# NEPAL SPS ASSESSMENT

## ROADMAP TO ADOPTING A MODERN SPS SYSTEM

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Food Safety Network AID-BFS-T-16-00001

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## List of Acronyms

| | |
|---|---|
| ADS | Agricultural Development Strategy |
| AH | Animal Health |
| AQ | Anthraquinone |
| ARS | USDA Agricultural Research Service |
| DFTQC | Department of Food Technology and Quality Control |
| DOA | Department of Agriculture |
| EU | European Union |
| FAO | Food and Agriculture Organization |
| FAS | USDA Foreign Agricultural Service |
| FDA | U.S. Food and Drug Administration |
| FNCCI | Federation of Nepalese Chambers of Commerce and Industry |
| FS | Food Safety |
| FSN | Food Safety Network |
| FTQC | Food Technology and Quality Control Office |
| GAP | Good Agricultural Practices |
| GC-MS | Gas Chromatography-mass spectrometry |
| GFSS | U.S. Global Food Security Strategy |
| GLP | Good Laboratory Practice |
| GMP | Good Manufacturing Practices |
| GON | Government of Nepal |
| HACCP | Hazard Analysis Critical Control Points |
| HOPTA | Himalayan Orthodox Tea Producer Association |
| HPLC-MS | Physical separation capabilities of liquid chromatography–mass spectrometry |
| ICP-MS | Inductively coupled plasma mass spectrometry |
| ILO | International Labor Organization |
| IPM | Integrated Pest Management |
| ITC | International Trade Centre |
| KFVM | Kalimati Fruits and Vegetable Market |
| KISAN II | Knowledge-based Integrated Sustainable Agriculture and Nutrition II Program |
| MCL | Maximum Contaminant Limits |
| MOAD | The Ministry of Agricultural Development of Nepal |
| MOC | The Ministry of Commerce of Nepal |
| MOH | The Ministry of Health of Nepal |
| MRL | Maximum Residue Limits |
| NAFOL | National Forensic Science Laboratory |
| NARC | Nepal Agricultural Research Council |
| NARI | Nepal Agriculture Research Institute |
| NASAA | National Association for Sustainable Agriculture, Australia |
| NCPA | Nepal Coffee Producers' Association |
| NFCCI | Nepal Federation of Chambers of Commerce and Industry |
| NFSL | National Forensic Science Laboratory |
| NIPHM | National Institute of Plant Health Management |

| | |
|---|---|
| NTCDB | Nepal Tea and Coffee Development Board |
| PH | Plant Health |
| PPD | Plant Protection Directorate |
| PRA | Pest Risk Assessments |
| RASFF | EU Rapid Alert System for Food and Feed |
| RBPR | Rapid bioassay of pesticide residues |
| SPS | Sanitary and phytosanitary standards |
| STDF | The Standards and Trade Development Facility |
| TIFA | Trade and Investment Framework Agreements |
| USAID | United States Agency for International Development |
| USDA | U.S. Department of Agriculture |
| USG | United States Government |
| WHO | World Health Organization |
| WTO | World Trade Organization |

## EXECUTIVE SUMMARY

This report responds to a request by USAID/Nepal that USDA prepare an assessment of the sanitary and phytosanitary (SPS) issues negatively impacting agricultural trade in Nepal and provide a roadmap toward developing a sound, modern SPS system. USDA/FAS involvement in undertaking this assessment directly supports the US Government's Global Food Security Strategy (GFSS). The assessment will strengthen USG efforts to support Nepal and do so in a manner that demonstrates the value added that USDA can provide as an inter-agency partner to USAID. This report includes recommendations that cover both short-term and long-term timelines that will assist Nepal with strengthening its SPS system, thereby better enabling the country to engage in regional and international trade and to most effectively direct future investments.

SPS systems are a necessary and integral part of any agricultural development strategy[1]. As a country's agricultural sector achieves greater production efficiencies and improved physical infrastructure food yields and domestic food security will increase. SPS systems and regulations must be in place to ensure food is safe and wholesome for domestic consumption. SPS systems and regulations must also be in place to ensure that increased agricultural productivity will translate into higher farm incomes and reduced hunger in the form of local, regional, and international market access. While many SPS concepts are understood by Nepalese officials, the government has not been able to act upon these concepts to establish a viable SPS system. The effort has been further hampered by the devolution of government to the state level after the 2017 elections, bringing forward progress on SPS issues to a veritable standstill, with critical policies and regulations in limbo as the political landscape is sorted out.

Beyond the ramifications of the latest election, the assessment team found four core areas for future consideration. The recommendations in this report identify areas that need little financial support and time to areas needing greater support and time. The recommendations are also responsive to requests from the Government of Nepal (GON) in recent intergovernmental discussions such as the third U.S. – Nepal Trade Investment Framework Agreement (TIFA) meeting held in April 2017 in Kathmandu. If actions are taken to address these areas, Nepal will be well on its way to achieving a viable SPS system. The four areas of significance include:

- **Standards adoption:** The implementation of SPS standards is needed to ensure a safe domestic food supply and enable exports. Food safety, plant health, and animal health controls are built upon process-based standards such as GAPs and tolerance standards such as maximum residue levels (MRLs). In order for these standards to be implemented they must be established and adopted through a national standard setting system that conforms to international standards and can provide confidence in the safety and quality of Nepalese exports. Nepal has no process for uniformly assessing or adopting international standards. The need for SPS standards is understood; however, the GON has not yet determined how to implement standard setting requirements for a sound SPS system. Immediate work must be undertaken to help guide the GON toward the establishment of SPS standards.

- **Risk management:** There is a fundamental lack of a scientific risk-based approach to SPS management across value chains. Inspection systems and sampling are predominantly *ad hoc,* based on the convenience of sampling rather than selecting samples based upon the risk of the product. The plant quarantine activities at the airport in Kathmandu and the Indian border rely primarily on visual inspection and minimal sampling or testing. The largest wet market in Kathmandu, Kalimati market, relies on a limited rapid bioassay of

[1] See Annex I: Sanitary and Phytosanitary Capacity Building for greater detail.

pesticide residues (RBPR) that does little to assure the actual safety of produce. Registration of pesticides does not evaluate for local-use risks, but simply rubber stamps India's processes. Nepal must implement risk-based systems and principles in order to more efficiently direct inspection resources and to utilize risk-assessment techniques in regulatory decisions to improve public health while facilitating trade.

- **Analytical services:** There is a disconnect between laboratory capabilities, demand for analytical testing, and services available. While laboratory capacity is underutilized, demand for laboratory export certifications and domestic monitoring tests go unfilled. So while the Department of Food Technology and Quality Control's Central Food Laboratory (DFTQC), for example, has accreditation for some tests, it is not accredited for testing of pesticides, heavy metals, or environmental contaminants needed for export certifications. Further, there is no authority in Nepal that can provide labs with the necessary accreditation/certification required to meet international standards. In the end, exporters such as Organic Village, either send their samples to Europe for analysis or export in the absence of testing certificates and hope for the best – which has resulted in cases of product delay, price reductions, or rejections. The establishment of an accrediting authority will help to solve problems around testing demand and issuance of export certificates.

- **Research to farm communication:** For SPS standards and risk management to work effectively, there must be a robust communication structure in place that will ensure all value chain actors understand standards and how to reach them. In Nepal there is little outreach to make this happen. For example, the Nepal Agriculture Research Institute (NARI) focuses on agricultural research that can help farmers produce higher yields more safely; however their findings are rarely distributed out to the farm level through extension services. A repeated refrain is that extension services need to be improved, so that farmers know where to turn for the latest production practices, pest and disease information, etc. The Nepalese government SPS experts can better inform farmers of SPS risks and how to address them by coordinating the work of subject matter experts such as the plant health experts at NARI with extension service providers and/or agricultural and veterinary service providers who can bridge information flow to/from the farmers.

While the findings in this report suggest Nepal is far from having an advanced SPS system, it is possible that the GON could establish a basic system because it understands the need for and how an SPS system works. A basic system could be established within a five year period and would be "good enough" to ensure that food destined for both domestic and export markets is safe and complies with international trade standards. Once a basic system is established, the GON can consider additional improvements that will lead them to a more advanced system.

Although much work remains and pulling the pieces together is daunting in the current uncertain political climate, Nepal can and will eventually come into its own in the international trading community. Exporting high-value, sustainably-made products requires businesses to be committed to meeting international standards and this requires a broader SPS system of clear rules; consistency of implementation; and good communication across the board.

## INTRODUCTION

Sanitary and phytosanitary (SPS) systems are a necessary and integral part of any agricultural development strategy. As a country's agricultural sector achieves greater production efficiencies and improved physical infrastructure food yields and domestic food security will increase. SPS systems and regulations must be in place to ensure food is safe and wholesome for domestic consumption. SPS systems and regulations must also be in place to ensure that increased agricultural productivity will translate into higher farm incomes and reduced hunger in the form of local, regional, and international market access. While many SPS concepts are understood by Nepalese officials, the government has not been able to act upon these concepts to establish a viable SPS system. The effort has been further hampered by the devolution of government to the state level after 2017 elections, bringing forward progress on SPS issues to a veritable standstill, with critical policies and regulations in limbo as the political landscape is sorted out. This report suggests actions that, if acted upon, could help guide the Government of Nepal (GON) toward the implementation of a basic SPS system.

## EVALUATIVE METHODOLOGY

In order to assess the current SPS environment in Nepal, USDA formed a technical team of food safety, animal and plant health experts, and capacity building practitioners from across the USG interagency. Prior to visiting Nepal in November 2017, the team reviewed published reports from previous studies and performed an in-depth literature review[2]. The team avoided duplication of past efforts to the extent possible and distilled the previous studies into the most important findings.

In Nepal, the team members participated in a series of meetings and field visits to discuss and observe regulatory processes; monitoring and inspection procedures; and food processing practices. Meetings[3] included government officials; industry association representatives; laboratory staff; farmers; and donor entities including USAID and the International Trade Centre (ITC), which is engaged in preparing a series of national strategies for targeted commodities on behalf of the GON[4]. As a result of these meetings, missing or weak areas were identified in which targeted capacity building is required to improve SPS practices.

During the meetings, the team considered current value chain strategies of USAID to strengthen the production and export of high-quality, safely-produced commodities including tea, ginger, vegetables; rice, maize and lentils to regional and international markets. While acknowledging the priority value chains, the team applied a market systems approach to defining recommendations. With these parameters in mind, the team evaluated the Nepalese SPS landscape within the context of three levels: inoperative systems that are not functioning because basic risks are not methodically controlled; basic systems where a risk approach is applied; and advanced systems that include continuing data-driven monitoring of risks. The table below summarizes the three levels along this continuum.

[2] See Annex II for a complete bibliography of literature reviewed.

[3] See Annex III for a list of people and organizations met during the assessment.

[4] See Annex IV for a breakdown of donor work in the area of SPS.

**Farm to Fork - Comparing a Value Chain with and without a Food Safety System**

| Examples of Practices and Effects of Food Safety Systems | | | |
|---|---|---|---|
| | Inoperative | Basic Systems | In an advanced system |
| Step 1: Inputs | Seeds, fertilizer, and pesticides are purchased without knowledge of the source and composition | The quality and safety of inputs are ensured through quality certification schemes | All inputs are certified by private third-party certifiers or government agents as appropriate. |
| Step 2: Growing | Uncomposted manure can be used as fertilizer, transferring pathogens onto fruits and vegetables. Excessive and unapproved pesticides are applied. | Only approved fertilizers and pesticides are applied in appropriate amounts. | Farmers are aware of which pesticides are approved by regulators in export markets, and these approvals are coordinated with domestic regulators and distributors. Production records can link inputs with specific lots of production. |
| Step 3: Harvest | Cattle may wander into the field during harvest. All products are harvested regardless of deterioration or spoilage | Farm workers are trained to avoid picking spoiled crops; cattle are prohibited from entering fields | Packing is performed in sanitary facilities. Each lot is traceable backwards to the originating farm and forward to the wholesale customer. |
| Step 4: Post-Harvest Storage and Transport | Crops may be stored without regard for humidity that can foster the growth of fungi that produce aflatoxin | Crops are storage facilities are controlled for temperature and humidity as needed. | Temperature and humidity levels are tested and the data is logged, as needed. |
| Step 5: Retailing | Wet markets may not be clean, and meat / vegetables may not be segregated, resulting in cross-contamination of pathogens onto fruits and vegetables. | Government inspectors ensure wholesale and retail establishment are sanitary. Public market infrastructure including refrigeration, clean water, ice, and restrooms are adequately funded. | Both private sector traceability systems and public health epidemiology data are used to identify foodborne illness outbreaks and trace the cause back to the source of production. |
| Step 6: Cooking and Consuming | Consumers are unaware of the need to fully cook certain foods to kill pathogens. Fruits and vegetables may be washed in unsanitary water. | Consumers have basic knowledge of food borne illnesses, sanitation and effective cooking techniques. | Public health officials, agriculture ministry staff and industry coordinate "risk communication" messages to consumers. |

## BACKGROUND

Slightly larger than the state of New York in the U.S., Nepal is a landlocked country situated between India and China, with a population of approximately 29.3 million people mostly residing in rural areas or approximately 80%[5]. Nepal relies heavily on agriculture and approximately two-thirds of its population depends on agriculture for its livelihood.[6] Nearly one-third of arable land in Nepal is dedicated to agriculture[7], producing crops such as coffee, tea, vegetables, and spices such as ginger, cardamom, turmeric, cinnamon, and pepper.

Agriculture accounted for nearly 33% of Nepal's estimated GDP, or about $7 billion in 2016[8], down slightly from 35% in 2013.[9] Nepal's international trade relies heavily on its neighboring countries, for both imports and exports. In 2016, for example, India and China accounted for over 69% and 13%, respectively, of the total dollar value of goods imported by Nepal. During the same period, Nepal exported approximately $714 million in goods worldwide. Water and water products are the largest export category for Nepal (13.6%), followed by carpets and other textile floor coverings (about 12.8%), man-made staple fibers (8.3%), and then coffee, tea, and spices (7.8%). Spices are particularly important for Nepal: the country is currently the fourth largest exporter of cardamom in the world, behind Guatemala, India, and Indonesia, exporting approximately $34 million of the commodity in 2016.[10]

Trade with India is of particular interest to the GON and Nepalese producers. The long and porous border between the two countries facilitates trade. More than 72% of Nepal's horticulture imports (edible vegetables and certain roots and tubers) and more than 75% of Nepal's imports of coffee, tea, and spices in 2016 came from India; on the other side of trading activity, India was the recipient of almost 46% of Nepal's horticulture exports and 94% of Nepal's exports of coffee, tea, and spice exports.[11]

With agriculture playing such a prominent role in its economy, production activities, and international trade, there is a growing interest in Nepal towards the production and export of safe, high quality commodities. The new Constitution of Nepal (2015) calls for the right to food and the right to access quality food as fundamental. Further, Nepal's 2015 Agricultural Development Strategy (ADS) touches on SPS and the GON is giving "top priority" to meeting the quality criteria of countries to which they export.[12] Over the past 5 years, Nepal imports have increased dramatically compared to exports (in trade volume) and this is in part because Nepalese exports have been unable to comply with the stringent requirements of food safety; SPS standards; and food safety management system certifications

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[5] Food and Agriculture Organization of the United States, http://www.fao.org/faostat/en/#country/149.

[6] The World Factbook. https://www.cia.gov/library/publications/the-world-factbook/geos/np.html

[7] DataBank, World Development Indicators. The World Bank. http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators . Over 41,000 square kilometers of land in Nepal were dedicated to agriculture according to the most recent (2014) numbers from the WorldBank.

[8] DataBank, World Development Indicators. The World Bank. http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators . The World Factbook. https://www.cia.gov/library/publications/the-world-factbook/geos/np.html

[9] DataBank, World Development Indicators. The World Bank. http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators .

[10] International Trade Centre (ITC), TradeMap. http://www.trademap.org/

[11] International Trade Centre (ITC), TradeMap. http://www.trademap.org/

[12] Consulted at: http://www.dls.gov.np/uploads/files/ADS%20Final.pdf, "Nepal Agriculture Development Strategy 2015-2035."

required by the EU and other major markets.[13]

SPS challenges for Nepali agricultural exports are apparent when examining the EU "RASFF" database of food safety alerts.[14] Imports into the EU of Nepalese food products have been found to contain *salmonella*, toxins, and unapproved food colorants. Likewise, U.S. FDA maintains "import alerts" for certain imported foods from Nepal because those foods were found to contain *salmonella*; they were mislabeled, or they contained undeclared allergens.[15]

Agricultural development and food safety also play an important role in U.S.-Nepal relations. According to the most recent 2017 U.S.-Nepal TIFA, the DFTQC within the Ministry of Agricultural Development (MoAD) identified 4 areas or "pillars" of assistance for food safety: (i) updating national food safety policy and laws; (ii) developing inspection and certification systems; (iii) establishing an accredited food laboratory; and (iv) disseminating SPS information and raising awareness. This assessment report will address three of the four pillars, specifically pillars ii-iv. Pillar (i) is not covered by this assessment since other donors have already extensively covered by other donors.[16]

## FINDINGS

Agricultural value chains have common SPS challenges that flow from production to processing all the way to consumption. In Nepal, the foundational pieces already exist, e.g. generally equipped laboratories and regulators who have a general knowledge of risk-based approaches. What is lacking in Nepal today is a clear strategy to build an integrated SPS system that is founded upon a culture of compliance. Within a culture of compliance, producers will be committed to monitoring and controlling key food safety risks through risk-based food safety systems. These systems would include recordkeeping, traceability, and continued improvement to address evolving risks. Ultimately, firms wishing to export to international markets must adopt these methods.

The key SPS challenges in Nepal can be summarized as follows: value chains do not incentivize the adoption of safe food production systems; food safety laws and regulations are outdated and there is no effective governance system in place; import inspections and SPS screening practices are not based upon science or on an evaluation of risk; testing laboratories are well equipped, but have weak competencies and offer testing services on few products on limited parameters; and inter-agency coordination is lacking at the national and provincial levels. In order to build on existing strengths to implement a sound, albeit elementary SPS system, the GON will need to address these obstacles.
The findings of this report are arranged in four key areas that are essential along the road to the basic SPS system. These are:

I. Standards Adoption;
II. Risk Management;
III. Analytical Services; and
IV. Research to Farm Communication.

These four areas are discussed in greater detail below; case studies are utilized to fully illuminate the current situation in Nepal.

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[13] Consulted at: http://www.intracen.org/export-quality-management-a-guide-for-small-and-medium-sized-exporters-second-ed/ and at: http://www.intracen.org/publication/NTM-Nepal/

[14] See here: https://webgate.ec.europa.eu/rasff-window/portal/?event=SearchForm&cleanSearch=1#

[15] https://www.accessdata.fda.gov/cms_ia/country_NP.html

[16] See the work of IFPRI, on behalf of Nepal DFTQC (MOAD): "Food Control System and Food Situation in Nepal. Assessment Report," October 2016. Consulted at: Policy Reform Initiative Project (PRIP): https://southasia.ifpri.info/the-policy-reform-initiative-program-prip/

## I. Standards Adoption

**Issue:** Standards are the sets of "rules" that must be followed by all players within a market system. These references provide guidance on how to grow, process, transport and store food safely as well as on how to sell foods to meet various markets demands. Standards can either be processed-based (Good Agricultural Practices-GAPs; Good Manufacturing Processes-GMPs; Hazard Analysis and Critical Control Points-HACCP; etc.) or tolerance-based (Maximum Residue Limits-MRLs; Maximum Contaminant Limits-MCLs; permissible limits for microorganisms; etc.). Both types of standards are aimed at reducing risks to the food supply. For example, GAPs schemes are the foundation of safe food production on farms. Under GAP schemes, farmers are trained to utilize safe practices for pesticides, animal manure, and other points of risk. The compliance with GAP schemes is monitored through record keeping and audits. In order to facilitate trade, national GAP schemes must promote practices that result in conformity to international standards, and foreign purchasers must have confidence in the implementation and monitoring. Without standards, stakeholders along a value chain have little or no ability to understand or comply with food safety practices. Thus, standards are needed to ensure the domestic food supply meets food safety parameters and are used to enable exports.

The adoption of international standards is necessary for a basic SPS system if a country in interested in agricultural trade. Codex Alimentarius Commission (CAC) is the food safety standard setting body established by Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) with the purpose of protecting the health of consumers and ensuring fair practices in food trade. The Codex Alimentarius (Latin, meaning Food Law or Code regularly referred to simply as Codex) is the result of the Commission's work: a collection of internationally adopted food standards, guidelines, codes of practice and other recommendations.[17] Unfortunately, Nepal has no process in place for uniformly adopting Codex standards, nor a process for assessing other internationally recognized standards for adoption.

**Overarching Observations:**

- No standards adoption/setting process in place; very few Codex standards or other internationally-recognized standards adopted; not participating in Codex meetings
- Lack of adoption/implementation of safety practice schemes across the value chain (GAP, GLP, GMP, HACCP, etc.)
- Frequent non-compliance with export market trade standards
- Lack of traceability system along value chains


Annapurna Organic Spices, exporters of organic Ginger and Turmeric, is a growing business, but may face challenges when exporting to markets demanding internationally recognized food safety certifications. *(Photos by Sharon Williams)*

[17] https://www.fsis.usda.gov/wps/portal/fsis/topics/international-affairs/us-codex- alimentarius/Codex+Alimentarius+Commission

**Regulatory Challenges:**

- The DFTQC has adopted very few Codex or other internationally-recognized standards (MRLs, MCLs, permissible limits for microorganisms, etc.), so there are no rules against which to regulate, providing no guidance to food producers and making enforcement of standards impossible. DFTQC officials lamented that, while they regularly attend standard setting conferences and events, they do not have a voice for standards that are set within the national Codex office or with other national authorities. A Nepal GAP is now being drafted with first three commodity-specific GAPs, but it's unclear if/how this Nepal GAP is consistent with other internationally-recognized GAP systems and how it will be promoted and implemented.
- Among numerous value chain stakeholders, the lack of standards to guide food safety production, processing, and exports was a common obstacle.

**Case Study: Enabling tea exports by testing for compliance with trade standards**

Nepalese agricultural producers must prove that they can reliably comply with foreign food safety standards in order to export to major markets. Export statistics for 2016 show that Nepal exported $714.2 million of merchandise. Of that amount, tea and spices accounted for $56 million (7.8%).[18] Tea and spices are the largest agricultural items that are produced on farms and traded internationally. As with most products, the largest export market for Nepalese tea and spices is India. Indeed, India imported $52.6 million, or 94%, of total Nepalese exports indicating Nepalese producers have not yet accessed other international markets.

Tea Industry at a Glance

Tea is a relatively high-value but fairly simple value chain – it is a mostly pick and dry product that does not require a cold chain or major processing. Even so, wholesale customers demand the strict quality and safety of products; competitive prices; and timely deliveries. Historically, the levels of trust between value-chain participants has supported local trade, but in a global system, in order for producers to meet quality and safety standards, they must prove that they are implementing science-based standards using systems like GAP and GMP; and the implementation of these systems is supported by comprehensive monitoring and record keeping.

The tea industry is quite segmented in Nepal and it includes small processors; local buyers and a few exporters. Farms are geographically distributed between the plains and the hills. Most all production from the hill areas is exported to India, but exporters receive relatively low prices due to the lack of quality. Unfortunately, small processors lack formal quality assurance and certification programs to maintain and document production quality – cumulatively these weaknesses prevent or discourage exports.

The **National Tea and Coffee Development Board** (NTCDB) acts as a policy advisory body to the GON. Established under special Act 2049 as an autonomous institution, the NTCBD **core areas of expertise** include: export promotion; advisory services; consultation and research, as well as promotion of trademarks including a brand name or logo for Nepalese tea and coffee that identifies products through a "code of conduct" for production practices (this may be akin to the notion of developing and implementing a Nepal GAPs or a national quality certification).

Government production incentives to farmers and entrepreneurs are channeled through the NTCDB which acts as umbrella organization for farmers' associations and producers.

Commodity associations like NTCDB belong to the **network of the Federation of Nepalese Chambers of Commerce and Industry (FNCCI)**, the umbrella organization of the Nepalese private sector. More than 20 commodity associations belong to the network of the FNCCI including, among others, the Himalayan Orthodox Tea Producer Association (HOPTA); the Cardamom Entrepreneurs' Association, and the Nepal Coffee Producers' Association (NCPA).

[18] Consulted at: www.trademap.org and also here: http://www.trademap.org/Country_SelProductCountry.aspx?nvpm=1|524||||09|||2|1|2|2|1|1|2|1|1

Some of the major concerns voiced regarding Nepalese tea include:

- Nepalese exports to India receive relatively low prices due to the lack of quality;
- Small processors also lack formal quality assurance and certification programs to maintain and document production quality – cumulatively these weaknesses prevent or discourage exports.

Specific challenges for tea exporters

- **Organic tea certification is challenged by strict contaminants standards in the EU.** Rejected tea shipments to Europe (Germany) are due to recent detections of an insecticide (monocrotophos, a pesticide which has been banned in many countries, including the U.S.) and the presence of anthraquinone (AQ), a believed naturally occurring chemical in tea. The EU has established extremely low MCLs for AQ, and Nepal tea has sometimes exceeded these limits. There is frustration that the source of AQ has not yet been identified in tea produced in Nepal and elsewhere. Producers do not understand why the EU has established such a low acceptable level for AQ, and whether the EU can change the maximum level if data were shown to prove that it is a naturally occurring compound.
- **The lack of residue management systems means reduced exports into EU.** Nepal is not in a position to successfully respond to the EU on the AQ detection issue because Nepal does not have widely adopted residue monitoring and traceability systems in place. These systems would allow Nepal to control for these residues and to trace production back to the farm if needed.
- **Weak capacity and competency of testing laboratories.** The NTCDB mentioned the need for an accredited laboratory that could test shipments for pesticides and other contaminants (for example, AQ) destined for the export market. Currently, Nepal labs can only test for a limited number of chemicals.
- **Nepal does not routinely attend Codex meetings/technical standards meetings where international standards for chemical residues are established.** Several Tea Board members suggested to join forces with other countries affected by the same AQ issue and to start attending the intergovernmental tea group that FAO convenes to discuss SPS concerns and trade barriers.

The presence of AQ as a chemical contaminant in exported organic tea is an example of a food safety and trade challenge that needs a multifaceted solution. One important step is to identify local laboratories that can test products for a wide range of chemical pesticides and AQ. Another step is to identify the source of AQ residues appearing in Nepalese tea, and final steps would be to work with the EU and Codex to establish safe MRL levels for AQ if the source of the contamination cannot be eliminated.

## II. Risk-based Management

**Issue:** Risk management is a process by which farmers, government officials and other decision makers detect, evaluate, and choose mitigating measures that will reduce the risk of food contamination and/or adulteration throughout the food chain. The process consists of hazard identification and characterization and risk evaluation and mitigation.[19] A strong risk management system will help to eliminate food safety concerns before they become problematic to consumer health and trade.

In Nepal, the risk management process is weak at best. For example, with limited resources, the DFTQC Regional Office has a massive food inspection task for a very busy and complicated border point of entry. Risk assessments are not conducted to identify significant plant health, animal health, and human health hazards presented by imported products. While some pests may not pose significant risk (e.g. those that already exist in both India and Nepal); exotic pests and diseases need to be controlled. Because these hazards are not identified and characterized, evaluated and mitigated, Nepal's agricultural production can easily be compromised. Further, the Plant Protection Directorate (PPD) has remedial ability to regulate import/export or domestic plant protection due to lack of connection to lab support, diagnostic capability, or risk-based approaches. All PPD activities need significant improvements especially in the areas of pest surveillance, scientific pest risk assessments, plant pest monitoring and inspection, plant quarantine, plant health laboratories, border inspection, and all areas of pesticide regulations and pesticide use.

These issues were clearly present at the Bharaiwa Customs Office and Bharaiwa Plant Quarantine Office and Laboratory where risk-based inspections did not follow international norms: the process should be to clear low-risk foods without frequent inspection, while higher risk foods should receive more frequent inspections including sampling for laboratory analysis to detect relevant pathogens or contaminants. Reducing border-transit times will improve public health through risk-based SPS management procedures. Modern trade facilitation and public health systems base management decisions upon risk. Managers make data-driven decisions on how to apply limited resources when inspecting imports for pests and diseases that can affect plant, animal, and human health. By using data to target the most risky products and shipments, trade in low-risk products will clear the borders more rapidly. Likewise when laboratory resources are limited, managers should use data on risks to prioritize the sampling and testing for pathogens, pesticides, and other chemical residues.



The Border with India is a major route of agricultural trade, but there is very limited actual sampling and testing of product to identify pests and diseases. *(Photos by Sharon Williams)*

[19] See Annex V: Risk Chain Capacity Building for additional detail.

**Overarching Observations:**

- Lack of risk-based sampling/diagnostic services at borders to monitor for pests entering Nepal
- Lack of government's ability to support exports through issuing of phytosanitary certificates or conducting required Pest Risk Assessments (PRAs)
- No scientific risk assessments to support pesticide registrations or to evaluate/adopt international standards
- No national food monitoring program; no support to markets to conduct analyses of excessive pesticide residues
- No regulatory inspection/monitoring of processing facilities

**Regulatory Challenges:**

- Lack of sufficient staff resources for the amount of traffic at the border
- Food inspections are based on visual inspection only (as observed at the Kathmandu Tribhuvan International Airport).
- No indication that food samples are collected and/or testing is conducted in the market place or at borders.
- No indication that risk-based sampling procedures are established that mandate the sampling of a planned number of shipments of high-risk foods. In order to analyze the appropriate quantity of samples, sufficient equipment and trained personnel are required at the quarantine laboratories located at land borders.

**Case Study: The Kalimati Market growing pains**

Traditional wet markets in Nepal are unhygienic, lacking separation of livestock and fresh produce or ready-to-eat foods, and with high contamination of water and surfaces. Because most products, fresh vegetables, fruits and spices sold in Nepal pass through a traditional wet wholesale or retail market, these markets are critical and cost-effective locations for monitoring safety of products and for interventions to improve hygiene.

A walk through the Kalimati Fruit and Vegetable Market (KFVM) shows a crowded, unhygienic environment. There is little or no separation of livestock and fresh produce or ready-to-eat foods; produce was often directly on the floor; work surfaces and washing water were dirty. Cross contamination of food could easily occur from dirty knives, filthy contact surfaces, and large amounts of waste. The board of directors of the Kalamti market listed the following as key concerns: (i) lack of cold storage; (ii) lack of grading and packing by farmers before sending their products to the market; (iii) waste management (iv) shelf life of products; and (v) pesticide residues.

Since 2014, the Kalimati market has implemented a strict pesticide monitoring program (private standard) for the incoming produce with specific information of their testing using the RBPR kit.[20] By inference, this KFVM pesticide private standard seems to be working as a warning for local farmers to ensure the proper use of pesticides in their pest control programs. However, the tests done on-site is limited because they do not quantify the pesticides suspected on crops, and there is no ability to trace back crops found to be contaminated.

[20] According to the data consulted, in 2014, KFVM tested 187 samples of several produce of which 26 samples tested in excess of the 35% threshold of acetylcholinesterase inhibition, these 26 produce by different famers were rejected entry into the market. In 2016, about 1,930 samples were tested with 22 samples exceeding the levels. In 2017, about 587 samples were tested and only one sample tested in excess. Source: Market and lab visit, November 8, 2017.

The Kalimati Bioassay Lab uses a Rapid Bioassay kit to monitor the presence of two classes of pesticides organophosphates and carbamates on fruit. These testing services could be better optimized with the first step being a deeper analysis of produce samples by taking the samples to an advanced lab that has a GC-MS to figure out exactly what the pesticides are and at what level.


The Kalimati Market is one of the growing central markets for local shops and restaurants to receive produce. Basic screening for pesticide residues is conducted on-site at the market, yet there is no ability to identify or quantify the pesticides suspected on crops, and there is no ability to trace back crops found to be contaminated. *(Photos by Sharon Williams)*

While the conditions in the Kalimati market are typical of many wet markets in developing countries, it was impressive to see that the market has its own laboratory to collect samples for testing of pesticide residues. However, the lab staff said that they had only a limited ability to conduct tests and that public announcements of adverse results were often delayed by vendors until the produce was already sold to consumers. While this is a positive step for food safety, it is also an example of how incentives are not aligned in a partially functioning system – in a system that had more comprehensive and transparent testing for pesticides, consumers may pay a premium for safe foods and vendors would respond to that demand. In contrast, the WHO Healthy Markets initiative[21] represents an innovative approach to establish a multi-stakeholder effort to upgrade or create new wet markets. This initiative has developed step-by-step guidelines for upgrading traditional markets to improve hygiene and reduce risk of diseases, and have documented some global case studies.[22]

Specific challenges for the Kalimati Market inlcude:

- **Grading and packing**: No grading and packing is conducted at collection sites – this reduces shelf life and creates waste. Inconsistent practices at farm level generate inconsistency in quality and safety of products.
- **Value chain actors and extension services:** There is a clear need to provide more guidance to retailers about proper grading (national grading standards could be developed), proper packing and proper transport of produce to the market. Further, farmers need more information about pesticide use and on farm GAP practices.
- **Cold storage:** There is also a need for developing cold storage facilities on the premises of the market to help prevent spoilage
- **Lab testing services:** Laboratory testing capabilities though on the market's premises are quite basic. The lab can only detect the presence of pesticides, but not which pesticide or it's actual residue level. It is not currently cooperating with the DFTQC lab to characterize positive samples.

[21] Consulted at: http://www.who.int/foodsafety/publications/capacity/healthymarket_guide.pdf

[22] See Annex VI: WHO Healthy Food Markets Initiative Background for greater detail.

- **Timely testing** is a concern for the lab operating testing station. Generally speaking, by the time the tests come back, the produce has already been sold at the market.
- **Public awareness**: The Kalimati testing station is used to provide consumers' awareness on food safety issues, for instance on pesticide contamination. The laboratory director suggested that local authorities offer pesticides' training to farmers in those districts that sell to Kalimati.
- Lab staff voiced the need for support from enforcement agencies when they do find pesticide contamination, as they don't want to be the ones to confront the sellers
- We learned that the same traders that operate at Kalimati's market are also running the lab testing thus there is no incentive to detect (and fix) quality issues that can penalize them. Labs lack financial resources while farmers and wholesalers lack incentives to adopt recommendations on how to fix the pesticide issues possibly encountered. A fee for service system needs to be investigated for lab testing

## III. Analytical Services

**Issue:** There is a disconnect between laboratory capabilities, demand for analytical testing, and services available. Ample laboratory capacity seems to be underutilized while a demand for laboratory export certifications and domestic monitoring tests is unfilled. Further, there is no authority in Nepal that can provide labs with the necessary accreditation/certification required to meet international standards. For instance, the DFTQC central lab has accreditation for some tests, but not for pesticides, heavy metals, or environmental contaminants needed for export certifications. In the end, exporters such as Organic Village, either send their samples to Europe for analysis or hope for the best and send product in the absence of testing certificates – which has resulted in cases of product delay, price reductions, or rejections.

Another government lab, the National Forensic Science Laboratory (NAFOL), an autonomous laboratory established under the Ministry of Science, Technology and Environment was found to be highly competent and equipped with basic facilities and some modern equipment[23] to analyze many pesticides. Unfortunately, it is under-utilized and does not currently conduct analyses for other government agencies or the private sector.

In order to support accreditation for additional tests, the GON of Nepal needs to establish an accreditation authority that understands international trade requirements and corresponding certificates. To further bolster current efficiencies, laboratories need a business funding stream for physical upgrades, pay accreditation fees, and cover costs of running samples.

The **National Forensic Science Laboratory** (NAFOL) provides analytical testing services for physical evidence pertaining to the investigation and administration of justice in Nepal.

More specifically, the NAFOL performs the following testing activities: Chemical analysis of visceral tissue, blood, and other contaminants (pesticides, heavy metals, plant poisons, volatile and gas compounds); analysis of narcotics; analysis of explosives and petroleum products; DNA analysis; biological tests; serology services; and examination of wildlife products.

**The NAFOL is a non-accredited testing laboratory.** There are approximately 20 non-accredited testing laboratories, both private and public, in Nepal.

**Overarching Observations:**

- Inability to certify exports or screen in advance; no accreditation/certification system
- Need staff training to optimize equipment and provide basic equipment maintenance
- No fee-for-service mechanism
- Lack of coordination of government labs to maximize instruments/capabilities

[23] A DNA analyzer and two Shimadzu gas chromatographs (a GC and a GS-single mass spectrometry) were observed during a visit on November 8, 2017.


Nepal's DFTQC (government) and Zest labs (private lab pictured above on the left) both have sophisticated analytical equipment that can support export testing services; however, exporting entrepreneurs (right) lament that since no labs are accredited, results are not recognized by destination authorities. *(Photos by Sharon Williams)*

It is suggested that private and public labs with relevant capacities be identified and that private tea processors and government lab technicians be trained together. For example, the NAFOL could work closely with the chemical laboratory of the National Food Authority in order to share expertise, and possibly coordinate cross-training activities especially to analyze heavy metals.

**Regulatory Challenges:**

- There is no accreditation authority.
- State-of-art hardware to perform necessary diagnostics, but few lab staff are employed and little processing of samples actually takes place.
- DTFQC and NAFOL are not fully optimizing/utilizing equipment (only screen for about 30 pesticides; organophosphate, organochlorines, carbamate, pyrethroids); available equipment is capable of screening 250+ pesticides and chemicals.

**Case Study: Zest Laboratories**

The plight of this well-run lab is emblematic of many of the systemic problems the team observed in other labs. Zest Laboratories is a privately owned company that employs 25 staff and has sufficient equipment to run general microbiological, heavy metal, pesticide and aflatoxin tests. However, the ability to provide full services is limited due to limited analytical equipment. As such, the lab is not able to screen for unknown compounds or analyze at the low concentrations that would be needed to support export certifications. Zest aspires to be accredited so that they can provide full export services, but they cannot become accredited until there is an accreditation authority established by the government. Further, they cannot invest in upgraded equipment because the demand for their services is undercut by subsidized government labs (if/when they do provide services. This cannot be remedied until the

Zest Laboratories is a very well modeled and organized business, but their growth is hindered due to lack of ability to become accredited, receiving samples from potential exporters, and potential competition with government labs. *(Photos by Sharon Williams)*

government labs establish realistic fee-for-services that are based on real costs that will ensure that public labs are not competing with private labs.
Specific challenges for Zest Laboratories includes:

- Zest cannot invest in new equipment to provide export services until samples flow into their laboratory.
- Samples will not flow into their lab until they become accredited.
- Zest cannot become accredited until there is an accreditation authority established in Nepal, which hinges on the passage of the Food Act.
- Even when they receive accreditation, there is deep concern that DTFQC will undercut them by providing subsidized services.

## IV. Research to Farm Communication

**Issue:** Many SPS risks occur on farms; plant and animal production risks easily become food safety hazards down the value chain and so must be controlled at the farm level. Further, pests and diseases must be effectively monitored and controlled so they do not spread throughout the country endangering more agricultural production.

In Nepal there is an urgent need to support inter-agency collaboration among public health, animal health, agriculture and other sectors for joint action and better implementation of food control systems. Agricultural research institutes can provide expert knowledge to extension services so that the extension agents can pass along this knowledge to farmers; however, research performed at Nepal's Agricultural Research Council's (NARC) National Agricultural Research Institute (NARI) does not appear to be coordinated with the extension services even though service agents are uniquely positioned to provide information and training on SPS management along value chains. Consumer awareness and advocacy programs are limited but should be pursued to better communicate about the effects of hazards and related health risks to human beings.

**Overarching Observations:**

- Lack of information flow to/from farmers and to/from agricultural researchers, regulators, and markets.
- Lack of technology development, such as new biopesticides, to support organic sector which can be a key export sector in Nepal.

**Communication/Extension Challenges:**

- NARI has nine research divisions and each division has its own laboratory – it is unclear how these various divisions coordinate with each other and avoid duplication.
- Limited capabilities to provide information to farm level through extension
- For plant health, NARI has not updated its pest identification lab and staff are not fully trained in taxonomy/entomology

**Case Study: The Blighted Pepper**

During a visit to Bhairawa, a remote area in western Nepal, a farmer complained of many chili pepper plants succumbing to a mystery illness. Unfortunately, he did not have the knowledge or resources to identify and fix the problem. Further, there was no indication of NARI manuals or online databases that could be accessed by farmers to help identify pests and diseases by crop. The mystery was solved when a NARI plant pathologist in Kathmandu was provided a photograph of the diseased plant. The pathologist was able to quickly diagnose the problem as blight and describe simple mitigation measures. Unfortunately, the link between information and farmer was not made, so the production yields decreased and risk of further contamination increased.

While NARI indicated that their research is meant to be disseminated through PPD extension officers and NARI officials in each district, researchers lamented they do not have an effective system for passing information to the extension officers at the regional/local level.

Blighted pepper, Barhaiwa area, Nepal, and NARI center where the plant disease was identified.
*(Photos by Sharon Williams)*

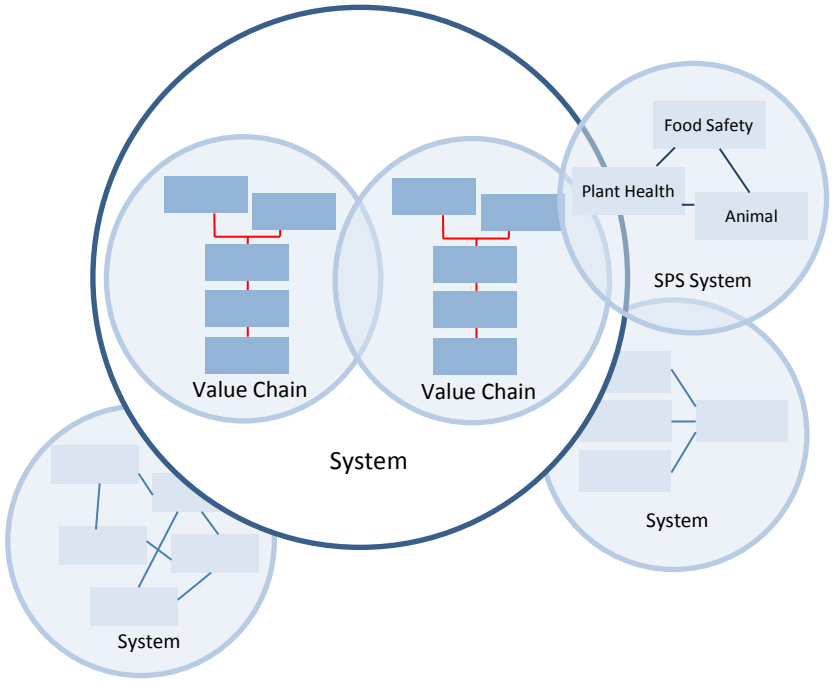
## RECOMMENDATIONS

As suggested in Table I of the Background section, there is a continuum for defining a functioning food safety system (similar continuums apply to a plant health system or animal health system – all three comprising the SPS system). The worst case scenario is when a food safety system is weak (or absent) to the point that clear harm occurs regularly (rampant food borne illness or death, widespread chemical poisonings, etc.); fortunately, this is not the case in Nepal. While not implemented, Nepal does understand most of the components and concepts of a basic SPS system, but is far from having an advanced system – which does not necessarily need to be the goal. Applying the "good enough" principle, the goal for Nepal at this point should be to adopt and implement a basic system for ensuring that food destined for both domestic and export markets is safe and complies with international trade standards. Once a basic system is established, the GON can consider additional improvements that will lead them to a more advanced system.

Based on the literature review and discussions during the visit, the USDA team provides here recommendations that will assist USAID and other potential donors a "roadmap" for how Nepal can achieve a basic SPS system – with emphasis on the food safety system.

The team developed these recommendations in consideration of a market systems approach to value chain programing[24]. A value chain model follows a specific commodity through a series of steps, starting with farm-level production, to processing, to sales, and finally to consumers. A market systems approach follows multiple value chains simultaneously (as illustrated in Figure I), providing the value chains guidance and reference - particularly at points of value chain transition - in order to facilitate the flow and safety of commodity between each of the chains' links. For example, farmers need to understand standards to produce safe food while reducing chemical hazards. Processing facilities, domestic sellers and exporters, and marketplaces need standards in place in order to ensure that food remains safe along the value chain. Standards, whether physical or procedural, need be monitored at each chain link in order to prevent safety problems from spreading down the chain, causing greater economic loss and expanding health risks as the chain progresses.

Figure I. Interconnected Market Systems Supporting Value Chains




[24] See Annex VII: Market Systems Approach to Value Chain Development for greater detail.

Recommendations here address the four core assessment "findings", and for illustrative purposes are provided at three "roadmap" destination points[25]:

i. Quick trip: these are goals that can be obtained by utilizing current USG resources or minimal financial inputs by USAID or other partners and coould be achieved within months to year.

ii. Excursion: these are goals that will require some additional stretching – by applying financial and planning resources - these goals would require moderate USG or partner financial inputs and could be achievable in the next 1-2 years.

iii. Long haul: these are goals that require a financial and project planning ladder – these goals would require substantial USG or partner financial inputs and may be achievable in the next 1-5 years.

## I. Standards System

Standards are the sets of rules that must be followed by all players within a market system. If we use a driving analogy, these could be viewed as safety standards for your car. The Department of Motor Vehicles uses these standards to ensure that cars on the road are safe to drive and don't negatively impact the environment. In the same way, governments use SPS standards to help ensure food is grown, processed, transported, and sold safely and don't negatively impact the environment and human health. Standards can either be processed-based or tolerance-based – both are aimed at reducing risks to the food supply. Without standards, stakeholders along a value chain have little or no ability to understand or comply with food safety practices.

In Nepal, only a few tolerance-based standards have been adopted to support domestic and export markets. There is a demand to develop or adopt process-based standards, including the establishment of a Nepal GAP, in order to expand food safety and thus export opportunities.

To achieve a basic SPS system, Nepal must establish and/or adopt and implement multiple process-based standards and international tolerance-based standards. Establishing standards that facilitate exports will require Nepal to participate in international standard setting work such as the work that the WHO/FAO Codex Alimentarius Commission performs to develop MRLs on pesticides. Below are some specific action items to help the GON reach this destination.

[25] These are organized according to achievability and illustrative cost to implement in Annex VIII.

### Recommended Actions

**Quick Trip:** Understand why/how international standards are established in order to encourage development of regulatory processes for adoption of Codex or other international standards. Assist exporting businesses in adopting HACCP/GMP processes in order to secure and expand exports, and also ensure a safer domestic food supply.

| Adopting Existing International Standards | ACTION | USDA Assistance | Funding |
|---|---|---|---|
| | **1a) Codex Participation - 1**<br>DFTQC, PPD, or other relevant agency: Participate in regional "Codex colloquium" events in order to better understand the issues coming up in Codex Committee meetings and to contribute to regional positions on topics of mutual interest. Even if Nepal cannot attend Codex meetings in person, at least their positions will be represented at Codex.[26] | The US Codex Office hosts and funds participant travel for 1-2 colloquia per year for Asian nations. FAS has discussed the possibility of Nepali participation in these with the US Codex Office; they are happy to include Nepal in the colloquia. The Plant Protection Division will need to help identify priority committees.<br><br>1-2 events during 2018 | US Codex Office |
| | **1b) Codex Standards**<br>DFTQC and PPD: Both entities need to understand Codex MRLs/MCLs and differences between Codex and other national standards; establishing a process for evaluating and adopting MRLs/MCLs – first Codex, then other, but science-based rationale. | FAS can identify experts either in-house or possible short-term consultants (1-2 experts needed)<br><br>1 workshop during 2018 | FSN (travel)<br>Needs to be identified |
| | **1c) Organic Ginger Processing Consult**<br>Provide HACCP consulting to the facility to improve processing line to reduce product damage and improve food hygiene.<br><br>This food safety consultancy is applicable to other processors in Nepal, as well. | FAS can identify USDA, USG or consultant experts.<br><br>On-site visit and consulting (1-2 days), plus longer-term guidance electronically to follow up with recommendations and answer questions. | Needs to be identified |
| | **1d) National Tea and Coffee Development Board Support** Provide support in developing the Code of Conduct – or, GAP specifically for tea and coffee. | FAS can identify a consultant expert.<br><br>1 consulting workshop to assist the Board in developing a Code of Conduct to assist their farmers in implementing food safety practices. | Needs to be identified |

[26] At the Codex regional meetings, the countries many times establish regional positions. So, several countries would make interventions – and base these on the regional agreement, or at the minimum have the other countries interests considered. These are good since it is impossible for all these countries to attend all the Codex Committee meetings.

| | | | |
|---|---|---|---|
| Other standards compliance issue | **1e) National Tea and Coffee Development Board FDA Complaint Review** Investigate the complaint by the Board of U.S. Food and Drug Administration delays of clearance. | FAS will inquire with FDA about this issue, and provide direct feed-back to the Board. | n/a |
| **Excursion:** Gain the ability to establish national standards for priority food hazards and a traceability system for important value chains. | | | |
| Establishing New National Standards | **1f) National Standards Guidance** DFTQC and PPD: Guidance on establishing national standards for domestic markets, especially in the absence of international standards; focus on food additives or other identified priority topics. | FAS can identify USDA, USG or consultant expert/s, depending on focus topic.<br><br>1-2 workshops needed per topic | Needs to be identified |
| | **1g) Nepal GAP Guidance** DFTQC and private sector stakeholders: Guidance on developing a Nepal GAP program. | FAS can identify USDA, USG or consultant expert/s, depending on focus topic.<br><br>2 or more workshops needed, depending on the level of engagement needed and wanted – possibly one with government only, and one with private sector included for input and ground-truthing. | Needs to be identified |
| | **1h) Traceability Guidance** DFTQC and private sector stakeholders: Guidance to help develop a traceability system: monitoring and coding system that is harmonized across the different value chains – need to make sure these are consistent and in-line with international systems – this also includes an e-certification system. | FAS can identify USDA, USG or consultant expert/s, depending on focus topic.<br><br>2 or more workshops needed, depending on the level of engagement needed and wanted – possibly one with government only, and one with private sector included for input. | Needs to be identified |

| **Long haul:** Engage and contribute to priority Codex Committees and regional coordination meetings in order to ensure the inclusion of Nepal's national interests into international standard setting; adopt international standards continually and consistently; increase the number of farmers and processors practicing Nepal GAP, GMP, HACCP, etc. | | | |
|---|---|---|---|
| **Contribute to international standard setting and implement national and international standard processes** | **Ii) Codex Participation - 2**<br>PPD: Attend and contribute to Codex Committee meetings. Identify priority meetings and dedicate staff to regularly attend (don't send new people each time). | If Nepal will dedicate staff to follow certain committees, USDA could support Nepal participation in regional coordination meetings, | US Codex Office |
| | **Ij) Farmer and Food Processors/Packagers Standards Training**<br>Trainings to implement Nepal GAP, GMP, HACCP, and other practices to gain certifications for exported products and ensure domestic compliance to safety standards. | Consultant experts could provide training to high-potential organic business, export-oriented businesses, and farmers selling directly to domestic markets. | Needs to be identified |
| | **Ik) Value Chain Stakeholders Traceability Training** Training and guidance on implementing a traceability system, particularly for export-oriented businesses | Consultant experts could provide training on how to implement traceability systems. | Needs to be identified |

## II. Risk-based Management

Safety standards in a market system (processes and tolerance limits) are established on the level of acceptable risk, given a particular hazard. For example, a speed limit is set by weighing the need to move vehicles quickly between locations verses the increasing possibility of a crash the faster one goes. The speed limit is a risk-based tolerance. If no speed limits were set, the road would be piled with fatalities. And, if the limits were set based on zero-hazard (no crashes ever) then driving would not be allowed. Risk-based systems rely on this compromise between safety and efficiency – however, this compromise requires judgements to be made by someone with both the technical knowledge of hazards and understanding of public needs and resources available.

Monitoring, inspection, and evaluation programs are components of a risk system. Currently in Nepal, many standards and monitoring programs related to food safety are not based on risk, resulting in inefficient use of resources or non-defendable regulations. Examples of this include ad-hoc sampling of products at borders (does not efficiently screen hazards) and the absence of evaluating risks during pesticide registrations (does not consider local conditions).

To arrive at the basic SPS system, the GON will need to implement risk-based processes for monitoring, investigating, and evaluating hazards and setting standards within the market system. Implementing the below recommended actions will help them get there.

## Recommended Actions

**Quick Trip:** Understand the basic concepts of risk-based systems and principles in order to guide the decisions for new sampling/testing procedures at borders (to more efficiently direct resources) and to encourage incorporation of risk-assessment in regulatory decisions (science-based justifications).

| | ACTION | USDA Assistance | Funding |
|---|---|---|---|
| Understanding Risk-based Systems | **IIa) Risk-based Sampling/Testing Training**<br>PPD and DFTQC**:** Training on establishing risk-based sampling/testing program at borders (land and airports) in order to better direct resources to screen for potential hazards. | FAS is planning to hold a regional workshop in spring 2018 with APEC economies on establishing risk-based sampling and testing protocols at borders in order to facilitate trade flows. USDA funds can only support travel for developing APEC countries, but if outside funds were available, USDA could see if Nepali participants can also join.<br><br>1 workshop in early 2018 | Needs to be identified |
| | **IIb) Risk in the Food System Training**<br>PPD, DFTQC, MOH: Training on basic principles of risk in the food system. This could be cross-cutting with multiple ministries/departments (chemical and microbial courses) | USDA could help explore NIPHM programs (Hydrabad, India) | Needs to be identified |
| | **IIc) Risk Assessment Training**<br>PPD and possibly DFTQC: Specific training on basic principles and practices of risk assessment for pesticide registrations and Codex MRL adoption, with the goal of raising awareness for the need of evaluating pesticides prior to registration, considering local conditions and encouraging use of lower-risk chemicals. | CropLife Asia may be willing/able to support 1-2 workshops at the request of USDA. USDA participation would require additional travel funds.<br><br>1-2 trainings in 2018 | Event - CropLife<br>USG travel - FSN |
| | **IId) Kalimati Market Sampling Guidance**<br>Assist the Board and analytical unit with establishing a risk-based sampling protocol for produce entering the market. Also, work with the Board to incorporate a food safety strategy into their Strategic Plan. | FAS can identify USDA, USG or consultant expert/s, depending on focus topic.<br><br>1-2 visits to the market to train on concepts of risk-based sampling procedures and to develop a draft sampling plan, with a follow up visit to assist in implementing the plan. | Needs to be identified |

| **Excursion:** Establishment of a national food safety monitoring program in order to reduce food-borne illness within the domestic food supply, but also supporting safety of export products. Also, begin implementing some basic risk-based practices for pesticide registrations and fresh markets. | | | |
|---|---|---|---|
| **Developing Risk-based Systems** | **IIe) PRA Training**<br>PPD: Training on conducting pest risk assessments (PRAs) in order meet international export requirements, and to evaluate assessments for products entering Nepal. | FAS can identify USDA, USG or consultant expert/s, depending on focus topic. .<br><br>2-3 workshops needed to cover PRA compliance for exports and domestic assessments. | Needs to be identified |
| | **IIf) Food Safety Monitoring**<br>PPD, DFTQC, MOH: Development/structure of a national food safety monitoring program for chemical/microbial contaminants (processing facilities, fresh produce collection centers, wet markets, retail stores). | FAS can identify USDA, USG or consultant expert/s, depending on focus topic.<br><br>Multiple workshops needed to develop the structure of monitoring programs, depending on the number of commodity types and contaminants to be included. | Needs to be identified |
| | **IIe) Inspection Training**<br>PPD and DFTQC: Inspector training for implementing a risk-based sampling and testing system, first focused on physical examinations at borders (pests/diseases identification). | FAS can identify USDA, USG or consultant expert/s, depending on focus topic.<br><br>At least on higher-level training for PPD and DFTQC officials, and at least training for working-level staff at each border point. | Needs to be identified |
| | **IIf) Pesticide Efficacy Trials Training**<br>PPD and NARI: Specific training on how to conduct efficacy trials for pesticides (conventional and biological) in order to evaluate new and existing pesticide products. | FAS can identify USDA, USG or consultant expert/s, depending on focus topic.<br><br>Possibly one conference-based workshop for regulatory guidance and one field-based training for technicians. | Needs to be identified |
| | **IIg) Kalimati Market Management Training**<br>Send board members to a functional "good model" fresh market within the region to observe how the market(s) is managed, with respect to hygiene practices and safety monitoring. | FAS can identify 2-3 similar fresh markets within the region for Kalimati Board members to visit.<br><br>In addition to board member travel, travel upport for USDA facilitators would be needed. | Needs to be identified |

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|---|---|---|---|
| **Long haul:** Border inspectors conduct risk-based sampling of products entering Nepal and can identify most pests and diseases found on products. PPD is able to carry out PRAs routinely for priority product exports. DFTQC has a basic system in place for monitoring pesticides, aflatoxin, and environmental contaminants from Kalimati market, private markets, and retail stores. PPD conducts basic risk assessments for registering pesticides and has a basic system in place to monitor pesticide product quality. | | | |
| **Implementing Risk-based Systems** | **IIf) Pest/Disease Inspection Training**<br>PPD and DFTQC: Training system developed for inspectors on pest and disease identification. | FAS can identify USDA, university, or consultant experts. | Needs to be identified |
| | **IIg) PPD Capacity Building**<br>Strengthen the technical knowledge of the PPD Pesticide Registration Unit on registration; risk assessment; product labeling; post-registration issues; pesticide compliance; inspection, and enforcement programs. Also strengthen the inspection program for pesticide imports, retailers, and distributors. | FAS can identify USDA, USG, or consultant experts. | Needs to be identified |
| | **IIf) Safe Pesticides Campaign**<br>PPD: Implement a national campaign to promote the safe use of pesticides; the proper disposal of pesticide containers, and the management of stocks of obsolete pesticides in coordination and cooperation with the pesticide industry. | FAS can identify USDA, university, CropLife, or consultant experts. | Needs to be identified |

## III. Analytical Services

Analytical services, a sub-component of national risk monitoring, inspection, and evaluation programs, help to ensure that standards are being met, if/when appropriate risk-based practices are being followed. Analytics can be compared to the dashboard on the car, constantly checking the speed and other controls to make sure that rules are followed and other alerts to the food safety system dashboard.

In Nepal, many of the analytical components are present, but they haven't necessarily been wired together. For example, the DFTQC has extremely the vehicle's mechanics are working efficiently. A red warning light indicates a failure in the system and a potential safety hazard. Analytical services identify pests, pathogens, pesticides, metals, drugs, and powerful equipment (a Ferrari), but only analyzes a few commodities/chemicals (only able to add gas into the tank a drip at a time). The NAFOL needs certain samples to be analyzed for heavy metals, but does not have a particular piece of equipment to do it. Exporters are also demanding services, but there is no way to pay for the services (no cash register at the pump). And, private labs, like Zest Labs, cannot offer the service because they are not accredited for certain tests (they don't have a license). Finally, there is no authority to accredit the laboratories (no one has the authority to issue the license).

To get to a basic SPS system, the GON will need to

(i) coordinate the existing analytical capacities and expertise housed within the different Ministries, and establish a fee-for-service system (with ability for labs to maintain some funds for reinvestment and purchase of essential supplies, as needed);
(ii) establish an accrediting authority in Nepal in order to expand diagnostic capability and the number of analytical service providers in the country; and
(iii) enhance the expertise of technicians in order to fully utilize and service their equipment.

Implementing the below actions will help get them there.

## Recommended Actions

| **Quick Trip:** Connect analytical service providers with clients, and provide analytical labs with essential skills to provide basic services. | | | |
|---|---|---|---|
| | **ACTION** | **USDA Assistance** | **Funding** |
| **Strengthening Current Analytical Services** | **IIIa) Diagnostics Training**<br>DFTQC, NAFOL, NARI, Zest Lab: Analytical training on pesticide, heavy metal, vet drug, aflatoxin, and other contaminant methods – optimizing the capabilities of their equipment. Guidance can also be provided on laboratory management practices, such as good laboratory practices, standard operating procedures, information management, and basic care and repair of equipment. | FAS could explore finding volunteer technicians through the American Chemical Society's Agro-Chemical Division who would be willing to spend time in the laboratory. Only travel funds would be needed.<br><br>Expert visits DFTQC, NFSL, NARI, and Zest Lab to provide training on pesticide residues, heavy metals, aflatoxins and environmental contaminants, vet drugs, and food pathogens during 2018. Some experts can visit multiple labs in one trip. | Needs to be identified |
| | **IIIb) Informational Meeting between Labs**<br>Zest Labs and National Tea and Coffee Board (and other potential clients): The Board indicated that they did not know that Zest could provide some of the analytical services An informational meeting may be helpful between Zest and possible clients to better understand what services are needed, and can be provided. Possible pesticide, heavy metal, and anthraquinone testing. Possible service agreement that will allow Zest to anticipate and plan for more consistent services, which allow Zest to invest in needed equipment. | USAID or other partner could arrange this meeting.<br><br>1 day information meeting in early 2018. | Needs to be identified |

| | | | |
|---|---|---|---|
| | **IIIc) Rapid Bioassay Method Training**<br>Kalimati Market and other labs: Training and one-on-one lab guidance on optimizing the method, and developing a plan to characterize and quantify the actual pesticides found during the screening tests. | FAS may identify USDA or university expert who could visit the laboratories on a voluntary basis, with just travel funding required.<br><br>1-3 days needed for each laboratory requiring a visit during 2018. | Needs to be identified |
| | **IIId) Lab Collaboration Framework**<br>DFTQC and Kalimati Market: Establish an agreement where "hits" found during the Kalimati Rapid Bioassing screening can routinely be analyzed by GC-MS, in order to identify the specific problematic pesticides and be able to develop a mitigation strategy. | USDA, USAID, or consultant to help coordinate dialog between DFTQC and Kalimati Market.<br><br>1-2 visits to establish the arrangements during 2018. | Needs to be identified |
| | **IIIe) Lab Enforcement Review**<br>DFTQC and Kalimati Market: Establish an enforcement mechanism between the Market and DFTQC (or other enforcement agency) so that the Kalimati analytical technicians are not required to also enforce actions. | FAS can identify a USDA, USG or consultant to help facilitate a dialog between DFTQC and Kalimati Market.<br><br>1-2 visits to establish the arrangements during 2018. | Needs to be identified |
| **Excursion:** Establishment of a national DFTQC laboratory system that is efficient and effective, but also utilizes limited resources wisely. | | | |
| **Structuring a National Analytical System** | **IIIf) Reference Lab Guidance**<br>DFTQC: Guidance on establishing their regional laboratory system and the role of their proposed reference lab. DFTQC could use guidance on what analytical capabilities each of their regional/reference laboratories really needs, in order to prevent possible duplication of services, or creating labs that are not utilized. | FAS can identify university or State Agricultural laboratory systems expert.<br><br>1-2 consulting workshops to discuss, plan, and provide recommendations on the structure and services that these labs will provide. | Needs to be identified |

| **Long haul:** Analytical service providers are accredited and are able meet basic needs of clients by providing certified test results for pesticides, heavy metals, aflatoxins and other contaminants. | | | |
|---|---|---|---|
| **Implementing a National Analytical System** | **IIIe) Fee-for-Service Guidance**<br>DFTQC and NFSL: Provide guidance on establishing a fee-for-service system for analytical services. | FAS can identify a university or State Agricultural laboratory systems expert.<br><br>2-3 consulting workshops to discuss, plan, and provide recommendations on establishing a fee-for-services system. | Needs to be identified |
| | **IIIf) Establish National Accreditation Authority**<br>DFTQC: Provide guidance on establishing a national laboratory accreditation authority. | FAS can identify a University, USG, or State Agricultural laboratory systems expert.<br><br>This item would require another visit by an expert to fully understand the scope of accomplishing this goal. | Needs to be identified |
| | **IIIg) Proficiency Testing Program**<br>DFTQC, NFSL, NARI, Zest, other labs: Develop a proficiency testing program between the national accrediting reference laboratory and other analytical laboratories with Nepal. | FAS can identify a university or State Agricultural laboratory systems expert.<br><br>2 workshops needed to develop and plan for the proficiency program, and longer-term consulting to start and maintain the program until self-sustaining. | Needs to be identified |

## IV. Research to Farm Communication

A communication/extension system links information about standards, risk management, and analytic alerts to farmers, consolidators, transporters, processors, local markets and exporters. A communication system offers guidance and direction about food safety systems, and is like road "signage and signals", alerting drivers to detours or upcoming hazards. A functional communication system passes information up and down the value chain, prioritizing work for agricultural research services from needs identified by farmers, and disseminating those results and recommendations back to farmers and other stakeholders.

Nepal does have key components of a communication/extension system, but the pieces are not effectively working together. Remember the farmer in Bhairawa? He said he did not know the cause of this disease, and he had not received guidance from the local AgVet[27] shop where he purchases plant protections chemicals. At NARI, when shown photos of the leaves, the researchers immediately identified the bacterial nuisance.

To get to a basic SPS system, the GON must establish a functional communication/extension service by

[27] AgVet is a pesticide or veterinary drug retailer/wholesaler.

coordinating the work of NARI with extension service providers and/or AgVet retailers who can bridge information flow to/from the farmers. Implementing the below recommended actions will help them get there.

### Recommended Actions

| **Quick Trip:** Export-oriented farmers and exporters acquire more pest control tools that comply with organic standards and reduce rejections in export markets due to residue violations. | | | |
|---|---|---|---|
| | **ACTIONS** | **USDA Assistance** | **Funding** |
| **Communication/Extension - Organics** | **IVa) Biopesticide Review**<br>Coffee/Tea/Ginger/fruit and vegetable growers and exporters, PPD, NARI: Provide a review of what biopesticides are currently available/used in Nepal, and determine if other effective products are globally available. Also, review if biopesticide alternatives could economically replace some of the most highly toxic chemical pesticides.<br><br>*Every value chain involved in exports expressed a move toward organic production and marketing – a potentially good niche for Nepali exports. A repeated request was to have more biopesticide tools available for farmers to 1) help replace conventional pesticides that cause product rejections in export markets, and 2) help control new pests and diseases that current registered products do not effectively control. | FAS can review the currently used/approved biopesticides in Nepal, review the targeted pests, and determine if any alternatives or better products are available in the marketplace.<br><br>FAS and Rutgers University's IR4 program are exploring to start a biopesticide project in SE Asia. It is possible Nepal could be included if there is interest on the part of Nepali agricultural researchers and grower/export associations,<br><br>Travel to organize this effort by an IR4 expert *may* be necessary.<br><br>If USAID could assist in obtaining pesticide and biopesticide registration lists in Nepal, and key pest list from grower associations, USDA could initiate a review of the products in early 2018. If interested, USDA could include Nepal in a funding request proposal to the Standards and Trade Development Facility (STDF). This will be submitted in March 2018. | Possibly STDF |

| | | | |
|---|---|---|---|
| **Excursion:** NARI is able to support organic and export-oriented farmers by providing efficacy research and collaborating with PPD for pro-actively seeking and registering reduced-risk pesticides/biopesticides. | | | |
| **Strengthening Agricultural Research** | **IVb) Biopesticide Research**<br>NARI: Assist NARI in strengthening its biopesticide research, and working with targeted value chain commodities in finding new solutions to support organic programs.<br><br>Identify research priorities through stakeholder workshop(s). | USDA and university (IR4) experts could establish bilateral research projects between NARI, IR4 and product manufacturers to facilitate registrations of new biopesticide products available in Nepal.<br><br>This could be a 2-3 year effort to establish, but if successful it can be a sustained relationship. Over the past few years, USDA and IR4 have established similar joint-program relationships in 20 countries around the world. | Possibly STDF |
| **Long haul:** A communications/extension system is developed that can share basic information up and down the value chain, such as pest and disease information, horticultural innovations, pesticide and fertilizer recommendations, and food safety alerts. PPD works to remove and replace the most highly hazardous pesticides from the market. | | | |
| **Strengthening Agricultural Extension** | **IVc) Improve Extension Service**<br>NARI, PPD, AgVets, Kalimati Market: Strengthen flow of information to/from farmers and other value chain actors. Look into disseminating information through AgVets, other input providers, or agricultural associations/businesses. | FAS can identify USDA, university, or consultant experts to provide guidance on communication mechanisms, communication materials, and training on communication methods. | Needs to be identified |

## Conclusion

While Nepal has a solid understanding of the components and concepts for a basic SPS system, however they have been unable to implement such a system. Improvements, modifications, and new processes in standards setting, risk management, analytical services, and research to farmer communications will help them achieve a basic SPS system. These market systems improvements will support existing value chain programing and are complementary to ongoing GFSS interventions and are therefore described as a market systems approach to value chain programming.

# ANNEX I. SANITARY & PHYTOSANITARY CAPACITY BUILDING

### *Background*

Sanitary and phytosanitary (SPS) systems are a necessary and integral part of any agricultural development strategy. As a country's agricultural sector achieves greater production efficiencies and improved physical infrastructure food yields and domestic food security will increase. Sanitary and phytosanitary (SPS) systems and regulations must be in place to ensure food is safe and wholesome for domestic consumption. SPS systems and regulations must also be in place to ensure that increased agricultural productivity will translate into higher farm incomes and reduced hunger in the form of local, regional, and international market access. To be able to trade, domestic regulatory systems must first harmonize with international standards; with harmonization comes regional food security, as food is able to flow from areas of excess to areas of need.

SPS capacity building bridges gaps between national capacity and internationally-recognized best practices. SPS capacity building

- assists countries to adopt science-based regulatory systems to ensure that domestic food supplies are safe;
- harmonizes domestic regulations with international standards;
- improves a country's ability to trade regionally and globally; and
- assists countries to understand and to adhere to WTO accession requirements, where applicable

### *International Standards and the Global Trading System*

SPS regulations address three key areas: animal health, plant health and food safety. These areas contribute to the productivity of agriculture and the overall safety of food and hence support food security and public health.

The development of these regulations is guided by the three inter-governmental standard-setting bodies to protect animal health (World Organization for Animal Health, OIE), plant health (International Plant Protection Convention, IPPC), and food safety (Codex Alimentarius).

The World Trade Organization's (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures (the "SPS Agreement") sets out the basic rules for these standards for the global trading system.

The SPS Agreement encourages WTO member countries to use international standards, guidelines and recommendations as they exist. It does allow for countries to set their own standards, but says that those regulations must be based on science and should be applied only to the extent necessary to protect human, animal or plant life or health.[28] (Text of the agreement: https://www.wto.org/english/docs_e/legal_e/15-sps.pdf)

### *Capacity Building*

SPS capacity building is generally a government-to-government interaction and recognizes that countries must commit to regulatory frameworks governing animal health, plant health, and food safety. To be successful, country commitment must be reflected in their national agendas and priorities.

The following sections highlight the components of viable animal health, plant health and food safety systems, as well as fundamental SPS systems that WTO Members need to have in place to meet their

[28] WTO Trade Organization, *WTO Agreements Series: Sanitary and Phytosanitary Measures* (World Trade Organization, 1998, 2005), 4.

WTO obligations. Each of these areas, and each of the components, feeds into the overall strength of SPS systems. If these components are not strong, capacity building can be a tool to raise awareness, improve understanding and support change.

### *Animal Health*

Animal health relates to all aspects of veterinary science and its supporting regulatory systems. This system recognizes the importance of disease control for food security, economic stability and market access as well as the fundamental need for healthy animals as they enter the food chain to ensure safe meat origin food products and public health. Components of a viable animal health system include:

- Veterinary infrastructure, including
    - disease monitoring and surveillance
    - prevention, eradication, control
    - Foreign Animal Diseases (FADs) outbreak response and bio-security enhancement
    - quarantine facilities/system and corresponding procedures to quarantine birds and livestock entering the country
- Internationally compatible authority, laws, and regulations to support
    - animal disease eradication and exclusion programs
    - quarantine systems for animals and farms in pursuit of animal disease eradication programs, FADs outbreaks, etc
    - national system of veterinary accreditation.
- National veterinary diagnostic laboratory or access to a regional laboratory
- An adequate budget
- Adequate Animal Health Surveillance System that
    - trained personnel to conduct the investigations for the surveillance system.
    - industry support to conduct surveillance investigations in a cooperative manner
    - has the mechanisms in place to elicit and respond to calls from the public reporting sick birds/livestock.
- Entry point inspection systems with standard operating procedures
- National animal identification and animal health records systems
- National Animal Health Indemnity Program

### *Plant Health*

Plant health relates to overall plant protection to ensure the health of commodity crops and horticultural products as they grow. As with animal health, food security, economic stability, a safe food supply and trade depend upon healthy production of plant crops. Components of a viable plant health system include:

- Plant quarantine and inspection system with well trained, government inspectors that can identify and monitor
    - pest and disease surveillance, eradication, control
    - imported and exported products and transit materials capable of introducing plant pests
- Defined and comprehensive procedures for carrier and commodity inspection
    - post entry quarantine
    - pesticide residue levels that do not exceed internationally recognized maximum levels
- Internationally compatible authority, laws, and regulations to support plant quarantine and inspection systems, including
    - means of issuing rules, regulations, proclamations and orders
    - application of treatments
- National plant diagnostic laboratory or access to a regional laboratory
- Pest Risk Analysis that

    - demonstrates potential pest status
    - determines need to assess risk
    - determine pest quarantine status
    - characterizes risk from pest(s).
- Treatments to prevent quarantine pests and diseases from entering the country
- Phytosanitary Certification that
    - ensures imported commodities are clean and free of problems
    - promotes the exportation of clean, un-infested commodities that will not be refused or destroyed once they reach their destination.

***Food Safety***

Food safety takes into account the safety of animal and plant products as they enter the food chain for domestic populations as well as export. Components of a viable food safety system include:

- Internationally compatible food safety regulatory enforcement and a supporting legal framework
- Standard Sanitation Operating Procedures (SSOPs)
- Implementation of Good Agricultural Practices (GAPs) and Good Manufacturing Practices (GMPs)
- National Maximum Residue Level (MRL) legislation is in place, indicating how MRLs would be established or adopted. Pesticide MRLs for all food uses are effectively monitored
- National food safety laboratories and diagnostics for pathogens, residues, and other contaminants) or access to a regional laboratory and personnel with the expertise to collect samples and run appropriate tests
- National monitoring system (such as a food market or basic food basket analysis)
- Official inspection laws governing
    - slaughterhouses and meat processing plants (hides, fleece, cheese, etc.)
    - horticultural products processing and food establishments (tree nuts, dried fruits/vegetables, juices, etc.)
- An adequate system that includes official inspectors in all exporting plants as well as a national residue plan and laboratory to carry out sample diagnostics
- National pesticide legislation, regulations, monitoring and enforcement of pesticides, including:
    - pesticide registration and labeling requirements for all pesticide products (as defined by Codex, including household and antimicrobial products); establishments (formulators, dealers, distributors)
    - complete pesticide registration packages for all products and is able to manage information for all registered products, including public availability for information.
- Pathogen reduction/Hazard Analysis and Critical Control Point (PR/HACCP) systems

***WTO Accessions***

Many newly acceding WTO Members have little or no experience with the accession process, with SPS and technical regulations, or with their WTO SPS obligations. Components of a system which meets WTO SPS obligations include:

- Procedures for incorporating other nations' or public comments into proposed regulations
- Functioning National Notification Authority and Enquiry point
- Incorporation of WTO SPS principles and reference to international standards, where applicable, in the regulatory process
- Provide training to the private sector to ensure they understand and are able to meet new regulations.

## ANNEX II: BIBLIOGRAPHY


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## ANNEX III. AGENDA AND LIST OF ENTITIES VISITED

The USDA assessment team conducted a field visit to Nepal over a week in early November 2017 The following information provides the name of the organizations the assessment team talked to; contact information; and the topic of discussion. This information should be useful in the event there in interest in future field work following this assessment.

The USDA/FAS mission wishes to express its appreciation for the assistance and hospitality provided by the Nepalese counterparts during the assessment visit on November 5-12, 2017. These meetings included Government officials from the following Ministries: The Ministry of Agricultural Development (MOAD); Ministry of Commerce (MOC); Ministry of Health (MOH). We also met with the Nepal Agriculture Research Institute (NARI); Nepal Tea and Coffee Development Board (NTCDB); Nepal Federation of Chambers of Commerce and Industry (NFCCI); Kalimati Vegetable and Fruits Market Management Board; the Central Laboratory at the Department of Food Technology and Quality Control (DFTQC); the national forensic laboratory and the customs laboratory in Bahirawa, at the border with India; USAID/Nepal mission; USAID-KISAN II project; The World Bank (Regional Trade and Transport Project); and the EU delegation (Trade and Private Sector Development project).

**Agenda and Visits - Nepal SPS Needs Assessment mission (November 5 – 12, 2017)**

| | Time | Institution | Topical Discussion | Contact Persons | Address and telephone No. |
|---|---|---|---|---|---|
| Sunday, November 5, 2017 (Kartik 19,2074)[29] | 8:15-9:45 | Assessment Mission | Group Meeting /Orientation | Anita Mahat and Dr. Shakya at Radisson Hotel Lobby | |
| | 10:15-12:00 | Department of Food technology and Quality Control (DFTQC) | Technical meeting (Food laws/regulations; Risk assessments-chemical contaminants, pesticide residues; SPS standards) and Central Food Laboratory visit- | Mr Sanjeev K. Karn/ Director General; Dr. Matina Joshi/Deputy DG and other concerned senior officials; | Babar Mahal, Kathmandu<br>Tel: 01-4262369<br>OK |
| | 13:30-15:00 | Plant Protection Directorate (PPD)of Department of Agriculture/Ministry of Agriculture Development + NPPO - National Plant Quarantine Program (NPQP) | Technical meeting (Pesticide registration/monitoring/storage and disposal related-regulations and practices and constraints and issues; plant quarantine and inspection systems, post entry quarantine, Pest Risk analysis; Pest diseases, Phytosanitary certificates quarantine facilities and diagnostic laboratories etc) | Mr. Achyut Prasad Dhakal, Program Director; Mr. Purushottam Hada, Chief National Plant and team of officials | Harihar Bhawan, Lalitpur<br>PPD-Tel: 01 5521597, And 5535844<br>9841574566<br><br>NPQP-<br>5524352, 5553798<br><br>OK |

[29] Date in parenthesis is as per Nepal Calendar

| | Time | Institution | Topical Discussion | Contact Persons | Address and telephone No. |
|---|---|---|---|---|---|
| | 16:00-17:00 | Ministry of Health and Population / Emergency Health Management Program of MoHP<br>or<br>Surveillance and Research Section<br>Epidemiology and Disease Control Division/Department of Health Services (DoHS) | SPS Risk assessments, disease surveillance; Early Warning And Reporting System (EWARS); Active surveillance system | Epidemiology and Disease Control Division<br>Dr. Bhim Acharya<br>Department of Health Services (DoHS)<br>Teku, Kathmandu | 01-4255796;<br>http://www.edcd.gov.np<br><br>9851096089<br>drbacharya@hotmail.com<br>OK |
| Monday November 6, 2017 (Kartik 20,2074) | 8:45-10:00 | US Embassy/USAID | In-briefing about the assessment work | | US Embassy<br><br>OK |
| | 10:30-12:00 | Joint meet with National Tea and Coffee Development Board (NTCDB), Himalayan Orthodox Tea Producers Association(HOTPA), Himalayan Tea Producers Cooperatives (HIMCOOP) | SPS issues faced in export; SPS Standards; Traceability, Conformity assessment by accredited laboratories/ organic certifications | Mr. Sashi Kant Gautam Executive Director/NTCDB; Deepak Baskota, President /HOTPA; Subash Shanghai, President/HIMCOOP; and some exporters of Tea | New Baneswor, Thapa Gaon<br>9851221849<br><br>01 4495792<br>01 4499786; 01-4490371<br>Gaurab Luitel<br>9849151659<br><br>Prem Acharya<br>OK |
| | 14:00-15:00 | Tribhuvan International Airport ( TIA) | Observation Import inspection – Food and Plant quarantine | TIA cargo terminal and Passenger Arrival section (DFTQC and NPQP agreed but needs to get permission from Civil Aviation Authority); | |
| | 16:30-18:00 | Departure for Bhairawa (Flight at 17:30<br>35 min) | For field visit | (Flight by Buddha Air filght No: U4857, Air ticket and Hotel to be booked in Bhairawa) | |
| Tuesday November 7, 2017 (Kartik 21,2074) | 8:00-11:00 | Depart for Arghakhanchi , Annapurna Organic Agriculture Industry | to inspect Ginger Processing Factory (drying and export) and in route visit KISAN vegetable farming pocket and market | Travel by vehicle; expected to take about 75 minutes each for up/down travel<br>Contact: Mr. Parasuram Acharya | Annapurna Organic<br>Arghakhanchi Tel: 9851103603<br>OK |

| | Time | Institution | Topical Discussion | Contact Persons | Address and telephone No. |
|---|---|---|---|---|---|
| | 12:00-13:00 | Bhairawa Customs office | Custom Inspection system; observe cross border trade between Nepal and India; Observe Custom laboratory | Mr. Bhupal Raj Shakya/Chief Customs Officer **Bhairawa Office** | Siddarthanagar Muncipality ward no. 1, Belahiya, Rupandehi Tel : 071-418003 |
| | 13:00-14:00 | Plant Quarantine Office | Observation -Import inspection system and Plant Protection Laboratories and Rapid Bio assay of pesticide residues laboratory | Regional Plant Quarantine Office and Regional Plant Protection laboratory | Belahiya, Rupandehi 071-418012 OK |
| | 14:30-16:00 | Regional Food Technology and Quality Control Office | Observation -Import inspection system and Food Testing Laboratories | Mr. Hasta Rai - Chief/ | Parsari , Rupandehi 071-520157 9857015157 |
| | 17:30-19:00 | Departure for Kathmandu (Flight at 18:25 35 min) | | Flight by Buddha Air filght No: U4858, | |
| Wednesday November 8, 2017 (Kartik 22,2074) | 8:30 – 10:00 | Kalimati Vegetable and Fruits Market | Observation and discussions with farmers and wholesalers (Vegetable supply chain and Rapid Bio assay of pesticide residues laboratory) | Mr. Tejendra Prasad Poudyal, ED | 01-4810086; Mr. Poudel: 9847041561 Mr. Binaya Shrestha (DD) 9823783009 binaystha@gmail.com |
| | 10:30-12:00 | Agro Enterprise Centre (AEC) of Federation of Nepalese Chambers of Commerce and Industry(FNCCI) | Meeting to get private sectors views on Policy/regulatory reforms; SPS standards settings; export barriers to trade of high value products; third party certification; environment for operation of accredited private laboratories. | Mr. Pradip Maharjan/CEO and some agriproduct exporters and importers | FNCCI Building Teku, Kathmandu Tel: 01 4262260/4262245 OK |
| | 13:00-15:00 | Meeting at Nepal Agriculture Research Institute ( NARI) | Technical meeting to discuss their existing and potential research support roles in pest and disease control; diagnostic services; pest risk analysis; pesticide uses and residue monitoring and MRLs | Dr. Bindeswor Prasad Sah, Director; Dr. Prem Nidhi Sharma, Chief Entomology Division; Dr.Bidhyanath Mahato, Chief Plant pathology Division | NARC complex Khumatar, Lalitpur Dr. Sah:Tel: 9851086919; 01-5525703;5540813 Dr.Sharma Dr.Mahato- |

| | | | | | |
|---|---|---|---|---|---|
| | 15:30-16:30 | National Forensic Science Laboratory, | Explore operational status of toxicological laboratory and its prospect for future toxicological research | Jiwan Prasad Rijal Managing Director | 1-5526927/5553049 National.forensic@gmail.com |
| | 16:30-17:30 | The Organic Village Private Limited | Discuss the issues in promotion of organic products for export; value chain development and Organic certification | Mr. Samir Newa Bakundole, Lalitpur | 9851038161 samir@theorganicvillage.com Tel: 00-977-1- 5549136 |
| Thursday November 9, 2017 (Kartik 23,2074) | 9:00 – 10:30 | US Embassy/USAID | Debrief with USAID Mission Director and Deputy Mission Director (9:00 – 9:30)<br><br>Debrief with USAID and US Embassy Team (9:30 – 10:30 | Peter Malnak, Mission Director; Amy Tohill-Stull, Deputy Mission Director | US Embassy<br><br>OK |
| | 10:30-11:30 | Ministry of Commerce Regional and International Trade and Export Promotion Division | To discuss the trade related SPS issues and barriers; GON policies on export promotion; development partners support to address SPS/TBT related issues and further potential areas of support | Mr. Rabi Shanker Sainju<br><br>Mr Sarad Bickram Rana, ED, TEPC | Singha Durbar Tel: 01-4211643 9851119235 Sarad Bickram Rana,TEPC ED-01-5525898 |
| | 12:30-14:30 | Mission Group Meeting | To | Hotel | |
| | 15:00-16:30 | European Union | To discuss the trade related SPS issues and barriers | Mr. Mim Hamal | Uttardhoka Sadak, Lainchaur (P.O. Box 6754) Tel. +977 1 4429445 (Ext-116) \| 9851130909 |
| Friday November 10, 2017 (Kartik 24,2074) | 9:00-11:00 | Combined Meeting with KISAN II and Nepal Seed and Fertiliser Project (NSFP) | | Mr. Phil Broughton/COP-KISAN II; Mr. Dyutiman Choudhary/COP NSFP | Phil-9801166647 9808973261 Mr. Dyutiman 9851243703 |
| | 11.30-12:30 | World Bank Project | To discuss the trade related SPS issues and barriers; GON policies on export promotion; development partners support to address SPS/TBT related issues | Mr. Murari Gautam/ NIRTTP | |

| | | | | | |
|---|---|---|---|---|---|
| | 14:00-15:30 | Observation visit in one Private sector Laboratory (Zest Laboratory- Dr. Basnet, Proposed- TBD) | Sharing Experiences of establishing an accredited laboratory; their existing and potential laboratory and research services in ensuring food safety- pesticides/veterinary drugs, other chemical contaminants | Dr. Sobha Basnet | 9851055140<br>OK |
| | 15:30-17:00 | Mim Hamal, EU | | | Open for contingency adjustments |

## ANNEX IV. DONORS MAPPING - WHO'S WHO WORKING ON THE SPS SYSTEM IN NEPAL

This assessment is supported by an in-depth literature review that serves as background information; it has also been informed by multiple conversations with both the USAID/Nepal Mission as well as with other donors, including the International Trade Centre (ITC), which is engaged in preparing a series of national strategies for targeted commodities on behalf of the GON. The FSN team avoided duplication of past efforts to the extent possible and distilled the previous studies into the most important findings. A summary of the various donors' current engagement in building capacity of the SPS policy and regulatory system in Nepal is presented in the donors' mapping Table below, at the end of the Executive Summary.

| SPS Policy and Regulatory Issues | Analytical Testing (Testing exports for compliance with safety standards in major markets) | Risk Based Management (Customs' inspection) | Standards Setting (MRLS, GAP standards) | Extension Services ("farm to fork" communication) |
|---|---|---|---|---|
| **World Bank – Regional Trade and Transport Project (NIRTTP):**<br>Completed activities under this project: (i) assessment of phytosanitary system in Nepal; (ii) gap analysis of Nepal's current SPS system vis a vis WTO compliance.<br>• Activities in the pipeline: (i) traditional trans-border trade study (w/policy actions for MOAD); and (ii) SPS system management of inter-regional trade; (iii) survey on pest surveillance methods for six major agricultural crops and three major medicinal and aromatic plants of Nepal (large cardamom, ginger, tea, coffee, tomato, and apple). | **EU - Trade and Private Sector Development project, (TPSD)**: to promote trade and private sector competitiveness.<br>• (i) To work on national quality infrastructure for compliance with food safety standards in export markets; and (ii) coffee value chain strengthening: improvement of quality and productivity of exportable coffee products.<br><br>**World Bank – Regional Trade and Transport Project (NIRTTP):**<br>Ongoing activities under this project: (i) infrastructure building: quarantine reference and diagnostic laboratory; (ii) construction of fumigation chambers and post quarantine inspection facilities. | **World Bank – Regional Trade and Transport Project (NIRTTP):**<br>• Ongoing activity under this project: establishment of Customs' Food Testing Laboratories at land borders w/India.<br><br>**International Trade Center (ITC):**<br>customs' infrastructure strengthening; Nepal-India transit and trade facilitation customized studies and applied research. | **USAID/KISAN II:**<br>Enhance market infrastructure and other services to support selected market systems (Grading, testing and standards adherence services);<br><br>Support agricultural market systems development in order to expand trade in domestic and regional markets, including (i) interventions to upgrade product quality and fulfil SPS requirements; and (ii) GAP standard promotion to improve the quality of selected commodities. | **USAID/KISAN II:**<br>Objectives: increase agricultural productivity and incomes and improve the private sector's role in agriculture extension services to smallholder farmers.<br><br>Value chains selected: rice, maize, lentils, vegetables, and one or two yet-to-be-selected commodities. |

| SPS Policy and Regulatory Issues | Analytical Testing (Testing exports for compliance with safety standards in major markets) | Risk Based Management (Customs' inspection) | Standards Setting (MRLS, GAP standards) | Extension Services ("farm to fork" communication) |
|---|---|---|---|---|
| **The European Union - Trade and Private Sector Development project, (TPSD)**<br>Objectives: (i) to enhance trade policy formulation/trade promotion capacity of the Ministry of Commerce and Supplies (MoCS) and related agencies.<br><br>**International Trade Centre (ITC):** Business survey on non-tariff measures (NTMs) and related trade obstacles and sector export strategies (SES) on key priority products (ginger, tea, cardamom, honey and coffee).<br><br>**KISAN II:**<br>Policy component: to build capacity for streamlining, harmonizing, and coordinating GON policies and regulations<br><br>**GIZ:** Trade Promotion Program in Nepal; funded the revised Nepal Trade Integration Strategy (NTIS) 2016. The program assists project implementation activities by the Nepalese Ministry of Commerce, as well as 21 World Trade Organization focal points in other ministries and departments involved in implementing the NTIS. Other partners that receive support include the Nepal Chamber of Commerce, the Federation of Nepalese Chambers of Commerce and Industry, the Confederation of Nepalese Industries, the Trade and Export Promotion Centre, and sector associations engaged in the five targeted value chains.<br><br>**ADB- Country Partnership Strategy (2013-2017)-Ag Sector Assessment**: The Country Partnership Strategy for 2013–2017 is aligned with ADB's Strategy 2020 and comparative strengths and Nepal's own development strategy. The new strategy also complements efforts by other development partners. | **International Trade Center (ITC):** export promotion of small businesses; technical assistance on implementation of SPS/TBT measures including: standardization, conformity assessment, metrology, technical regulations, and accreditation; development of export guides focusing on quality-related issues linked to the in-country quality infrastructure. | | | **USAID/CIMMYT:** Nepal Seed and Fertilizer project (NSAF): to build competitive seed and fertilizer systems to expand seed production, marketing and distribution through public-private partnerships in seed and fertilizer value chains development.<br><br>USAID-KISAN I project under the **USAID/Farmer 2 Farmer Program**<br><br>**IDE-DFID:** Anukulan-BRACED Program; The project facilitates the development of sustainable rural organizations around economic opportunities in agriculture, water resource management, and community forestry.<br><br>**USAID/Feed the Future Asia Innovative Farmers Activity:** scaling up of agricultural technologies through the development of regional innovation ecosystem, commercial partnerships, regional technology transfer, and improved regional policy-enabling environment. |

# ANNEX V: RISK CHAIN CAPACITY BUILDING

Risk management is a process by which farmers, government officials and other decision makers detect, evaluate, and choose mitigating measures that will reduce the risk of food contamination and/or adulteration throughout the food chain. The process consists of the following actions:

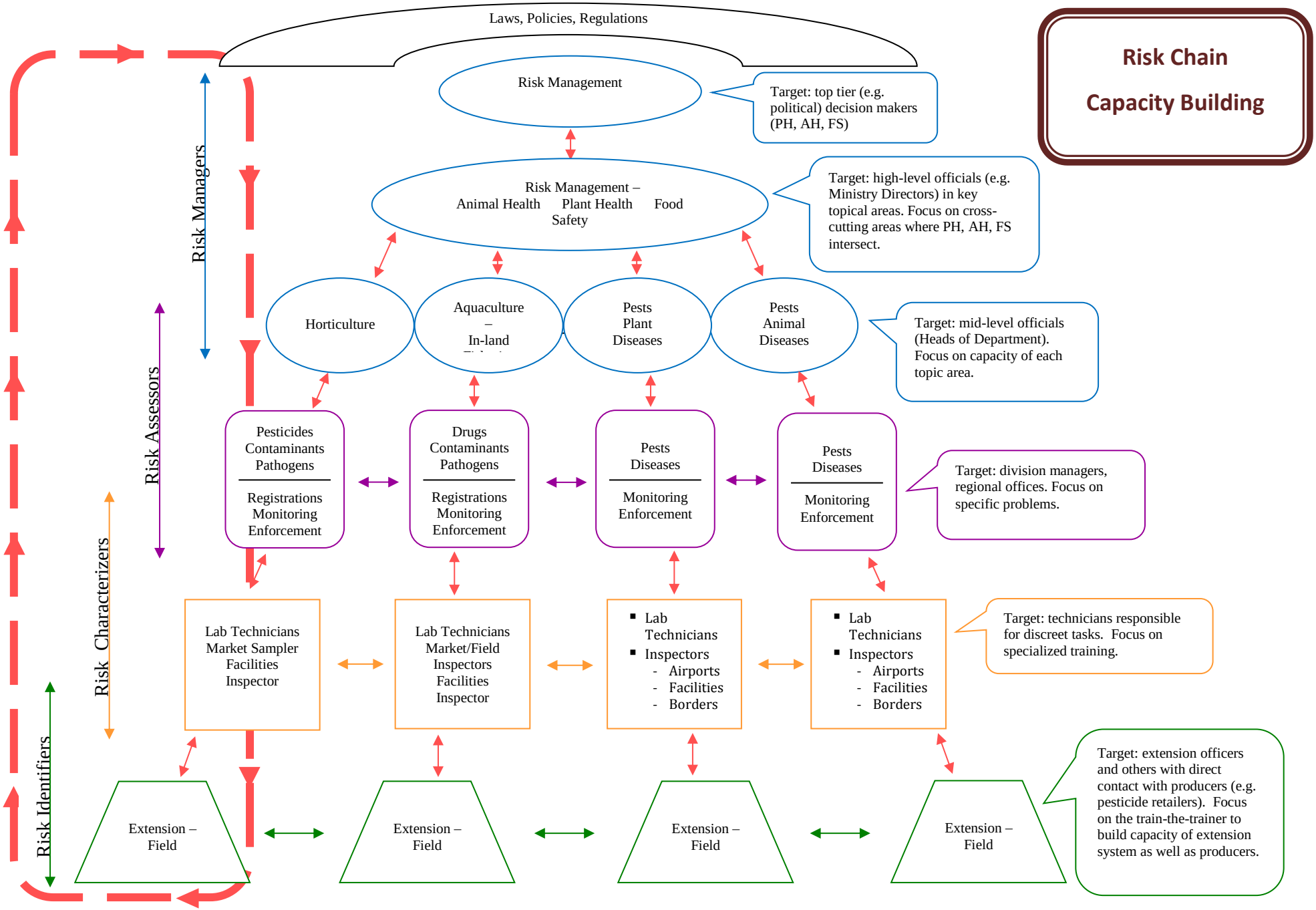
1) Hazard identification: this is the beginning of a process where a risk (real or perceived) is identified and an action (decision) is needed in order mitigate the risk. For example, this can be a field extension officer noticing an insect on a crop, or an officer noticing adulterated produce in the central distribution market. They may not know exactly if the insect or chemical is really dangerous or not. They take a sample and hand it over to an analytical expert at a laboratory.

2) Hazard characterization: a laboratory technician receives the insect or food product sample; it is their job to characterize what that hazard is. The technician will identify the insect or analyze the residue on the produce to determine exactly what the insect or chemical is. They will report this information up to a risk evaluator.

3) Risk evaluation/assessment: a higher ranking official receives the report describing the insect or chemical, and learns that the insect is a thrip, or the chemical is a registered (legal) pesticide. The job of the risk evaluator is to determine the extent of the hazard – is it a real or perceived hazard? Is the thrip of significant danger to the crop or whole industry? Is its occurrence widespread or an isolated case? What was the level of pesticide found? Does it exceed human health standards, or is it within safety limits?

4) Risk management: this information will be passed to a regulatory (enforcement) authority that will make a decision about a response. If the pesticide exceeded human health safety standards or contains a quarantine pest, the authority may decide to pull the produce from the market and destroy it. If it does not exceed limits, but is close, the authority may decide to enhance sampling and monitoring.

The following figure on "Risk Chain Capacity" shows the risk management process broken down into its key actions: hazard identification; hazard characterization; risk assessment and risk management.




**Feedback Loop:**

Policies provide direction – Assessors implement actions to enforce policies – Technicians then know what to test for – Field officers know what to look for.

Field officers find a problem – Technicians identify the problem – Assessors determine the problem's importance – Policy makers can set new guidance.

# ANNEX VI: WHO HEALTHY FOOD MARKETS INITIATIVE BACKGROUND

The WHO Healthy Food Markets initiative has developed step-by-step guidelines for upgrading traditional markets to improve hygiene and reduce risk of diseases, and have documented some global case studies. (WHO, 2006) The guidelines highlight three basic principles that underpin the concept of a Healthy Food Market:

- The provision of safe and nutritious food;
- The promotion of food safety from production to consumption; and,
- The fostering of partnerships between suppliers, government and consumers.

The WHO points out that the various stakeholders have to see the advantages for expending the effort and expense to upgrade and maintain a cleaner, safer market place, and they have to be closely involved in the effort to ensure ownership and sustainability. The awareness of food safety matters should be disseminated for all who produce, handle and prepare food in and for markets (farmers, transporters, distributors, vendors, and food service personnel), and specifically in relation to the foods they handle.

Donors can certainly support the upgrading of a traditional market, but stakeholders' motivation is crucial to success. A Healthy Food Market pilot project is also best guided by a multi-sectoral team or task force that should meet periodically to oversee and monitor progress of implementation. A multi-sectoral team should involve vendors' associations, consumers' organizations, as well as government officials and academia. Representatives from agriculture, fisheries and animal husbandry may be involved to address problems that arise during production. Municipal authorities should be included to ensure that essential services and support are provided to the market. Government and academic experts in food safety are essential advisers. Public health authorities with knowledge of community and occupational health should also be included.

Most markets have some capacity to support improvements in terms of funds, materials, labor or other in-kind contributions. Funding of the project could include income generating activities in the food market, such as small fees to use the toilet facilities or the sale of ice or bleach. Improvements of market facilities like refrigerators, cold displays and storage equipment could be supported by vendors themselves.

Because they function as public goods in a wet market, basic infrastructure improvements, like safe water supply, toilets and handwashing facilities, waste disposal, and health services may require outside funding in the form of grants or loans.

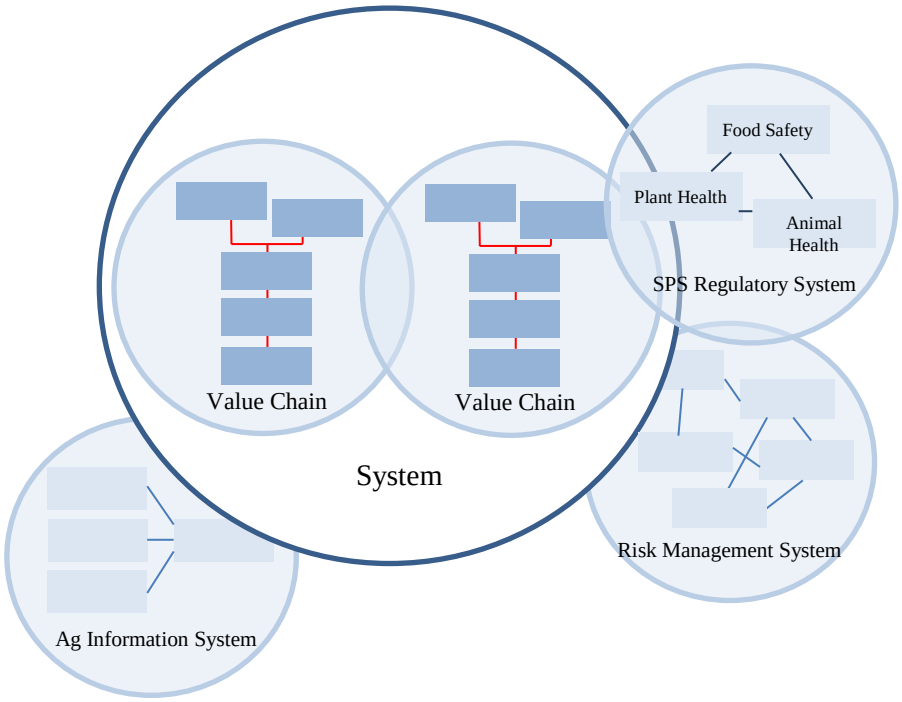
Other options to provide financial resources could be 'market fees'. Provision of major infrastructure and services by city and other responsible authorities should be considered as part of urban development planning, but can be supplemented with donor funds.

Stakeholders must then set objectives and indicators to be measured over the short and longer term. Specific components of a wet market development plan may include zoning requirements within the market to avoid cross-contamination. Livestock and poultry in particular should be slaughtered and handled far from ready-to-eat food. Administrative and management systems need to be established including food inspection services. Access to health services must be provided for vendors and employees, but also to reduce transmission of contaminants from people to food. Local health services capacity may need to be upgraded to be able to test for and detect food-borne diseases. At the same time, local authorities need to monitor quality and quantity of water delivered to markets.

# Annex VII. Market Systems Approach to Value Chain Development

For a country to increase agricultural yields, robust market systems must be in place to ensure those yields are fully realized in: nutritional value; consumer food safety; increased local, regional, and international trade; and greater incomes all along the value chain. Exploiting different value chain intersections with supporting market systems will help avoid redundancy in market systems development and leverage complementary project resources.

**Example of Interconnected Agricultural Market Systems Supporting Value Chains**




Agricultural market systems, such as SPS, risk management, and market information, interact with one another. Changes in one system can affect the functioning of other systems. While no single project can be expected to simultaneously transform multiple systems, such interconnectivity sometimes allows practitioners to trigger broad-scale change in the market system by targeting linkages with other systems. By understanding the connections between systems, practitioners can decide whether to address a given constraint in a linked system, or find ways to mitigate its impact.[30]

Important market system considerations related to agricultural value chains include:

- **Agricultural inputs systems:**
  - Impact of contaminants (toxins, chemicals, dirty water, etc) on food safety and trade.
  - Policy frameworks that enable the proper use of and access to clean irrigation, safer formulas (pesticides, fertilizer), and seeds.
  - Functioning laboratory systems that can validate chemical inputs, i.e. that is detect counterfeit products.

[30] https://drive.google.com/drive/folders/1Jn0ntqQ9Ar7ENRSdIt5KJVM3CnrkPf2c

- **SPS regulatory systems:**
    - Robust system that monitors agricultural production in safe food for domestic and international consumers.
    - Harmonization/mutual recognized policies, regulations, border processes including those that enables and expedites agricultural trade, emergency response to pests and plant/animal diseases and food safety outbreaks, and WTO obligations.

- **Risk Management Systems:**
    - Science-based processes in place to identify hazards, evaluate risk to health, set risk limits, and enforce regulatory decisions
    - Effectively communicate risk to the public, with transparent and science-based information
    - Ensure that risk systems are consistent with international norms, both protecting health and encouraging the flow of trade

- **Market Information Systems:**
    - Improved collection, analysis, and dissemination of agricultural information including:
        - Agricultural Statistics
        - Agricultural Market Reporting
        - Agricultural Data Analysis
        -
- **Postharvest Loss Systems:**
    - Reducing postharvest loss is critical to strengthening global food security, not just by increasing the availability of food, but also by supporting farmer incomes.
    - Good post-harvest practices improve sanitation and pest pressures.
    - Cold chain capacity enables farmers and businesses to handle perishable agricultural products through various stages of the value chain.

## ANNEX VIII: ACHIEVABILITY "ROAD MAP"

The below are illustrative costs for a quick trip, excursion, long haul scenarios

**Quick Trip Cost Summary Table- $445,000**

| Amount Needed for Implementation | Possible Funding Source |
|---|---|
| $10,000 | USDA/US Codex Office |
| $20,000 | Food Safety Network |
| $75,000 | CropLife |
| $100,000 | STDF |
| $240,000 | Unknown |

| | | | | |
|---|---|---|---|---|
| STANDARDS ADOPTION | **Quick Trip:** Understand why/how international standards are established in order to encourage development of regulatory processes for adoption of Codex or other international standards. Assist exporting businesses in adopting HACCP/GMP processes in order to secure and expand exports, and also ensure a safer domestic food supply. | | | |
| | Adopting Existing International Standards | **ACTION** | **Funds Needed** | **Funding Source** |
| | | Ia) Codex Participation - I | $10,000 | US Codex Office |
| | | 1b) Codex Standards | $50,000 | Travel - FSN<br>Fees - Needs to be identified |
| | | Ic) Organic Ginger Processing Consult | $15,000 | Needs to be identified |
| | | Id) National Tea and Coffee Development Board Support | $15,000 | Needs to be identified |
| | Other standards | Ie) National Tea and Coffee Development Board Complaint Review | $0 | n/a |
| RISK-BASED MANAGEMENT SYSTEM | **Quick Trip:** Understand the basic concepts of risk-based systems and principles in order to guide the decisions for new sampling/testing procedures at borders (to more efficiently direct resources) and to encourage incorporation of risk-assessment in regulatory decisions (science-based justifications). | | | |
| | Understanding Risk-based Systems | IIa) Risk-based Sampling/Testing Training | $10,000 | Needs to be identified |
| | | IIb) Risk in the Food System Training | $50,000 - $100,000 | Needs to be identified |
| | | IIc) Risk Assessment Training | $50,000 - $100,000 | CropLife, FSN |
| | | IId) Kalimati Market Sampling Guidance | $15,000 | Needs to be identified |

| | | | | |
|---|---|---|---|---|
| ANALYTICAL SYSTEMS | **Quick Trip:** Connect analytical service providers with clients, and provide analytical labs with essential skills to provide basic services. | | | |
| | Strengthening Current Analytical Services | **ACTION** | **Funds Needed** | **Funding Source** |
| | | IIIa) Diagnostics Training | $30,000 | Needs to be identified |
| | | IIIb) Informational Meeting between Labs | $0 | n/a |
| | | IIIc) Rapid Bioassay Method Training | $30,000 | Needs to be identified |
| | | IIId) Lab Collaboration Framework | $10,000 | Needs to be identified |
| | | IIIe) Lab Enforcement Review | $10,000 | Needs to be identified |
| RESEARCH TO FARMER COMMUNICATION | **Quick Trip:** Export-oriented farmers and exporters acquire more pest control tools that comply with organic standards and reduce rejections in export markets due to residue violations. | | | |
| | Extension - Organics | IVa) Biopesticide Review | $100,000 | STDF |

**Excursion Cost Summary Table**

| Amount Needed for Implementation | Funding Source |
|---|---|
| $570,000 - $645,000 | Needs to be identified |

| | | | | |
|---|---|---|---|---|
| STANDARDS ADOPTION | **Excursion:** Gain the ability to establish national standards for priority food hazards and a traceability system for important value chains. | | | |
| | Establishing New National Standards | **ACTION** | **Funds Needed** | **Funding Source** |
| | | If) National Standards Guidance | $25,000-$75,000 | Needs to be identified |
| | | Ig) Nepal GAP Guidance | $25,000 | Needs to be identified |
| | | Ih) Traceability Guidance | $50,000-$75,000 | Needs to be identified |
| RISK-BASED MANAGEMENT SYSTEM | **Excursion:** Establishment of a national food safety monitoring program in order to reduce food-borne illness within the domestic food supply, but also supporting safety of export products. Also, begin implementing some basic risk-based practices for pesticide registrations and fresh markets. | | | |
| | Developing Risk-based Systems | IIe) PRA Training | $100,000 | Needs to be identified |
| | | IIf) Food Safety Monitoring | $100,000 | Needs to be identified |
| | | IIe) Inspection Training | $150,000 | Needs to be identified |
| | | IIf) Pesticide Efficacy Trials Training | $50,000 | Needs to be identified |
| | | IIg) Kalimati Market Management Training | $30,000 | Needs to be identified |
| ANALYTICAL SYSTEMS | **Excursion:** Establishment of a national DFTQC laboratory system that is efficient and effective, but also utilizes limited resources wisely. | | | |
| | Strengthen Current Analytical Services | IIIf) Reference Lab Guidance | $40,000 | Needs to be identified |
| RESEARCH TO FARMER COMMUNICATION | **Excursion:** NARI is able to support organic and export-oriented farmers by providing efficacy research and collaborating with PPD for pro-actively seeking and registering reduced-risk pesticides/biopesticides. | | | |
| | Strengthen Agricultural Research | IVb) Biopesticide Research | $100,000 | Needs to be identified |

**Long-Haul Cost Summary Table**

| Amount Needed for Implementation | Funding Source |
|---|---|
| $1.2 million | Needs to be identified |

| | | ACTION | Funds Needed | Funding Source |
|---|---|---|---|---|
| STANDARDS ADOPTION | **Long haul:** Engage and contribute to priority Codex Committees and regional coordination meetings in order to ensure the inclusion of Nepal's national interests into international standard setting; adopt international standards continually and consistently; increase the number of farmers and processors practicing Nepal GAP, GMP, HACCP, etc. | | | |
| | Contribute to international standard setting and implement national and international standard processes | Ii) Codex Participation - 2 | $30,000 | Needs to be identified |
| | | Ij) Farmer and Food Processors/Packagers Standards Training | $200,000 | Needs to be identified |
| | | Ik) Value Chain Stakeholders Traceability Training | $150,000 | Needs to be identified |
| RISK-BASED MANAGEMENT SYSTEM | **Long haul:** Border inspectors conduct risk-based sampling of products entering Nepal and can identify most pests and diseases found on products. PPD is able to carry out PRAs routinely for priority product exports. DFTQC has a basic system in place for monitoring pesticides, aflatoxin, and environmental contaminants from Kalimati market, private markets, and retail stores. PPD conducts basic risk assessments for registering pesticides and has a basic system in place to monitor pesticide product quality. | | | |
| | Implement Risk-based Systems | IIf) Pest/Disease Inspection Training | $200,000 | Needs to be identified |
| | | IIg) PPD Capacity Building | $100,000 | Needs to be identified |
| | | IIf) Safe Pesticides Campaign | $200,000 | Needs to be identified |
| ANALYTICAL SYSTEMS | **Long haul:** Analytical service providers are accredited and are able meet basic needs of clients by providing certified test results for pesticides, heavy metals, aflatoxins and other contaminants. | | | |
| | Implement a National Analytical Services | IIIe) Fee-for-Service Guidance | $50,000 | Needs to be identified |
| | | IIIf) Establish National Accreditation Authority | $50,000 | Needs to be identified |
| | | IIIg) Proficiency Testing Program | $100,000 | Needs to be identified |
| RESEARCH TO FARMER COMMUNICATION | **Long haul:** A communications/extension system is developed that can share basic information up and down the value chain, such as pest and disease information, horticultural innovations, pesticide and fertilizer recommendations, and food safety alerts. PPD works to remove and replace the most highly hazardous pesticides from the market. | | | |
| | Strengthen Ag Research | IVc) Improve Extension Service | $200,000 | Needs to be identified |