and associated media and manuals on food safety control will be very relevant resource material. The project Capacity building for the food inspection system in Vietnam (OPFMAC) - ONE UN- 2 project (UNJP/VIE/042/UNJ) is also relevant particularly the development of the subsidiary legal framework for the inspectional component of Vietnam's national food control system.

In addition to FAO interventions in food safety, the proposed project will also seek to build on lessons learnt from previous initiatives such as Nedspice's two year farmers partnership programme (2013) that began to help develop a sustainable peppercorn supply chain in the Binh Phuoc province in Vietnam. The project focussed on improving farmers practices to comply with the Rainforest Alliance (SAN) standard. Also in 2013, SDC funded an initiative called Spice of Life: Leveraging the spice sector for poverty reduction amongst ethnic minority communities in Vietnam. The project focused on cardamom, cinnamon and star anise as they were spices that were both cultivated and collected from the forest.

[7] http://www.standardsfacility.org/sites/default/files/Vietnam_MCDA_report_June2013.pdf

Plantwise is an initiative, led by CABI, to improve food security and the lives of the rural poor by reducing crop losses. Central to the Plantwise concept is the development of networks of plant health clinics as part of national plant health systems. These clinics aim to deliver appropriate, affordable and effective advice to smallholder farmers regarding any crop, and any plant health problem. There are currently 25 clinics and 88 trained plant doctors in Vietnam, and 30 clinics and 58 trained plant doctors in Cambodia. Recently, CABI has started working with the Vietnam Peppercorn Association, and other stakeholders, to establish a network of plant clinics specifically for the peppercorn industry.

IDH Sustainable pepper initiative is a project under The Sustainable Spices Initiative (SSI) that aims to sustainably transform the mainstream spices sector, thereby securing future sourcing and stimulating economic growth in producing countries. The initiative was launched in 2018 and is working with local and international companies and the government to strengthen national agricultural extension systems by providing technical support and training.

Australian Center for Agriculture Research (ACIAR) recently undertook a study to scope out a programme that aims to increase the sustainability, productivity and economic value of key cash crops such as black pepper, (and integrated fruit and food crop) farming systems and value chains in the Central Highlands region of the Vietnam, and thus will contribute to the broad goal of increasing socio-economic development in the region. The programme will include a number of research projects addressing issues such as major soil fertility, pest and disease, market and agribusiness issues affecting the billion-dollar exports of coffee and black pepper.

Vietnam is a priority partner for Australia and is a role model to the region in terms of economic development, regional cooperation and prosperity. The continued economic growth reforms over the past two decades have led to its emergence as a lower–middle-income country. Vietnam will continue to have a comparatively high percentage of rural population over coming decades, and issues of rural poverty and structural adjustment remain at the top of the policy agenda. More than 7 million people still live in poverty, mostly in rural and remote communities with few services. Productivity on either a land or labour basis is still very low (OECD 2013). The small scale of production on individual farms, the fragmented landholdings and increases in input costs are significant problems, which conceal huge productivity increase potential. Ethnic minority groups and those in remote regions are particularly affected, and the Vietnamese Government is providing greater focus on programs to assist these groups. In response, DFAT's program is specifically designed to contribute in some of these major areas where Australian expertise has the ability to deliver benefits. In response, Australian aid programs are specifically designed to contribute areas where Australian expertise has the ability to deliver benefits.

This research proposal presents a multi-disciplinary approach to regional development in the Central Highlands. It targets rural poor farmers with activities to increase productivity, food safety and resilience to climate risks, leading to increased incomes and employment opportunities. Enhanced access to markets for smallholder farmers provides them with more choices about how to improve their lives. A critical need for improvements in water management in the CH and the importance of targeting specific end-users were documented almost a decade ago (van de Fliert et al. 2008, Bennett et al. 2009). These previous ACIAR projects provide some basis for a renewed focus on agricultural development in the CH. Partnerships, especially with the private sector and value chains. which add value to farm production, to enhance economic development, will play a key part in agricultural economic development.

Seed to Table is a project in Vietnam run by a Japanese non-profit organisation with the aim of promoting eco-friendly agriculture and supporting community development in Vietnam. The project is working with many different stakeholders including farmers, local and national government staff, academics, and companies in order to enhance mutual cooperation through the adoption of Participatory Guarantee Scheme to expand the capacity and technology of small-scale vegetable producers in the Mekong Delta, to process consumer items locally, and thereby link these smallholder farmers with landless households to create employment opportunities for men and women[8].

In 2016 a local entrepreneur in Cambodia started a business, adopting PGS for local vegetable market to overcome food safety concerns, particularly from pesticide and pollutant contamination. A study on interactions between traditional social processes and Participatory Guarantee Systems (PGS), undertaken by IFOAM, noted that Women, in particular, are directly empowered through Participatory Guarantee Systems. Women respondents in the study all expressed personal empowerment including development of knowledge, skills and self-confidence. The culture of

[8] http://seed-to-table.org/english.html

continuous leaning at community level empowered them to innovate and adapt at house and individual levels[9]. Caritas Cambodia is an official social development arm of the Catholic Church in Cambodia. In 2017 launched pilot project with two PGS groups, with a total of 20 families (10 families in each group). The families are applying PGS model on their vegetable farming. 13 of out the 20 families are doing great and has managed to send their vegetables to Natural Village Mart.

Research to improve pepper productivity includes: A assessment of genetic diversity by morphological characteristics of black pepper cultivars (piper nigrum l.) commonly grown in southern Vietnam (2012), characterisation of *Phytophthora capsici* isolates from black pepper in Vietnam (2010).

5. Public-public or public-private cooperation

The project is focused towards strengthening peppercorn SPS measures, specifically food safety and hygiene, thus addressing immediate compliance threats to exports in this sector. It will provide an action-based case study for the strengthening of SPS measures in general, which is expected to be applicable to other spices and regions.

In developing this project proposal private sector companies and associations were consulted. Key private sector value chain participants shared their concerns with regard to sourcing sufficient quantities of "clean" raw material. Companies consulted were in agreement that **village level production and processing practices were the biggest hurdle to expanding their production of high quality peppercorn for export.** These companies were also of the opinion that efforts to expand the raw material supply base for safe, quality peppercorn will also support not only their production but will also, eventually, incentivize other companies to upgrade their quality systems, including more stringent raw material quality criteria. Therefore, while the project design addresses strengthening of the peppercorn value chain, particularly targeting **village level private sector participants** (input traders, farmers and collectors), export companies will be the ultimate beneficiaries as they will have a wider base for sourcing quality raw material, the key step in any quality control system. To ensure that concerns of the private sector are being effectively addressed, the pilot test will work closely with processing companies such as: Tonkin Invest JSC in Vietnam and Sela Pepper company LTD in Cambodia, and explore the modalities of direct sourcing to a UK food manufacturing company Greencore.

The project will work closely with the VPA, a private public private partnership venture that will support bringing both the public and private sectors involvement with regard to the proposed project.

6. Ownership and stakeholder commitment

The Governments of the target countries have been very supportive of the STDF PPG. They recognize the importance of the peppercorn industries for sustainable development and improvement of rural livelihoods. The proposed partners have facilitated the process of development and submission of the application for an STDF PG.

The Ministry of Agriculture and Rural Development, Vietnam in discussion with the Vietnam Academy of Agricultural Sciences (VAAS), an umbrella organization of 18 research institutes, and the Plant Protection Department (PPD), the focal point for SPS, approached WASI and CABI to resolve the problem of rejection of peppercorn by the EU as a result of injudicious pesticide use. A similar concern and interest was also underscored by the Department of Crop Production which is under MARD. VAAS, in collaboration with CABI, organized a peppercorn stakeholder workshop in mid-December, 2016 to assess the problem. output of the workshop was to seek funding for a thorough assessment of the current spice value chain focusing on the quality and safety aspects of peppercorn for better market access.

During project development, discussions were held with peppercorn export companies in the region, food manufacturing companies, input suppliers, collectors/Traders, and VPA, as well as pepper growers. These consultations confirmed the interest and support of industry and smallholders for this project to help them address concerns related to falling and inconsistent product quality from the smallholder supply-base and absence of Good Agricultural Practice (GAP) on smallholder farms.

[9] https://www.organicwithoutboundaries.bio/2018/03/06/entrepreneur/

II. PROJECT GOAL, OBJECTIVE, OUTPUTS & ACTIVITIES (LOGICAL FRAMEWORK)

7. Project Goal / Impact

The **goal of the STDF peppercorn project is to increase the competitiveness & sustainability of the regional peppercorn industry in terms of consistent supply of high quality safe peppercorn from small-scale farmer driven value-chains. This will be achieved though adoption of improved food safety and hygiene practices and will result in increased sales to premium international markets such as EU, USA, and positive impact on the livelihoods of rural households.**

The regional peppercorn industry needs innovative approaches to support improvements to smallholder pepper value chain organisation, production and processing.

The real indicator of the longer-term success of the STDF intervention will be an increased percentage of exports of higher quality, higher value peppercorn and potential positive spillover effects for domestic consumption of spices (peppercorn) . Linked with this should be a reduction in alerts and notifications on contaminated peppercorn. The regional peppercorn industry relies on smallholder growers and processors for 95% of its supply. Improvements in the overall performance of the industry in terms of increased sales of higher quality products will have a direct impact on rural livelihoods of peppercorn producing households and communities through at least a 25% increase in value of peppercorn sales.

8. Target Beneficiaries

The final beneficiaries of the project are all the stakeholders in the peppercorn export value chain, with – possibly - the most important ones, the primary producers of peppercorn. These peppercorn growers are mostly small-scale farmers. The hired labour, for a large part women, will also benefit. Ultimately, export companies will benefit from having a larger base of safe quality raw material that will be traceable to the production site (farm).

All of the information and material generated will be in the public domain and will be publicised so that companies and groups not directly involved can access the outputs of the proposed project.

(a) Gender-related issues

Men and women are equally involved in the production of peppercorn and should benefit equally from access to the opportunities created by the STDF project. According to the International Peppercorn Community[10] source (http://www.ipcnet.org/), Vietnam has the highest Global Growth Generators Index among 11 major economies. However, the country still suffers from relatively high levels of income inequality, disparities in healthcare provision, and poor gender equality. This project will seek to examine the gender roles and provide solutions, where necessary, in the peppercorn supply chain from farm to market.

The project benefits support institutions in which both men and women staff will gain through improving their skills and knowledge of modern technologies and industrial information. All required efforts will be made by the project to enrol as much as possible women in its planned training activities, both at management and technical levels, and encourage them to participate in all relevant project and decision-making activities.

It has been recognised that women are far better recipients of training than men, often focussing on the practical aspects of a training course, compared to men who retain more information on the technical aspects. The project will actively engage women in key roles as facilitators of knowledge transfer and adoption of practices. Training given will be tailored to accommodate both farm and family commitments by household members, to ensure training is targeted directly to the end user, not relying on indirect transfer of knowledge.

The code of practice will address safe use, including application, of agricultural chemicals. This will impact positively on farmer health, most of which are women.

[10] IPC have indicated that they are keen to be part of this project and will provide strong beyond regional linkages support in quality, R&D and marketing of pepper

9. Project objective, outputs and activities (including logical framework and work plan)

The **objective of the STDF peppercorn project is for increased financial returns, improve productivity, quality/safety and market access for smallholder pepper growers & processors and grower/processor groups by improving compliance with international food safety requirements in high value markets such as EU, USA and Japan, for production and to restore food manufacturing industry confidence in peppercorn sourced from the region**.

To be more competitive in terms of quality/safety and volume, the regional peppercorn industry needs to support the smallholder supply base to adopt better food safety and quality management systems for primary production of pepper, including post-harvest handling. The main markets for peppercorn are very food safety conscious, often paying higher prices for safe product. Lower grades sell at much lower prices and tend to be exported to lower value markets. To achieve this objective the industry needs to invest in the smallholder driven value-chain to improve yield and quality and manage SPS risks associated with microbial and pesticide contamination effectively.

Output 1: Codex based Code of Practice and implementation support package available for pilot testing

It is proposed to develop a codex based **code of practice** suitable for adoption by farmers, collectors and input suppliers involved in peppercorn supply chains in Vietnam, Cambodia and Laos. Each national code of practice will detail sufficient level of practice to ensure compliance with international market needs and will be harmonized across the three countries considering different operating environments.

1.1 Prepare appropriate code of practice

A first step will be to review past and present initiatives to promote good practices at the village level (GAP & GHP) and determine bottlenecks to wider adoption of the good practices through the supply chain. This will involve a review of the information and approaches already available and will ensure that the material developed will be fit for purpose – namely suitable for the target group (both in content and presentation) and directly applicable to the peppercorn sector in the target countries. This activity will build on available studies, such as those conducted by IDH as part of the sustainable spice initiative and the value chain analysis of the peppercorn industry in Vietnam and Cambodia undertaken by CABI.

In collaboration with country partners and based on existing codex based standards, a generic code of practice will be prepared by an international consultant. Key documents consulted will include national good practices codes (GAP, GHP) and internationally recognised pepper quality control instruments.

The code of practice will include:

a. a risk based approach;
b. practices to control identified SPS issues;
c. farm management practices aimed at improving quality aimed towards reducing production costs; and
d. management of input providers and collectors.

The code of practice will be designed, as much as possible, to minimize implementation costs. Minimum criteria will be identified to ensure peppercorn safety and a risk based approach will focus farmer's efforts on specific problem areas. The code of practice will include guidance on improving farm management practices to lower production costs, increase yield and improve pepper quality. Practical aspects of implementation and known barriers to implementation of good practices will be addressed.

Based on the generic code of practice, a country specific code of practice will be developed for each country. The country working groups supported by international and national consultants, in consultation with private sector partners, will prepare the code of practice in consultation with growers, collector, input providers and other value chain actors. The team will also review technical documents with respect to local farm conditions.

For each country, the objective will be to involve as many stakeholders as possible in developing a national code of practice that is practical and relevant to farmers, collectors and input providers and which is harmonized across the 3 countries facilitating mutual recognition.

Material to support the code of practice will be developed. Working closely with private sector partners, farmers, collectors and village level input suppliers and using a behaviour-based approach for creating a food safety culture:

- a set of practical implementation guides (i.e. farmer manual, etc) will be prepared. These guides will be relevant to farmers, collectors and input providers and will take into account the levels of literacy and farm/business size. The guides will be tailored to the different audiences, i.e. farmers, collectors, extension workers, etc.
- guidelines for developing compliance criteria, inspection and monitoring tools suitable for use by the Participatory Guarantee System (PGS) groups as a basis for creating their own instruments based on local field conditions and needs.

1.2 Tailor code of practice to meet local conditions, requirements and cultural norms

The draft version of the code of practice and supporting documents will be presented to two farmer groups in Vietnam and one group in Cambodia to obtain feedback from the stakeholders to determine the strengths and weaknesses of the draft documents. Other industry partners will also be consulted, including input suppliers, collectors/traders, regulatory bodies, development agencies that work on projects relating to peppercorn. The protocol will be modified taking account of any issues identified during the consultations and testing.

The team will seek to lobby the government through engaging with International Peppercorn Community (IPC) and VPA to influence the governments moves to ban the sale of these products. The Vietnamese government, as the rule-maker in terms of enforcement and a market arbitrator (managing demand-supply and prices), is already putting in place measures that would help with sustainability of the demand driven pepper industry in the long-term. These include banning of unregistered pesticides, rationalizing the current acreages to about 110,000 ha and compliance to GAP practices. Key stakeholders e.g. Farmers, enterprises, government and scientists should work together. Along with support from IPC the project will provide the evidence to facilitate enforcement of government measures.

A range of practical communication tools will be prepared. Tools will be tailored to the different audiences, i.e. farmers, farm supervisors, extension workers, etc.

1.3 Develop knowledge resources to support the implementation of the code of practice

The supporting information factsheets will be created that will provide advisors with practical and technical knowledge that will help them to deliver relevant advice to farmers on how to achieve specific requirements of the code of practice. These advisors will be both government extension and private sector companies, such as input suppliers and processors. The factsheets will be generated by content experts from the partner organisations and commissioned leading experts. The partners will work closely with other organisations who provide technical information to farmers. The content will be cross referenced with existing information available to ensure consistent messaging.

1.4 Develop an electronic resource of all information/materials generated by the project

An electronic resource of best practice for the management of quality and safety in smallholder production of peppercorn. The "hub" will be website based and will present information of peppercorn best practice, with an emphasis on the code of practice. It will include the code of practice, technical resources, and factsheets generated from current validated research outputs. The website will be designed to allow for future development options such as: operating in offline mode, chat-bot style helpline, inclusion of multi-media content, knowledge exchange platform, and data collection for benchmarking analytics. User Experience methodologies will be used to design and test the user interface.

Some of the content will be freely available, but some will be user access control, to facilitate monitoring of use. The fieldwork has obvious benefits for the peppercorn industry but the outcomes of the proposed project could have much wider impact if the systems and supporting documents were made available to value-chain stakeholders in other producing countries. To

achieve this aim, it is essential to present the material in a widely-used language. For this reason, a master set will be created in English to supplement the materials in the national language for use in the three countries.

1.5 Knowledge sharing with peppercorn value chain participants and stakeholders in Cambodia, Laos and Vietnam

Regional workshops intended to raise awareness of the code of practice and its impact on pepper safety and quality among pepper processing and exporting companies who were not directly involved in the project.

Update and produce industry and government guidance documents linking the code of practice to export market opportunity. The documents will reflect current knowledge and practices for increasing quality through the value chain. To improve the utility of these documents accessible, user friendly communication tools will be created. While a number of guidance documents have been developed, some may not be accessible for a variety of reasons, e.g., not available, culturally insensitive, too general, wrong language, or uses the written word. Existing guidance document should be reviewed and updated, as necessary. To improve the utility of these documents, material should be presented in a clear and accessible format. In addition, tools should be developed that will allow individuals/organizations to create customized extracts/compilations of the guidance(s) to review, share, discuss, and educate with particular groups.

1.6 Knowledge sharing with stakeholders involved in peppercorn international trade

Conduct quality requirements for export market workshop sessions. This project is designed to support an increase in trade of peppercorn. In order to do this it is imperative that all stakeholders understand the driving forces behind requests for specific quality requirements for export markets by appropriate training. This training will be focused on activities related to supplying the international markets such as quality management and good handling practices. These issues as they apply to international trade will be addressed through a workshop carried out by a foreign consultant with strong experience in international pepper trade. The consultant will also be required to provide practical advice on how to enter international markets. These workshop sessions will be part of the regional workshops.

Build recognition of the code of practice with international buyers. Building recognition of the positive impact on peppercorn safety and the farmer groups adopting the code will drive deeper interest in the code and a means for identifying practicing farmer/collector groups. The consultant in consultation with IPC and its network of international pepper buyers will identify approaches for building such recognition. Examples could include database of practicing farmers, partnering with the International Pepper Community (IPC), etc.

Output 2 Code of Practice pilot tested and a PGS based system developed for the pepper sector.

The successful implementation of a code of practice will require acceptance from all those involved in the supply chain. The Participatory Guarantee Scheme (PGS) model will be piloted in the 3 countries, to facilitate the implementation of the code. Although PGSs are adapted to local conditions, they share a common set of core principles (IFOAM, 2008, Greater Mekong, 2017). In this case, the peppercorn code of practice will be adopted and based on the guidance documents and management system framework. Each PGS will design their own compliance criteria, internal control systems and documented management systems to suit their own situation.

It is proposed to stagger pilot testing of the code of practice. Pilot testing in the first year will take place in one location in all three countries. In subsequent years additional locations will be selected proportional to the number of farmers producing peppercorn. This approach will allow for more focused delivery of resources to overcome any initial teething problems.

The private sector plays a pivotal role in the success of the PGS approach. The project implementation team will work closely with participating companies to identify feasible incentive models to ensure commitment to the approach is maintained, beyond the life of the project. One of the measures of success of the pilot will be determined by the robustness of the approach, and its ability to withstand market pressures and enable effective scaling. In addition, to strengthen the smallholder-private sector link, in this case, the CIAT's LINK methodology (which is a participatory method to foster inclusive commercial relationships between smallholders producers

and modern markets), will be tested. This approach is being used in other PGS's (e.g. organic vegetables in Vietnam (Source: Rikolto International Belgium).

2.1 Undertake market to farmer visits/dialogues and farmer to market visits/dialogue; based on shared learning strategies.

Whilst developing this proposal several lead firms (processors/exporters) and farmer groups were identified in Vietnam and Cambodia. The lead firms and farmer groups identified will be asked to verify their commitment to the project, if necessary alternative lead firms and farmer groups will be identified by the national working groups. The piloting will be undertaken at 2 sites in Vietnam, 1 in Cambodia and 1 in Lao PDR.

Information will be collected on the identified value chains in terms of the number of farmers, size of intermediaries, relationship with lead firm, geographic information, how geographically arranged i.e around a village, etc. The purpose of the information will be to support the introduction of the code of practice and to identify participants for the pilot test.

Stakeholders will engage in "walking the chain", undertaking market to farmer visits/dialogues and farmer to market visit/dialogues. This activity provides an opportunity to review key tasks relating to the code of practice.

2.2 Undertake facilitated market and grower dialogues to establish quality and supply criteria based on code of practice and establish agreements for ways of working together, including supporting the establishment of farmer groups.

Stakeholder workshops with farmers, collectors, local government officials and (if involved) lead firm will be organized in order to solicit stakeholder input on the updated code of practice, supporting material and management framework. The workshops will also provide an opportunity to explain the purpose and collect views on the pilot study. The stakeholder workshops will also provide opportunity to develop visibility for the initiative.

It is important to have stakeholders validate the code of practice, guides and proposed management framework. The workshops also provide the venue to identify list of possible participants in the trial and assess the feasibility of establishing a PGS.

2.3 Conduct PGS-linked training workshops.

At the start of the project, and at each location, two introduction activities will be undertaken consecutively, a briefing session and short training session.

The briefing session will be delivered to farmers and collectors at the pilot sites. One of the purposes of the kick-off meeting is to inform farmers, collectors and intermediaries of the code of practice and management system field test, emphasizing the importance of adhering to the procedures, and completing the forms. A second purpose of the kick-off meeting is to provide farmers and collectors with an overview of the purpose of code of practice and to illustrate the relationship of its correct implementation with future market access and demands of buyers.

The training session will introduce the basic food safety and quality assurance concepts in pepper production, primary processing and transport. This output of the project will ensure that the concepts of food safety and quality assurance will be introduced in a format that is suitable for small landholders and collectors with limited education. Training will be delivered in stages and will be coordinated with delivery of specific practices by the farmers, collectors or input providers. The pace of training delivery will take into consideration the absorptive capacity of the farmers and will accommodate their schedules.

Further training sessions will cover specific activities that are related to implementing PGS and the code of practice, including developing market orientated farm business management skills.

2.4 Build capacity of advisory services

A team of experts will identify the most suitable advisory expert model structure that would best suit the farmer groups involved in the project. Experts will be identified from existing public and private extension and research entities, who will be trained to provide ongoing support to the farmers based on the information kits and knowledge resources collated in the project. Key National trainers will also be trained to deliver ongoing training to these advisors. In this context, lessons from Plantwise and other programmes will be incorporated into the advisory mechanism to capitalise on their successes.

2.5 Ongoing support to stakeholders by technical experts

Ongoing support will be provided to stakeholders by technical experts. The project will prepare simple information kits suitable for farmers. The information kits will be prepared considering literacy levels of farmers. In addition to the basic training, farmers will be provided on-going mentoring support through the infrastructure established in Output 1.

Output 3: Strategies for wider roll-out of the PGS based system and code of conduct identified

3.1 Document success stories

Starting at the beginning of the project, the project will document narrative and pictures for individual success stories. Success stories are useful for promotion of the outcomes of the project to the local donor community, the pepper industry and grower groups external to the project.

Progress stories will be periodically communicated to industry partners, particularly buyers and processors who will be the potential adopters of the approach. This will include presentations at key events, such as the IPC conference. Awareness of the project will help facilitate the uptake within the industry.

These stories will also be made available to STDF with contact details of stakeholders named in the story. This will allow the STDF to carry out their own follow-up of the project's impact and help tell the human story behind the project.

3.2 Assessment of the suitability of the code of practice, PGS, supporting documents and training material and identify roll out

The level of success and lessons learnt from the pilot will be synthesized and documented. The monitoring reports produced after each inspection, and feedback from stakeholders will be reviewed and analysed with the view to modifying the code of practice, support documents and training material. This will be an on-going activity with feedback generated during implementation field visits and training.

The purpose of the evaluation is to answer a set of questions:

- Is the code suitable for implementation in practice by the relevant stakeholders?
- Are the code and its forms useful and are there suggestions for improvement?
- Are the code and related documents suitable to improve and guarantee food safety and product quality in the peppercorn supply chain?
- What is the behaviour and attitude of growers, collectors and intermediaries towards the code?
- What are the benefits or disadvantages of the code for the participants in the test?
- Does the code give a positive stimulus to food safety and product quality in the peppercorn supply chain?
- Which issues can obstruct implementation of the code?
- Did the method and approach of designing, development and testing of the code prove to be suitable for the purpose?

To answer these questions an assessment plan will be developed and implemented throughout the history of the project. Opinion will be collected at the stakeholder and closing meetings, and training sessions. In addition the inspection reports and on-going assistance will provide a pool of information that will be helpful in answering the questions above.

Based on a synthesis of the experiences, lessons learnt and stakeholder feedback during implementation of the pilot test, the project will identify approaches/strategies for wider roll-out of the code of practice and management system.

3.3 Dissemination seminar for pepper industry stakeholders & donor representatives

This activity is intended to raise awareness of the successful outcomes of the STDF peppercorn project among pepper processing and exporting companies who were not directly involved in the project.

The seminar will include a discussion forum for the industry to make recommendations and plan for the wider uptake of the outcomes of the STDF project. Representatives of the major donor organisations will be invited as further donor support would be beneficial in pushing forwards with wider uptake of the outputs of the proposed peppercorn project.

10. Environmental-related issues

Currently there are no published studies on the impact of peppercorn on the environment, but with any crop that is intensively grown with a high use of pesticides the environmental and health risks are inevitable. The project will seek to address this by improving management of pesticide usage. Improved management of used chemical containers will also be addressed.

The outcomes of the proposed project would have a positive impact as they include introduction of a smallholder friendly safety and quality management system for primary production of pepper. Under these systems farmers would keep basic records of farm inputs and would implement the basics of integrated crop management (ICM). Improved linkages between the farmers and the private sector buyer will improve the flow of information to the farms on correct choice of chemicals, dosage, pre-harvest intervals and conditions for usage.

Implementation of the outcomes of the proposed project will allow yields to be increased and quality increased in a sustainable manner without risk to the environment or worker safety. As key part of our proposal is primary farm code of practice pepper production and post- harvest handling. The code of practice will adapt and integrate content from international (Codex) standards so as to meet both the needs of the smallholders in the region and the requirements of the major international buyers of peppercorn. The intention is to keep the code of practice as simple and cost effective as possible. In developing the smallholder food safety and quality management system and code of practice the team will consider options to address organic farming based on the successful example from Kampot pepper in Cambodia.

Foreseen longer term environmental benefits include rejuvenated soil, which will translate into more effective natural breakdown agrochemicals and reduced deforestation as farmers move towards cultivated live supports for the pepper vines.

11. Risks

The key risks are described in the logical framework (**Appendix 1**). In addition the following comments can be made.

The proposed project aims to develop and roll out a smallholder friendly food safety and quality management system for production of peppercorn with associated training packages. The majority of the pepper farmers in the region are unfamiliar with implementation of quality and safety management systems for production of pepper. Experience in other parts of the world suggests that not all farmers may be willing or able to adopt the management systems developed under the STDF project. However, given the correct incentives the project partners are confident that a significant percentage of farmers will adopt these measures and that such farmers will become the backbone of the future development and prosperity of the regional peppercorn industry. The project relies on developing a "self-control" mechanisms, but the success in controlling the input suppliers and collectors remains an issue of concern as past efforts by the government have failed.

Market access based on 'self-control' mechanisms is a vital part of the value-chain and as demonstrated in past initiatives in Cambodia, if such expectations are not met the farmers will not be willing to participate in the project. Guidance on good farm management practices is built into the code of practice, which will help the farmer reduce production costs and / or improve yields/income. It is anticipated that this will provide sufficient stimulus for farmer involvement rather than just promising improved market access.

12. Sustainability

PGS is a proven model for sustainability. The case examples cited in this document, illustrate the relationships, established between the parties through a PSG project, are built on trust and mutual

understanding. This relationship fostered during the life of the project builds the foundation for a long-term business partnership to grow. Participation in an approach of this nature is voluntary, with people's involvement being based on business interests.

In addition, the PGS approach will consider mechanisms to strengthen long term sustainability e.g.(i) Establishment of a local PGS Management Committee with specific ToRs (e.g in Argentina comprising of various stakeholders endorsed by the local Municipality); (ii) Facilitate long-term inclusive business relationship between farmers and private sectors (such as those approaches used the CIAT's LINK model); (iii) Advocacy to raise awareness of consumers and ; (iv) Strong public - NGO sector partnerships e.g. in India which is complementary to the NGO PGS system whereby the former focuses on institutional networking, surveillance and monitoring and data management. With regards to training, farmer training in business and marketing, management should create a holistic approach integrating the value chain (front and back end). The safety net supplied by STDF funding enables this model, new to the peppercorn industry, to the piloted, providing the opportunity for guidance from key experts and an exploration of new approaches, that together will allow tailoring to accommodate the unique challenges faced by the industry.

The selected participants upstream will already be connected through trade of peppercorn. The project will seek to build on those existing connections rather than trying to establish new ones. For example, Tonkin Invest JSC, in Vietnam, already buys peppercorn from a particular community. Likewise, Sela Pepper Company, in Cambodia, have been working with communities of farmers. They regard this project as an opportunity for them to engage with their supply base in a far more collaborative way and leverage this relationship to explore new market opportunities both domestically and abroad.

Greencore Ltd, a UK food manufacturing company, is interested in exploring the business implications for them direct sourcing from these companies; an approach contrary to their business-as-usual which is largely bulk purchase from warehouses in Europe. Whilst this piece of work is not in the scope of the project, the company hopes to work with partners to leverage further funding to investigate this further.

This approach could also lead the establishment of a Safer Spice Guarantee Scheme that could be rolled out to other countries and other spices. A model like this could provide a solution, in part, for traceability challenges and compliance with Environment, Social and Governance for larger multinational companies. The partners will therefore seek to engage with companies like Olam, further enhancing the sustainability of the activities delivered in this project.

III. BUDGET

13. Estimated budget

1. Counterpart inputs (Ownership and Stakeholder Commitment)

Vietnam

WASI will act as the main counterpart for the project. However, WASI will build partnerships with CABI and STDF in close coordination with the industry stakeholders. Through this coordination, WASI will bring the needed institutional environment for facilitating the institutional level support for the project. This is an integral part of the project for its effectiveness and sustainability.

Of importance is WASI's special relationship with the main entities involved in Vietnam's peppercorn, viz. **Ministry of Agriculture and Rural Development (MARD)**, the ministry mandated to manage food safety for primary production, collection, processing for export, import and trading of agricultural products such as pepper. Vietnam Peppercorn Association (VPA), the key non - governmental organization, representing enterprises belonging to all economic sectors, organizations and individuals of Vietnam related to Peppercorn Industry.

WASI will add value to the project through bringing experience and industry specific knowledge and wisdom. Specifically, direct contribution to the farm management component of the code of practice by utilising their research on:

- Integrated cultivation practices of black pepper with resulting profit increase of 7-15%.
- Determination of the appropriate dosage of mineral fertilizer to save costs of 10-20%,
- Strategies for using live supports for black pepper that reduce initial investments costs by 40-50%

- Irrigation technology that reduces water use by 20-25%.
- Intercropping of pepper with coffee to increase income by 80-150%
- Management of fast and slow wilt in the field by using integrated management solutions

Furthermore WASI will provide:

1. Staff time needed for the role as Focal Point to follow up on the implementation and progress;
2. staff time needed to follow up on steering committee related matters;
3. Up to 3 technical experts to establish a technical working group;
4. Premises for project related meetings;
5. A reduction of 40% on their normal charge out rates of support technical staff/experts for implementation of local activities; and
6. Miscellaneous administration support not covered in the administrative budget lines.

Cambodia and Lao PDR inputs

General Directorate of Agriculture (GDA), Cambodia and **Department of Agriculture (DOA)**, Lao PDR will be national counterparts in their respective country.

General Directorate of Agriculture (GDA), Cambodia, a key organization under the **Ministry of Agriculture, Forestry and Fisheries (MAFF)** which includes the Department of Plant Protection, Sanitary and Phytosanitary (PPSPSD) will provide access to extension, research and policy related actors for the plant quarantine work, diagnostic and other work related with plant protection.

Department of Agriculture (DOA), Lao PDR is a key organization under the **Ministry of Agriculture and Forestry (MAF)** with the mandate to control food safety.

Furthermore both GDA and DOA, Lao will each provide:

1. Staff time needed for the role as Focal Point to follow up on the implementation and progress;
2. Staff time needed to follow up on steering committee related matters;
3. Up to 3 technical experts to establish a technical working group;
4. Premises for project related meetings;
5. 40% subsidy for the charge out rates of support technical staff/experts for implementation of local activities; and
6. Miscellaneous administration support not covered in the administrative budget lines.

CABI Inputs

CABI will lead on activities relating to 2 and contribute to output 1 and 3. Leveraging the expertise in facilitating knowledge dissemination and development of practical evidence-based end-user knowledge, and provision of a technical support to the PGS activities.

CABI will coordinate the activities relating to adopting the PGS model (Output 2) drawing on previous experience of the process from other countries by key staffs, and collaborate with National and International experts.

Furthermore CABI are expected to provide the following:

1) Access to the knowledge bank resource and processes to facilitate the adoption of the plant clinics in the three countries;
2) Provide 1 technical expert to establish a technical working group;
3) To cover 5 percent of IT staff time to contribute to the development of the knowledge hub framework;
4) To cover 10 percent of trainer time needed to delivering various capacity training on plant health related issues; and

5) Overall project coordination and management across the three target countries.

II Budget Summary
Total costs (in USD)

Output/Activity	STDF	In-kind contribution	Total
Output 1 Farm-village level pepper producer, collector and input provider code of practice based on existing national good practice standards and harmonized regionally			
1.1 Prepare appropriate code of practice	46,789	4,800	51,589
1.2 Tailor code of practice to meet local conditions, requirements, and cultural norms	22,060	1,880	23,940
1.3 Develop knowledge resources	9,135	0	9,135
1.4 Develop an electronic resource of all information /materials generated by the project with global access, hosted on CABI's Plantwise Knowledgebase	61,749	32,800	94,549
1.5 Knowledge sharing with peppercorn value chain participants in Cambodia, Laos and Vietnam	23,223	2,970	26,193
1.6 Knowledge sharing with stakeholders involved in peppercorn international trade	60,731	6,400	67,131
Output 1 Subtotal	**223,686**	**48,850**	**272,536**
Output 2 Code of Practice pilot tested and a PGS based system developed for the pepper sector			
2.1 Undertake market to farmer visits/dialogues and farmer to market visits/dialogue; based on shared learning strategies.	25,178	3,760	28,938
2.2 Undertake facilitated market and grower dialogues to establish quality and supply criteria based on code of practice and establish agreements for ways of working together. Including supporting the establishment of farmer groups.	23,188	3,560	26,748
2.3 Conduct PGS-linked training workshops.	67,310	10,240	77,550
2.4 Build capacity of advisory services	102,012	34,900	136,912
2.5 Ongoing support to stakeholders by technical experts	121,641	11,200	132,841
Output 2 subtotal	**339,329**	**63,660**	**402,989**
Output 3 Strategies for wider roll-out of the PGS based system and code of conduct identified			
Activity 3.1 Document success stories	6,872	2,740	9,612
Activity 3.2 Assessment of the suitability of the code of practice, PGS, supporting documents and training material and identify roll out	12,122	1,300	13,422
Activity 3.3 Dissemination seminar for pepper industry stakeholders & donor representatives	11,867	8,100	19,967
Output 3 subtotal	**30,861**	**12,140**	**43,001**
Coordination			
Oversight and logistical support	14,103	65,100	79,203
M&E	23,371		23,371
External evaluation	10,000		10,000
Auditing	5,100		5,100
Subtotal Coordination	**52,574**	**65,100**	**117,674**
Cost of maintaining CABI infrastructure on which the project activities will be built			
Costs related to maintaining infrastructure from which the project will benefit		12,000	12,000

Output/Activity	STDF	In-kind contribution	Total
CABI cost of covering 10 percent of IT staff time to contribute to the development and maintenance of the knowledge hub framework		5,000	5,000
Subtotal CABI infrastructure costs		**17,000**	**17,000**
Sub-total	**646,451**	**206,750**	**853,201**
Indirect costs (10% - administration and financial coordination and support)	64,645		64,645
Grand total	**711,096**	**206,750**	**917,846**

In-kind contributions (in USD)

In-kind contributions to the project being – WASI, GAD, DOA, CABI and linked private sector. Largely related to salary costs and use of premises such as providing facilities for training workshops.

	Vietnam	Cambodia	Laos	CABI	Total
Administration					
Staff time needed for the role as Focal Point to follow up on the implementation and progress	3,600	3,600	3,600		10,800
Staff time needed to follow up on steering committee related matters	3,600	3,600	3,600		10,800
Upto 3 technical experts to establish a technical working group	7,200	7,200	7,200		21,600
Premises for project related meetings.	500	500	500		1,500
Miscellaneous administration support not covered in the administrative budget lines	2,000	2,000	2,000		6,000
CABI cost of providing 1 technical expert to establish a technical working group				14,400	14,400
Sub-total	**16,900**	**16,900**	**16,900**	**14,400**	**65,100**
Consultant charges					
National consultants: 40% subsidy for the charge out rates of support technical staff/experts for implementation of local activities	6,900	7,640	5,800		20,340
CABI: 200 USD/day subsidy on deploying CABI technical staff as international consultants (charge out rate international consultant $600 vs $400 for CABI)				92,130	92,800
Sub-total	**6,900**	**7,640**	**5,800**	**92,130**	**112,470**
Workshops					
20% subsidy related to organising local workshops	5,890	3,960	2,330		12,180
Sub-total	**5,890**	**3,960**	**2,330**		**12,180**
Cost of maintaining CABI infrastructure on which the project activities will be built					
Costs related to maintaining infrastructure from which the				12,000	12,000

	Vietnam	Cambodia	Laos	CABI	Total
project will benefit					
CABI cost of covering 10 percent of IT staff time to contribute to the development and maintenance of the knowledge hub framework				5,000	5,000
Sub-total				**17,000**	**17,000**
Total	**29,690**	**28,500**	**25,030**	**123,530**	**206,750**

14. Cost-effectiveness

Cost effectiveness will be ensured using local resource persons as far as possible who are knowledgeable on the ground situation as well as involving all relevant government institutions who are connected to the project and getting their support from the beginning is intended to ensure successful implementation of the project at a cost effective level.

Adopting a comprehensive value chain approach - A project may not deliver the expected end product, if in the design and implementation of the project the concerns and interests faced by all the stakeholders are not taken into account. Hence, the inputs that go into the project could be wasted. The proposed STDF project has been designed taken into account concerns and interests of a large number of stakeholders and addresses all the key constraints of the system.

The project will build on experiences and resources already available with the project partners to minimise the costs.

IV. PROJECT IMPLEMENTATION & MANAGEMENT

15. Implementing organization

15.1 National partners

Vietnam: WASI

The Institute
Western Highlands Agriculture & Forestry Science Institute (WASI), a governmental scientific organization belonging to the **Vietnamese Academy of Agricultural Sciences (VAAS)**, is responsible for research and technology transfer in the fields of agriculture, forestry, animal husbandry, biotechnology, protection of ecological environment for the development of agriculture and forestry in the Central Highlands. Research and transfer advanced technologies in agriculture, forestry and water resource to Central Highlands region as follows:

- Carry out research on breeding, selection, propagation of crops and livestock; plant protection; agronomy; agriculture & forestry systems; ecological environment protection; processing and storage of agriculture forestry products and foodstuffs for cattle to support for the agriculture forestry development of Central Highlands region.
- Study on the uses and protection of land and water resources and small scale hydroelectricity.
- Research on marketing, processing and storage of agriculture and forestry products.
- Assess and test fertilizers, fungicides and insecticides, new varieties; soil and water analysis; build up solutions for pest control such as IPM. Produce, commercialize products of research as well as other products for agricultural productions.
- Collaborate with local and international organizations on science research & technology transfer in the areas of agriculture, forestry and environment protection for the development of Central Highlands region.

WASI is interested in this project because they want to:

- Be key organization responsible for the pepper R&D and value chain in Vietnam and voice of the Vietnam government
- Corporate agribusiness is taking a larger role in the value chain, especially for high-value commodities with strong export potential such as pepper. Create opportunities for rural transformation in the region, through improving the productivity, profitability and environmental sustainability of small farmers Improving capacity and participation of smallholder farmers and agribusinesses in the value chain.
- Strengthen the policy and institutional framework for transformation into the identified agricultural systems – making recommendations for practical national and international policy action and investment plan, facilitating peppercorn industry opportunities.
- Improve value chains and integration between farmers, suppliers, processors, traders and high-value consumer markets, with food quality standards, traceability systems and market information readily.

Role and Responsibility

- Appoint competent persons to coordinate the delivery of the project (project manager, project assistant, project accountant)
- Implement project activities locally
- Nominate a representative to serve in the National Working Group
- Coordinate with different stakeholders at national/district level and with
- Organize National Working Group Meetings and keep minutes
- Identify resource persons to carry out the program in consultation with other stakeholders
- Participate at relevant key meetings
- Provide meeting room facilities for the stakeholder/National Steering Committee meetings
- Monitor, evaluate and report progress
- Managing finance and maintain records
- Publicize project activities and project results (inviting media for workshops, and issuing press releases, advertisements)

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Cambodia: General Directorate of Agriculture (GDA)

The Institute
General Directorate of Agriculture (GDA), Cambodia is a key organization under the **Ministry of Agriculture, Forestry and Fisheries (MAFF)**, Cambodia which includes the **Department of Plant Protection, Sanitary and Phytosanitary (PPSPSD)**.

The PPSPSD is strongly linked to extension, research and policy related actors for the plant quarantine work, diagnostic and other work related with plant protection. They also process import permit, phytosanitary certificates and other documents, in respect of the consignments which are checked for genuineness and proper entries.

GDA is interested in this project because they want to:

- Be key organization responsible for supporting the production of pepper and farm level value chain activities in Vietnam
- Strengthen the Cambodian policy and institutional framework to support local industry in producing, processing and exporting quality peppercorn
- Improve value chains and integration between farmers, suppliers, processors, traders and high-value consumer markets, with food quality standards, traceability systems and market information

Role and Responsibility

- Appoint competent persons to coordinate the delivery of the project activities in Cambodia
- Implement project activities locally
- Nominate a representative to serve in the National Working Group
- Coordinate with different stakeholders at national/district level and with
- Organize National Working Group Meetings and keeping minutes
- Identify resource persons to carry out the program in consultation with other stakeholders
- Provide meeting room facilities for the stakeholder/National Steering Committee meetings
- Monitor, evaluate and report progress
- Managing finance and maintain records
- Publicize project activities and project results (inviting media for workshops, and issuing press releases, advertisements)
- Participate at relevant key meetings

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Cambodia
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Lao PDR: Department of Agriculture (DOA)

The Institute
Department of Agriculture (DOA), Lao PDR is a key organization under the **Ministry of Agriculture and Forestry (MAF)** and have the mandate to control food safety. DOA has adopted good agricultural practice (GAP) from ASEAN and developed an import and export food safety control system to support vegetable and fruit production in Lao PDR. Lao PDR has long history for pepper production which is mostly produced for domestic consumption. Recently, due to demands of the region and international market growing, the number of commercial farms growing pepper has increased in southern part of Lao PDR (14 hectare in champak province and 167 hectare in Sekong province).

DOA is interested in this project because they want to:

- Support production of quality peppercorn by Lao farmers
- Promote increase in national export of peppercorn

Role and Responsibility

- Appoint competent persons to coordinate the delivery of the project activities in Lao
- Implement project activities locally
- Nominate a representative to serve in the National Working Group
- Coordinate with different stakeholders at national/district level and with
- Organize National Working Group Meetings and keeping minutes
- Identify resource persons to carry out the program in consultation with other stakeholders
- Provide meeting room facilities for the stakeholder/National Steering Committee meetings
- Monitor, evaluate and report progress
- Managing finance and maintain records
- Publicize project activities and project results (inviting media for workshops, and issuing press releases, advertisements)
- Participate at relevant key meetings

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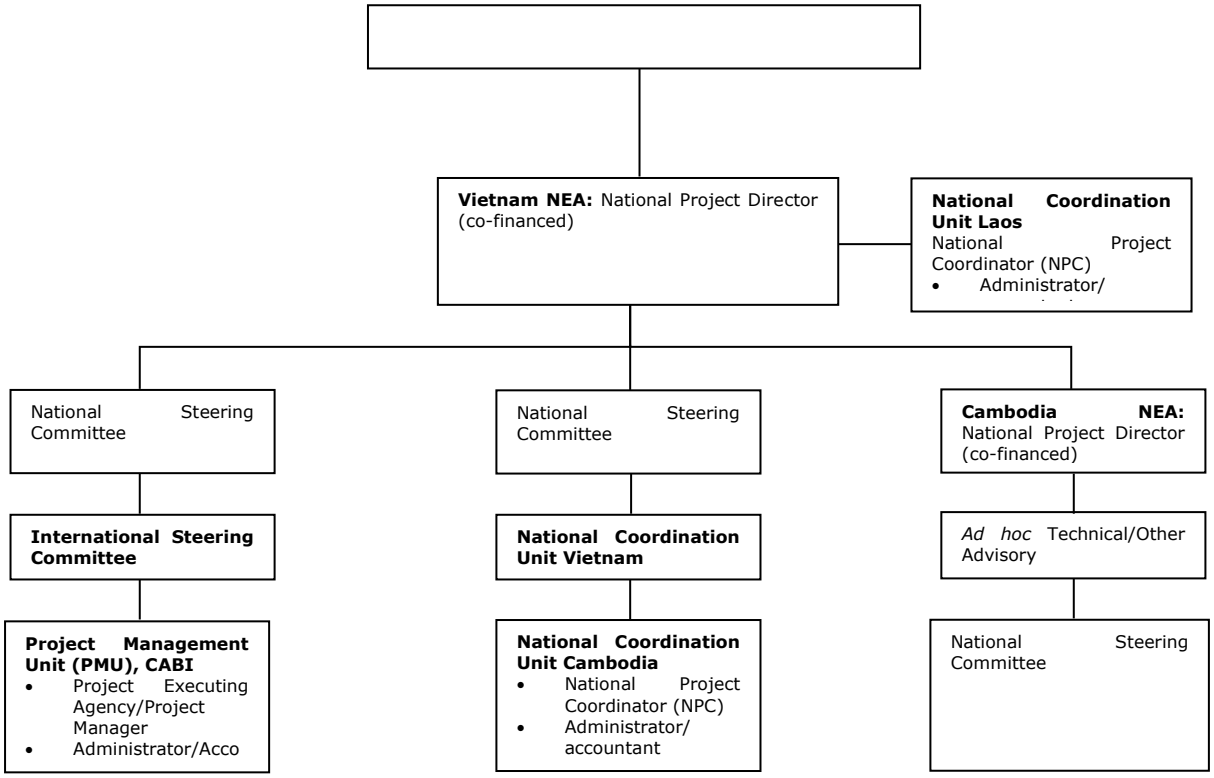
15.2 Letters of support

The letters of support from a number of organizations to be involved in project implementation, particularly: **Cambodia** (General Directorate of Agriculture and Ministry of Agriculture, Forestry and Fisheries - MAFF); **Lao PDR** (Department of Agriculture - DoA, and Ministry of Agriculture and Forestry - MAF); and **Vietnam** (Western Highlands Agriculture and Forestry Science Institute – WASI and Ministry Agriculture and Rural Development – MARD) are presented in **Appendix 4**.

15.3 Proposed project overall institutional framework



CABI has been requested by the applicant, viz. WASI for taking the role of implementing, supervising and assuring the project outcomes. This cooperation has been symbolized by a letter (**Appendix 5a**) from WASI to CABI, rendering their consent to this project implementation arrangement.

CABI, acting as the **Project Executing Agency (PEA)/Project Manager (PM)** and will be responsible for implementation of the project in accordance with the objectives and activities outlined in the project document. CABI will work closely with the **National Executing Agencies (NEA)** and the **National Coordination Unit (NCU)**. The main responsibilities of CABI as Executing Agency will include the following:

- be responsible on project implementation, reporting, and performance;
- report to STDF and meet all of its reporting and updating requirements
- inviting the members for the Project Steering Committee (PSC), and through the PMU run the secretariat for the PSC;
- planning for and monitoring the technical aspects of the project, and monitoring progress benchmarks and outputs;
- actively participating in all relevant project activities where appropriate;
- adopting, during the course of the project, the systems, programmes and tools developed by the project to ensure sustainability of the project outcomes;
- play an active role in coordinating with other stakeholders throughout the project;
- preparation and submission of periodic progress reports, and regular consultations with beneficiaries and contractors;
- maintaining a separate project account for the accountability of project funds;
- ensuring advanced funds are used in accordance with agreed work plans and project budget;

- preparing, authorizing and adjusting commitments and expenditures; ensuring timely disbursements, financial recording and reporting against budgets and work plans;
- managing and maintaining budgets, including tracking commitments, expenditures and planned expenditures against budget and work plan; and
- maintaining productive, regular and professional communication with STDF and other project stakeholders to ensure the smooth progress of project implementation.

A **Project Steering Committee (PSC)** will provide strategic and technical guidance for the project. The PSC will meet at least once a year and will be responsible for overseeing and approving annual work plans and budgets, solving issues and other strategic decisions. Membership of the PSC will include representation from each of the National Executing Agencies (NEA), the CABI Project Manager, and representatives of key organizations with expertise on peppercorn food safety and value chain, such as IPC and VPA. The STDF Secretariat will be invited to observe the PSC meetings. Country NEAs will establish National Steering Committees following local practices.

CABI will, where necessary, contract NEAs who will be responsible for the country programme implementation. On a day to day basis this will be managed and reported on by the NCU, headed by a National Project Coordinator (NPC), usually a staff member from the NEA, a national administrative/accounting assistant (to be hired by the project part time or full time), and technical staff or consultants. The NCUs will manage the country activities, and CABI will provide backstopping to NCUs, through its Project Management Unit (PMU).

The National Executing Agencies (NEAs) in the three project countries are as follows:

- *Cambodia*: General Directorate of Agriculture, Ministry of Agriculture, Forestry and Fisheries (MAFF);
- *Laos*: Department of Agriculture (DoA), Ministry of Agriculture and Forestry (MAF); and
- *Vietnam*: Western Highlands Agriculture and Forestry Science Institute (WASI).

15.4 Regional support

Given the applicants expertise in pepper research, WASI will provide an overarching technical support to the national working teams in terms of information exchange either directly or through a project mechanism designed for such dissemination.

15.5 Implementing organisation

The proposed implementing organization will be CABI SEAsia. CAB International (CABI) is an inter-governmental, not-for-profit organization established under an international treaty registered with the United Nations. The mission and direction is influenced by 48 member countries from around the world, including Vietnam.

CABI has a long history of supporting agriculture development with a mission to improve people's lives worldwide by providing information and applying scientific expertise to solve problems in agriculture and the environment. Its staff have a range of technical skills in value chains including facilitating market access, value chain analysis, SPS measures, ICM/IPM, extension, socio-economics, knowledge management and facilitating the adoption of GAP. CABI has been working closely with WASI and VPA to establish plant clinics to help peppercorn farmers improve plant health and has recently undertaken a value chain analysis to identify other opportunities for improving access to knowledge. In the past, CABI has also being involved as the Project Manager in the STDF funded project such as Beyond Compliance: Integrated Systems Approach for Pest Risk Management in Southeast Asia (STDF/PG/328) which involved four countries i.e. Vietnam, Philippines, Malaysia and Thailand, in the Region.

A detailed list of SPS/food safety related projects managed by CABI is presented in **Appendix 5c**

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CABI SEAsia provides in **Appendix 5b** written consent agreeing to manage and supervise implementation of the project.

16. Project management

Implementing/Supervising Organization
An Inception Phase of 3 months will be conducted to establish a baseline, formulate the detailed work plan and to verify the logical framework. During the Inception Phase the following scope and objectives will take place:

- Development of a detailed activity plan which includes, progress evaluation, risk assessment, gender and participatory processes;
- Validation of the logical framework and establishment of a baseline for the impact indicators;
- Establishment of a Monitoring and Evaluation system according to result-based reporting;
- Validation of the approaches and concepts proposed in the project document taking into consideration the latest developments in the country and the applicant's suggestions;
- Validation of the budget and adjustment to the same as necessary;
- Elaboration of a detailed work plan;
- Establishment of the Steering Committee and project management structure; and
- Sensitization and awareness building of stakeholders and partners to secure their active involvement.

In the beginning of the project for each of the 3 countries, a project steering group will be set up, in order to:

- Endorse a management structure in which the practical management will be carried out by CABI Asia;
- Identify members of the project technical working group (s);
- Oversee progress of project activities against agreed timelines (annual workplans);
- Disburse and monitor the use of STDF funds as per agreed budgets;
- Support the development of good working relations and partnerships;
- Report to the STDF Secretariat and disseminating of project results; and
- Intervene in the event of any problem.

The management and implementation by CABI SEAsia will be implemented in concert with the national PSGs. Additional support will be provided by CABI in providing regional level coordination, knowledge sharing and communication.

At the beginning of the project CABI together with the national coordinators will develop an overall work plan and budget and the first annual workplan and associated budget. Annual work plans will be developed each year taking into account rollover of activities not started/completed from the previous workplan and a budget for each plan identified.

Roles and responsibilities:

- Coordinate overall project;
- Provide guidance and advice counterparts for the successful implementation of the programme's activities and for reaching its objectives;
- Review and adjust workplan as per stakeholders' recommendations;
- Ensure agreed activities, timelines and outcomes are delivered as per plan;
- Ensure effective and timely implementation of individual project components;
- Decide on budget allocation and revision;

- Liaise regularly and coordinate activities with the NPM and project stakeholders;
- Ensure effective involvement of the NPM in project coordination;
- Regularly review progress of the project and where necessary make recommendations to enhance effective and timely implementation of responsibilities and activities of all project partners;
- Monitoring, Evaluating and Reporting Progress; and
- Disseminate information and success stories of the project achievements.

V. REPORTING, MONITORING & EVALUATION

17. Project reporting

Regular reporting, on the project progress in relation to the foreseen work plan (**Appendix 2**) will be carried out by CABI SEAsia. The progress reports will include a financial report.

In month 1 an inception report will be prepared. Regular progress reports will be written in months 7, 13, 19, 25, 31 and a final report in month 36 and provided to the STDF for review and approval. The decisions of the PMC meetings will be included in these reports.

The first month of the project implementation (inception phase) will be used for refining and elaborating and further defining project log frame, the activity plan, and detailing out the budget to match the time and situational demands of the project. This will be carried out in consultation with the project stakeholders including STDF, WASI, CABI and other counterparts. The outcome of this inception work will be captured and communicated through an inception report.

The project will adopt two types of reporting, i.e. (a) operational or process level; and (b) results level progress reporting. Operational level reporting will be carried out through monthly, quarterly, and annual progress reporting.

Reporting on the results will be carried out according to the project logical framework and following RBM principles. In the inception phase of the project implementation, elaborating on the monitoring mechanism will also be addressed. In the reporting on the results, the project will establish baseline database and through structured and systematic manner will collect and compile information to report.

18. Monitoring and evaluation, including performance indicators

The logical framework (**Appendix 1**) outlines the monitoring framework. The PMC will be responsible for the overall monitoring of the project implementation and progress related to the work plan and this logical framework. During the first PMC meeting, when an inception report will be drafted, a detailed and refined work plan will be further developed and this broad framework will be elaborated and refined. The progress of the project will then be monitored against the key indicators and milestones laid out in the monitoring framework, at each PMC meeting. A participatory process will be adopted with all project stakeholders in elaborating and actualizing this M&E plan. Approaches to capture any positive spillover effects on domestic public health and improved farmer/village level practices, with respect to other crops for domestic and local consumption, will be identified.

It is hypothesised that the PGS (and Plantwise) approach will help to facilitate engagement between information generators (market) and adopters (farmers), this will improve understanding and adoption of key practices to ensure food safety within the supply chain. To test this a counterfactual analysis will be undertaken. Two groups will be selected: those who have access to the code of practice and support through the PGS approach; and those who have access to the code of practice only (without access to plant clinics or support through PGS). As part of M&E framework, data will be collected from these two groups. The team will also seek alternative funding to undertake a more detailed analysis of the two groups, to acquire deeper understanding of the socio-economic behaviours that will influence out-scaling of the code of practice.

Following the elaboration of the M&E plan, tools and methods of data collection, processing, analysing, and interpreting will be detailed out. Tools such as questionnaires and structured surveys will be used in collecting data. To optimise the reach data will be captured via face to face and online survey methods. Baseline data will be established for the performance indicators, which

have been defined in the project logical framework and benchmarking will be carried out to see the changes caused by the project at different results levels.

The project aims to pilot the PGS approach and will therefore limit its engagement to two processing companies in Vietnam and Cambodia and one in Laos. Depending on the scale of the businesses selected, one to four farmer groups, each with at least 20 farmers, will be selected, along with stakeholders that serve the middle (input suppliers and collectors/traders).

The code of practice will aim to reach all peppercorn farmers in the three countries. The initial cohort will aim to include at least 10% of the peppercorn farmers. Following refinement, it is envisaged that by the end of year three, at least 70% of farmers will be aware of the code of practice and at least 50% are partially following recommendations, 20% fully compliant. A final and external evaluation will be conducted at the end of the project by an idependent evaluator selected by CABI. The estimated cost of the final evaluation is included in the project budget as outlined in the STDF Guidance Note for Applicants.

An expert will be contracted for the project to carry out these basic monitoring tasks. This person will collect, comply, update, and administer the project database and duly report to the project management.

The project evaluation will be carried out according to both STDF and CABI evaluation procedures and guidelines with at least one mid-term evaluation and a project completion final evaluation. In addition, a 6 monthly self-evaluation will be carried out in order to report the project progress to the STDF Secretariat (every 6 months). CABI and STDF will consider close coordination in implementing the different project evaluations.

19. Dissemination of the projects results

During the project implementation, the project website will publish key information and progress. The project results will be disseminated to broad range of stakeholders through the organisation of annual meetings (activity 1.6) and an electronic resource of all information (activity 1.4). The project will also provide for regular updating and knowledge sharing between participants in the peppercorn value chains in the 3 countries through knowledge sharing workshops (Activity 1.5) publishing proceedings and the awareness creation.

Success stories will be documented (activity 3.1) on an on-going basis and shared with all stakeholders. At the end of the project the results and lessons learnt will be widely disseminated to a broad range of stakeholders, including peppercorn industry, donors, etc through the organisation of a seminar (Activity 3.3) and the production a short documentary (the script will be developed in consultation with STDF communication expert).

ATTACHMENTS

Appendix 1: Logical framework

Appendix 2: Work Plan

Appendix 3: Project Budget

Appendix 4: Letters of support from organizations that support the project request

Appendix 5a: Letter from WASI requesting to manage the project

Appendix 5b: Written consent from CABI agreeing to implement the project

Appendix 5c: List of SPS/food safety related projects managed by CABI

Appendix 6: Terms of Reference for key staff involved in project implementation

APPENDIX 1: Logical Framework

APPENDIX 1: Logical Framework[11]

	Project description	Measurable indicators / targets	Sources of verification	Assumptions and risks
Goal	Develop an effective approach to drive increased competitiveness & sustainability of the regional peppercorn industry in terms of consistent supply of high quality safe peppercorn from smallholder driven value-chain, resulting in increased sales to premium markets.	Increased value per KMT of peppercorn produced by the groups targeted by the STDF project. Demonstrable roll-out strategy for the model.	VPA, grower/processor group records & buyer data relating to targeted groups. Documented roll-out strategy	Small-scale growers, processors and export companies committed to effectively implementing quality systems. Government continues to recognise and support agriculture as the driver of the rural economy. Climatic conditions remain stable and conducive for pepper production. Long-term upward trends in global market demand and value/kg are maintained.
Immediate objective (purpose)	Increased financial returns, yields, quality/safety and market access for smallholder pepper growers and grower groups. Improved compliance with international phytosanitary standards for production and export of regional peppercorn to EU and American markets.	Within 3 years, at least 50% of the groups targeted by the STDF project record: • At least a 45% reduction in detection of microbial contaminants and excess pesticide MRLs • Rejection percentages / values due to SPS compliance reduced by 10%.	VPA, grower/processor group records & buyer data relating to targeted groups. Grower/processor groups will collect data as part of management systems.	Small-scale growers, and export companies effectively implement improved quality systems. Climatic conditions remain stable and conducive for cocoa production.
Expected results (outputs)	**Output 1:** Farm-village level pepper producer, collector and input provider code of practice based on existing national good practice standards and harmonized regionally			
Activities	1.1 Prepare appropriate code of practice	Generic code of practice for village level activities (farmer, collector, & input provider) prepared and draft available by **Q2**	Copies of the code of practice and supporting documents available. Record of revisions and modifications to the code of practice based on stakeholder feedback.	Relevant documents of existing standards/guides made available to the TA team. There are no delays in deployment of the consultant.
	1.2 Tailor code of practice to meet local conditions, requirements and	Code of practice for village level activities (farmer, collector, & input provider) tailored	Copies of each national code of practice and supporting documents available in the local	Relevant documents of existing standards/guides made available to the TA team.

[11] See the CIDT Handbook on Project Identification, Formulation and Design, available on the STDF website, for guidance on the preparation of logical frameworks.

	Project description	Measurable indicators / targets	Sources of verification	Assumptions and risks
	cultural norms	to national needs and draft version completed in each of the 3 countries, by **Q4** Implementation guide and guidelines for developing compliance criteria and inspection & monitoring instruments completed for each of the 3 countries by **Q4**	language and English versions available electronically. Record of revisions and modifications to the code of practice based on stakeholder feedback.	There are no delays in deployment of the consultant. National country teams committed and available to develop support material and guides Support is provided without any unwanted bureaucratic delays
	1.3 Develop knowledge resources	Factsheets and guides developed by **Q5**:	Factsheets local language and English versions available electronically.	Content is available and willingly shared
	1.4 Develop an electronic resource of all information /materials generated by the project with global access	Activity will be ongoing with full e- resource of English versions of the code of practice and all supporting documents/tools available in electronic format by **Q12**	E-resource available for public access	
	1.5 Knowledge sharing with peppercorn value chain participants in Cambodia, Laos and Vietnam	One (1) regional workshop held each year, with the host country rotating through the 3 project countries. Activity will be ongoing with full e- resource of English and national language versions of the industry and government guidance documents and communication tools available by **Q10** Activity will be ongoing with at least 2 real examples of implementing the code of practice identified and documented by **Q11**	Copies of each workshop agenda and proceedings available in electronic format presented in English and each of the national languages Copies of the industry and government guidance documents and communication tools available in electronic format English and national language copies of the real example story documents available in electronic format	Local partners are able to support the timely organisation and hosting of workshops Support is provided without any unwanted bureaucratic delays
	1.6 Knowledge sharing with stakeholders involved in peppercorn international trade	Quality requirements for export market workshops held in each of the project countries by **Q11** Strategy for building awareness of the code of practice with international buyers identified and documented by **Q10**	Reports from the workshops, including recommendations on how the countries can move forward Copy of the report detailing the strategy for building awareness available	Local partners are able to support the timely organisation and hosting of workshops
	Output 2 Code of Practice pilot tested and a PGS based system developed for the pepper sector.			
	2.1 Undertake	Lead firms and farmer	Letters of commitment	Smallholder farmer groups are

	Project description	Measurable indicators / targets	Sources of verification	Assumptions and risks
	market to farmer visits/dialogues and farmer to market visits/dialogue; based on shared learning strategies	groups identified and demonstrating their commitment by **Q8**: For each value chain, village level participants (growers, collectors and input suppliers) identified and profiled by **Q8**	to the pilot scheme from lead firms and farmer groups Reports on the survey for each value chain	committed to implementation of better practices Staff and farmers motivated to participate in training and to change the procedures and implement changes.
	2.2 Undertake facilitated market and grower dialogues to establish quality and supply criteria based on code of practice and establish agreements for ways of working together. Including supporting the establishment of farmer groups	Participants for the pilot scheme identified and workshop at all pilot sites completed Assessment of the feasibility of starting a PGS in each area by **Q9**	List of participants for the pilot Training reports Assessment reports	Training consultant delivers according to ToR Staff and farmers motivated to participate in training and to change the procedures and implement changes. All relevant stakeholders represent and participate at the consultative and validation sessions.
	2.3 Conduct PGS-linked training workshops	Briefing and training completed at each pilot site Agreement on the general direction and purpose of the PGS in each area by **Q9**	Workshop reports Reports from each site detailing the general direction and purpose of the PGS	Training consultant delivers according to ToR All stakeholders concerned reach consensus and agreement.
	2.4 Build capacity of advisors	Extensions staff trained and advisory centres established by **Q6**	Advisory reports	All stakeholders engaged and motivated
	2.5 Support pilot trial participants to implement the code of practice	Piloting of code of practice and PGS by selected groups & finalization of code of practice by end of **Q12** Interim modification of the code of practice based on smallholder & industry feedback from piloting in Vietnam and Cambodia by end of **Q9**	Report of the start of the pilot trial demonstrating start of the trial. Training / mentoring plans and reports Inspection reports Reports of piloting programme with analysis of challenges & solutions for implementing the code of practice Record of revisions and modifications to the code of practice based on stakeholder feedback Report on costs of implementing the code of practice	Members of smallholder farmer groups are committed to implementation of better practices Private sector partners support smallholder groups to implement better practices effectively Support is provided without any unwanted bureaucratic delays
	Output 3: Strategies for wider roll-out of the PGS based system			

	Project description	Measurable indicators / targets	Sources of verification	Assumptions and risks
	and code of conduct identified			
	3.1 Document success stories	Activity will be ongoing with at least 4 success stories identified and documented by **Q11**	Copies of the success story documents available in electronic format	
	3.2 Assessment of the suitability of the code of practice, PGS, supporting documents and training material and identify roll-out strategies	Success factors and lessons learnt from the pilot synthesized and documented for each country by **Q11** Rollout strategies identified and documented for each country by **Q11**	Assessment plan and reports of each assessment available in electronic format Copies of the synthesized reports available in electronic format Copies of the rollout strategy documents available in electronic format	
	3.3 Dissemination seminar for pepper industry stakeholders & donor representatives	Seminar held in each of the 3 countries by Q12	Report on the seminars including recommendations for moving forward	Private sector and international buyers peppercorn see the value of a code of practice for smallholder production

APPENDIX 2: Work Plan

APPENDIX 2: Work Plan[12]

Activity	Responsibility	Year 1				Year 2				Year 3			
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Output 1: Farm-village level pepper producer, collector and input provider code of practice based on existing national good practice standards and harmonized regionally													
1.1 Prepare appropriate code of practice	CABI, NWG, Expert												
1.2 Tailor code of practice to meet local conditions, requirements and cultural norms	CABI, NWG, Expert												
1.3 Develop knowledge resources	CABI, NWG												
1.4 Develop an electronic resource of all information /materials generated by the project with global access, hosted on CABI's Plantwise Knowledgebase	CABI												
1.5 Knowledge sharing with peppercorn value chain participants in Cambodia, Laos and Vietnam	CABI, NWG												
1.6 Knowledge sharing with stakeholders involved in peppercorn international trade	CABI, NWG												
Output 2 Code of Practice pilot tested and a PGS based system developed for the pepper sector.													
2.1 Undertake market to farmer visits/dialogues and farmer to market visits/dialogue; based on shared learning strategies	CABI, NWG, Experts												
2.2 Undertake facilitated market and grower dialogues to establish quality and supply criteria based on code of practice and establish agreements for ways of working together. Including supporting the establishment of farmer groups	CABI, NWG, Experts												
2.3 Conduct PGS-linked training workshops	CABI, NWG, Experts												
2.4 Build capacity of advisory services													

[12] Please shade or otherwise indicate when the activity will take place.

Activity	Responsibility	Year 1				Year 2				Year 3			
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
2.4 Support pilot trial participants to implement the code of practice	CABI, NWG, Experts												
Output 3: Strategies for wider roll-out of the PGS based system and code of conduct identified													
3.1 Document success stories	CABI, NWG												
3.2 Assessment of the suitability of the code of practice, PGS, supporting documents and training material and identify roll-out strategies	CABI, NWG												
3.3 Dissemination seminar for pepper industry stakeholders & donor representatives	CABI, NWG												

APPENDIX 3: Budget

APPENDIX 3: Budget (US$)[13]

Output/Activity	Vietnam	Cambodia	Laos	Technical experts	Project Executing Costs	Total
Output 1 Farm-village level pepper producer, collector and input provider code of practice based on existing national good practice standards and harmonized regionally						
Activity 1.1 Prepare appropriate code of practice						
Code of practice international consultant (@$600/day)				12,600		12,600
Communication expert (CABI @$450/day)					2250	2,250
DSA + accommodation for international travel				1,200		1,200
International travel				261		261
Local travel	998					998
Media company (agrimedia)	10,000					10,000
Misc. - printing, communication	1,450	300	150			1,900
National consultant (GDA, DoA, WASI)	2,500	2,000	2,000			6,500
Regional consultant (WASI) (@$140/day)	2,080					2,080
Translation and interpretation	3,750	500	250			4,500
Workshops and stakeholder consultation	2,250	1,500	750			4,500
Subtotal	***23,028***	***4,300***	***3,150***	***14,061***	***2,250***	***46,789***
Activity 1.2 Tailor code of practice to meet local conditions, requirements, and cultural norms						
Code of practice international consultant (@$600/day)				6,000		6,000
DSA + accommodation for international travel				1,500		1,500
DSA + accommodation for national travel	800	700	700			2,200
International travel	400	300	300	500		1,500
Local travel	300	300	300			900
Misc – printing, communication	300	300	300			900
Technical staff of partners	700	430	430			1,560
Translation and interpretation	500	500	500			1,500
Workshop and training	2,000	2,000	2,000			6,000
Subtotal	***5,000***	***4,530***	***4,530***	***8,000***	***0***	***22,060***
Activity 1.3 Develop knowledge resources						
Technical coordinator (CABI@$150/day)					9,135	9,135
Subtotal	***0***	***0***	***0***		***9,135***	***9,135***

[13] Use the headings in the budget table above as a basis to prepare a budget table, preferably as an Excel chart.

Activity 1.4 Develop an electronic resource of all information /materials generated by the project with global access						
App development consultant				12,000		12,000
Business analyst					450	450
CoP					5700	5,700
IT development team					6750	6,750
User experience					10000	10,000
Website running costs	4,000	4,000	4,000			11,999
Website, including offline caching					8100	8,100
WYSIWIG editor					6750	6,750
Subtotal	***4,000***	***4,000***	***4,000***	***12,000***	***37,750***	***61,749***
Activity 1.5 Knowledge sharing with peppercorn value chain participants in Cambodia, Laos and Vietnam						
Code of practice international consultant (@$600/day)				4,200		4,200
DSA + accommodation for international travel				1,050		1,050
International travel				730		730
Misc - printing, communication	1,000					1,000
National consultant (GDA, DoA, WASI)	520	390	390			1,300
Regional consultant (WASI@$140/day)	900					900
Technical coordination					3,183	3,183
Translation and interpretation	1,230	820	410			2,460
Workshop and training	4,200	2,800	1,400			8,400
Subtotal	***7,850***	***4,010***	***2,200***	***5,980***	***3,183***	***23,223***
Activity 1.6 Knowledge sharing with stakeholders involved in peppercorn international trade						
Annual meeting	5,000	5,000	5,000			15,000
Code of practice international consultant (@$600/day)	0	0		4,500		4,500
DSA + accommodation for international travel	975	975	975	4,500	2925	10,350
International travel	234	232	232	4,950	2149	7,797
Local travel	1,400	100	100			1,600
Misc - printing, communication	400	400	400			1,200
National consultant (GDA, DoA, WASI)	1,213	303	303			1,819
Regional consultant (WASI@$140/day)	1,800	0				1,800
Technical coordination					11,164	11,164
Translation and interpretation	500	500	500			1,500
Workshop and training	4,000					4,000
Subtotal	***15,522***	***7,510***	***7,510***	***13,950***	***16,238***	***60,730***
Output 1 subtotal	**55,400**	**24,350**	**21,390**	**53,991**	**68,556**	**223,685**
Output 2: Code of practice piloted						
Activity 2.1 Undertake market to farmer visits/dialogues and farmer to market visits/dialogue; based on shared learning strategies.						

Value chain expert (CABI@$450/day)					4500	4,500
DSA + accommodation for international travel				1,500	1500	3,000
DSA + accommodation for national travel	200	200	200			600
International travel				1,268	1650	2,918
Local travel	200	200	200			600
Meetings and participants support	1,000	1,000	1,000			3,000
National consultant (GDA, DoA, WASI)		390	390			780
National PGS expert (@$130/day)	390					390
Regional consultant (WASI) (@$140/day)	390					390
PGS international expert (@$600/day)				9,000		9,000
Subtotal	***2,180***	***1,790***	***1,790***	***11,768***	***7,650***	***25,178***
Activity 2.2 Undertake facilitated market and grower dialogues to establish quality and supply criteria based on code of practice and establish agreements for ways of working together. Including supporting the establishment of farmer groups.						
Value chain expert (CABI@$450/day)					4500	4,500
DSA + accommodation for international travel				2,250	1500	3,750
International travel				1,268	1650	2,918
Local travel	400	400	400			1,200
National consultant (GDA, DoA, WASI)		390	390			780
National PGS expert (@$130/day)	650			9,000		9,650
Regional consultant (WASI) (@$140/day)	390					390
Subtotal	***1,440***	***790***	***790***	***12,518***	***7,650***	***23,188***
Activity 2.3 Conduct PGS-linked training workshops.						
Value chain expert (CABI@$450/day)					10500	10,500
DSA + accommodation for international travel				4,500	4500	9,000
International travel				2,536	2574	5,110
Local travel	1,000	1,000	1,000			3,000
Misc - printing, communication	2,000	1,400	600			4,000
National consultant (GDA, DoA, WASI)		1,300	1,300			2,600
National PGS expert (@$130/day)	1,300					1,300
PGS international expert (@$600/day)				13,800		13,800
Workshop and training	9,000	6,000	3,000			18,000
Subtotal	***13,300***	***9,700***	***5,900***	***20,836***	***17,574***	***67,310***
Activity 2.4 Build capacity of advisory services						
Consumables	5,076	4,230	1,692			10,998
Equipment	3,600	3,000	1,200			7,800
National consultant (GDA, DoA, WASI)	9,750	9,750	6,500			26,000

Regional consultant (WASI) (@$140/day)	7,200					7,200
Advisory services expert (CABI @$450/day)					12789	12,789
Session running costs	6,000	5,000	2,000			13,000
Technical coordination					15,225	15,225
Training course	3,000	3,000	3,000			9,000
Subtotal	***34,626***	***24,980***	***14,392***	***0***	***28,014***	***102,012***
Activity 2.5 Ongoing support to stakeholders by technical experts						
Value chain expert (CABI@$450/day)					18818.1	18,818
DSA + accommodation for international travel				1,650	5359.08	7,009
International travel				2,536	9351.3993	11,887
Local travel	1,800	1,800	1,800			5,400
National PGS expert (@$130/day)	5,200					5,200
PGS international expert (@$600/day)				18,000		18,000
Regional consultant (WASI) (@$140/day)	5,200					5,200
Technical coordination					37226.37	37,226
Technical staff of partners		5,200	5,200			10,400
Workshop and training	2,500					2,500
Subtotal	***14,700***	***7,000***	***7,000***	***22,186***	***70,755***	***121,641***
Output 2 subtotal	**66,246**	**44,260**	**29,872**	**67,308**	**131,643**	**339,329**
Output 3: Strategies wider roll-out						
Activity 3.1 Document success stories						
Communication expert (@$450/day)					3600	3,600
Document success stories	600	400	200			1,200
DSA + accommodation for international travel					600	600
International travel					952	952
National consultant (GDA, DoA, WASI)	260	173	87			520
Subtotal	***860***	***573***	***287***	***0***	***5152***	***6872***
Activity 3.2 Assessment of the suitability of the code of practice, PGS, supporting documents and training material and identify roll out						
awareness seminars/workshops	1,500	1,500	1,500			4,500
misc - printing, communication	250					250
National consultant (GDA, DoA, WASI)	1,400	933	467			2,800
Technical coordination					3,972	3,972
Translation and interpretation	-	300	300			600
Subtotal	***3,150***	***2,733***	***2,267***		***3,972***	***12,122***
Activity 3.3 Dissemination seminar for pepper industry stakeholders & donor representatives						
Communication expert (CABI@$450/day)					1350	1,350
DSA + accommodation for international travel					750	750

International travel					952	952
National consultant (GDA, DoA, WASI)	217	217	217			651
Technical coordination					6,365	6,365
Translation and interpretation	300					300
Workshop and training	500	500	500			1,500
Subtotal	***1,017***	***717***	***717***	***0***	***9,417***	***11,868***
Output 3 subtotal	***5,027***	***4,023***	***3,271***	***0***	***18,541***	***30,862***
Coordination						
Project administration	2862				11,241	14,103
External Auditor costs					5,100	5,100
Monitoring and Evaluation	5,843	5,843	5,843	0	5,843	23,371
End of project external evaluation				10,000		10,000
Subtotal	***8,705***	***5,843***	***5,843***	***10,000***	***22,184***	***52,574***
	135,378	**78,476**	**60,375**	**131,299**	**240,923**	**646,451**
Indirect costs (10%)/Implementation Fee						64,645
GRAND TOTAL						**711,096**

APPENDIX 4: Letters

MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT
VIETNAM ACADEMY OF AGRICULTURAL SCIENCE

Vietnam, 9th July, 2019

To: **STDF Secretariat**
World Trade Organization
Centre William Rappard,
Rue de Lausanne, Switzerland
Tel: +41 (0)22 739 5295
Fax: +41 (0)22 739 5750
Email: STDFSecretariat@wto.org

Subject: Support letter for project proposal

We are writing to inform you that the Vietnam Academy of Agricultural Science (VAAS) belonging to the Ministry of Agriculture and Rural development (MARD) welcomes the opportunity to partner with the STDF to implement the WTO/STDF funded project "***Safer spices: Securing market access through improved food safety and connectivity within the spice value chain focusing on peppercorn in Vietnam, Lao PDR and Cambodia***".

This project will contribute to the development agenda, detailed in the Vietnam Sustainable Development Strategy for 2011 to 2020, by supporting development of quality agricultural products for the local and domestic markets and will address the management of food hygiene and safety issues so as to protect consumers' health and interests.

Building capacity of small farmers to produce safe and high quality peppercorn will not only make the agribusiness sector more competitive, but also enhance the living standards of the rural farmer community. Strengthening government mechanisms that support the farmer community will ensure that skill levels are continuously upgraded after the end of the project. With our experience of working with the rural farmer community and the excellent links we have established over the years with all stakeholders, coupled with our technical expertise, we are confident of our ability to successfully implement the regional capacity building project.

We are therefore pleased to inform you that we will extend the fullest support and endorsement to the project as it will provide an immense contribution to the Vietnamese peppercorn sector development.

Thank you very much for your consideration and approval

Yours sincerely,

DEPUTY DIRECTOR GENERAL

VIỆN KHOA HỌC NÔNG NGHIỆP VIỆT NAM

Prof. Dr. Pham Van Toan
VAAS-MARD
Thanh Tri district, Ha Noi city, Vietnam
Tel: +84 (0) 24 38615487; Fax: +84 (0) 24 38613917; Website: http//www.vaas.org.vn

VIETNAM ACADEMY OF AGRICULTURAL SCIENCE

WESTERN HIGHLANDS AGRICULTURE & FORESTRY SCIENCE INSTITUTE

Vietnam, 9th July, 2019

To: STDF Secretariat

World Trade Organization

Centre William Rappard,

Rue de Lausanne, Switzerland

Tel: +41 (0)22 739 5295

Fax: +41 (0)22 739 5750

Email: STDFSecretariat@wto.org

Subject: Support letter for project proposal

This is to inform that WASI will support the WTO/STDF funded project "***Safer spices: Securing market access through improved food safety and connectivity within the spice value chain focusing on peppercorn in Vietnam, Lao PDR and Cambodia***", which will be jointly implemented in collaboration with National partners in Cambodia and Lao.

WASI is interested to participate in this project because we want to: Be the key organization responsible for the peppercorn R&D and value chain in Vietnam and voice of the Vietnam government; Support corporate agribusiness to take a larger role in the value chain, especially for high-value commodities with strong export potential such as peppercorn; Create opportunities for rural transformation in the region, through improving the productivity, profitability and environmental sustainability of small farmers; Improving capacity and participation of smallholder farmers and agribusinesses in the value chain; Strengthen the policy and institutional framework for transformation into the identified agricultural systems – making recommendations for practical national and international policy action and investment plan, facilitating peppercorn industry opportunities; Improve value chains and integration between farmers, suppliers, processors, traders and high-value consumer markets, with food quality standards, traceability systems and market information.

On behalf of WASI, I am happy to inform you that WASI will coordinate the project in Vietnam. We also acknowledge our commitment to the roles and responsibilities detailed in the project proposal.

Thank you very much for your consideration and approval

Yours sincerely,

Deputy Director

VIỆN KHOA HỌC KỸ THUẬT NÔNG, LÂM NGHIỆP TÂY NGUYÊN

Dr. Phan Viet Ha

WASI

No 53, Nguyen Luong Bang street, Buon Ma Thuot city, Vietnam

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VIETNAM ACADEMY OF AGRICULTURAL SCIENCE

WESTERN HIGHLANDS AGRICULTURE & FORESTRY SCIENCE INSTITUTE

Vietnam, 9th July, 2019

To: **STDF Secretariat**
World Trade Organization
Centre William Rappard,
Rue de Lausanne, Switzerland
Tel: +41 (0)22 739 5295
Fax: +41 (0)22 739 5750
Email: STDFSecretariat@wto.org

Subject: Letter from WASI requesting CABI manage the project

We appreciate the assistance and guidance given by WTO/STDF in supporting the design of a successful project, namely the "***Safer spices: Securing market access through improved food safety and connectivity within the spice value chain focusing on peppercorn in Vietnam, Lao PDR and Cambodia***". This project is important as there is an urgent need to address the issues of quality, productivity and sanitary standards of peppercorn.

In light of the regional nature of the project, Western Highlands Agriculture & Forestry Science Institute (WASI) would like to propose to WTO/STDF to have the Center for Agriculture and Biosciences (CAB) International as the executing partner of this project during the implementation stage. We are of the opinion that CAB International's expertise at various production and value chain levels in the peppercorn sector will support both the timely execution of project activities and efficient use of resources resulting in successful project implementation.

Thank you very much for your consideration and approval

Yours sincerely,

Deputy Director

VIỆN KHOA HỌC KỸ THUẬT NÔNG, LÂM NGHIỆP CÁC TÂY NGUYÊN

Dr. Phan Viet Ha

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Lao People's Democratic Republic
Peace Independence Democracy Unity Prosperity

Ministry of agriculture and Forestry
Department of Agriculture

No. 1516 /DOA
Vientiane, date: 15 JUL 2019

Mrs. Roshan Khan
Economic Affairs Officer
Standards and Trade Development Facility
World Trade Organization
Tel: +41 22 739 6153

Subject: Lao PDR's supporting letter for WTO/STDF funded project "Safer spices: Securing market access through improved food safety and connectivity within the spice value chain focusing on peppercorn in Vietnam, Lao PDR and Cambodia"

Dear. Mrs Roshan Khan

This is to inform that Department of Agriculture (DOA) will support the WTO/STDF funded project "Safer spices: Securing market access through improved food safety and connectivity within the spice value chain focusing on peppercorn in Vietnam, Lao PDR and Cambodia", which will be jointly implemented in collaboration with National partners in Cambodia and Vietnam.

The project will address current quality and safety issues faced by the peppercorn sector, by improving quality at the production and primary processing stages of the value chain to meet international quality and safety standards. The project will also improve coordination and cooperation among the private sector and government institutions responsible for developing, implementing, inspecting and certifying SPS standards to facilitate international trade.

DOA is interested in this project because they want to:

- Support production of quality peppercorn by Lao farmers
- Promote increase in national export of peppercorn

On behalf of DOA, I am happy to inform you that DOA will coordinate the project in Laos PDR. , We also acknowledge our commitment to the roles and responsibilities detailed in the project proposal.

Lastly, in order to facilitate the communication, I would be appreciated if you could consider our designated contact person, Mr Souliya Souvandouane, Deputy Director of Regulatory Division, email address: souliya_ss@yahoo.com

Sincerely yours

Vilaysouk Khenavong
Director General

Department of Agriculture, Ministry of Agriculture and Forestry, Lane Xang Avenue, Patuxay Square, P.O. BOX 811, Vientiane Lao PDR.Tel: (856 21) 412350, Fax: (856 21) 412349;

APPENDIX 5: CABI

Appendix 5B – Letter commitment from CABI

Date: 16th May, 2019

The Secretariat
STDF
World Trade Organization
Center William Rappard
Rue de Lausanne 154
CH-1211-Geneva
Switzerland

Dear Sir/madam,

Re: Letter of commitment to implement STDF project "Safer spices: Securing market access through improved food safety and connectivity within the spice value chain focussing on peppercorn in Vietnam, Lao PDR and Cambodia".

CAB International (CABI) is an inter-governmental, not-for-profit organization established under an international treaty registered with the United Nations. It has a long history of supporting agriculture development with a mission to improve people's lives worldwide by providing information and applying scientific expertise to solve problems in agriculture and the environment. Its staff have a range of technical skills in value chains including facilitating market access, value chain analysis, SPS measures, ICM/IPM, extension, socio-economics, knowledge management and facilitating the adoption of GAP. CABI has been working closely with a number of national agencies in Vietnam (e.g. Western Highlands Agriculture and Forestry Science Institute, Vietnam Academy of Agriculture Sciences, Plant Protection Department and Vietnam Pepper Association) to help peppercorn farmers improve plant health and has recently undertaken a value chain analysis to identify other opportunities for improving access to knowledge. In the past, CABI has also being involved in a number of STD- funded projects in the Region.

We welcome the choice to include CABI as the executing partner in the proposed STDF project "Safer spices: Securing market access through improved food safety and connectivity within the spice value chain focussing on peppercorn in Vietnam, Lao PDR and Cambodia". This project is aligned with one of CABI's key theme i.e. on Trade and Commodities, which addresses the trade-related issues of quality, productivity and international sanitary standards of commodities including peppercorn. We look forward to working with the countries in making this project a success.

Yours sincerely,

Dr. A. Sivapragasam
Regional Director, CABI South-East Asia
43400, Serdang, Selangor MALAYSIA

CABI is a not for profit organization

CABI improves people's lives worldwide by providing information and applying scientific expertise to solve problems in agriculture and the environment.

CABI, the trading name of CAB International, is an international organization recognized by the UK Government under Statutory Instrument 1982 No. 1071

CABI
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E: cabisea@cabi.org

Appendix 5C – Food safety projects managed/implemented by CABI

CAB International

Title: **Investigating heavy metals in cocoa**
Period: 2008-2011
Countries: Peru and Venezuela
Donor: European Cocoa Industry

Heavy metal contamination in foodstuffs are of great concern to human health. Although humans can be exposed to heavy metals by inhaling particles in the atmosphere, the majority of heavy metals that occur in the body are consumed though contaminated food. The European Commission is responsible for setting maximum limits for contaminants in foodstuffs to protect consumers in Europe. They wish to implement new legislation to impose more stringent limits on heavy metals in foodstuffs. The heavy metal cadmium has been found to be present in some chocolate and cocoa products. Heavy metals originate from both natural and man-made sources including: the formation of soil, the weathering of rock and volcanic activity, and industrial processes, mining, smelting, combustion of fossil fuels and the application of agricultural amendments. Anthropogenic activities have increased over recent decades and there is a tendency for the heavy metals produced to be more soluble in water and therefore easy for plants to take-up. The European cocoa industry and ICCO wished to understand more about heavy metal contamination in cocoa so that informed decisions on maximum limits could be set. CABI reviewed and evaluated all of the available information on levels of heavy metals in cocoa, particularly cadmium, lead and aluminium and identified properties of soil which could influence the availability and uptake of heavy metals by plants. Samples of soil and cocoa beans were collected from the most important cocoa growing regions in both Peru and Venezuela. These were analysed for the presence of aluminium, arsenic, cadmium, copper, iron, lead and zinc. Other soil properties which can affect the ability of plants to take-up heavy metals were also investigated. The results indicated that in general, analysed cocoa beans from both Peru and Venezuela contained low levels of cadmium but some samples did contain high levels. Levels of lead in cocoa from both countries were also very low. pH of the soil was an important factor which affected the ability of plants to take-up heavy metals. The comprehensive report produced, highlighted the complex nature of heavy metal uptake in cocoa and the need for further research. Further studies are now ongoing in cocoa origins and in Europe.

Title: **Supply chain improvement of selected agriculture and livestock products: Capacity building leading to certification**

Period: 2012-2014

Country: Pakistan

Donor: Government of Punjab, Pakistan

The close proximity of import markets in the Middle East, Iran and Afghanistan, and market access to Malaysia, offers enormous potential for the export of agricultural and livestock products from Pakistan. The exports of agricultural and livestock products from Pakistan are much less than the actual potential and are confined to conventional wholesale markets. This primarily is attributed to technical barriers to trade like food safety, traceability, etc. Recognizing this, the Government of the Punjab launched a project entitled "Supply Chains Improvement of Selected Agriculture & Livestock Products" to support and facilitate the development of supply chains that conform to international requirements for food safety and traceability leading ultimately to increased exports of agricultural and livestock products from the country. CABItrained and supported the selected beneficiaries to achieve International certifications. The project targeted over 200 beneficiaries for certifications. CABI conducted global GAP trainings and certification for rice, potato and citrus.

Title: **Capacity Building in risk assessment, official controls and reinforcement of inspection service in East Africa**.
Countries: Uganda, Kenya and Tanzania
Period: 2017-2018
Donor: DAI Global LLC contracted by USAID to operate the East Africa Trade and Investment Hub (see www.eatradehub.org/)

The assignment was in response to a call for consultancy services to organize and deliver seven regional (East African Community) training courses on risk analysis and official controls in the SPS areas of plant health, animal health and food safety. Comprehensive training on SPS risk assessment and risk communication (plant health, animal health, food safety), organisation and implementation of official SPS controls in EAC (plant health, animal health, food safety), with associated manuals. Forty inspectors were trained on inspection (ISO17020) in order to comply with national and international standards, Manuals on inspection procedures (with in-build mechanisms of review) for most traded commodities were also developed. .

Title: **Breaking barriers, facilitating trade**
Countries: Egypt, Kenya, Malawi, Sudan, Uganda, Zambia, Zimbabwe
Period: 2015-2018
Donor: Standards and Trade Development Facility (STDF)
The Breaking barriers, facilitating trade project sort to increase trade in agri-food products within the COMESA region and to improve food security and foster economic development. The project reviewed the implementation of SPS measures (including food safety) for selected commodities, such as maize, fish and beef, on given trade routes to reduce overall trading costs. This involved adopting risk based measures and reducing the administrative costs to the extent possible, while maintaining or reducing the level of risk. The project, was implemented by COMESA with technical support from CABI. Overall, the project piloted a number of SPS practices and approaches that help build capacity and foster good practices in SPS in line with the new WTO Trade Facilitation Agreement. Ultimately the project simplified the application of SPS measures; upgraded and harmonized regulatory protocols and develop the necessary institutional and human resource capacities. All of this will facilitate intra–COMESA trade and will identify good practices and innovative approaches that can be disseminated and replicated elsewhere in COMESA.

Title: **Training courses for SPS Focal Point and Laboratory Specialist Staff**
Period: 2006 - 2007
Country: 17 COMESA member countries
Donor: Common Market for East and Southern Africa (COMESA)
A set of six training courses on SPS issues was presented to focal point staff and laboratory specialists in food safety, animal health and plant health from member countries of COMESA. Representatives of Burundi, Comoros, Democratic Republic of Congo, Djibouti, Egypt, Eritrea, Kenya, Madagascar, Malawi, Mauritius, Rwanda, Seychelles, Sudan, Swaziland, Uganda, Zambia and Zimbabwe (i.e. 17 of the 20 COMESA nations) attended at least one of the courses. The courses took the form of workshops, with formal presentations on topics relevant to SPS issues in the context of the relevant discipline alternating with informal discussions based on the presentations and group exercises. Each of the participants made a short presentation on the SPS situation in his/her country. Participants also undertook an ongoing group exercise to produce a SPS protocol and programme for the COMESA region, focusing on regulatory issues or laboratory development as appropriate.

Title: **Phytosanitary system development for the vegetable sector in Ghana**
Period: 2015 - 2019
Countries: Ghana
Donor: Netherlands Ministry of Foreign Affairs
This project aims to work with the entire supply to establish an effective SPS system. This public-private partnership builds on the existing phytosanitary system and aims to develop Ghana's technical and organizational capacity for core phytosanitary competencies related to export. To do this, CABI's team will work to strengthen the responsible government institutions so that they can provide regulations, protocols and standard operating procedures. We are also setting up phytosanitary surveillance systems for the horticultural sector, and overcoming phytosanitary problems in the vegetable sector through Good Agricultural Practices in order to regain export markets in the UK and the Netherlands. With partners, we plan to develop a new supply chain of organically certified produce (lime) from Ghana to Europe, and will do this by helping importers develop strategic alliances with producers and exporters in Ghana. Technical expertise in country (producers and exporters) is being enhanced to meet the quality standards required.

Title:**Assessing and addressing pesticide practice in cocoa producing countries to meet regulatory standards**

Period: 2006 -2011
Countries: West Africa and Indonesia
Donor: Netherlands Ministry of Agriculture in association with the European Cocoa Industry; American Cocoa Industry

Pests and diseases, including pod rots, cocoa mirids (capsids) and pod borer, are major pest constraints for cocoa production- reducing yields and quality. As a result, producers can use chemical pesticides but these can be costly and there is increasing public concern over pesticide contamination of foodstuffs as well as increasingly stringent regulations being imposed by cocoa importing countries. CABI therefore worked with producers in West Africa as well as importing industries to assess the supply and use of pesticides throughout the in- country supply chain in order to make improvements. The aim of the study was to provide essential baseline data on the supply and use of pesticides in cocoa to inform and enable policymakers in both producer and consumer countries to set realistic recommendations and regulations. Through this work, pesticide usage through the supply chain was determined as was the origin of the pesticides being supplied, why they were needed and how they were used. Health and safety implications were also assessed. In some instances, products were officially registered and marketed legitimately, but were not intended for use on cocoa. In other cases, products had not been registered by the national authorities. Based on this study, measures were introduced to raise in-country awareness of areas of risk presented by chemical use, to modify or eliminate the use of certain products and to provide information and training to improve many aspects of pesticide practice as a component of good agricultural practice (GAP). Recommendations were provided for effective and affordable alternatives available to all supply chain stakeholders. Importantly, national authorities and members of the cocoa trade community were more empowered to effectively negotiate with national and international regulatory authorities to ensure compliance. A further project "To Mitigate the harmful effects of pesticide residues in order to maintain market access' was undertaken in West Africa. This was ed by the International Cocoa Organization (ICCO) in partnership with the NARS, Crop Life, EDES/COLEACP, UNIDO and funded by the Standards and Trade Development Facility (STDF).
In addition, a similar CABI led project was conducted in Indonesia, funded by the American Cocoa Industry. As in West Africa, pesticide use through the cocoa supply chain was investigated (2011) This project formed the basis for a regional project in Malaysia, Indonesia and PNG (led by CABI) and funded by the STDF and partners (see below)

Title:'**CocoaSafe' Capacity Building and Knowledge Sharing in SPS in Cocoa in South East Asia**
Period: 2013-2016
Countries: Malaysia, Indonesia and PNG
Donor: STDF and co-funding form partners

Complementing the African SPS project, a similar initiative was launched in South East Asia and the Pacific in 2013. 'CocoaSafe' Capacity Building and Knowledge Sharing in SPS in Cocoa in South East Asia and the Pacific. This was led by CABI in partnership with in-country cocoa organizations in Indonesia, Malaysia and Papua New Guinea plus ICCO, Crop Life Asia, Mars. The project was funded by STDF with co-financing being provided by partners. The main objective of the project was to improve the safety and quality of cocoa by strengthening SPS capacity along in-country supply chains and to reduce harmful residues and contaminants through implementation of best practices. A training syllabus was developed and adapted to each country's needs. The scope of the training syllabus was expanded to include all aspects of cocoa agronomy, processing and storage to provide a comprehensive country-based cocoa manual that could be adopted for all subsequent cocoa training programmes and ensure awareness is raised on food safety issues including reducing contamination caused by pesticide residues, heavy metals, polycyclic aromatic hydrocarbons and mycotoxins. A Training of Trainers approach was employed to train Master Facilitators who, in turn, trained staff from extension services and lead farmers groups, post-harvest processors and input suppliers. These facilitators were then able to pass this knowledge to their peers along the supply chain. Other awareness-raising materials such as best practice posters and videos were also produced in local languages by the country partners to make it easier for farmers and processors to understand the information provided. The training syllabus was adopted by the project partners and is being scaled up across the countries. In addition to the activities in the individual countries, a project website was established where all of the training materials and resources can be accessed (www.cocoasafe.org)

which is linked to the ICCO Cocoa SPS Africa website. Indonesia and Malaysia have developed their own webpages on their institution websites in local language which will allow the information to be accessed by a wider audience and improve sustainability going forward.

Title: **Value Chain Technical Assistance Team (VCTAT) for Establishment of Model Farms Linked with Improved Supply Chain & Value Addition**

Period: 2018-2021

Country: Pakistan

Donor: Government of Punjab

The project intends to provide technical assistance (TA) relating to value chains (VC) and market access, to a much larger agricultural development project of the Government of Punjab, Pakistan, "Establishment of Model Farms Linked with Improved Supply Chain and Value Addition" (2018-2021). This 'Model Farms' project intends to work on 250,000 acres of agricultural land in Punjab and aims to increase exports of citrus, mango, potato and other vegetables from Punjab to high-end markets by 30% by 2021. The TA isfocusing on value chain analysis followed by capacity building with farmers (GAP, IPM), and suppliers/processors/exporters (SPS, certification), as well as wider outreach

Title: **Feasibility Study on Cluster Development Based Agriculture Transformation Plan-V2025**

Period: 2018

Country: Pakistan

Donor: Planning Commission of Pakistan

The project provided consultancy services to conduct a feasibility study covering all major agriculture commodities, not exceeding 33, and having significant potential in production and international trade. A detailed analysis of the whole value chain for each commodity including production, processing, logistics, storage, trade, etc. will be conducted. The supporting services, such as financing, research, information delivery mechanisms, and government support in terms of subsidies (or taxes), etc. will be analysed to see how these help or hinder production, processing, or trade activities. Social networking among stakeholders, if any and the possibilities of transforming existing networking into clusters are alsoanalysed.

Objective of the study wasto conduct specific analyses of value chain mapping for a large number of agriculture, horticulture, livestock, fisheries and floriculture commodities by nine eco-regions of Pakistan, the type of investment required to overcome value chain constraints, how such investment can be incentivized, and how the synergies of stakeholders can be strengthened so that cluster commodities can be transformed into specific products to enable them to compete internationally.

Title: **Phytosanitary Risk Management Program (PRMP)**

Period: 2014 –2019

Country: Pakistan

Donor: USDA

This USDA-funded project seeks to reduce the damage to crops incurred as a result of insect infestations, and to strengthen post-harvest phytosanitary compliance. Biological controls were developed to counter the pests and result in a greater volume of crops of a higher market value being achieved. This project aims to strengthen the capacity of national systems to implement biocontrol programmes for papaya mealy bug and codling moth. Training was also imparted in post-harvest pest management in rice and horticultural crops, where this has been successfully implemented. An extensive programme of training of trainers programme has been implemented to enable the new practices to become embedded in the agricultural systems in Pakistan. The project was initially for 3.5 years, operating in Sindh, Punjab and Baluchistan; a subsequent amendment extended the project for a further 2 years and extended its scope to include activities in Gilgit-Baltistan, as well as work on control of aflatoxins in chili and maize.

Title: **Partnership to deliver International Online SPS training in Pakistan**

Period: 2012-2017

Country: Pakistan

Donor: USDA

The project aimedto facilitate capacity building efforts in Pakistan's animal and plant health regulatory systems, including sanitary and phytosanitary (SPS) issues; to increase the SPS capacity of Pakistan's regulatory and scientific officials; and to support national agricultural production and trade objectives

Title: **Go to Market (G2M)**

Period: Jan -Dec 2015

Country: Pakistan

Donor: CABI Development Fund (CDF)

G2M was developed by CABI CWA for diagnosis and assessment as part of a comprehensive training program for farmers, harvesters, packers, exporters, and retailers. The supply chain partners answered a series of related and inter-connected questions on the web version of the tool kit. The interactive tool kit determines the level of compliance of general food quality and safety requirements of food buyers and determines training needs for supply chain actors. G2M aims to enable local food suppliers (farmers, packers, exporters) and related agencies (NPPOs and trade associations) to understand the requirements and standards of international markets so as to improve access to these markets for their products. The user, from any point in the supply chain, needs to register to use the diagnostic tool kit, which is designed to assess each point in the supply chain independent of other points. Largely, the supply chain operations have been segregated into three areas: Production, Harvest Handling, and Postharvest Handling Including Storage.

Successful commercial testing of G2M was conducted by CABI with a research grant funded by the Australian Centre for International Agricultural Research (ACIAR).

Title: **Fruit and Vegetable Development Project, Punjab (FVDP)**

Period: 2005-2009

Country: Pakistan

Donor: Government of Punjab, Pakistan

The "Fruit and Vegetable Development Project, Punjab" aimed to increase the income of small holder farmers by enhancing production of fruits and vegetables according to WTO standards. The project provided training for agricultural extension workers and project staff in quality assurance and through farmer field schools, created awareness amongst farmers of good agricultural practices, trade implications, and international sanitary and phyto-sanitary standards applicable to the export of fruits and vegetables. The project also facilitated the formation of a network of self-sustaining farmer field schools associations. Furthermore, CABI developed curricula and training manuals for field facilitators and training of master trainers on integrated crop management and sustainable approaches for fruit and vegetable production in the Punjab.

Title: **Project for Horticultural Promotion**

Period: 1996

Country: Pakistan

Donor: Swiss Development Cooperation/Inter Cooperation (SDC/IC).

The project involved two components: research including piloting new methodology, and horticulture promotion. CABI provided the research expertise in integrated crop management and piloted new extension methodologies such as participatory technology development and FFS. CABI staff also led the horticulture promotion component covering certified inputs production/provision, crop diversification, social organisation, enhanced productivity and improved marketing.

Title: **Integrated Crop Management in High Value Crops, Afghanistan**

Period: 2007-2010

Country: Afghanistan

Donor: Aga Khan Foundation and Government of Belgium

The project aimed to promote integrated crop management (ICM) in high value crops. The goal of the project was to improve the livelihoods in the target areas through enhanced agricultural

productivity among three main target groups: landowners, landless people/smallholders, and women. The project builthuman capacity amongst agricultural professionals for the implementation and mainstreaming of ICM, expanded knowledge of ICM across the target population, enabling the adoption of locally verified economically and ecologically sound agricultural technology and practices. The project trained trainers from the Provincial Ministry of Agriculture, other NGOs and project staff and two training and research units have been established. The first developed ICM curricula covered grapes, apple, peach and pomegranate. Curricula for other perennial and annual horticulture crops were also prepared.

Title: **Australia-Africa plant biosecurity partnership**
Period: 2015 – 2018
Countries: Burundi, Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Uganda, Tanzania, Zambia,
Zimbabwe
Donor: Standards and Trade Development Facility (STDF) and The Common Market for Eastern andSouthern Africa (COMESA)

The Australia-Africa Plant Biosecurity Partnership was a plant biosecurity capacity development programme that used Australian expertise to strengthen biosecurity skills and planning in Africa. It supported increased production, market access for African farmers and improved food security. This AUS$1.6 million programme focused on strengthening plant biosecurity skills in Africa. The initiative aimed to facilitate trade, including intra-regional trade, by strengthening countries' capacity to address plant pest and disease problems that hinder agricultural exports and threaten food security. The project also worked with 45 biosecurity fellows 'change champions' in their countries and helped improve national and regional plant biosecurity. The programme involved training, mentoring and placements in relevant Australian agencies, and through regional organizations such as COMESA, IAPSC – the Regional Plant Protection Organization and FAO in order to foster links between related initiatives.

Title: **Nipping pests in the bud – supporting Ugandan floriculture**
Period: 2012 - 2015
Country: Uganda
Donor: Standards and Trade, Development Facility (STDF)

Uganda has received interceptions of its cut flower exports to the EU despite having carried out inspections and issuing phytosanitary certificates. The Department of Crop Protection (DCP), the National Plant Protection Organization of Uganda requested STDF for assistance to develop its technical and organizational capacity for core phytosanitary competencies related to export; and also establish an institutional arrangement enabling private sector to achieve compliance with international phytosanitary standards. Project Objectives were to develop the technical and organizational capacities of DCP and institutional arrangements in the export floriculture to comply adequately with international phytosanitary standards for production and export of flowers for the European Market. CABI managed the project.

Title: **African Centre of Phytosanitary Excellence**
Period: 2008 - 2010
Countries: Kenya, Uganda, Tanzania
Donor: Standards and Trade Development Fund (STDF)

The project's mandate was to establish a centre of phytosanitary excellence involving plant protection organizations, the private sector, government agencies and international bodies with an interest in plant health and international trade. These stakeholders designed and endorsed an institutional and management framework for running the centre, and developed a business plan including the sustainable provision of its services and activities such as setting up the legal and institutional framework for a Phytosanitary Centre of Excellence, setting up a training unit to develop training opportunities in phytosanitary policy and practice, appropriate to the needs of the region, including the establishment of an exemplary plant inspection facility and information management system for use as demonstration and training tools; setting up a unit for applied pest risk analysis (PRA) generating PRAs according to relevant international standards and to establish a network of African pest risk analysts and promoting the Centre, and the services

APPENDIX 6: Terms of Reference

International Code of Practice Expert

Terms of Reference

- Review past and present initiatives (GAP, GHP, etc) to promote good practices at the village level and identify bottlenecks to adoption
- Review existing relevant standards and codes of practice (such as National GAP codes, internationally recognizes codes for peppercorn or spices)
- Prepare a generic code of practice for village level control based on existing standards and relevant for the control of SPS/food safety, product quality and good farm management practices
- Support localization of the code of practice for the three project countries
- Assist in the development of support material such as practical implementation guides, guidelines for developing compliance criteria, communication tools,
- Work closely with the National Steering Committee and the National Project Coordinator in implementing the project activities

Duration of the Assignment:15 days

Qualifications

- Relevant university degree (post graduate qualifications in the relevant field would be an added advantage)
- Proven experience in developing quality standards for the fruit and vegetable export sector (preferably spice sector); specific experience in the three target countries would be an advantage
- Sound knowledge on international SPS requirements in relation to peppercorn
- Over ten years experience in conducting similar capacity building programs in developing countries
- Good communication skills and fluency in English
- Experience in working with different stakeholders

International PGS Expert

Terms of Reference

- Participate in farmer visits/dialogues and farmer to market visits/dialogue
- Participate in facilitated market and grower dialogues to establish quality criteria based on the code of practice
- Support the identification and establishment of agreements for ways village level participants work together
- Design, organize and conduct PGS-linked training workshops
- Provide ongoing support to CABI, national working groups and farmers on the implementation of PGS
- Prepare information kits to support CABI and national working groups in implementing PGS

Duration of the Assignment:15 days

Qualifications

- Relevant university degree (post graduate qualifications in the relevant field would be an added advantage)
- Hands on experience in working in the agriculture sector in the target countries (preferably spice sector)

Laos National Director (co-financed)	**NEA:** Project

- Proven experience designing and implementing PGS; specific PGS experience in the target countries would be an advantage
- Over ten year's experience in conducting similar capacity building programs in developing countries
- Good communication skills and fluency in English
- Experience in working with different stakeholders