CABI WORKING PAPER 4

More Trade, Safer Trade:
Strengthening Developing Countries' Sanitary and Phytosanitary (SPS) Capacity

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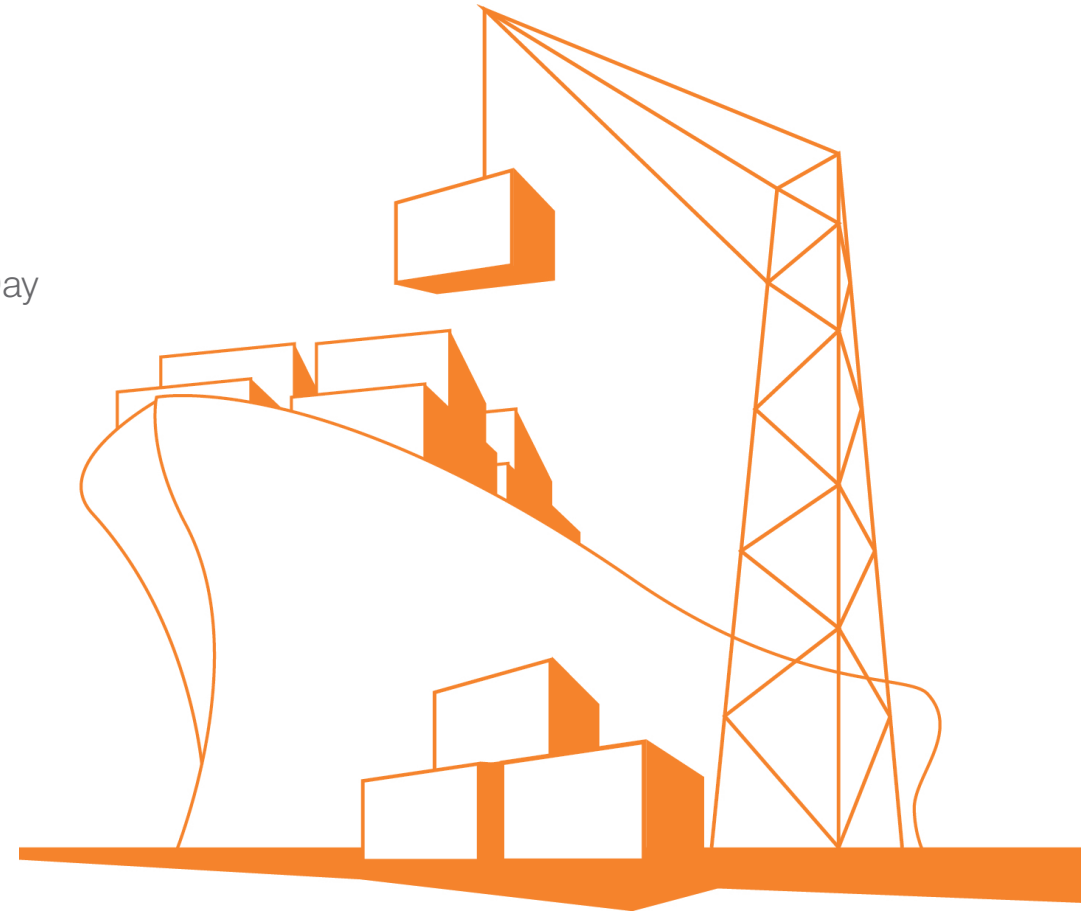

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Summary

Trade is an ‘engine of development’, and one-third of all official development assistance is now ‘aid for trade’. But trade carries risks. Shipments of food can harbour microbes capable of causing sickness and even death among consumers. Pests and diseases of plants and animals can inadvertently be transported along with the goods, threatening the importer’s agricultural production. Food and feed may be contaminated with pesticide residues or other chemical toxins.

To reduce these risks without unduly restricting trade, the Sanitary and Phytosanitary (SPS) Agreement of the World Trade Organization (WTO) allows importing countries to adopt SPS measures. SPS measures must be scientifically justifiable, and preferably based on international SPS standards recognized by the Agreement. Sometimes the market itself also sets standards as a way of providing customers with an assurance of quality.

Countries that want to access and maintain export markets must be able to comply with the importing country’s public and market standards. Government regulatory agencies and the value chain actors must have the capacity to undertake a range of SPS functions, which together provide assurance to the importing country that SPS risks have been managed to an acceptable level. Shortcomings in SPS capacity mean developing countries lose market opportunities.

SPS capacity development seeks to strengthen countries’ abilities to support their exports and maintain their own biosecurity. Capacity is a function of organizations and systems, not just individuals, so capacity development is much more than training. The identification, prioritization, conduct and type of SPS capacity development activities all affect the extent to which intended outcomes and impacts are achieved.

CABI is an intergovernmental organization that has been working in agricultural research and development for over 100 years. Its member countries have requested assistance in SPS capacity development, which is relevant to its thematic areas of invasive species, commodity crops, knowledge for development and knowledge management, as well as its taxonomic expertise. Currently CABI undertakes work in phytosanitary capacity development, some in food safety, but little in animal health.

There is demand and potential for CABI to make further contributions to SPS capacity development, in partnership with national, regional and international organizations. This could be achieved through: increasing internal awareness of how existing plant health expertise can be used in the SPS context; utilizing skills and experience from developed country food safety systems; deploying information, communication and knowledge management expertise in SPS capacity development; extending taxonomic support from production to trade contexts; promoting SPS capacity development in developing countries for biosecurity, not just exports; linking SPS capacity development more closely to the organization’s value chain work; and promoting good practice in SPS capacity development.

Introduction

This paper is about a subject commonly known simply as 'SPS', an abbreviation of 'sanitary and phytosanitary'. Although an adjective, 'SPS' is often used as a noun, to mean the broad area of activity related to implementation of the World Trade Organization's (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures. The SPS Agreement was one of around 60 agreements that were part of establishing the WTO, which came into force on 1 January 1995. Management of the risks covered by the SPS Agreement was going on long before the WTO was established, but the SPS Agreement has brought the subject more sharply into focus, in both developed and developing countries. SPS issues stand at the nexus between trade, development, agriculture, human health and the environment, so are of relevance to many different people.

CABI is an intergovernmental organization that 'improves people's lives by providing information and applying scientific expertise to solve problems in agriculture and the environment'. Thus SPS issues are related to CABI's mission, and are directly relevant to the member countries whose interests the organization serves. But although CABI has been working in agricultural development for over 100 years, only recently has it become more directly involved in SPS-related work.

Many of CABI's member countries are developing countries, and have requested the organization to do more work in the area, so SPS capacity development in developing countries is the focus of this paper. Other possibilities for CABI's contribution in the SPS arena will be addressed elsewhere.

The first part of the paper (Section 1) summarizes the SPS 'problem', describing what SPS is about, and what must happen for a national SPS system to function effectively and ensure compliance. Efforts to enable countries to overcome constraints to compliance can be described as 'capacity development', so Section 2 examines SPS capacity development and what it entails. Then in Section 3 the current and potential role of CABI in SPS capacity development is discussed.

1. The SPS Problem

1.1 Trade and development

Trade is the 'lifeblood of global economies' (DFID, 2011), driving economic growth and reducing poverty. Increasing a country's trade by 10% can raise incomes by 5% (Feyrer, 2009) so there is now much emphasis in international development on promoting trade. The Doha Round of WTO negotiations, commencing in 2001, introduced a strong emphasis on development and building trade-related capacity, as a result of which the WTO's 2005 Hong Kong Ministerial Declaration established the Aid for Trade (A4T) initiative. Around one-third of global official development assistance[1] now comes under A4T (OECD and WTO, 2011).

[1]Sector allocable official development assistance, i.e. excluding debt relief, emergency aid, refugees.

Agriculture is central to the economies of many developing countries, so trade in agricultural products is potentially a key component of their economic development. Global trade has expanded rapidly in the last decade, including trade in agricultural products (Figure 1), yet developing countries' share of global trade is still relatively low (Ercsey-Ravasz *et al.,* 2012).

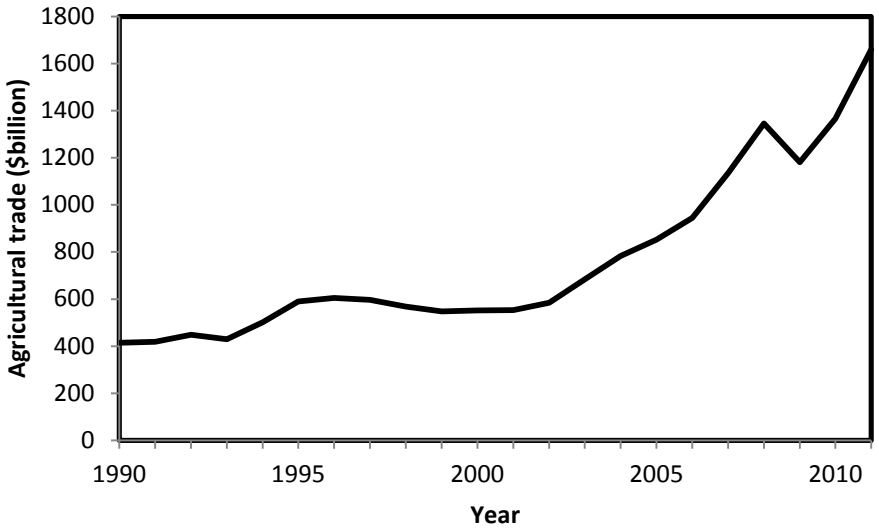

Fig. 1. World trade in agricultural products. (Data from http://stat.wto.org)

World Bank (2007) identified four categories in which developing countries' agricultural trade could be expanded. First, there are the bulk commodities, whose production, in many cases, was established in the colonial era, including crops such as coffee, cotton, cocoa, tea, tobacco, cashew and others. While these crops are still important revenue earners for developing countries, global prices have generally fallen. But there are various product differentiation opportunities such as specific origin, organic and fair trade, and potential for more processing in the countries of production. Second, in the last two decades, some developing countries have already diversified from these traditional exports to higher value fresh or processed products such as fish, horticulture and meat. Opportunities were created by advances in transport and supply chain technologies allowing fresh produce to reach distant destinations in good condition, as well as increasing developed country consumer demand for fresh produce at all times of the year. Reduced tariffs and continuous production have increased developing country competitiveness in these markets. Third, on a smaller scale urbanization and rising incomes are creating domestic or regional market opportunities for higher value, semi-processed or processed products and convenience foods. And fourth, surpluses of staple foods can also be traded, particularly on regional markets.

Jaffee *et al.* (2011) categorized market opportunities for developing countries into six levels (Table 1), based on the stringency of market requirements rather than the type of product. The higher the level, the more stringent the official and market standards (including SPS), so the more sophisticated the systems must be for ensuring conformity.

Table 1. Spectrum of regulatory and market requirements in agri-food systems. (Adapted from Jaffee *et al*., 2011)

Market level	Typical target market	Market requirements	Regulatory process
1	Developing country traditional retail markets and small stores	Visual characteristics.	Visual inspection
2	Developing country small local supermarkets	Quality grades and varietal preferences. Consistent quality and quantities.	Visual inspection
3	Developing country high-end/international supermarkets	Internal quality characteristics of products. Basic requirements on pesticide use.	1st and 2nd party inspections/testing
4	Industrialized country retail markets, local stores	Selected basic standards, basic good agricultural practice (GAP), good hygiene, and approaches to safe pesticide use/storage and record keeping.	2nd and 3rd party conformity assessment
5	Industrialized country discount supermarkets	More-advanced and specific process standards with more-detailed record keeping.	2nd and 3rd party conformity assessment
6	Industrialized country high-end supermarkets	More-advanced and specific process standards in the context of highly integrated supply chains. Sophisticated quality control and risk management systems at suppliers.	2nd and 3rd party conformity assessment

Table 1 draws attention to the fact that while the WTO SPS Agreement applies to all trade between countries, SPS issues are part of a wider set of market requirements for which compliance systems must be established. It also emphasizes that the stringency of conformity requirements tends to increase with the value of the market, although the extra costs of compliance may not necessarily make the higher levels more profitable.

1.2 SPS hazards and risks

Trade in agricultural products carries risks to human, animal and plant health. Foods may contain microorganisms capable of causing disease and even death (see Box 1). They may also contain potentially harmful residues of chemicals used during production, such as pesticides or veterinary drugs, or those used during processing, such as food additives. Animal products can carry the microorganisms responsible for diseases in animals as well as humans. And plant products can carry pests from an exporting country to an importing country where they are not found, but where once established they could cause serious crop losses.

The microorganisms, chemicals or pests that may be transported during trade are technically referred to as hazards, while risk is the probability of an event occurring, multiplied by the consequences if it does. It is with the determining and managing of these risks that SPS systems are concerned.

Box 1: Unsafe food; Germany 2011

In May and June 2011 nearly 4000 people were affected by a food-borne bacterium, *Escherichia coli* strain 0104:H4. Most cases were in Germany where over 50 people died. Initially German officials identified cucumbers imported from Spain as the source. But the *E.coli* found on Spanish cucumbers was not the strain causing disease, and probably contaminated the vegetables in Germany anyway. In early June it was found that the source of the disease-causing *E.coli* was bean sprouts from a farm in Lower Saxony. Later there was a suggestion that the fenugreek seeds used to grow the bean sprouts were the source of the infection, and they had been imported from Egypt. Whatever the origin of the bacteria, the impact was enormous. By 8 June it was estimated the outbreak had cost US$2.84 billion in human losses alone, aside from the material cost of unsold produce (Marler, 2011). Demand for fresh fruit and vegetables plummeted across Europe, and EU (European Union) farmers claimed losses of up to €400 million per week (COPA-COGECA, 2011).

1.3 SPS systems

The WTO's Agreement on the Application of Sanitary and Phytosanitary Measures recognizes that countries have a sovereign right to protect their human, animal and plant health by managing these risks. But SPS measures could also be used to restrict trade for other reasons such as protectionism. The SPS Agreement was thus designed to provide a set of rules, backed up by a dispute settlement mechanism, that allows countries to adopt measures to protect human, animal and plant life from the risks arising from the entry, establishment or spread of pests, diseases or disease-carrying organisms, but ensuring that such measures are not disguised barriers to trade. The agreement thus covers the three areas of food safety, animal health and plant health. Key elements of the agreement are:

- International standards as the basis for harmonized SPS measures
- Risk assessment based on scientific principles and evidence
- Consistency in the application of appropriate levels of protection (non-discrimination)
- Acceptance of equivalence of measures
- Transparency through notification of measures

The SPS Agreement recognized the danger that limited capacity to implement the Agreement could constrain some countries from participating in expanding global trade. The Agreement therefore included a number of provisions to assist developing countries, including Article 9 on Technical Assistance and Article 10 on Special and Differential Treatment.

Figure 2 depicts some of the key elements of an SPS system, through which the provisions of the SPS Agreement (and other market requirements regarding SPS) are implemented; the framework could also apply to any of the three SPS areas individually. A national SPS system is thus a combination of various components, which are described in the following sections.

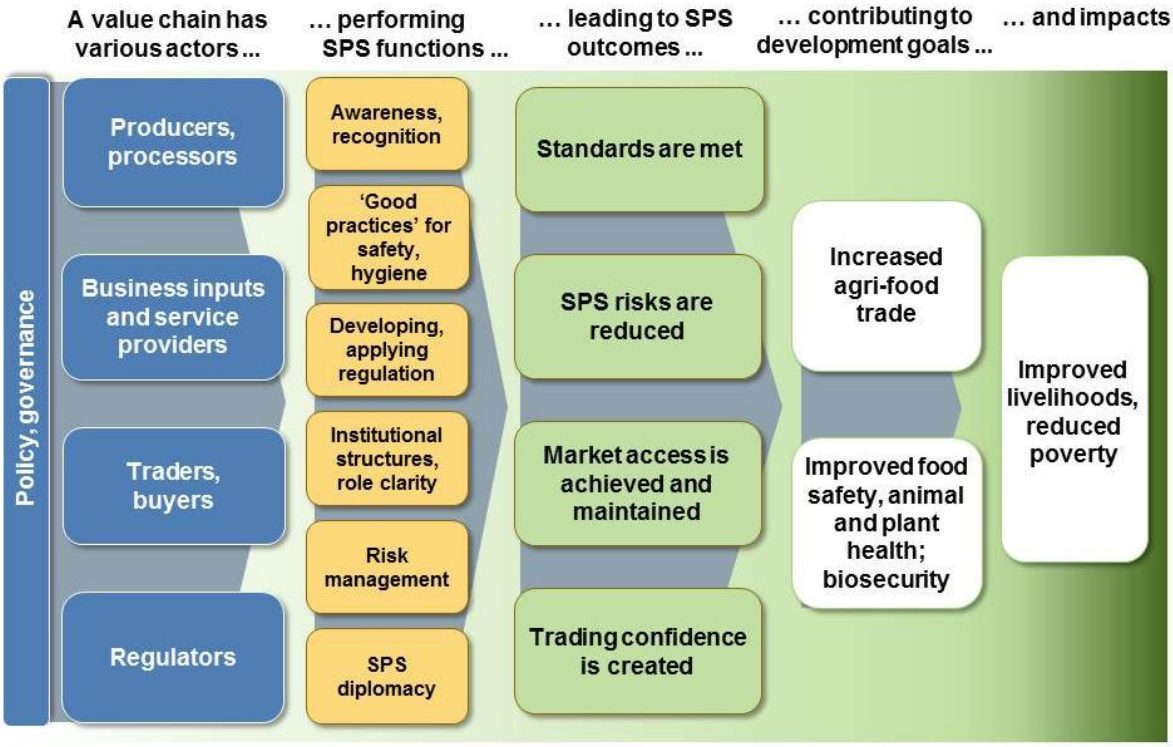

Fig. 2. The components of an SPS system.

1.3.1 Policy and governance

Policy and governance provides the context within which SPS functions occur. Relevant national policy may be dispersed between the technical areas, and between policies covering production, and trade and exports. Many countries have legislation covering food safety, plant protection, and livestock health and veterinary services, which needed updating following the entry into force of the SPS Agreement. Such legislation includes conferring mandates and responsibilities on government bodies responsible for making and enforcing regulations. In some cases there may be insufficient authority for importers to be confident that there is a 'competent authority' capable of ensuring standards are met. In other cases mandates may be unclear, with overlaps or gaps; food safety is probably more prone to such difficulties as aspects of it fall within the mandate of various ministries including health.

There may also be regional policy relevant to SPS issues. For example, in Africa a number of regional economic communities (RECs) have established their own SPS regulations,

although it has been suggested that these do not always add value to the WTO SPS Agreement, and in some cases might actually contradict it (Magalhães, 2010).

1.3.2 Actors

There are many different actors involved in SPS systems, corresponding to the participants in the value chains involved. For the purposes of this discussion, four categories of actor are identified: producers and processors; business inputs and service providers; traders and buyers; and regulators. Their roles are briefly described, and some of the constraints they face highlighted.

Producers and processors of food and agricultural products have a direct role in implementing various SPS measures. Examples are in the use of hygienic practices to ensure that fish are not contaminated at a landing site; management of crop pests so that they are not present in consignments; and managing livestock to prevent them contracting diseases of sanitary importance. In developing countries there are many small farms or enterprises involved in agricultural production, so a major challenge is in ensuring that they are all aware of SPS issues, and have the information and capacity to implement the necessary procedures and practices. This challenge is usually addressed through institutions such as cooperatives, or through supply chain linkages to larger enterprises. In both cases there may be capacity shortages in forming and running farmers' organizations, or in establishing effective relationships with larger, more powerful firms.

Business inputs and service providers cover a wide range of actors who are essential for value chains to function, and who may have significant roles in SPS compliance. At farm level agricultural input dealers and advisory service providers (public, private or non-governmental) provide information and other inputs, which affect what SPS measures are used, and when and how. Aggregators and transporters need to ensure consignments are correctly handled to prevent contamination and preserve quality. Research organizations develop more-effective or more-economical methods for the various technical activities involved with SPS compliance, as well as identify and analyse risk. Accreditation and certification organizations also play a role. For small private sector organizations, providing SPS-related business services sustainability may be a challenge, especially if development interventions distort the market. Government organizations may not come and go like private enterprises, but they too face organizational, technical and resource capacity constraints.

Traders and buyers represent the market for food and agricultural products. They are less concerned with implementing SPS measures, but they influence what SPS measures are acceptable. In some cases this involves private standards, which address a range of issues including SPS hazards, but also allow product differentiation or branding as a marketing strategy (see section 1.3.6).

Regulators are key actors in SPS systems. They set national standards, and must ensure that all necessary local or international standards are met. Their responsibilities include formal certification that exported consignments comply with importers' SPS requirements. They are also responsible for managing biosecurity in relation to imports. They thus occupy a central role in SPS systems, and many capacity development efforts focus on strengthening regulatory bodies or organizations as their entry point.

1.3.3 Functions

The different actors must perform a range of SPS functions. Some concern individual consignments, such as performing inspection and certification at the point of export. Others are more general and relate to the way in which the SPS system as a whole operates. The World Bank's Integrated Framework Diagnostic Trade Integration Studies use a hierarchical categorization with six levels of SPS functions (World Bank, 2005) on which the functions in Figure 2 are based (reproduced in Figure 3).

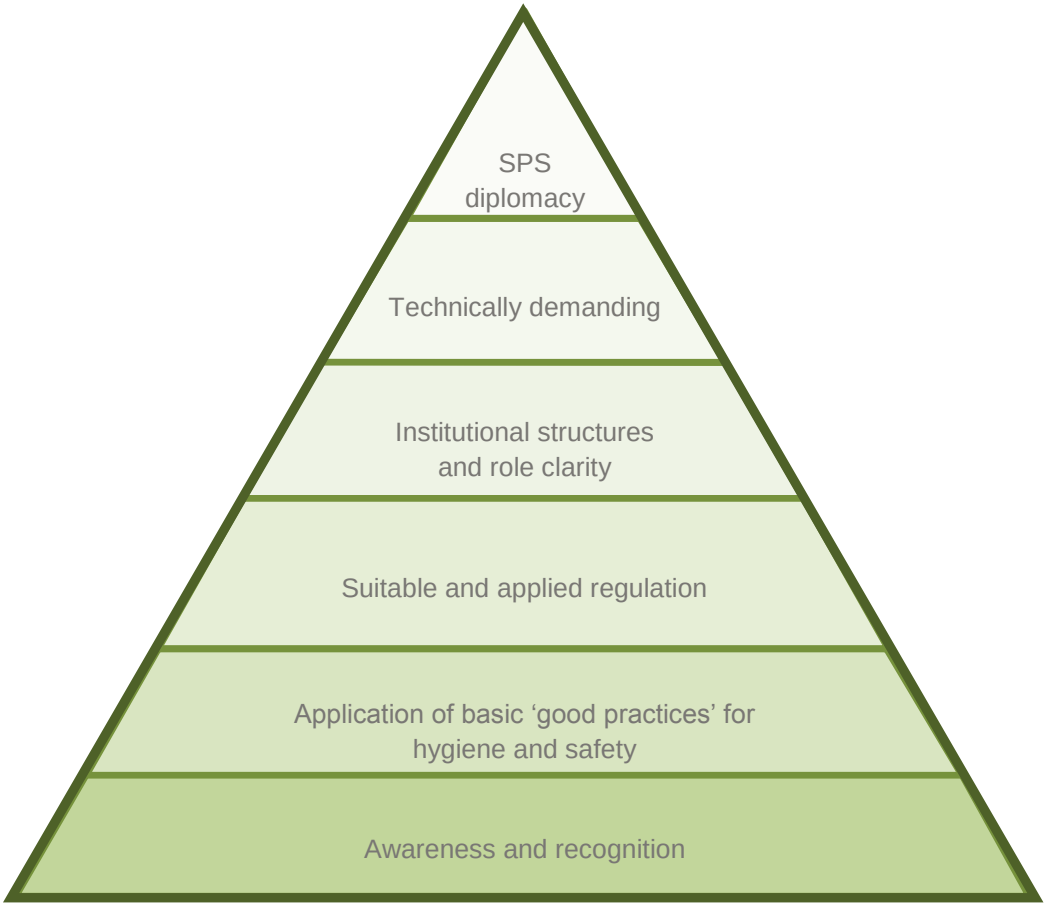

Fig. 3. Hierarchy of trade-related SPS management functions. (From World Bank, 2005)

Creation of awareness and recognition. Where awareness is lacking, attempts at regulatory enforcement are likely to fail. Awareness is needed among government officials so that SPS considerations are reflected in national policies and strategies, and so that resources are allocated on the basis of priorities. Producers need to be aware of SPS issues so that they too can allocate resources, whether they are large-scale agribusiness or smallholder farmers.

The application of good practices in relation to agricultural production, hygiene and safety applies along the value chain, though the points of production and processing are critical. Understanding and application of hazard analysis critical control point (HACCP) approaches are included here.

While the application of good practices can manage some risks, oversight and coordination is required, often through the development and application of regulation. This is the role of national regulatory bodies or 'competent authorities', who need the legal and operational capacity to certify exports as well as manage biosecurity.

Institutional structures and role clarity are necessary for the SPS system to function effectively as a whole. Frequently several different ministries are involved, requiring coordination. Similarly both public and private sectors are involved, and their relative roles and responsibilities need to be clear.

Various aspects of SPS systems concern technical functions, often requiring quite specialized, high-level skills, and use of scientific facilities, equipment and methodologies. These can be broadly described as risk management, covering all aspects of assessment and management of risk, including methods for monitoring risks by scientific testing. Some of these functions may be performed by private sector organizations, but usually they are in the mandate of public sector organizations.

SPS diplomacy includes engaging with regional and international organizations, particularly those setting international standards, and the WTO SPS Committee. Developing countries are often weak in this area, cast as receivers of standards set by others. SPS diplomacy is also essential in bilateral market access negotiations between trade partners, and in resolving problems or disagreements which arise during trade. SPS diplomacy relies on scientific capacity.

1.3.4 Linkages

A critical feature of any system is the extent and quality of linkages between the different components; this contributes to the 'emergent' properties of the system. Linkages between different actors in an SPS system may take various forms, and may be simply channels for information flow. Despite new opportunities for communicating easily, good information flow remains a challenge in many developing country SPS systems. Sometimes this is because the quality of available information is poor, but it is also because the need for communication has not been systematically analysed and addressed.

Information flow is a basis for stronger linkages in the form of collaboration or partnerships. STDF (2010) emphasized the importance of partnerships in SPS systems, and identified a number of preconditions for successful partnerships:

- National demand and ownership
- Clear and measurable objectives
- An open mind-set, alignment of cultures and expectations
- Commitment and trust
- Leadership
- Good governance and transparency
- Basic capacity of actors involved

While these preconditions are all desirable, in practice it may be that partnerships must be developed where these preconditions do not all exist. The most important is probably that there is demand for a partnership by both or all parties. Some of the other attributes, such as mutual trust and transparency, will develop over time.

Linkages may also be formalized as contractual relationships. For example, a regulatory body might contract some of its activities to a service provider. An important linkage in SPS systems is between the public and private sectors (STDF and IDB, 2012). Stereotyped perceptions of one by the other hinder the establishment of working relationships, which is why STDF (2010) identifies a change of mind-set as a way of promoting public and private partnerships. While some tension between regulator and regulated might always be expected, sustained SPS compliance is only possible when public and private sectors recognize their mutual dependence and act accordingly. An example of where this relationship has been formalized is the Deed signed by the Government of Australia and the plant industry on cost sharing in respect of emergency plant pest responses (Plant Health Australia, 2013).

Linkages can be promoted through a variety of structures. Crop or supply chain-focused working groups, task forces, or authorities are a common approach, where SPS issues may be one of a range of topics addressed. National SPS committees or other coordination mechanisms have been promoted through various capacity development efforts. A study by Kleih (2012) in Africa found that in some cases such committees work well, but often they are constrained by unclear mandates, out-dated legislation, limited SPS awareness, inadequate resources and limited involvement of the private sector.

Linkages between national and local levels are also important in an SPS system, particularly where there are large numbers of smallholder farmers. National extension systems are expected to provide this linkage, but agricultural extension in developing countries is often weak, with insufficient resources to match the needs. Linkages from national to local level through input and output markets may be stronger, but there too there are challenges in reaching large numbers of small-scale producers. Thus intermediary organizations, such as farmer associations or producer groups, and in some cases non-governmental organizations (NGOs), can be important for making those linkages.

International linkages from national competent authorities are important as well. These include links to competent authorities in trading partner countries, and links to regional bodies such as economic committees or regional technical agencies as well as to international bodies such as the WTO SPS Committee, and the international standard setting organizations.

1.3.5 Measures

Annex A of the SPS Agreement defines what is meant by SPS measures (Box 2). As the definition shows, there are many different kinds of SPS measures ranging from laws and regulations, to specific measures against individual pests in the field, to food safety aspects of packaging. Because the SPS Agreement was established by the WTO, the SPS measures that it refers to are those designed to protect human, animal and plant health and life in the context of international trade. However, similar measures may also be used where international trade is not involved; domestic food safety measures, for example, are sometimes described as ‘SPS’.

The focus of the SPS Agreement is on allowing an importing country to protect itself from the risks associated with trade from an exporting country. For many developing countries, SPS issues have thus became closely associated with access to developed country markets. However, this potentially overlooks the fact that developing countries are also importers, so must protect themselves from the SPS risks that imports present. In many developing countries, even those that have been able to secure and maintain market access supported by effective SPS systems, biosecurity outcomes have not been so successfully achieved.

1.3.6 SPS standards

The SPS Agreement states that countries should base their SPS measures on international standards, and designates three organizations as responsible for setting international standards (Table 2), often referred to as the 'three sisters'.

Standards set by these bodies are known as public standards, and are set through transparent, consultative and consensual processes. Public standards may also be set by regional or national bodies, such as a national bureau of standards, which may have responsibility for standards extending well beyond the SPS arena. Public standards are often compulsory, set by law, decree or regulation, although they may also be advisory.

Box 2: WTO SPS Agreement's definition of an SPS measure

Any measure applied:

(a) to protect animal or plant life or health within the territory of the Member from risks arising from the entry, establishment or spread of pests, diseases, disease-carrying organisms or disease-causing organisms;

(b) to protect human or animal life or health within the territory of the Member from risks arising from additives, contaminants, toxins or disease-causing organisms in foods, beverages or feedstuffs;

(c) to protect human life or health within the territory of the Member from risks arising from diseases carried by animals, plants or products thereof, or from the entry, establishment or spread of pests;

(d) to prevent or limit other damage within the territory of the Member from the entry, establishment or spread of pests.

Sanitary or phytosanitary measures include all relevant laws, decrees, regulations, requirements and procedures including, inter alia, end-product criteria; processes and production methods; testing, inspection, certification and approval procedures; quarantine treatments including relevant requirements associated with the transport of animals or plants, or with the materials necessary for their survival during transport; provisions for relevant statistical methods, sampling procedures and methods of risk assessment; and packaging and labelling requirements directly related to food safety.

Many other standards are devised by stakeholders in different value chains, and these are often referred to as private or voluntary standards. Like public SPS standards, they aim to manage risk, but they are also used to add value through quality improvement or product differentiation. In addition to SPS issues, such as pesticide use and residues, private standards cover environmental, social and technical issues not directly related to SPS concerns. Thus SPS compliance is sometimes loosely taken to include all these other standards. Some private or voluntary standards have effectively become 'involuntary', as without adhering to them, market access can be almost impossible to achieve. GlobalG.A.P. is an important private standard system originally developed by European retailers of horticultural products (Box 3).

Table 2. International SPS standard setting bodies.

SPS area	Body	Description
Food safety	Codex Alimentarius Commission (CAC)	CAC is an intergovernmental body established in 1963. It reports to the Directors General of WHO (World Health Organization) and FAO (Food and Agriculture Organization of the United Nations). CAC standards cover food hygiene, food additives, residues of pesticides and veterinary drugs, contaminants, labelling and presentation, methods of analysis and sampling, and import and export inspection and certification. The scope includes raw, semi-processed and processed foods.
Animal health	World Organisation for Animal Health (OIE)	OIE is an intergovernmental organization established in 1924. Its aim is to control the occurrence and course of epizootics that could endanger animal and human health. Standards cover trade in animals and animal products (International Animal Health Code); diagnostic techniques and vaccines (Manual of Standards for Diagnostic Tests and Vaccines); and aquatic animals (International Aquatic Animal Health Code and Diagnostic Manual for Aquatic Animal Diseases). OIE's headquarters are in Paris.
Plant health	International Plant Protection Convention (IPPC)	IPPC is a multilateral treaty deposited with the Director-General of FAO, and has its secretariat at FAO headquarters in Rome. The IPPC was first established in 1951, but the convention text was revised in 1977, and then again in 1997 to reflect its role in relation to the WTO SPS Agreement. IPPC aims to prevent the spread and introduction of pests of plants and plant products, through legislative, technical and administrative measures. It requires contracting parties to have a national plant protection organization (NPPO). IPPC, through its organs, produces International Standards for Phytosanitary Measures (ISPMs).

Standards can be divided into two broad categories: product and process. Product standards describe specific features of the product, such as the maximum pesticide residue level it can contain. Process standards are about how things are done, such as the methods for using pesticides, or for sampling and analysing a product's pesticide residues.

1.3.7 Compliance

Meeting standards is often referred to as compliance. A general definition of compliance is 'to act in accordance with a command'. The IPPC and OIE glossaries do not define the word, although use it frequently in their standards. The IPPC text itself refers to the reporting of 'non-compliance' (Article VII 2 (f)) (FAO, 1997a), so in some situations compliance can have a very specific meaning. For example the OIE terrestrial code includes paragraphs on 'compliance with the Terrestrial Code', such as for gaining recognition regarding the status of a particular disease. ISPM No. 13 is 'Guidelines for the notification of non-compliance and

emergency action' (FAO, 2001). While the emphasis is on notification, the standard also indicates examples of 'significant non-compliance' as referred to in the Convention text, with the focus clearly on non-compliance in relation to specific consignments.

Thus compliance can have a specific meaning in relation to particular standards, whether public or private. However, countries also have broader responsibilities under the international standard setting bodies and compliance can also be taken to include the extent to which countries meet these obligations, as well as those under the WTO SPS Agreement itself.

The ability of a country to meet a particular standard depends a whole range of public and private sector actors, and the way in which they function individually and together. Thus compliance in a broad sense can be taken to mean the whole process by which an SPS system delivers the outcomes and impacts shown in Figure 2. The SPS capacity of a country comprises all the elements of Figure 2, and determines the extent to which it can 'comply', or meet its SPS objectives.

Box 3: GlobalG.A.P.

GlobalG.A.P. was started in 1997 by the Euro-Retailer Produce Working Group (EUREP), aiming to establish one standard for GAP; hence the original name of EurepGAP. GAP is viewed broadly, so aims to:

- Minimize food safety risks
- Lessen the environmental impact of farms
- Ensure a responsible approach to worker health and safety, and animal welfare.

The GlobalG.A.P. integrated farm assurance standard was recently revised to simplify implementation, and increase emphasis on environmental issues such as water management. To link the standard more closely to local conditions, national technical working groups have been established.

2 SPS Capacity Development

In this section capacity and capacity development are examined in more detail, including discussion of what approaches to SPS capacity development appear to be most successful.

2.1 Rationale

When the SPS system functions effectively, four types of outcome are achieved as shown in Figure 2. First, SPS standards are met, which as we have seen may be either public or private. Second, an effective SPS system reduces risk. In the context of exports from developing countries, the emphasis is on managing the risk to the importing country. But developing countries must also manage their own SPS risks, and it is not uncommon for this to receive much less attention than ensuring exports meet market requirements. It is sometimes said that developing countries pay greater attention to ensuring the safety of food exported to developed countries than they do to the safety of food eaten by their own citizens.

Third, a key outcome is that market access is achieved and maintained. Initial access may require SPS negotiations, but maintaining access requires a dynamic and responsive SPS

system that can anticipate and respond to changing situations and new problems as they occur. While lack of capacity can result in markets being lost, often countries cannot even consider exports because they lack the necessary capacity to comply. For example, Tanzania has one of the largest cattle herds in Africa, but because of foot and mouth disease, and other OIE-notifiable diseases, the country's meat exports are worth less than US$1 million a year. In contrast, Botswana has invested in capacity development and enjoyed meat exports worth $159 million in 2010.

Fourth, national SPS systems give confidence to their trading partners. For example, the European Commission's Food and Veterinary Office undertakes assessment missions to countries from which the EU imports. The assessments clearly document how much confidence can be placed in the SPS system of a country, and this in turn affects the EU's risk assessment and risk management measures, such as inspection intensity. Thus creating confidence reduces the cost of doing business and improves competitiveness.

These outcomes contribute to increased agri-food trade, which in agriculture-based economies is central to achieving development goals. At the same time, biosecurity is achieved, which protects the natural resources (plants and animals) on which the trade depends, as well as the health of the people. SPS capacity development is therefore aimed at improving countries' abilities to achieve these outcomes and impacts.

2.2 What is capacity?

OECD (2006) defines capacity as 'the ability of people, organizations and society as a whole to manage their affairs successfully', while the United Nations Development Programme (UNDP) defines it as 'the ability of individuals, organisations and societies to perform functions, solve problems, and set and achieve objectives in a sustainable manner' (UNDP, 2010). The UNDP definition is widely used and adapted for particular contexts, but the various definitions clearly indicate that capacity is much more than the knowledge, skills and tools of individuals and organizations. It is a property of a system comprising a range of different actors and the formal and informal linkages between them. Thus capacity development should be based on this wider understanding of capacity.

The IPPC's Commission on Phytosanitary Measures has recently adopted a definition of national phytosanitary capacity based on the above ideas (IPPC, 2012):

The ability of individuals, organizations and systems of a country to perform functions effectively and sustainably in order to protect plants and plant products from pests and to facilitate trade, in accordance with the IPPC.

Capacity development has come much into focus in recent years, and capacity building features prominently in the 2005 Paris Declaration on Aid Effectiveness (Anon., 2005), prompting deeper consideration of what is meant by capacity and how it can best be developed. An OECD (2006) report on the challenges of capacity development, together with a five-year study by the European Centre for Development Policy Management (ECDPM, 2008) have provide valuable insights (see section 2.6).

FAO conducted an evaluation of its capacity development work in Africa (Muir-Leresche *et al.*, 2010), SPS being one area where there has been significant investment. The first recommendation of the report concerned the need to ensure that FAO and partners develop a better common understanding of what capacity development is, as analysis showed that

75% of capacity development projects had focused on individuals. Subsequently FAO has adopted a new capacity development strategy (FAO, 2010).

2.3 Capacity evaluation

A good starting point for capacity development is to assess current capacity. Any method for capacity assessment is based on an understanding of what is meant by capacity, and this will in turn influence the capacity gaps or needs identified, so capacity evaluation tools can have a strong influence on capacity development.

There has been considerable effort devoted to developing capacity evaluation tools in the SPS arena, particularly by international organizations including the standard setting bodies. These are summarized in Table 3 (adapted from STDF, 2011).

2.4 Prioritizing interventions

SPS capacity needs assessments, and gap analyses can generate a large number of possible interventions, particularly in least-developed countries where the needs are often greatest. But resources are limited, so eventually some form of prioritization takes place. For several reasons, and as with many capacity development interventions, identifying and agreeing priorities is not always straightforward.

Different stakeholders have different objectives, perceptions, information and power, so different stakeholders will have different priorities. External funders of capacity development, for example, may wish to build SPS capacity in a country to ensure the supply of safe products to their market. National experts may wish to see their particular area developed. Businesses involved in export of a particular product might reasonably want that value chain to be the focus.

Table 3. SPS capacity evaluation tools. (Adapted from STDF, 2011)

Tool	Focus	Description
Quick guide and guidelines to assess capacity building needs in national food control systems	Food safety	The quick guide describes a five-step process to obtain a rapid overview of what is needed to strengthen a national food control system. It complements a more detailed guideline on assessing capacity building needs in each of five components of the system: (i) food control management; (ii) food legislation; (iii) food inspections; (iv) official food control laboratories; and (v) food safety and quality information, education and communication. A participatory approach is advocated, although an external facilitator can assist.
Evaluation of the performance of veterinary services (PVS)	Animal health	The OIE tool is based on one developed by the Inter-American Institute for Cooperation on Agriculture (IICA), enhanced to allow assessment of a veterinary service's ability to meet the standards of the Terrestrial Animal Health Code. It covers four areas: (i) human, physical and financial resources; (ii) technical authority and capability; (iii) interaction with stakeholders; and (iv) ability to access markets. In each component there are a number of parameters, each with five levels of advancement described, against which the assessment is made. OIE trains and certifies experts to carry out the evaluations. The evaluation can be followed by a gap analysis by a certified expert.

continued

Table 3 continued

Tool	Focus	Description
Phytosanitary capacity evaluation (PCE)	Plant health	PCE was originally designed for NPPOs to assess their technical capacity to implement ISPMs and meet their obligations under the IPPC. The CD-ROM version was progressively expanded to 11 modules with over 600 questions but following a review it is being redesigned as a web-based tool, with options for more or less detail according to need. PCE was conceived as a self-assessment tool, although often a consultant facilitates the process, which includes contributions from non-NPPO staff.
Performance, vision, strategy	All	There is a performance, vision and strategy tool for each of the three SPS areas, and a fourth for looking at a country's overall institutional performance. They cover four areas: (i) technical capacity; (ii) human and financial capital; (iii) interaction with the private sector; and (iv) safeguarding public health and market access. Qualitative levels of advancement are described for each of a set of critical competencies in each area. In 'passive mode' the tools provide a description of the current situation, but in 'active' mode they can be used to bring about commitments and action. The tools are designed for a participatory approach, organized and facilitated by an expert in the field.
Guide to assess biosecurity capacity	Cross-cutting	The guide is seen as complementary to the area-specific tools, so focuses on capacity needs at the interfaces between human, animal and plant health and life. It also addresses aspects related to environmental protection. The guide provides broad questions to assist information collection and analysis, along with tips on the process, which is envisaged as being participatory and consultative. An external consultant may be used.
Food safety and agricultural health action plans	Cross-cutting	The plans address specific areas and cross-cutting SPS issues. They are prepared by a team from the World Bank and consultants in collaboration with national staff. There is no standardized methodology, but the hierarchy of SPS management functions is used as a conceptual framework (as described in section 1.3.3). The composition and structure of agricultural trade is the starting point.
Evaluation of conformity assurance infrastructure	Conformity assessment	The United Nations Industrial Development Organization (UNIDO) undertakes evaluations of conformity assurance infrastructure at the request of countries, in order to identify challenges at the level of: (i) government policy and regulatory framework; (ii) institutional capacity, particularly of organizations dealing with standards, metrology, testing and quality (SMTQ); (iii) sectors and value chains; and (iv) enterprises. A methodology for enterprise-level surveys analyses problems and opportunities for trade-related challenges faced by exporters.

These issues have been addressed at a broad level by the Paris Declaration on Aid Effectiveness (Anon, 2005), which covers ownership, alignment, harmonization, managing for results and mutual accountability. The principles in the declaration state that a beneficiary country will 'exercise leadership over its development policies and strategies, and inform donors of its own development priorities and results oriented strategies'. However, as Gascoine (2008) pointed out, the very lack of capacity that creates the need may also prevent countries from effectively identifying and prioritizing their needs. A pragmatic approach is for countries to use the available tools and methods, but with assistance in facilitating the process.

Kolstad and Wiig (2002) argued for the use of a cost–benefit framework for allocating SPS-related technical assistance, but only assessed benefits in terms of export markets. Henson and Masakure (2010) proposed a broader-based framework using multiple criteria, and have

developed a seven-step process for using criteria which may differ from country to country (Henson and Masakure, 2011) (Box 4).

Possible criteria are defined by stakeholders at Step 3. Key to the success of this approach is using available knowledge and information and involving the different stakeholders. Good facilitation is required to ensure the process produces an outcome to which all parties can agree. This approach to prioritization thus costs more than other, less-structured approaches, but it should generate consensus and ownership regarding the identified priorities, and so is a good basis for interventions.

Box 4: Prioritizing SPS capacity development (from Henson and Masakure, 2011)

Steps

1. Compilation of information dossier.
2. Definition of choice set.
3. Definition of decision criteria and weights.
4. Compilation of information cards.
5. Construction of spider diagrams.
6. Derivation of quantitative priorities.
7. Validation.

Possible decision criteria

Objective	Decision criteria
Cost	Up-front investment Ongoing costs
Trade impact	Change in absolute value of exports
Domestic agri-food impacts	Impact on agricultural productivity Impact on domestic public health Impact of local environmental protection
Social impacts	Poverty impacts Impact on vulnerable groups

2.5 Types of SPS capacity development

The WTO SPS Committee (WTO, 2000) outlined a typology for SPS technical assistance, identifying four categories:

- Information. Conferences, workshops and seminars to introduce the WTO, the SPS Agreement and related issues.
- Training. Technical training and workshops on specific aspects of the SPS Agreement, such as risk analysis, equivalence, regionalization.
- 'Soft' infrastructure development. Mainly training activities in areas related to particular standards, such as inspection, certification and surveillance. Provision of software, support for developing regulatory frameworks, and consumer education was also included.
- 'Hard' infrastructure. Provision of equipment and facilities for a range of technical functions and services, including the establishment of disease-free areas.

These categories appear to overlap considerably and are focused on implementing the SPS Agreement, so possibly exclude some areas. The various SPS capacity assessment tools described above also imply different categories of capacity development. Rather than attempt to provide a unified typology of SPS capacity development initiatives, we describe some of the types of initiatives that are undertaken, and give relevant examples. Some of the axes on which different projects may be located are as follows:

- Public sector/private sector. Many projects focus on, or take as their starting point, the public sector role, while others focus more on producers and the private sector. Promoting public–private sector linkages is an aim of some projects.

- Trade/regulation. Some projects take trade (in one or more products) as the starting point, and address SPS issues in order to support trade. Others seek to build SPS regulatory capacity that can be applied broadly across many value chains.
- SPS sector. Many projects address one of the three SPS areas, while others take a more unified, higher-level approach.
- National/regional. Projects often focus on a single country, but some take a regional approach, either because there is added value in several countries doing the same thing at once, or because an activity is intrinsically regional (such as harmonization).

The WTO maintains a database of trade-related assistance (WTO, 2013) which development partners are requested to update, though many do not. However, a review of SPS capacity development initiatives gleaned from that database and elsewhere indicates the following areas to be ones emphasized or used as entry points in SPS capacity development interventions. Individual programmes or projects often cover several of these areas.

- Legal frameworks. Analysis, revision or introduction of laws and regulations to ensure they reflect international obligations and national priorities, assign responsibilities and authority appropriately, and provide enforcement powers.
- Participation in international standard setting. Practical and financial support for participation in committees, standard setting processes and other activities of the 'three sisters'.
- Regional harmonization. Development of regional agreements, protocols and standards with the aim of promoting intra-regional trade.
- Capacity assessment, planning. Use of one or more capacity assessment approaches, with the aim of developing strategies and identifying priority interventions.
- Training. Short- to long-term training for individuals or groups, often on technical functions. Individuals may be from any of the actor categories described in section 1.3.2.
- Infrastructure. Provision of buildings, facilities and equipment with which to undertake SPS functions, particularly in the public sector.
- Organizational development. Strengthening the management capacity of organizations in the public or private sectors.
- Information provision and management. The acquisition of information from within a country or elsewhere, and its utilization and communication to national and international stakeholders.
- Implementation of measures. Operationalization of specific procedures and systems, particularly in risk management, such as inspection, surveillance, and establishment of pest-/disease-free areas.
- Value chain development. Addressing SPS compliance issues in the context of upgrading a particular value chain, usually with a strong private sector/producer focus, and usually addressing a range of issues affecting competitiveness.

- Private standards compliance. Supporting development, implementation and certification in relation to private standards.
- Specific SPS problems, methods. Researching and implementing solutions or methodologies for a specific SPS issue, such as a particular hazard or pathway.

2.6 What makes SPS capacity development effective?

Those investing in SPS capacity development, whether governments, businesses or development agencies, ask this question. Two types of answer have been given; one is about the process of capacity development or *how* it is done, while the other is in terms of *what* is done.

The European Centre for Development Policy Management (ECDPM) research programme on capacity change and performance examined 16 case studies from a wide spectrum of situations (ECDPM, 2008). It generated a number of key insights about how capacity development should be undertaken to improve impact and sustainability (Box 5), some of which correspond well with current practice, others of which fit less well.

Box 5: Capacity development in practice (from Land *et al*., 2009)

- Retain a focus on ownership. Ownership is critical to any capacity development process, because change is fundamentally political.
- Approach capacity development more as a process of experimentation and learning than as the performance of predetermined activities.
- Take an evolutionary approach to design, leaving space for adaptation along the way.
- Ensure that the design process engages local stakeholders in the determination of needs and strategies.
- Invest in understanding context in terms of the political, social and cultural norms and practices that shape the way a country or an organization understands capacity, change and performance.
- Analyse the nature of the change that is being demanded as a basis for defining the appropriate form of support.
- Conduct capacity diagnostics as an intrinsic part of a change process that is supportive of evolutionary design.
- Give attention and recognition to less visible aspects of capacity, such as values, legitimacy, identity and self-confidence, as well as other non-monetary forms of motivation that may be critical to outcomes.
- Be creative about options for support, and which resources and techniques to apply, relying less on international technical assistance as the standard means of support.
- Accept a higher degree of risk and failure, as a means of encouraging learning and innovation.
- Invest in relationship building. The effectiveness of capacity development support depends tremendously on the relationships forged between local stakeholders and outsiders.
- Be realistic about the scope of external intervention. External partners are marginal actors compared to the influence exerted by underlying domestic processes and forces.

Land *et al.* (2009) contrasted the traditional and widely used planned approach to capacity development with the more evolutionary and adaptive approach the ECDPM study indicated

to be more effective. The former originates from a technocratic and rational perspective, in which organizations are viewed or perceived as functioning like machines. The latter takes a complex adaptive systems perspective in which organizations are recognized as human systems. However, Land *et al*. (2009) noted that an intermediate approach is likely to be most feasible, particularly given the current emphasis on planned and structured interventions in international development.

WTO (2008) examined SPS capacity development work to identify elements of good practice in terms of how it is done (Box 6). Several of their recommendations resonate with those of the ECDPM study, and apply to capacity development in general rather than specifically to SPS-related capacity development.

Box 6: Good practice elements in SPS-related technical cooperation (from WTO, 2008)

Project design

- Paying attention to the country context and absorptive capacity
- Promoting ownership
- Systematically assessing and prioritizing needs
- Ensuring transparency, connectivity and sequencing of activities
- Adopting a value chain approach to maximize the market access impact
- Promoting the active involvement of all concerned stakeholders including the private sector
- Considering the challenges and potential benefits of a regional vs. national approach

Project implementation

- Use strengthened country expertise and systems
- Ensure flexibility in implementation
- Pay attention to results-based management including monitoring and evaluation
- Promote active learning and link skills development to practice. (Strengthening managerial capacity in the agencies responsible for SPS-related technical assistance was emphasized).

Project outputs and the achievement of higher-order objectives

- Maximize impacts and sustainability through greater participation of beneficiaries
- Consider market distortions and promote sustainability in project activities and impact
- Follow a multi-tiered structure of objectives.

With reference to the type of capacity development undertaken, Gascoine (2008) observed that some areas have received much attention, such as upgrading legislation, provision of laboratory infrastructure and training in risk analysis, and this certainly fits with the technological perspective described above (Land *et al*., 2009).

Hageboeck (2010) conducted an evaluation of the United States Agency for International Development's (USAID's) Trade Capacity Building (TCB) since 2002 which included SPS capacity development. While increased trade resulted from the capacity development, it was noted that export performance is affected by many factors, and the influences (positive or negative) from the broader context cannot be avoided. Most of the USAID TCB projects involved a contribution of different elements (such as technical assistance, policy improvement, training and equipment), which were more successful than those that did not.

However, this was only when the project addressed one rather than multiple export sectors. Projects that promoted public–private sector dialogue and those that focused on women or the poor also scored better than average. The overall conclusion was that the TCB had given a good return on investment, US$1 of USAID TCB assistance generating a $42 increase in exports two years later.

Jaffee *et al.* (2011) synthesised findings from a range of research and development projects aimed at improving farmers' (particularly smallholders') ability to meet public and private standards required by markets. Their focus was on interventions aimed at moving farmers up from one level to another in terms of the markets they access, rather than on capacity development of the national regulatory system. They drew two main conclusions. First, the prior existence of strong lead firms in the particular subsector or value chain being addressed increases the likelihood of successful outcomes. In other words it is difficult for small-scale farmers to connect directly to markets, and where agents such as NGOs have attempted to do that on behalf of the farmers, the results have tended to be unsustainable. Thus capacity development should build on foci of success already achieved by lead actors in the private sector. Second, success is more likely if upgrading the value chain does not attempt to move farmers up too many levels at once (see Table 1). Thus capacity development should be aimed at moving farmers up to the next level from where they are, allowing them to gain experience and skills there, on the basis of which they can later move up to another level. Attempting to support farmers moving directly from supplying a local market to supplying high-end supermarkets in a developed country is unlikely to be cost-effective.

3. CABI and SPS Capacity Development

In this section the rationale for CABI's involvement in SPS capacity development is presented and discussed. The organizational mandate and the structure is described first, followed by a description of its areas of work, through which a case is made for CABI's further involvement in the area.

3.1 The organization

CABI is an intergovernmental, not-for-profit organization originating in 1910 and now established by a United Nations treaty-level agreement. It currently has 47 member countries (of which 90% are developing countries) who govern the organization through an Executive Council and Review Conference. Membership is open to all countries.

The headquarters are in UK, with regional and subregional centres and offices in Africa, Asia, Europe, North America and Latin America and the Caribbean. Through these offices, CABI works with a wide network of partners and collaborators in the public, private and civil society sectors.

Through various processes, the organization seeks to understand and respond to its member countries' needs. In recent years member countries have requested the organization to become more involved in the agricultural value chain, including in the area of trade. The 17th Review Conference identified six areas of focus including GAP and trade. This has been echoed by regional consultations, with member countries identifying compliance with SPS and other standards as an area of need and one which fits with CABI's

structure and expertise. SPS issues have national, regional and international dimensions, providing a good fit with the organization's intergovernmental structure and mode of operation.

3.2 Scope and programmes

CABI is a science-based development organization, with programmes in international development and publishing. In international development activities are focused on four themes, each of which has relevance to SPS issues.

The Invasive Species theme addresses all aspects of the management of invasives, so is directly related to SPS issues. The theme includes invasive species in the natural environment; CABI was a founder member of and hosted the Global Invasive Species Programme (GISP), with close linkages to the secretariat of the Convention on Biological Diversity. The theme also includes agricultural invasive species, many of which are introduced intentionally or unintentionally through trade. The emphasis is on invasives of phytosanitary importance, while invasives threatening animal health are addressed only in the context of knowledge management (see below). A particular area of expertise is integrated pest management (IPM), including biological control, as a component of integrated crop management (ICM), which contributes to compliance with public food safety standards such as those on pesticide residues, as well as with various private standards.

The Commodities theme has a particular focus on the bulk commodity crops such as coffee, cotton, cocoa, and others, though is not limited to these crops. It aims to empower smallholder farmers to produce for and compete in local and global markets, so includes any crops which are marketed, including horticultural crops such as fruit, vegetables and flowers. Thus SPS issues fall within the ambit of the theme, as one of a range of requirements related to product quality, market access and trade.

The Knowledge for Development theme has two strands. One is concerned with the use of specific knowledge and its application, particularly in the areas covered by the two preceding themes. The other strand concerns the capacity of systems to respond to change. This is relevant in the SPS context, as we have seen that SPS compliance is achieved through a system of various interacting components. The theme also covers adaptation to climate change, which can be expected to create new SPS hazards and modify current risks.

Knowledge Management concerns the tools, particularly information and communication technologies (ICTs), that support decision making by different stakeholders in agriculture and the environment. A series of compendia have been produced, including the Animal Health and Production Compendium and the Crop Protection Compendium, widely used by national plant protection organizations (NPPOs) in pest risk analysis. The use of mobile phones for communicating with farmers is another major area of work. SPS systems have substantial knowledge management requirements, so this theme too is relevant to SPS capacity development.

In addition to these four themes, Bioservices provides taxonomic identification services. There is in-house expertise in identification of fungi and bacteria, both as food contaminants and diseases. Other taxa of SPS significance are identified by partner institutions, and together with CABI, through funding from the UK Department of International Development (DFID), a free service to developing countries is provided. CABI was a founder member of BioNET, a global taxonomy network based on a series of locally operated regional networks.

The South-East Asian Network is hosted by CABI in Malaysia. Cock (2011) has emphasized the importance of taxonomy to SPS capacity.

CABI's publishing wing maintains CAB Direct, a bibliographic database of over ten million abstracts as well as 180,000 full text articles, selected from the world's literature. Subjects covered include agriculture, veterinary science, applied economics, food science, nutrition and public health, so SPS issues are well catered for by the database. CABI also publishes around 60 new books a year, including titles related to agricultural trade and SPS topics (Table 4).

Table 4. Examples of books on SPS issues published by CABI.

Title	Author	Year
Animal Health Economics	J Rushton	2013
Food Supply Networks: Trust and E-business	Edited by M Canavari, M Fritz, G Schiefer	2013
Plant Pest Risk Analysis: Concepts and Application	Edited by C Devorshak,	2012
The Economics of Regulation in Agriculture: Compliance with Public and Private Standards	Edited by F Brouwer, G Fox, R Jongeneel	2012
Epidemiology for Field Veterinarians	E Sergeant	2012
Chemical Food Safety	L Brimer, M Tingleff Skaanild	2011
Vegetable Production and Marketing in Africa	Edited by D Mithöfer, H Waibel	2011
Natural Antimicrobials in Food Safety and Quality	Edited by M Rai, M Chikindas	2011
Agri-food Chain Relationships	Edited by C Fischer, M Hartmann	2010
Pest Management and Phytosanitary Trade Barriers	G Hallman, N Heather	2008
Global Supply Chains, Standards and the Poor	Edited by J F M Swinnen	2007
Heat Treatments for Postharvest Pest Control	Edited by S Lurie, E Mitcham, J Tang, S Wang	2007
WTO Negotiations and Agricultural Trade Liberalization	Edited by E Diaz-Bonilla, S E Frandsen, S Robinson	2006
Agriculture and International Trade	Edited by M N Cardwell, M R Grossman, C Rodgers	2003
Food Safety	Edited by J P F D'Mello	2003
Principles of Plant Health and Quarantine	D L Ebbels	2003
Public Concerns, Environmental Standards and Agricultural Trade	Edited by F Brouwer, D E Ervin	2002
Food Safety and International Competitiveness	G E Isaac, J Spriggs	2001

CABI has recently established a global initiative called Plantwise (www.plantwise.org) that works across the above areas, and is thus also related to SPS. Plantwise primarily aims to improve food security and the lives of the rural poor by improving plant health and reducing crop losses. This is to be achieved by gathering, organizing and disseminating vital knowledge about plant health.

Plantwise assists developing countries to set up and run community-based plant clinics that deliver free plant health advice to farmers. The clinics, staffed by 'plant doctors', run regularly in easily accessible locations, and provide information and advice to farmers on whatever problems they bring to a clinic. Clinic registers also provide an invaluable supply of information on the plant health problems farmers are facing, and the ones they are having most difficulty solving. The Plantwise knowledge bank gives plant doctors, extension workers and researchers access to plant health information, in order to improve the advice farmers receive. The information is sourced globally from multiple partners, so that the knowledge bank is a comprehensive resource on plant health.

Plantwise can contribute to SPS capacity development in several ways. When advising farmers, plant clinics can ensure farmers are aware of possible SPS implications of any pest management methods they use. Clinics cannot provide the training needed to upgrade farmers' compliance, but they can advise on its value, and how it can be obtained.

Plant clinics also provide one form of general surveillance, as described in ISPM No. 6 (FAO, 1997b). Information from plant clinics can thus provide a guide to where specific surveillance might be required. Plant clinics generate demand for higher level taxonomic skills. These same skills are required by phytosanitary services, but are often perceived as of low priority.

The Plantwise knowledge bank can be used in pest risk analysis, although as in the Crop Protection Compendium, the information is not official information provided by NPPOs. The Plantwise knowledge bank can also provide alerts when reports of new pests appear in the world's literature.

3.3 Current SPS activities

Table 5 gives examples of recent SPS-related projects in which CABI has either led or been a partner, showing which of the 12 types of intervention described above they covered. Some other projects (not listed) have components that are SPS-related, but their main aim was not trade-related; for example, a recently concluded Global Environment Facility – United Nations Environment Programme (GEF-UNEP) project on 'Removing barriers to invasive plant management in Africa' was primarily about biodiversity conservation, but it included capacity development (systems and skills) in risk analysis, an important part of the work of SPS regulatory bodies.

CABI has managed or been a partner in several projects financed through the Standards and Trade Development Facility (STDF). STDF is a multi-lateral trust fund that supports developing countries in developing their capacity to implement international SPS standards, guidelines and recommendations, as a means to improve their human, animal and plant health status, and their ability to gain or maintain access to markets.

3.4 Future role

SPS capacity development is recognized as a continuing need in many countries, and this has been reaffirmed by CABI's member countries, so how should CABI respond to this demand? CABI is already engaged in some SPS capacity development work, but given the organization's expertise and experience, as well as its structure and *modus operandi*, there is scope for increasing its contribution.

CABI's scientific base, as well as its expertise and information resources, are of direct value to the SPS arena, particularly in the plant health sector, and to a lesser degree in food safety. This strong scientific and evidence-based approach fits well with the principles laid out in the SPS Agreement, which allows countries to impose SPS measures provided they are technically justified. The Agreement is founded on the application of scientific methods for the assessment and management of SPS risks, which resonates strongly with CABI's mission.

Table 5. Examples of CABI's SPS-related projects.

Project	Country/region	Summary	Area (Table 6)
African Centre of Phytosanitary Excellence	E Africa	Establishing a capacity building facility in support of trade.	4, 5, 7
Beyond compliance: integrated systems approach for pest risk management	SE Asia	Five-country collaboration to develop and apply the systems approach (ISPM No. 14) in case studies including jackfruit and oil palm planting materials.	5, 9, 12
Capacity building and knowledge sharing in SPS in cocoa in South East Asia (CocoaSafe)	Indonesia, Malaysia, Papua New Guinea	Improving compliance with food safety standards, through capacity development along the supply chain.	5, 8, 10, 12
Cocoa pod borer incursion management	Papua New Guinea	Establishment of surveillance, rapid response and management for an important quarantine pest.	5, 9, 12
Enhancements of pest risk analysis techniques (PRATIQUE)	Europe	Multi-partner project on advancing pest risk analysis methods, including assembling datasets.	8, 12
Enhancing plant and animal quarantine services and facilities in Brunei	Brunei	Upgrading quarantine services to improve SPS compliance and biosecurity.	4, 5, 6, 7, 8, 9
Ensuring Pakistan's agricultural trade is healthy	Pakistan	Increasing the capacity of animal and plant health officials through training including distance learning.	5, 6
Heavy metals in cocoa	Latin America	Characterizing and evaluating the status of cadmium and other heavy metals in cocoa to improve SPS compliance.	12
Improving tobacco production	Argentina, Turkey	Improving pest management methods in line with industry scheme for GAP.	9, 11
Increasing sustainability of European forests (ISEFOR)	Europe, China	Risk assessment diagnosis and management for forest pests, especially in the nursery trade, and in relation to climate change.	12
Oil palm biosecurity	Malaysia	Development of an industry-wide biosecurity management plan.	4, 9
Pathway evaluation and pest risk management in transport (PERMIT)	Europe/global	Analysis of legislation in relation to pathways of introduction of forest pests, as the basis of a systems approach for risk management.	1, 4, 12

continued

Table 5 continued

Project	Country/region	Summary	Area (Table 6)
Pest surveillance and diagnosis for market access	SE Asia	Surveillance systems for leaf miner, whitefly, thrips and mealybug in Asia–Pacific Economic Cooperation (APEC) countries.	5, 9, 12
Plant health diagnostic network	SE Asia	Establishment of a plant disease diagnostic clearing house mechanism taking trade sensitive information into account.	3, 5, 8
Regulation of biological control agents (REBECA)	Europe	Policy support action on regulations and risk assessment procedures for biorational pest control products.	1, 3
Safe cocoa, sustainable production	W Africa	Study on pesticide use in cocoa, in relation to EU regulations on maximum residue levels in cocoa imports.	4, 12
SPS compliance in East and Central Africa	Malawi, Tanzania	Desk study of SPS compliance in two countries, with selected case studies.	4
SPS training	Africa	Training for SPS contact points and laboratory specialists in Common Market for Eastern and Southern Africa (COMESA) countries.	3, 5
Strengthening the phytosanitary capacity of the floriculture sector	Uganda	Strengthening public and private sector capacity to comply with European market (especially phytosanitary) requirements for flower exports.	5, 9, 12
Supply chain management	Pakistan	Capacity development for GlobalG.A.P. certification.	5, 10, 11

Table 6 summarizes CABI's current expertise and experience, which is largely in the plant health area, with some in food safely, while in animal health it is confined to the area of information and associated training. What should this table look like five or ten years from now? Clearly the strength in plant health should be consolidated, although not all areas necessarily need in-house expertise. But CABI should be able to provide more or less the full range of phytosanitary capacity development support through its own or partners' expertise.

Table 6. Areas of CABI's SPS capacity development work.

Capacity development activity	Animal health	Food safety	Plant health
Legal frameworks			✓
Participation in international standard setting			✓
Regional harmonization			✓
Capacity assessment, planning			✓
Training	✓	✓	✓✓
Infrastructure		✓	✓
Organizational development			✓
Information provision and management	✓	✓	✓✓
Implementation of measures		✓	✓✓
Value chain upgrading			✓
Private standards compliance			✓
Specific SPS problems		✓	✓✓

✓=Some activity; ✓✓=Major activity.

Within a wider trade-related context, CABI will strengthen its contribution to SPS capacity development in the following ways.

Training and awareness

CABI's staff has extensive expertise in plant health which has largely been deployed for improving crop production and productivity. More recently we have begun to apply this expertise in the SPS context.

We will undertake internal training and awareness-raising to ensure that CABI's staff and the organization as a whole have a good understanding of SPS issues and their significance in trade. This will enable us better to respond to our member countries' requests for support and capacity development in improving trade, especially in the phytosanitary area but also in animal health and food safety.

Food safety

CABI's work in food safety to date has focused on providing services to the food industry in developed countries.

We will seek to use our existing expertise in this area to develop capacity for food safety in developing countries, particularly where there are links with plant health, such as pesticide residues, mycotoxins and microbial contaminants of fresh and processed crops. We will work more closely with Campden BRI through our recently established alliance, to complement and further develop our capability in this area. We have no plans to develop technical expertise in animal product-related food safety issues, so we will partner with competent organisations where necessary.

Using information

CABI's strengths include information collation, management, dissemination and communication as demonstrated by the widely used Crop Protection and Animal Health and Production Compendiums, held in high regard by quarantine officials around the world.

The importance of information and communication in the SPS arena has been described above, so this is an area in which we will continue to focus. We will develop information resources, and enhance countries' capacity to access, manage and use SPS information resources and services, such as those provided by WTO, the 'three sisters' and others.

Taxonomy

CABI has taxonomic expertise especially in pests and contaminants of plants and plant products. We will use this to support phytosanitary and food safety capacity development, and through partnership with others such as Campden BRI, broaden the range of taxonomic support we can provide to national SPS systems.

Biosecurity

The impetus for SPS capacity development often comes from the potential returns from increased exports. This can result in developing countries paying less attention to their own biosecurity, and examples abound showing how lack of capacity in this area leads to serious losses; the *Bactrocera invadens* invasion of Africa since 2003 is a case in point that has had serious impacts on trade as well as on food security.

CABI will help assist countries to maintain their biosecurity by supporting the development of crop or sectoral biosecurity strategies, including risk-assessment, risk management and communication, surveillance, and emergency response planning and implementation.

Supporting farmers

CABI works to enable small-scale farmers to benefit from selling to local, regional and international markets. In this work we will more explicitly address how farmers can comply with SPS and related private standards, including GAP. In designing and implementing such interventions we will take account of lessons learned elsewhere showing that a key success factor is targeting markets requiring standards not too far above current practices, as well as the prior existence of strong lead firms in the sub-sector or value chain.

Sustainable capacity development

Recent insights on improving the impact and sustainability of capacity development (section 2.6) fit well with CABI's experience. CABI will be a strong advocate of such approaches in the SPS arena, and through our regional centres, we will put into practice the principles listed in Box 5. We will aim to strengthen the capacity of SPS systems, the public and private sector organizations and individuals involved, and the linkages between them.

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Acronyms and Abbreviations

A4T	Aid for Trade
ACIAR	Australian Centre for International Agricultural Research
APEC	Asia-Pacific Economic Cooperation
CABI	Centre for Agricultural Bioscience International
CAC	Codex Alimentarius Commission
COGECA	General Committee for Agricultural Cooperation in the European Union
COMESA	Common Market for Eastern and Southern Africa
COPA	Committee of Professional Agricultural Organisations
DFID	Department for International Development, UK
ECDPM	European Centre for Development Policy Management
EU	European Union
EUREP	Euro-Retailer Produce Working Group
FAO	Food and Agricultural Organization of the United Nations
FVO	Food and Veterinary Office, European Commission
GAP	Good agricultural practice
GEF	Global Environment Facility
GISP	Global Invasive Species Programme
HACCP	Hazard analysis critical control points
ICM	Integrated crop management
ICT	Information and communication technology
IDB	Inter-American Development Bank
IICA	Inter-American Institute for Cooperation on Agriculture
IPM	Integrated pest management
IPPC	International Plant Protection Convention
ISEFOR	Increasing Sustainability of European Forests
ISPM	International Standard for Phytosanitary Measures
NGO	Non-governmental organization
NPPO	National plant protection Organization
OECD	Organisation for Economic Co-operation and Development
OIE	World Organisation for Animal Health
PCE	Phytosanitary capacity evaluation
PERMIT	Pathway Evaluation and Pest Risk Management In Transport
PRATIQUE	Enhancements of Pest Risk Analysis Techniques
PNG	Papua New Guinea
PVS	Performance of veterinary services
REBECA	Regulation of biological control agents
REC	Regional economic community
SDC	Swiss Agency for Development and Cooperation
SMTQ	Standards, metrology, testing and quality
SPS	Sanitary and phytosanitary
STDF	Standards and Trade Development Facility
TCB	Trade capacity building
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
WHO	World Health Organization
WTO	World Trade Organization

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