PAKISTAN'S AGROBASED EXPORTS & SANITARY AND PHYTO-SANITARY (SPS) COMPLIANCE

The World Bank

Joint World Bank and UNIDO Report

UNIDO

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Acknowledgments

This study is a joint product between The World Bank and UNIDO in the framework of their respective cooperation programmes in Pakistan. Both are assisting the Government of Pakistan in the development of its trade capacity, and joined forces for a comprehensive analysis of SPS related challenges across three key sectors with high export potential. For the present study, the World Bank was responsible for the overall study and the sectoral analysis of the horticulture and livestock sectors, while UNIDO was responsible for the analysis of the fisheries sector.

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List of Acronyms and Terms

ADB	Asian Development Bank
ASF	Agribusiness Support Fund
AQ	Animal Quarantine
BSE	Bovine Spongiform Encephalopathy
BRC	British Retail Consortium
CA	Competent Authority
CAC	Codex Alimentarius Commission
CG	Consultative Group
DALPMG	Department of Agriculture Livestock Products Marketing and Grading
DFID	Department for International Development
DPP	Department of Plant Protection
EDF	Export Development Fund
EMS	Environmental Management System
EPB	Export Promotion Bureau
EU	E uropean Union
EUREGAP	Euro-Retailer Produce Working Group Good Agriculture Practices
FCS	Fishermen's Cooperative Society
FMD	Foot and Mouth Disease
FP	Fish Products
FSCRD	Federal Seed Certification and Registration Department
FSVPHA	Food Safety and Veterinary Public Health Authority
FTA	Free Trade Agreement
FVQ	Food and Veterinary Office
GAP	Good Agricultural Practices
GDP	Gross Domestic Product
GHP	Good Hygiene Practices
GMO	G enetically Modified Organism
GMP	Good Manufacturing Practice
HACCP	Hazard Analysis and Critical Control Points
ICM	Integrated Crop Management.
IPM	Integrated Pest Management
IPPC	International Plant Protection Convention
LDDB	Livestock and Dairy Development Board
LW	Livestock Wing
MFD	Marine Fisheries Department
MINFAL	Ministry of Food, Agriculture and Livestock
MOC	Ministry of Commerce
MOST	Ministry of Science and Technology
MRL	Maximum Residue Levels
NEP	N ational E nquiry Point
NNA	National Notifica tion Authority
NVL	National Veterinary Laboratory
NWFP	North West Frontier Province
OECD	Organization for Economic Cooperation and Development
QIE	Office International des Epizooties
QP	Organophosphates
PAEC	Pakistan Atomic Energy Commission
PALDIS	Pakistan Automated Livestock and Disease Information System
PAMCO	Punjab Agri-Marketing Company
PARC	Pakistan Agricultural Research Council
PCSIR	Pakistan Council for Scientificand Industrial Research
PFL	Pakistan Food Law
PHDEB	Pakistan Horticulture Development and Export Board

PNAC	Pakistan National Accreditation Council
PSQCA	Pakistan Standards and Quality Control Authority
SGS	Société Générale de Surveillance
SPS	Sanitary and Phyto-Sanitary
SSOP	Sanitation Standard Operating Procedures
TBT	Technical Barriers to Trade
TRTA	Trade Related Technical Assistance
UNIDO	United Nations Industrial Development Organization
VPH	Veterinary and Public Health
WHO	World Health Organization
WTO	World Trade O rganization

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Executive Summary

It is imperative that Pakistan augments the production and export of high value agricultural and fish products not only to increase revenue but also employment. The economic growth of the country has failed to absorb the increase in the labor force. Pakistan is seeking to expand and diversify its food and agricultural exports by increasing the county's high value agricultural and fish product exports. The country's exports of fish, meat and horticultural products have shown a positive trend over the last 14 to 15 years.

International trade in high value food products has increased dramatically over that last two decades with fresh and processed fruit and vegetables, fish, live animals and meat and nuts and spices now accounting for 50% of the total agri-food product exports of developing countries. Total food trade is now estimated at $300 to $400 billion per annum, with fish trade in excess of $55 billion and is a major export earner for developing countries, vegetables estimated at $14 billion and fruit at $33 billion per annum.

Imported agricultural and food products have to conform to SPS measures which are applied to protect human or animal life from food borne diseases and from plant carrying diseases. The WTO Agreement on the application of SPS measures specifies that countries should base their technical regulations and sanitary and phytosanitary measures on international standards. If they conform to the standards laid down, then by implication the international standards will not form barriers to trade. Recent food scandals and outbreaks of food borne diseases have created added pressure for regulator to tighten rules and their enforcement.

In the past Pakistan has been subject to formal bans, for example; meat to the Middle East and animal casing to Romania. At the present time the Government has implemented a voluntary export suspension of fish products to the European Union (EU), to give the industry a “breathing space” to attain the SPS standards required. During 2004-05 the country has been subject to 26 EU food alerts indicating that there are real concerns related to some Pakistani food exports.

The broad findings of the mission were:

- Pakistan lacks a coherent strategy or set of strategies for quality and SPS management in relation to its trade. Whatever strategy exists is pursued independently at the micro or business to business level.
- Although there is renewed vigor by the government for SPS compliance, there is a lack of coordination and effective collective action by the many ministries, departments and companies involved in the activities that are to address the constraints of achieving quality and SPS management.
- There is little if any effective participation in the processes of international standard setting, either by government or the private sector.
- Existing capacities for quality and SPS management do exist in selected pockets, within the non-traditional export sectors, but these have tended to be overwhelmed by broader systemic or supply chain weaknesses, primarily traceability, number of linkages in the supply chain and the potential hazards associated with the raw materials supplied.
- In the absence of a coherent strategy, Pakistani stakeholders are largely reacting to events and adopting defensive postures in which they seek to limit the apparent impact of standards or limit the adverse affects of non-compliance with those standards, as is evident in the fisheries and meat products sectors.
- Non-compliance with existing and potential trade partner requirements has already constrained Pakistan's market access for certain non traditional exports and has the potential to do the same in the future. At the same time there is little evidence that Pakistani firms or farmers have been able to use quality/SPS standards to their competitive advantage, to increase market share or to gain access into new markets, as has been the case with other exporting country's firms and farmers.

Fish Products

There have been periodic problems with food safety and sanitary compliance of the fish products in the destination markets particularly to the EU. A recent EU inspection visit found significant areas of non-compliance with EU regulations, in relation to the country's regulatory enforcement system and in the operating methods and facilities of many of Pakistan's vessels, docks, auctions, licensed fish processors and exporters. The Government instigated a self-imposed suspension of fishery exports to the EU which has an estimated impact of $45 million per annum, although it has also been estimated that the loss was actually $40 million during the first four months of the suspension.

With the objective of lifting the suspension there are major issues that need to be addressed and resolved (i) the Marine Fisheries Department is the Competent Authority and has weaknesses in the inspection system in terms of organization, responsibility, authority, methodology and a poor understanding of the significance of the public health risks including their causes and suitable controls (ii) the industry has not exercised the control of public health within their supply chains. The need for the companies to operate supplier assurance programs and verify appropriate control within capture, handling, storage and transport is not fully understood. The vessel owners and harbor authority also lack an understanding of the consequences of poor control and have only just begun to initiate programs to achieve increased control (iii) processors lack an understanding of HACCP and competitive levels of Good Manufacturing Practices (iv) the fishing boats have non-compliance issues such as no hand-washing facilities, fuel oil control, container and hold materials used, cleanliness and design etc (v) the landing site hygiene and handling operations are poor and (vi) the auction halls are not protected from the exterior and there is a complete

absence of basic sanitary facilities, with no control of cross-contamination from foreign matter and pests on the auction hall floor.

There are 22 processing plants/exporters listed to export fish product to the EU, although only 11 plants (which still need a few corrective actions) are considered up to a satisfactory standard to be EU compliant. The environmental impact of the fishery sector is likely to grow significantly and if the planned growth of markets is achieved through value addition and aquaculture then the impact will be more evident. No enterprise evaluated had an Environmental Management System (EMS) in place or are planning to develop an EMS. More serious are the environmental issues that can be considered out of the control of the fishery sector, which is contaminant build up in the sea, particularly heavy metals. Already there are traces of heavy metals such as cadmium, chromium, lead, mercury and zinc found in fish products captured off the coast. Some external trade partners are beginning to pay increased attention to the presence of heavy metals in food.

Meat and Livestock

Pakistan has not been a traditional exporter of livestock and livestock products. Until recently, Pakistan's livestock exports were restricted to leather/leather products and wool and rugs. Ironically from 1997 onwards, the country was able to gain a foothold in some markets, when European exporters had SPS problems of their own, namely Bovine Spongiform Encephalopathy (BSE).

Pakistan has felt the effect of quality/SPS standards in the meat and livestock sector; animal casing exports witnessed a rapid decline in 2003-04 due to Pakistan's placement in Category II List by the EU regarding the export of sheep casing, because of the country's uncertain status of BSE presence. Similarly, Romania placed a ban on Pakistani animal casing imports as there were fears that the casings were contaminated with insecticide. In the latter half of year 2001, exports of meat to the country's main destination markets--Saudi Arabia and the United Arab Emirates were banned, caused by concerns over hygiene in the country's slaughterhouses. After satisfying the standards required, the ban is now lifted. In comparison to the world trade of meat and livestock Pakistan's share is miniscule at approximately $20 million (2004/05 estimate) for meat and $7 million for livestock, yet leather goods are estimated to be $790 million. Opportunities do exist if SPS measures can be improved, especially for *Halal* meat in Muslim countries.

The domestic meat market is largely unregulated and accounts for almost 70% of the total slaughtered animals. Many slaughterhouses have limitations regarding a shortage of potable water, the butchers lack training especially in the area of personal hygiene, while the basic infrastructure and equipment is inappropriate for hygienic operations, pre and post mortem inspection is non-existent and the regulatory framework and its enforcement ineffective. The private sector has improved the slaughtering of animals and there is a Code of Practice for slaughterhouses developed by the Pakistan Quality Control and Standards Authority, but it is not observed or enforced.

Domestic livestock markets generally lack basic infrastructure and production is still based on traditional methods. The private sector has only established a few animal stock holdings and yards to control quality and consistency of the raw material supply. The transportation used is mainly not refrigerated and the whole supply chain is unhygienic with the incidence of *Salmonella* infection in raw meat common.

Fruit and Vegetables

The total area of fruit and vegetable production has increased rapidly in recent years, reaching 1.5 million hectares in 2004, with an annual production of 12 million tons providing a farm gate value of $2 billion. However the current exports for all horticultural produce (including nuts) are valued at $134 million, most of which is exported to other developing countries with limited SPS management capacity and enforcement.

The export of kinnow and mangoes predominate primarily due to the concentrated production areas of the crops, the maintenance of quality at the point of export and private sector investment in packhouses, cold stores and some quality assurance programs. Other fruit crops such as apples, guava and apricots have not been able to compete in the export market for a number of reasons, including (i) there is varietal variability with the product not being uniform (ii) the fruit quality is poor in comparison to the competition (iii) there are problems with pest and disease (iv) the post harvest infrastructure is not in place (iv) raw material prices are not competitive as the economies of scale are not achieved with comparatively smaller land holdings, scattered production units, and in the case of the temperate crops, the production units have poor physical market access.

Potatoes and onions are the major fresh vegetables exported, but in US dollar terms export earnings have stagnated over the past four years, primarily as a result of the traditional export market for vegetables (the Middle East) receiving produce from other countries that are improving their quality, which are competitively priced. Most Pakistani vegetables in the main Middle Eastern markets are sold in the wholesale markets. It is only for onions and potatoes that a proportion of the crop is marketed through importers, in countries such as Sri Lanka, Indonesia and Malaysia where quality standards are required. Asian vegetables such as okra, eggplant and the various cucurbits are not exported in any significant quantities.

The industry has been proactive with a number of exporters obtaining HACCP certification for their packhouses, but a number of weaknesses exist; (i) growers have difficulties conforming to Good Agricultural Practices (ii) Pakistani produce is placed at the lower end of the price range, with most exporters being salespersons rather than marketers (iii) the supply chain is weak and at times, has too many players within the structure, all of which does lead to poor product traceability and high transaction costs (iv) the exporter's are too reliant on Government support to identify and visit export

markets (v) the pest risk assessment is either based on pre-partition work, scant or nonexistent information, thus allowing importer countries to lay down conditions that dictate treatments for pest and pathogens that may not be present or prevalent and (vi) pesticide levels in fresh vegetables are relatively high.

Recommendations

Many of the recommendations detailed will require both internal and external funding, manpower and materials. It is proposed that on the basis of the recommendations that Pakistan mobilizes a task force to design a program that will be effective in resolving SPS issues and take the country forward in ensuring compliance and addressing environmental impacts, to determine costs and above all, not duplicate the activities of other projects. Some of the recommendations can be pursued with support provided under on-going or planned development assistance projects of the Asian Development Bank, United Nations and EU. Yet there may be certain gaps that need to be identified and addressed. The already formed WTO Consultative Group can propose members of the Task Force which can also be mandated to monitor the overall situation, track progress in problem-solving and capacity-building and identify important gaps.

Fish

Most of the recommendations are made in order that the recently lifted voluntary export suspension is able to be maintained. However there are environmental concerns of heavy metals entering the food chain, that go beyond the suspension. Environmental damage is significant and the knowledge of Environmental Management Systems is poor as is the awareness of opportunities to reduce waste and improve operational costs. An environmental impact study is essential and recommended.

Competent Authority (CA)

The action plan drawn up by the EU assessment team should be monitored by the CA on a weekly basis and the file updated with objective evidence to provide the guarantees required by the EU. The other activities and actions include:

- the specific actions to address public health issues should be highlighted, monitored and verified i.e. modified vessel design, training of handlers, auction hall modifications etc;
- the actions to address improvement in enforcement consistency and control should be highlighted and monitored;
- the phase 1 EU corridor plan and improvement work should be monitored and verified;
- the approved vessel program should be fully documented and lists maintained;
- the agreed changes to practices in the auctions/markets should be verified;
- the full implementation of the fledgling quality system outlined for the CA should be implemented;
- the traceability system for product movement through an assured supply chain should be fully designed, installed and tested;
- the CA should formalize management systems and seek ISO9001 certification;
- a set of Codes of Practice should be developed for the sector and players within the sector made aware of proper practices; and
- the design and implementation of effective systems to monitor and enforce standards related to the emergence aquaculture sub-sector, and in particular relation to fish feed, use of antibiotics, water quality, and end product safety;

Enterprises and vessels

In view of the unhygienic on-board operating conditions and that of the actual fishing fleet, a check list has been developed and should be used to cover the (i) hold and container design (ii) cleaning procedures (iii) removal of melt water (iv) the temperature, location and layout of the fish hold (v) vessel operation (vi) catch protection, handling and storage (vii) refrigeration and ice quality (viii) end of trip cleaning procedures (ix) on-board fish preparation (x) equipment used and (xii) crew health and hygiene.

Without exception the processors need to review their HACCP studies, identifying more fully the Critical Control Points with control measures prior to raw material intake within the plan. It is recommended that several (volunteer) enterprises be assisted to effectively benchmark their HACCP and GMP standards with that of the British Retail Consortium. This process could then be extended to other members of the industry.

Traceability systems are weak and will not be in compliance with emerging requirements of major trading partners. Computerized traceability is recommended providing a "boat to fork" system, utilizing systems from paper-based or bar-code and radio frequency identification.

Pakistan has considerable, yet unfulfilled potential to add value to its fish products and to compete in the rapidly growing higher value seafood consumer segments. A center or council to support the development of technologies for processing, new products, packaging etc is recommended, perhaps financed by an export levy.

Livestock and Animal Health

The recommendations regarding livestock and animal health are:

- A phasing in of the privatization of veterinary services is required;

- There is need to promote the rational use of veterinary medicine by employing therapeutic drug monitoring, counseling and education, along with the regulation of imports and local produced veterinary drugs;
- The Pakistan Automated Livestock Disease Information System (PALDIS) needs to be reactivated and supported;
- There should be an accreditation scheme of both production and processing units, with the inspection and issuance of permits based on traceability and compliance performance of standards and health and hygiene requirements; and
- The remit of the soon to be formed Livestock and Dairy Development Board should be expanded to include meat development.

Horticulture

The supply side of the industry is the weakest link in the export of fresh produce for international compliance. The Government must support and provide incentives for greater direct farm to packhouse procurement to achieve full traceability and the private sector needs to be made aware of the consequences if the supply chain remains weak. The future Agribusiness Support Fund can offer the packhouses, entrepreneurs and farmer enterprise groups matching grants for such interventions. The funding needs to be utilized effectively to: (i) ensure that farmers are made aware and trained in Good Agricultural Practices including the diligent use of pesticide to satisfy international compliance; and (ii) encourage packhouses to establish their in-house extension support network that works closely with the farmer suppliers (all year round) in order that the raw material procured satisfies the market specifications and standards required.

An effective mechanism to bring institutional capacity building and support to the agribusiness sector is the development of clusters. There are known concentrated areas of production for mango, kinnow, grapes, dates, potatoes and onions. The cluster approach for the kinnow and mango crops in Punjab Province should be promoted.

Pest risk assessment is either scant or nonexistent, thus allowing importer countries to lay down phytosanitary conditions that dictate treatments for pest and pathogens that may not be present at the time of harvest or prevalent. There is a requirement for Pakistan to commission pest risk assessments in order that the research can be presented at the time of negotiating export agreements and protocols.

There has been limited research in maximum residue levels (MRL). A fund needs to be created to provide recurrent expenditure to the MINFAL departments that have the equipment, but not the budgetary and manpower resources to undertake the work.

Institutions and Legal Framework

The overall contention is that SPS management capacity should be developed in a strategic manner that focuses on the opportunities to exploit export markets in a manner that engenders competitive advantage and/or minimizes the associated costs. A great deal of work is required to even focus on establishing the core elements of SPS management capacity in terms of (i) the institutional and legal framework, its efficiency and effectiveness (ii) food safety and quality (iii) plant and animal health (iv) testing capability and capacity and (v) international policy and regional dialogue. The institutional and legal framework recommendations are:

- Promote education and awareness of food safety, quality and SPS management, so there is greater understanding and awareness and recognition of its importance;
- Define and demarcate the roles and responsibilities of the different federal and provincial government ministries and other agencies;
- Continue to review and harmonize the regulations and laws dealing with food safety and animal and plant health relating to the WTO agreement;
- Ensure participation in the SPS process, in the meetings of SPS Committee, Codex Alimentarius Commission (CAC), Office International des Epizooties (OIE) and International Plant Protection Convention (IPPC) and other standardization agency meetings and support private sector involvement in the standard setting process;
- Assess the need to establish a Food Safety and Veterinary Public Health Authority (FSVPHA) and Codex Contact Point, to oversee food safety issues;
- Invest in the development of quality infrastructure and institutionalized food quality and safety system which includes a network of accredited laboratories observing good laboratory practices for cross border supply chain management;
- Build up further the technical capacity for developing and administering science-based SPS measures including risk assessment;
- Institutionalize an early warning system and alerts for pest and disease, residues and contaminants; and
- Employ a mentoring and twinning arrangement to proactively learn from and share experiences within the area of quality control and SPS management, with other WTO Members.

Conclusion

The overall picture regarding SPS management and the ability to comply with food safety and agricultural health requirements in export markets is one of generally low levels of capacity within both the public and private sectors. There are examples of enhanced capacity that have evolved in response to particular problems complying with export market requirements (for example for fish and fish products) or the emergence of acute SPS problems (for example outbreaks of animal disease or unhygienic meat). In most cases the

enhanced capacity has been induced by immediate market access problems, promotion by an industry Board or with funding from bilateral and/or multilateral donors.

Pakistani stakeholders need to adopt a more proactive approach to SPS management, focusing on building the awareness and capacities of primary producers and packer/processors and strengthening the systems for preventative risk management, via improved capacities for risk surveillance and supply chain monitoring and inspection.

Much better coordination of activity is needed, both among different agencies and levels of government and between these and the private sector. The Consultative Group (CG) on WTO, featuring representation from exporters, civil society, farmers, the Ministries of Health, Environment, Commerce and Agriculture, could play a key role in such coordination and in achieving a more coherent national vision and strategy for institutional reform and investment in this area.

1 Introduction

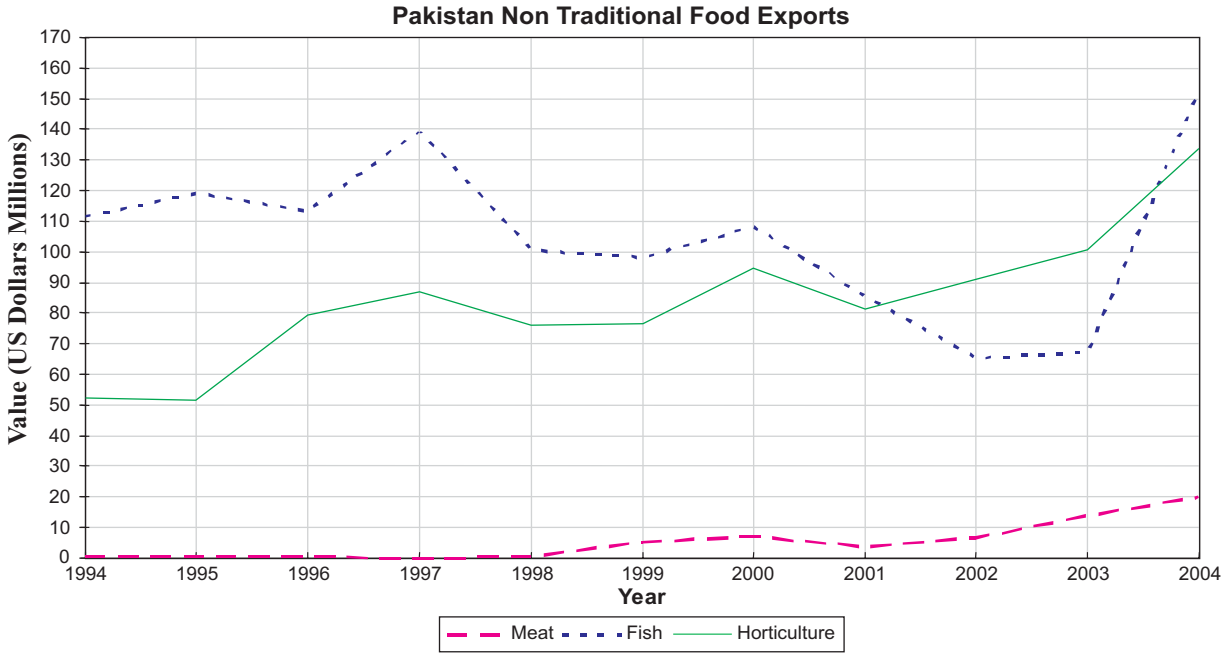
Developing countries are dependent on agriculture and agricultural produce for a major portion of their export earnings. They are facing greater challenges to access not only developed markets but also some developing countries. It is imperative that Pakistan augments the production and export of high value agricultural and fish products not only to increase revenue but also employment. The economic growth rate has failed to absorb the increase in the available labor force. Between 1995 and 2002, the average annual employment growth rate has been 3.2% while the annual labor force growth rate was 3.4% and annual GDP growth averaged 3.8% (International Labor Organization 2003). Economic growth has been capital intensive and urban orientated which has not helped the rural community. Some 75% of poor people in Pakistan live in rural areas and over 95% of the employed rural population depends on agriculture and fishing for their livelihood, either directly or indirectly. Sustainable development of the agribusiness sector has the potential to provide employment opportunities in rural and coastal areas, increase incomes and contribute to the diversification of the rural economy. It is estimated that by 2010 some 82 million inhabitants or 42% of the population could be living below the poverty line, compared with the current estimates of 32%. The Government's target is to reduce the incidence of poverty to 15 percent of the population by 2011 (Government of Pakistan, 2001).

In order to spur faster economic growth and create improved income-earning opportunities, Pakistan is seeking to expand and diversify its food and agricultural exports by increasing the county's high value agricultural and fish product exports. Indeed, the country's exports of fish, meat and horticultural products have shown a positive trend over the last 10 years, as highlighted in the illustration below.

International trade in high value food products has increased dramatically over that last two decades with fresh and processed fruit and vegetables, fish, live animals and meat and nuts and spices now accounting for 50% of the total agri-food product exports of developing countries (see Aksoy and Beghin (2005). Twenty years ago, international agricultural food trade was dominated by grains and oilseeds, sold as commodities. In recent years, processed and semi-processed foods accounted for over 60% of the food trade. Total food trade is now estimated at $300 to $400 billion per annum, with fish trade in excess of $55 billion which is a major export earner for developing countries, vegetables estimated at $14 billion and fruit at $33 billion per annum.

The WTO Agreement on the application of SPS measures specifies that countries should base their technical regulations and sanitary and phytosanitary measures on international standards. If they conform to the standards laid down, then by implication the international standards will not form barriers to trade. Compliance with the requirements is mandatory in many countries. Imported products require certificates issued by internationally accredited third party conformity assessment bodies or, more typically in SPS matters by official bodies in the exporting country.

The recent outbreaks of food borne diseases and food scandals have added pressure for greater regulation and stricter enforcement of current safety measures (see World Bank 2005). In many cases import/export bans and voluntary export suspensions have been used as a means to limit the spread of pest and diseases or to allow a domestic industry attain and comply with international standards. Nothing can highlight the issue of disease outbreaks and import bans and its effect on world trade more than the example of BSE in cattle and Avian Flu in poultry. Because of the disease outbreaks, import bans



Source: UNCTAD Statistics on line and Fruit, Vegetables and Condiments Statistics of Pakistan 2003-04

and quarantine measures were implemented throughout the world. During 2003-04 half the world poultry exports were stopped and a quarter of the global trade of beef was halted. This is equivalent to approximately 6 million tons of meat with a value of $10 billion.

Pakistan has in the past been subject to formal bans, for example; meat to the Middle East and animal casing to Romania. The Government implemented a voluntary export suspension of fish product to the EU, which was lifted on August 8, 2005. During 2004-05 the country has been subject to 26 EU food alerts, examples of which are detailed in Table 1 below:

Table 1: Selected alert notifications against Pakistan by EU member states during 2004-05

Date	Notifying country	Product and reason
26/01/04	Italy	Rodent faeces in chick peas and lentils
06/04/04	Germany	Color Sudan 1 and color Sudan 4 in spice mixes
07/05/04	United Kingdom	Erucic acid in chilli pickle and mixed pickle
25/05/04	Greece	Color Sudan 1 and color Sudan 4 in masala spice mixture
27/12/04	Norway	Ochratoxin A and aflatoxins in extra hot chilli powder
21/02/05	Austria	Hydrocyanic acid in bitter apricot kernels
01/03/05	Italy	*Bacillus cereus* and too high count of Enterobacteriaceae in sesame seeds
13/03/05	United Kingdom	Salmonella Edinburgh and too high count of Enterobacteriaceae in chilli powder

Source: European Commission: Rapid Alert System for Food and Feed Weekly Reports 2004 -2005

Standards have come to be crucial elements facilitating transactions and trade both within and between countries. Standards and technical regulations stipulate what can or cannot be exchanged and they define the procedures that must be followed for the exchange to take place. Thus, the ability to comply with standards in overseas markets is a major factor determining access to those markets and more broadly the capacity to export. This is true both for mandatory regulations, set by governments to meet their objectives regarding health, safety and the environment, and for market-driven voluntary standards, set within the private sector, to reflect the demands and tastes of consumers or the technological or management requirements of supply chain leaders (World Bank 2005).

It is important to distinguish between product standards and process standards. Product standards refer to the characteristics that goods should possess, for example, size, shape, appearance, and maximum pesticide residues etc for agricultural products or performance requirements for equipment. Process standards relate to the conditions under which products are produced and packaged.

In the past international trade standards or specifications in food and agri-based products were quality standards with such parameters as type, species and variety, physical and organo-characteristics, tolerances for defects and extraneous matter and therefore rejection. Recently increased emphasis has been placed on SPS standards, in order to manage risks associated with the potential spread of pests and diseases or the risks to human health from adulteration, contaminants or disease-causing organisms. The SPS standards include laying down the conditions under which products must be produced and processed and/or the characteristics of the end product or labeling and other information requirements.

SPS standards and other measures have been traditionally promulgated and applied by public authorities and provide a minimum set of food safety and/or plant and animal health standards with which suppliers must comply. The private sector standards have become an equally mandatory requirement to access high-value markets for agricultural and food products. Building on the binding international standards, a number of powerful trade groups, have introduced industry standards, which may also include environmental and social criteria, for example the British Retail Consortium Global Food Standard and Euro-Retailer Produce Working Group Good Agriculture Practices (EUREPGAP).

While the globalization of markets for agricultural and food products and the decline in tariff protection can provide opportunities for developing countries, SPS standards may continue to hinder market access. Developing countries can face problems complying with SPS standards because of their limited SPS management capacity or their food safety and agricultural health capacity. Any country must have a certain minimum level of SPS management capacity in order to access high-value markets for agricultural and food products. SPS management involves an agglomeration of basic and more sophisticated technical and administrative functions, in turn requiring a broad range of skills, physical infrastructure, institutional structures and procedures, and financial resources

(World Bank, 2005). Some of the basic functions are detailed in Box 1.

Box 1. Some basic SPS management functions

- Apply GAP, GMP, SSOP, HACCP and QM at farm and enterprise level
- Develop appropriate legislation and standards.
- Register/control feed, agrochemicals, veterinary drugs etc.
- Conduct basic research, diagnosis and analysis.
- Accredit laboratories/veterinarians/other third party entities for official duties.
- Develop/apply quarantine procedures, including for emergency situations.
- Carry out epidemiological surveillance and information management.
- Inspect/license food establishments.
- Develop/maintain pest or disease-free areas.
- Test products for residues, contaminants and microbiological content.
- Verify/certify biological materials (seeds; embryos, semen).
- Establish/maintain identity of products (for example traceability).
- Report possible hazards to treaty/trading partners.
- WTO/trading partners on new SPS measures.
- Participate in international standard-setting processes.

Many regulatory, research and management functions are carried out by governments, and by a designated public sector 'competent authority', where importing countries require that certain SPS functions are performed. The private sector also has an important role to play:

- To contribute to standard-setting at the national level;
- Become compliant with food safety and agricultural health requirements;
- Build capacity in SPS management and product analysis and testing; and
- Create an effective lobby to encourage the public sector to implement their SPS management responsibilities.

The array of SPS management functions and the associated institutional, technical and capacities required is daunting for many developing countries with existing levels of capacity being low, while available resources are limited and the opportunity cost associated with investments in the enhancement of SPS management capacity is high; there are other potential uses that compete for limited and scarce resources. There is a need to prioritize capacity-building efforts in terms of the integral functions of SPS management. At the same time, priority-setting is a complex task necessitating trade-offs between competing and multiple deficiencies. This underlines the need for a strategic approach to capacity-building that focuses on areas with the largest potential pay-off and the related need to avoid capacity development in a mode of 'problem-solving' or 'fire-fighting'.

There is a hierarchy of trade SPS management functions which schematically can be based on six tiers in the form of a pyramid. At its base is the foundation of SPS management meanwhile the tiers towards the top add value and sophistication (World Bank, 2005), they are:

- **Awareness and recognition**. At the base of the pyramid is the foundation of SPS management which requires awareness among the stakeholders about the relevance and importance of food safety and agricultural health to the competitiveness of their country/sector/company and the recognition of their own role in this system.
- **Application of basic good practices in hygiene and safety.** Another core set of building blocks that proceed from broad awareness is the application of risk and quality management practices at the farm and processing levels of supply chains, including HACCP, GMP and GAP.
- **Suitable and applied regulations.** With the application of good practices, many potential SPS risks can be effectively managed at the enterprise and farm or boat level. Yet there are other risks that cannot be controlled "locally", which are broader and need collective action and consensus, they are considered as "higher order functions" requiring basic research, surveillance systems and quarantine and emergency management systems and controls, all of which require particular technical skills, often specialized equipment and procedures supported by recurrent funding.
- **Institutional structures and role clarity.** Some of these functions need to be mandated by law in order to ensure that they are implemented appropriately. This requires an effective regulatory framework and transparent institutional structures. The roles of the various institutions need to be defined, mandated and be provided with sufficient authority to be able to enforce SPS measures.
- **Technically demanding risk and management functions.** With the institutional and legal framework established the capacity of the individuals and agencies that have to implement SPS management have to be enhanced particularly in the competent authorities, the national SPS enquiry and SPS focal points.

- **SPS diplomacy**. Finally individual WTO members need to engage effectively both technically and politically in international standard setting, negotiations with bilateral trade partners and with regional integration partners on matters dealing with harmonization, equivalence, joint programs, special considerations, etc. All too often developing countries are not well represented in the fora; they need a 'voice' in the development of compliance strategies associated with SPS standards.

Given the importance of binding quality with SPS standards, these can also be used in pursuing protectionist designs of importing countries. There is a growing concern among developing countries that stringent quality and SPS standards can potentially impact on their trading opportunities in the area of food and agricultural products. These countries however, have to satisfy the growing demand for standards compliance, if they want to compete, particularly in the face of consumer power and activism in the developed countries. Inadequacies in the institutional and regulatory framework make developing countries like Pakistan especially vulnerable to trade interruptions and the emergence of negative reputations for compliance with international standards.

Pakistan must enhance its capability in addressing current and prospective challenges relating to international compliance particularly in SPS measures, in order that existing and potential export markets will accept the entry of the country's products based on quality, uniformity, health and hygiene. On that basis the Government of Pakistan through the Ministry of Food, Agriculture and Livestock (MINFAL) requested the assistance of the World Bank and its development partners UNIDO and the European Union (EU) in assessing the current situation and making recommendations on how the industry can enhance the country's capability and alleviate constraints in light of agro-food export opportunities identified.

A consultancy team was mobilized using the resources of the World Bank and UNIDO/EU, the latter through the Trade Related Technical Assistance Project (TRTA). The team consisted of three international and two national consultants. The mission took place over a period of 3 weeks in May 2005 with stakeholders consulted throughout the high value food sectors (Appendix B).

The report provides an overview of the existing and emerging challenges and opportunities that Pakistan faces in relation to food safety, agricultural health standards and trade in fish, meat, fruit and vegetables. If the fish products voluntary suspension being experienced by the country's fisheries export industry is not enough, this report seeks to catalyze the pertinent Pakistani stakeholders to adopt a more proactive and strategic approach to managing trade related standards. Highlighted in the report are factors including market destinations and their requirements, current SPS standards in-country, market opportunities, institutional and regulatory framework limiting factors that could weaken the country's position in the export market and recommendations in ways in which external assistance can be used to address the limiting factors or constraints.

The recommendations identify the most immediate and/or most significant risks that the country faces from an SPS and trade perspective as well as the most immediate and/or significant market opportunities in the product sectors studied. The report also distinguishes between short-term and medium/long-term priorities and the scope for action. Some measures are simply not amenable to immediate or short-term solutions due to their technical or institutional complexity or the need to pursue certain activities in stages. Strategic planning for trade and SPS management should not be a one-off event it needs to be monitored periodically, taking into account new requirements, new technical challenges and lessons from on-going experience.

2 Institutional And Legal Framework

How Pakistan's institutions collaborate and function and the relevance and effectiveness of the legal framework is the key in measuring the country's capacity and capability in SPS management. The hierarchy of SPS management and its effectiveness is dependant on the suitability of the regulations and their application, the institutional structures required, their roles, the institutional authority, transparency and how they work, the management function and the Government's representation and diplomacy in SPS issues. Therefore the following assessment highlights key constraints, issues to address and the various ministries, institutions and agencies involved in SPS management.

2.1 SPS Management Constraints

A major factor constraining Pakistan's effective participation in the SPS process and management is due to the lack of inadequate capacity and the capability, to:

- Assess and regulate the food safety and agricultural health-related risks, associated with the agricultural imports;
- Examine and assess the possible implications of SPS-related notifications of the Members (especially when the number of notifications issued by the Members has increased fourfold since 1995);
- Participate effectively in SPS-related meetings at WTO and in dispute settlement procedures;
- Defend national SPS measures and make an effective case for equivalence arrangement with trading partners;
- Respond to quality and safety import requirements of Members, especially developed countries and negotiate science-based standards;
- Participate in the process of standardization carried out by international organizations; CAC, IPPC, and OIE;
- Evaluate or challenge the scientific base of SPS measures of the Members;
- Invest in quality infrastructure and SPS management; considerable investment is required in complying with regulatory requirements in the export markets.
- Cater to human resource needs in the area of SPS management and training; and
- Respond to the queries of the Members regarding SPS services, technical assistance and regulations.

2.2 Quality and SPS Regulations Implementation, Key Concerns

Countries regulate food quality, safety and agricultural health regulations through the use of process, product (performance), or information standards. Process standards specify how the product should be produced e.g. Good Manufacturing Practices specifies in-plant design sanitation, and operation standards. Product (performance) standards require that final product has specific characteristics. Finally, information standards specify the types of labeling or other information that must accompany a product. The problems Pakistan faces in complying with such regulatory requirements and standards are primarily because of:

- Resource and scientific and infrastructural constraints e.g. in Plant and Animal Quarantine Departments;
- Access to appropriate scientific and technical expertise, for example in the area of standardization;
- Poor knowledge of food safety and SPS issues, both within government and the food supply chain, and the skills required to assess SPS measures applied by developed countries are lacking;
- Fragmented and isolated institutions, at times resulting in duplicated work of institutions involved in the SPS management; and
- Very weak laboratory and quarantine infrastructure both in Animal Quarantine and Plant Quarantine Departments.

2.2.1 Quality and SPS Related Export Compliance Constraints

A number of constraints exist that impede the Country's progress to SPS compliance, including the:

- lack of political direction and policy support towards change management,
- poor communications and coordination and as a consequence the administrative response to changing quality and SPS requirements in export markets is slow and bureaucratic.
- insufficient access to information, services, scientific expertise and technical assistance.
- lack of coherence in regulations and institutions that relate to food, public, plant and animal health and environmental laws and the proliferation of Ministries and Departments that have involvement in SPS issues.
- financial limitations in developing, rehabilitating quality and safety support structures;
- lack of public awareness and educational base on quality and safety requirements and quality and SPS management both in public and private sectors;
- Lack of public- private partnership particularly in standard setting.

2.3 Departmental Roles and Responsibilities

While the major challenge facing the Pakistani fish products, horticulture and livestock exports is the adoption of the SPS standards, the situation is compounded by the large number of governmental agencies, both Federal and Provincial, having

an input in the area. SPS and quality management falls under the jurisdiction of a number of Federal Ministries; principally departments within MINFAL, Ministry of Commerce, Ministry of Science and Technology and the Ministry of Health, as well as many provincial and local government departments. In discussions it was evident that each department or institution work totally in isolation. Table 2 below gives an indication where overlap and duplication occurs.

Table 2 : Government Departmental Roles and Responsibilities

Activity	MINFAL (DPP)	MINFAL (DALMG)	MOC (PHDEB)	MOC (EPB)	MOST	Other Government Departments.
Product Inspection	Yes	Yes	Yes*			Yes
Product Testing/analysis	Yes	Yes			Yes	Yes
Grading and Standards		Yes	Yes			
Export Promotion			Yes	Yes		Yes
Market Information		Yes	Yes	Yes		Yes
SPS Focal/Enquiry Point	Yes twice					

*Pakistan Horticulture and Development and Export Board using the services of SGS
Source: Authors

The diffusion of roles and responsibilities gives rise to duplication of effort and excessive use of limited resources, leading to the decision making process slowing down with resultant poor reaction times,when particular issues and alerts are raised regarding Pakistani exported products, as has been the case regarding chili aflatoxins and Sudan 1 and Sudan 4 colorants in Paprika.[1]

2.3.1 The SPS Committee

A Pakistani Consultative Group (CG) on WTO was formed in 2000-01. Major interest groups were represented including exporters, civil society, farmers and representatives from the Ministries of Health, Environment, Commerce and Agriculture. A SPS Committee was also established as an operational arm of the CG. This Committee undertook a stocktaking exercise in terms of SPS management capacity, and recommended measures for change in the area of quality, safety and agricultural health. As a result of the review process, the concept of the National Animal and Plant Health Inspection Service was formulated through the integration of all animal and plant heath and standardization departments. Unfortunately, the concept couldn't be carried forward because of frequent staff changes in MINFAL which caused a lack of commitment and continuity leading a moribund committee.

2.3.2 Participation in IPPC, OIE and CAC Meetings

Pakistan has not been able to engage itself actively, in the standardization activities of the international organizations and to participate in WTO/SPS related work. Developing countries are not well represented in the standard setting process and SPS related work at WTO. When represented, in many cases individuals that have limited technical experience in the particular field in question attend the meetings. For example, in the OIE related business, representatives of Animal Quarantine Department of MINFAL have never been able to participate, and instead a Deputy Animal Husbandry Commissioner from MINFAL attended the meetings. Whereas, Plant Protection Department participates in IPPC meetings, but the participation of relevant individuals in Codex Meetings has been very rare. For example, in 2000-01 the then National Enquiry Point was nominated to attend the CAC meeting and the then Minister of Agriculture declined to concur the nomination, as it involved Government funding. As a result the concerned department and individuals were never able to benefit from the process and build their capacity in the negotiation and standard setting process.

2.3.3 National Enquiry Point & Notification Authority

The transparency requirements under the SPS Agreement include establishing a National Enquiry Point (NEP) in member countries, responsible for responding to SPS related queries and a single National Notification Authority (NNA) responsible for all procedures associated with notification of new or amended SPS measures. By mid 1999, only 65% of low and lower middle income countries had specified the NEP and only 59% of these had specified a NNA, including 29 Least Developed Countries, which were not obliged to comply with these requirements until 2000. Given the fundamental importance of the transparency in the working of the SPS Agreement, this indicates an important weakness in the participation of developing countries in the SPS Agreement.

Pakistan is among those Developing Countries that have notified its NEP and NNA, yet no financial support has been provided by MINFAL. As a result the office is poorly equipped to handle the assigned task. There is no intra-MINFAL mechanism of coordination, linking the NEP with concerned departments. The capacity to effectively participate in the SPS process is also limited, and capability to examine the notifications issued by the Member countries and assess their possible implications for Pakistan is lacking at present. Similarly, there is limited ability to participate effectively in the WTO negotiations on SPS, in the dispute settlement procedures and to defend domestic SPS measures. (see Box 2).

[1]The aflatoxin complaint was dealt with through the imposition of the use of stricter standards, monitored by the government's laboratory analytical resources. However little is being done to deal with the Sudan colorant alerts, as who takes the lead and what has to be done has yet to be decided (Dr Pirzada)

No training has been arranged for the NEP and other staff in SPS management.

Box 2 SPS Management - A Case Study

The EU Member countries have placed Pakistan in Category-II, for purposes of the export of sheep casings and bone meal from Pakistan, due to the risk of Bovine Spongiform Encephalopathy (BSE). Since, there has not been a single case of BSE in Pakistan. Pakistan was thus entitled to its placement in Category-I. However Pakistan has not been able to defend its position, and negotiate a change in Category, which will have an impact on future livestock related trade, at least in the short term, especially in animal casings and bone meal. This clearly reflects lack of capacity to handle trade-related SPS issues.

Similarly, because of the Avian Influenza issue, Pakistan's export of day old chicks to the Middle East was affected. The Animal Quarantine Authorities were of the view that the case was not handled properly by the Federal Livestock Wing. As a result financial loss was suffered by the Pakistani exporters.

2.4 Federal Government Institutional Arrangements

At the Federal government level, there are at least four Ministries directly involved in Trade and WTO activities that impact on fish, livestock and horticulture development and promotion, they are (i) MINFAL (ii) Ministry of Commerce (MOC) (iii) the Ministry of Science and Technology (MOST) and (iv) The Ministry of Health.

2.4.1 Ministry of Food, Agriculture & Livestock

MINFAL has the overall responsibility for formulating and implementing policies with regards to animal and plant quarantine and health, pesticides regulation and agricultural produce grading. The departments entrusted with the task of administering these policies and standards are the Department of Plant Protection (DPP), Department of Agricultural & Livestock Products Marketing & Grading (DALPMG), the Livestock Wing, the National Veterinary Laboratory (NVL) and the Marine Fisheries Department (MFD)

The Department of Plant Protection is responsible for the administration of the Plant Quarantine Act, 1976. DPP is a Member of the International Plant Protection Convention (IPPC) and is mandated to undertake both plant protection & quarantine related activities. The Department also deals with issues of pest control. MINFAL is responsible for registration of pesticides, its execution lies with the Department. The main regulatory functions of the Department are under the auspices of the (i) Enforcement of Plant Quarantine Act 1976 (ii) Agricultural Pesticide Ordinance 1971 and (iii) Agricultural Pesticide Amendment Act, 1997. The DPP also advises the Government on all aspects of plant protection including its international obligations. The DPP does undertake some research and pesticide trials. An example of the research is the dis-infestation of fruit fly using vapor heat treatment.

The DPP also extends inspection services at the entry and exit points to check for diseases, pest infestation of plant and plant materials, and provides phytosanitary certifications for agricultural produce intended for export. The quarantine facilities for imported plant material are limited and are not satisfactory in order to maintain the planting material in good condition.

The DPP claims to be the Enquiry Point for SPS (both for quarantine and contaminants), while MINFAL has also notified an independent Focal Person on SPS/TBT in April 2005, and has assigned him the responsibility to formulate a National SPS/TBT Strategy**.** The draft strategy is now under consideration by MINFAL. MINFAL, has also notified on June 2, 2004 three 'Focal Persons' for participation in the meetings of CAC they are the Animal Husbandry Commissioner, the Director General Plant Protection Department and Deputy Director WTO, MINFAL. There is thus some confusion regarding who are the enquiry and focal points for SPS issues.

DALPMG is responsible for the administration of the Agricultural Produce (Grading & Marketing) Act 1937. Under this Act, export and quality grades and standards for agro-livestock commodities are developed and enforced. It facilitates the inspection and certification of export products, with the Department having staff and facilities located at the key exit points. DALPMG extends support to exporters by undertaking physical, pesticide and microbiological analysis, and quality certification of the products. In addition, the Department is responsible for undertaking agricultural commodities research and marketing intelligence surveys. It shares this information with interest groups and stakeholders through its Market Report and Price Bulletins.

DALPMG has chemical, microbiological and physical testing facilities, through an investment of $500,000 its laboratory infrastructure has and is being upgraded and will, in future, have the capacity to test for pesticide residues and microtoxins. The Department has so far developed quality standards for 42 primary agricultural[2] and livestock[3]

[2]Citrus fruit, lime & lemon, chilies (whole), ginger(whole), garlic(whole), onion , potato, radish, brinjal, peas, asparagus, brussel sprouts, cauliflower, tomato, turnips, cucumber, carrot, fresh beans, artichokes, celery, green chilies (large),lady fingers, arum, guavas, dates, banana, mangoes, oil cakes including solvent extracted meals.

[3]Animal wool, animal hair, animal casings, animal bones, lambskin and eggs.

commodities and products.

The Livestock Wing headed by the Animal Husbandry Commissioner is responsible for policy formulation in the area of livestock. Within the Wing there are Assistants and Deputies responsible for Drug and Vaccines, Animal Nutrition and Epidemiology. The Wing lacks orientation in export-led agriculture and trade-related livestock policies. Livestock development is a provincial subject, despite the fact that import and export related matters including quarantine measures are Federal Government concerns. The Animal Quarantine (AQ) Department of MINFAL is responsible for implementation of quarantine regulations. Veterinary public health and food safety, which should be a state responsibility, is not being addressed by the MINFAL.

The National Veterinary Laboratory was established in 1998-99 at a total cost of $1 million to meet the European Union and other trading partner's requirements, regarding quality, safety and animal health testing. It is a referral laboratory established by MINFAL in Islamabad. The purpose was to provide a central referral facility for diagnosis of livestock diseases and research, and for quality and animal health assurance for export of livestock and livestock products. This initiative has units covering virology, bacteriology, pharmacology, epidemiology, pathology and parasitology. If equipped and manned properly, it can be used by the animal heath and quarantine departments as one of their testing facilities. The post of the Director General NVL remained vacant, and the Animal Husbandry Commissioner took on that responsibility which has had a negative effect on NVL development and performance.

Marine Fisheries Department (MFD) is attached to the Livestock Wing and was established in 1951. It is the executive fishery agency of the Federal Government, with primary responsibilities for ensuring management and development of fishery resources.

According to the constitution, the management of marine fisheries is a federal responsibility outside the limit of territorial waters (12 nautical miles). The MFD mandate is to:

- exploit and manage fisheries and other living resources in the exclusive economic zone of Pakistan;
- conduct exploratory fishing surveys and biologica research on various aspects of fisheries;
- study the occurrence, life history and distribution of commercially important fish species;
- manage and ensure improvements to the fishing fleet;
- introduce improved fishing techniques and improve traditional methods;
- train fisher folk in various disciplines including modern fishing techniques, engine maintenance, fish processing and quality control;
- liaise with various national and international agencies;
- collect, analyze, interpret and publish statistical data of fisheries;
- advise federal and provincial governments in matters relating to fisheries;
- provide quality control service for export and domestic consumption of fish ; and
- provide technical assistance and promotion of fish processing industry.

2.4.2 Ministry of Commerce

The Federal Ministry of Commerce has overall responsibility for formulating the national trade policy and overseeing its implementation. It also acts as a contact ministry for WTO affairs. The departments mandated with the task of administering these policies are the Export Promotion Bureau (EPB) and the Pakistan Horticulture Development and Export Board (PHDEB).

The Export Promotion Bureau is the primary agency of the Government engaged in promotion and boosting the Country's exports. Since its inception in 1963 the EPB has continued to facilitate the exporters in overcoming difficulties faced by them on the supply and demand side of exporting. On the demand side, EPB helps exporters to participate in exhibitions abroad and sends delegations to export markets with a view to explore new markets and develop the traditional markets. On the supply side, EPB has established over 32 training institutes and projects in various export sectors to train the necessary manpower that can manage the export trade and industry in order to meet the requirements of the export markets. Export promotional activities are carried out in co-ordination with trade bodies at home and Pakistan's trade missions abroad.

Though EPB had given the responsibility of horticultural export promotion to the Pakistan Horticulture Development and Export Board (PHDEB), it has retained control over the promotional activities of this sector and has continued its activities in parallel with that of PHDEB and in some cases duplicating PHDEB's work.

The Pakistan Horticulture Development and Export Board was set-up by the Government in 2002 with the specific objective of developing and promoting horticulture exports from Pakistan and took over the EPB role in that sector. The Board claims it has been mandated with the task of developing and promoting horticulture exports, including developing standards and policies for horticulture produce exports.

PHDEB has initiated the process of developing and enforcing its own quality related grades and standards for horticulture produce as well as inspection and certification of export produce, albeit voluntary. Lacking the required technical and marketing expertise needed for its operations, PHDEB has enlisted the technical support of an international certification

[4]PHDEB is financed by the Export Development Fund (EDF) of the Ministry of Commerce, through a 0.25% levy on exports, with an annual budget of PRs25 million ($435,000)

and inspection agency from the private sector Société Générale de Surveillance (SGS) for this task. The Board's operation is financed by an export development tax[4] which has led to resentment among the horticulture export community. There are also plans of PHDEB instituting a pre-shipment inspection requirement for horticulture exports and only the exporters that conform to the standards and grades laid down by PHDEB will be eligible for a 25% export freight subsidy. Exporters view this plan as detrimental to exporting horticultural produce as all pre-shipment inspection requirements are strictly business-to-business (B2B) requirements, satisfying the buyer's specifications.

PHDEB is also promoting HACCP certification for exporter plants and has now begun to emphasize EUREPGAP accreditation for the horticultural production units.

The Board has initially concentrated on the export of kinnow and mango. All other fruits and vegetables have not been promoted in the same manner, as a consequence the EPB has again taken on the task of identifying and developing export markets and provincial governments, particularly in Punjab have taken on the role of agricultural marketing and developing horticulture themselves.

2.4.3 Ministry of Science and Technology

The Pakistan National Accreditation Council (PNAC) has been established as an autonomous body, under the administrative control of the Ministry of Science & Technology (MOST).

Pakistan National Accreditation Council regulates the accreditation and registration system in the country. It is a member of the International Accreditation Forum and International Laboratory Accreditation Council and also acts as a Focal Point for coordination with relevant international, regional and national organizations. It is attempting to ensure that eventually all ISO certification in Pakistan has international recognition. Laboratories in the agro-livestock sector were encouraged to obtain accreditation with PNAC. As a result at least four laboratories have started this.

EPB has also announced a package to facilitate the accreditation of laboratories. Through this package, EPB undertakes to meet 60 % of the investment costs and consultancy charges.

Pakistan Standards & Quality Control Authority (PSQCA) was established under the Pakistan Standards and Quality Control Authority Act, 1994 to provide a one-window service for standardization and quality control. Consequently, three organizations namely Pakistan Standards Institution, Central Testing Laboratories and Metal Industry Research & Development Centre were merged into a single entity the PSQCA. The PSQCA works through three centers (i) Standards Development Centre (ii) Quality Control Centre and (iii) Technical Services Centre. It is a member of International Organization for Standardization, International Electrochemical Commission and International Organization for Legal Metrology.

PSQCA has developed standards for food and food products and has adopted 13,500 ISO standards, of these only 46 are mandatory and 18 deal with food and agricultural products including livestock and poultry feed, oil cakes, edible oil, mycotoxins for rice and chilies, testing methods for Salmonella and canned meat standards. The mandatory standards relate to edible oil, Vanaspati ghee, biscuits, bottled drinking water and carbonated beverages etc. It has also developed codes of practice and voluntary guidelines for quality standards. PSQCA primarily deals with processed products, and as a principle has adopted CAC standards for food and guidelines for GMP, GAP and encourages HACCP certification. DALPMG deals with fresh produce, while processed products are covered by PSQCA. The authority's main activities are to:

- set up standards on quality dimensions;
- prepare and promote the general adoption of Pakistan Standard Specifications;
- operate the Certificate Marks System;
- coordinate the efforts of producers and users for the improvement of standardization;
- extend assistance in the manufacture of quality products;
- test and assess industrial raw materials and finished products to establish their quality, grade and composition, with reference to national and international standard's specifications of quality;
- coordinate with other national, regional and international organizations, associations, societies, institutes or councils; and
- disseminate technical information through seminars, workshops, symposia, and the print and electronic media.

2.4.4 Ministry of Health

The responsibility of enforcement of the food laws lie with the District Health Administration, which until recently directly operated under provincial Health Departments which are primarily responsible for curative human health, whereas, the Federal Ministry of Health monitors the quality of food items in the country. The authority responsible for food rules are the provincial Secretaries of Health Departments. The provincial governments also engage Municipals Corporations, which can then appoint food and sanitary inspectors. In most cases the municipalities engage the services of veterinarians, working in animal health departments, on a part time basis for meat inspection. The posts of District Health Officers, who monitor food quality, exist in almost all districts of Pakistan.

2.5 Provincial Agriculture Institutional Arrangements

The provincial Government of the Punjab has identified agricultural marketing as a priority and as such supported two initiatives to promote that goal by establishing (i) a Department of Agricultural Marketing and (ii) Punjab Agri-

Marketing Company (PAMCO).

The Government of Punjab has entered into the field of agricultural marketing, splitting away from the provincial Department of Agriculture. The Department of Agriculture Marketing was established to support the development of agriculture and horticulture produce marketing in the Province.

The Government of Punjab has also set-up PAMCO with the specific objective of commercializing horticulture exports from the Punjab through the development of much needed cold storage infrastructure in the production areas. The company also aims to set up laboratories for quality control, soil and contaminant analysis and to analyze diseases in the crops. PAMCO plans to invest over $66 million ($18 million from government and $48 million from the private sector) in the next four years on developing a market information system and integrated logistical.

This decision was taken by the Provincial Government after a careful review of the potential of the horticulture industry within the province and its role in alleviating rural poverty. There had been discussions between PHDEB and PAMCO to achieve mutual cooperation. However the Government of Punjab is now distancing itself from PHDEB and pursuing the program alone, although very similar to PHDEB's activities.

2.5.1 Provincial Livestock Sector Activities

The research and development activities relating to livestock, including animal health, is dealt with by the provincial Livestock and Dairy Development and Animal Husbandry Departments, which are headed by provincial Secretaries and have one or more Directorate Generals of Livestock Extension and Research.

The Directorate General (Extension) has for example in Punjab, among its constituent units, a Directorate of Animal Health. The key services, provided by the provincial Animal Health Directorates are (i) the treatment of animals, which is the core activity of the veterinarians working in the Directorates (ii) the prophylactic vaccination of livestock, (iii) diagnosis and epidemiological surveys, lab-based diagnosis is not undertaken and the capacity to undertake epidemiological surveys/surveillance is lacking (iv) meat inspection at the slaughter houses, which is a part time activity and the staff is neither trained nor well equipped to undertake effective meat inspection (v) extension education and health services which are limited in the scope operation.

The Director (Animal Heath) oversees the activities of a network of veterinary hospitals and dispensaries, primarily responsible for disease control, curative treatment. Most veterinary hospitals are manned by graduate or postgraduate veterinary professionals but are not equipped sufficiently to cater for modern veterinary services, especially in the global trade context. The centers lack surgical equipment, medicines, quality vaccines and mobility and also the physical infrastructure including laboratories. The focus of veterinary services in Pakistan has been invariably on curative rather than preventive control measures and on individual animal health rather than herd health management. The indiscriminate import, along with the injudicious use of veterinary medicines is yet another problem because of quackery, which is a key concern in the context of SPS Agreement. Despite the sizeable number of veterinary centers in the country[5] the efficiency level remains low.

2.6 Existing Legislation And Regulations

There is a need to make Pakistan's SPS related laws compliant with international and trade-partner requirements. The key legislation pertinent to trade related SPS management in Pakistan are (i) Pakistan Pure Food Laws, 1960 (ii) Pakistan Animal Quarantine (Import & Export of Animals & Animal Products) Act, 1985 (iii) Pakistan Plant Quarantine Act, 1976 (iv) Federal Seed Certification Act, 1976 (v) Pakistan Standards and Quality Control Authority Act, 1994 (vi) Agricultural Produce (Grading & Marketing) Act 1937 and (vii) Pakistan Fish Inspection and Quality Control Act, 1998.

The Pakistan Food / Pure Food Laws (PFL) are the basis of existing trade-related food quality & safety legislative framework in Pakistan. The PFL covers 105 food items, which fall under nine broad categories (i) Milk & Milk Products (ii) Edible Oil & Fats Products (iii) Beverages (iv) Food Grains & Cereals (v) Starchy Food (vi) Spices & Condiments (vii) Sweetening Agents (viii) Fruit & Vegetable Productsand (ix) Miscellaneous Food Products.

Essentially these regulations address the purity issues in raw food and deal with subjects associated with additives, food preservatives, food and synthetic colors, antioxidants, and in some cases heavy metals. The regulations fail to address potential hazards in the food-supply chain and in processing such as biological, chemical and environmental contamination. Similarly labeling requirements are limited to information such as the list of ingredients, label terminology and name of producer or manufacturer.

The Food Act makes provision for the appointment of Food Inspectors who are responsible to submit randomly collected samples to carry out food safety and quality laboratory testing. In practice the Food Inspectors rely on physical examination, and the whole process of inspection is at times non-transparent. *T*he food laws are outdated and there is a need to update the laws, to bring them in line with CAC standards, with added emphasis on supply-chain management. It requires an umbrella act, see 178/2002 or UK Food Safety Act (1990). This is an enabling act allowing regulations to be put in place quickly and could provide specific Federal Ministerial powers.

Unlike the developed countries, there is not a Food Safety and Veterinary Public Health Authority (FSVPHA) in Pakistan, which can be made responsible for the execution of laws, nor are there appropriate quality testing and referral laboratories

[5]For example 1,281 veterinary hospitals and dispensaries, 2,002 veterinary centers, 17 mobile clinics,16 diagnostic laboratories are present in Punjab alone,

available.[6] There are two institutions namely the Nutrition Division of the National Institute of Health in Islamabad and Pakistan Council for Scientific and Industrial Research (PCSIR) laboratory network, which have the capacity to undertake analytical work related to food quality and safety and consumer protection. There is thus need for a FSVPHA to manage food safety and SPS related issues in the country**.** The FSVPHA would be a government department mandated by law to provide advice and information to the public and Government on food safety from farm to fork, nutrition and diet. It also protects consumers through effective food enforcement and monitoring. The Agency should have access to advice from scientific advisory committees and the research network and commission research work and studies when required.

Pakistan Animal Quarantine (Import & Export of Animals & Animal Products) Act, 1985 is administered by MINFAL through its Animal Quarantine (AQ) Department, which was created under the Act. The Department which is supported by its offices and laboratories located in the seven cities; Karachi, Lahore, Peshawar, Quetta, Multan and Sialkot, provides certification services to the importers and exporters of animals and animal's products. From 1995 to 2000, the Department handled 63,250 import and export cases including birds, livestock and livestock products. It handled 11,873 such cases during 2003-04.

The Act fails to address issues such as institutional and quality infrastructural requirements, scientific risk assessment, standardization requirements and the role of private sector, meat inspection, animal welfare and damage control to animals, and matters related to wild life, residues, environmental contaminants, live vaccines, serum, toxins, Genetically Modified Organisms (GMO), traceability, and social compliance. There is a need to amend the Act and formulate new regulations addressing the aforementioned issues, along with matters related to tariffs, inspection and quarantine user charges. To address the emerging SPS requirements the AQ Department proposed a second amendment through an Ordinance namely Pakistan Animal Quarantine Ordinance, 2000 which has not yet been promulgated. However the proposed Ordinance doesn't go far enough. The core concern, of the real and perceived impact of emerging animal and public health issues on Pakistan's livestock and meat sector and its economic interests, needs to be studied and investigated, and reflected in the regulatory framework so that it satisfies the import requirements of the WTO and its members and ensures equivalence and a scientific basis of control for market access, which implies unless scientific evidence is used then a product cannot be removed from the market until such evidence is produced.

Neither the airport nor seaports have any formal quarantine facilities. The quarantine offices, in most parts of the country are in the rented facilities and ill-equipped to cater for quarantine testing. At best these can provide physical/visual inspection based certification, only, with limited laboratory/analytical work undertaken. However the animal quarantine facilities at Karachi have been upgraded at the total cost of $1 million. A new laboratory for residue-testing has also been established in Karachi. The manpower available with the AQ Department needs training in SPS management. Recently, three additional quarantine facilities have been established in private sector near Lahore. Also new quarantine facilities are planned at the borders at Khokhrapar and Darra Khanjrab in light of new trade import/export protocols with India and China.

The Plant Quarantine Act, 1976 is administered by MINFAL through the Department of Plant Protection which is mandated to undertake both plant protection and quarantine related activities. The DPP also undertakes locust surveys, and deals with pest control issues. The DPP extends inspection services at the entry points to check for pathogen and pest infestation of plant and plant materials, and provides phytosanitary certification, and issues 'Import Release Orders' for all plants and vegetative plant material. The DPP lacks human resources for analytical work and has to depend on other laboratories like that of PCSIR to test for pathogens.

There is evidence of weak enforcement of quarantine regulations. A recent case study noted that the Customs Department under the 'CARE' program had released consignments without 'Release Order, and/or 'Quarantine Certificates' issued by the DPP Department. This indicates lack of coordination and cooperation between agencies, and poor enforcement of regulations.

The Plant Quarantine Act, 1976 is under review, to make it compliant with the International Plant Protection Convention and with the requirements of trading partners. A draft amendment has been submitted by DPP to MINFAL in 2000. The proposed amendments are not all encompassing and fail to address issues relating to invasive pests, scientific risk assessment, standardization requirements and the private sector's role, protecting biodiversity/natural resources and sustaining the ecosystem, human health and safety, social acceptability, etc.

The Federal Seed Certification Act, 1976 is administered by MINFAL through the Federal Seed Certification and Registration Department (FSCRD).The Act mandates the Department to control and certify the quality of seeds, the release and sale of varieties and carrying out inspection of the crops. The FCSRD undertakes random sampling to ascertain the purity, viability and health status of the seed varieties, and issues certificates accordingly. The cotton seed varieties are tested by Cotton Research Committee and Cotton Standards Institute which are research institutes affiliated to MINFAL and Ministry of Textile respectively. There is a lack of coordination between the Ministries.

Pakistan Standards and Quality Control Authority Act, 1994 established the Pakistan Standards & Quality Control Authority (PSQCA**)** which was established under the Pakistan Standards and Quality Control Authority Act, 1994 to provide a one-window service for standardization and quality control.

[6]Few testing laboratories established between 1960 and 1980 are sufficiently equipped and do not have the human resources to undertake food related analytical work.

Agricultural Produce (Grading & Marketing) Act 1937 is administered by MINFAL through DALPMG. Under this Act, export and quality related grades and standards for agro-livestock commodities are developed and enforced. DALPMG facilitates in inspection and certification and the Department has facilities at key export points. In addition DALPMG is responsible for undertaking agricultural commodities research and marketing intelligence surveys. DALPMG is mandated by law to develop and enforce quality-related grades & standards for agro-livestock export commodities as well as facilitating inspection & certification of export produce. This Department has so far developed quality standards for 41 standards for agriculture and livestock commodities. If the product conforms to the standards then the product can carry the "Pakmark" quality label.

Pakistan Fish Inspection and Quality Control Act, 1998 The Act provides the necessary instructions related to public health, environment and fish quality. The Pakistan Fish Inspection and Quality Control Act, 1998 is the only SPS-related Act in Pakistan. It was introduced to cater for the WTO agreements and to satisfy the Country's trading partners, particularly the EU.

Animal Slaughter Control Act 1963 (W.P. Act III of 1963). Under the act veterinary inspection is required but many animals are slaughtered outside the recognized abattoirs. There is not an Act or Law on wholesomeness of meat or are there prescribed standards e.g. microbiological standards. Microbiological Standards and examination are required to enhance pre-and post-slaughter meat hygiene. Microbiological standards also help in the adoption of suitable measures to limit the microbiological contamination to the safer levels. In the USA, for example, the fresh or processed meat products are considered adulterated, if the total bacterial count exceeds five million per gram. There is also limit on Coliform organisms. Such standards need to be developed and adopted in Pakistan. A Code of Practice for slaughterhouses and grades for carcasses and animal casings along with standards for canned meat, have been developed by PQSCA. These are not being enforced at present, and also need reviewing as they were developed between 1960 and 1980.

2.6.1 Biosafety Guidelines

In May 2005, The Ministry of the Environment notified the Biosafety Guidelines, as stipulated under Cartagena Protocol, a Multilateral Environmental Agreement (MEA) seeking regulation of cross boundary movement of GMO. The Biosafety Guidelines provide for risk assessment for GMO. The implementation of these guidelines would also need further legislation, and human and capital resources to develop risk assessment mechanisms. The interface of SPS issues with GMO is crucial in the context of the MEA and Precautionary Principle stipulated under SPS Agreement.

3 Fruit and Vegetable Production and Exports

So-called minor crops, which include horticultural crops, contributed 12% of the country's agricultural GDP in 2003-04. Although Pakistan is among the largest international producers of fruit and vegetables, the bulk of production is either wasted, consumed on-farm or sold in the domestic market. In 2004, the estimated area under fruit and vegetable production was 1.5 million hectares. Some 12 million tons of produce was generated, having a farm-gate value of nearly $2 billion. The current level of fruit and vegetable exports is $134 million. This is up from $53 million in 1990 and $87 million in 1997.

3.1 Land Fragmentation

The distribution of land is highly skewed in the country and a large proportion of the rural population is landless or near landless, working as laborers. The total farm area in the country is 50.5 million acres (20.4 million ha) and total number of landowning households is 6.6 million. Landownership is historically skewed in Pakistan and remains so despite three major land reform processes in 1959, 1972 and 1977. A very small number of large land owners possess holdings above 150 acres. In contrast, nearly 60 % of the total ownership holdings are smaller than 5 acres, which is 16 % of the total farm area (Appendix C). Over the period between 1972 and 2000, the number of marginal landholdings has dncreased dramatically, while so-called small holdings (i.e. 5 to 25 acres) have decreased substantially.

Horticulture remains a major activity in rural areas throughout the whole of Pakistan, employing large numbers of the rural population. Fruit production remains very much in the domain of the large landowner because the type of fruit crops being produced are mainly tree or vine, all of which are grown an a more extensive basis and require considerable establishment investment and recurrent expenditure to be managed properly. Exporters that purchase directly from farmers will deal with farms that have land holdings above 5 acres and favor procurement from farmers that have holdings of 25 acres and above. In general vegetables are mainly produced by small farmers or by producers who rent lend from larger landlords. The average unit size for vegetable producers is less than 5 acres.

In general the owners with the larger holdings are absentee landlords or if they are involved with the farming operation sell their crop prior to harvest to either contractors or commission agents (see below). The landowners then have no control over the spray program. For example, in Punjab' mango orchards, the spraying is undertaken by the *bekhar* (the equivalent of the farm foreman) working an behalf of the contractor or commission agent. Spray records are not kept and the foreman, while being experienced in production practices, has no formal training in the use of pesticides, let alone Integrated Pest Management (IPM), record keeping, and health and safety procedures. Such crop management patterns are a major constraint in fruit production for export and the implementation of SPS procedures.

3.2 Domestic Market Structure

The fruit and vegetable market system in Pakistan is complex. In practice, there are four main categories of wholesale markets; primary wholesale (terminal), secondary wholesale, district wholesale and rural assembly markets. These categories of markets differ mainly in the scale of operation, geographic location and regulatory status. Under the regulated market structure there are 203 markets established under statutory acts[7], comprised of Punjab (132), Sindh (68), Balochistan (2) and NWFP (1). Whilst difficult to quantify, there are a number of un-regulated markets throughout the four provinces.

The overall market structure for fruit and vegetables is organized by various participants, namely: farmers, commission agents *(Arthis)* who are often stationed in the wholesale markets, contractors *(beoparis)*, wholesalers *(paria/mashakoor)*, inter-market traders *(ladanwala)* and many other retailers. The commission agents can be considered as the most important market functionaries influencing price, offering services and facilities at the market, providing inputs and credit to growers and wholesalers, but often not taking title of the commodities. The contractor purchases in bulk from fruit growers in the production areas and this may be either done pre harvest or post harvest. At pre harvest the crop purchase takes place at either the flowering stage or initial fruit set. The contractors are the risk takers and are actually informally providing crop insurance to the producers, as much as a third of the contract value cash is given to the farmer before harvest. The market based wholesaler purchases the produce through auction, usually in lots, and sells mainly to retailers, distributors or exporters and often grades the produce. The inter-market traders operate between the markets and usually take advantage of the price differential between various markets.

Grading, packaging and labeling for the domestic market are either non existent or rudimentary. The packaging for the domestic market is basic, usually in 10 or 20 or 40kg wooden boxes for fruit or jute or hessian sacks in the case of potatoes and onions and in some cases mangoes. In many instances the sacks are reused and are extremely unhygienic. Some of the packaging used for export markets is now evident in the wholesale markets but this is usually due to a consignment being diverted from the export market prior to dispatch.

The local marketing system for fresh produce is very poor, with no fully linked cold chain, or adoption of normal post harvest handling methods, resulting in considerable post harvest losses (20-30%) and shelf life reduction. Unavailability of suitable crop storage in production areas limits farmer marketing options and discourages producers from linking

[7]Including the Agricultural Produce (Grading and Marketing) Act, 1937 and theAgricultural Produce MarketsAct.work.

direct market demand with production and supply seasons (Rural Partnerships, 2005).

3.3 Export Supply Chains

Until recently, exporters in Pakistan mainly purchased their produce needs from wholesalers, in the manner outlined above. Purchases were consolidated and then manually handled and packed to meet individual export orders. The exception to this pattern relates to citrus fruit (kinnow) and grapes where most of the produce is procured directly from farmers and then subjected to mechanized grading and handling. The major exporters of mangoes (with export volumes in excess of 1,000 tons) also procure directly from farmers. This pattern of procurement is also beginning to occur for onions and potatoes as exporters seek to increase their control over produce supply and cost.

In the cases of onions, potatoes and kinnow, the on-farm procurement price can be 20% below the wholesale market price, yet this is still attractive to farmers since they will not have to pack and transport the crop or pay market commissions. However, for some quality produce (i.e. for grapes) some exporters have been willing to pay price premiums of between 5 and 25%. This is a positive development, both for farmers and for the maturation of the marketplace. There is greater control by the buyer/exporter in obtaining quality grades, where in many cases thebuyers grading and packing team are the ones undertaking the operation on-farm. In recent years, there have been major improvements in the packing of produce destined to international markets farther afield than the Middle East[8].

3.4 Freight

The Ministry of Commerce through the EPB does offer a 25% freight subsidy to encourage certain product lines which includes fruit and vegetables, the subsidies are provided primarily to increase market share in existing markets and to open up new markets, particularly Latin America, Africa, East Europe and Oceania or for any country where Pakistan's total exports have averaged less than $10 million in the last three years.

The sea and air freight rates are detailed in Appendix D. The sea freight costs have stabilized and in a number of routes prices have dropped as demand has increased and there are more destinations now available to the exporter. Journey times, particularly to Europe are becoming less[9]. The major issue for Pakistan's freight carriers is the limited backhaul capacity and the piling up of reefer containers at certain Gulf ports, particularly in Saudi Arabia which adds to the cost for what are considered comparative short journey times. Fresh produce exported to the UAE has in the past been shipped in dry boats or open topped containers. There is increasing resistance an the part of the UAE government to allow produce to enter into the country without refrigeration.

A comparative advantage for the industry is the cost of air freight out of Pakistan. Air freight rates have dropped as there is more capacity at the country's exit points. Exporters claimed that air freight rates to China had dropped to $1.09/kg from $2.0/kg from the previous year (2003). This is in comparison to the Mumbai to Shanghai rate of $1.89/kg. Freight to the UK is now priced at $1.09/kg. This compares with freight rates for produce of $1.60-1.80 from India and Kenya and only $0.70 to $1.00/kg. from Ghana to the UK.

Although air cargo capacity has increased, the country's national carrier Pakistan International Airlines (PIA) provides cargo space an its passenger planes and is not operating dedicated freighter plane flights. Some exporters have chartered freighters but with mixed results. Abu Dhabi and Dubai based carriers do ease some of the cargo limitations by picking up consignments in Pakistan and transhipping on to other countries. During 2004, total fresh produce airfreight was divided as follows: Emirates (50%), PIA (20%) and other carriers (30%).

Domestically over 90% of the freight and passenger traffic moves by road. Yet, 50% of Pakistan's national highway network is in a poor condition, significantly adding to transportation costs and reducing export competitiveness in the country. This reflects an in-country reefer freight charges, which vary between $490 to $750 per forty foot container, depending an the location and the season. When the kinnow season is in fall swing, in-country freight rates increase due to the demand for reefers. However the motorway construction program that Pakistan is undertaking has improved the road network in Punjab, but there is still a need to continue building motorways in the main routes of Lahore to Karachi, Quetta to Gwandar, Gwandar to Karachi and Peshawar to Lahore and Islamabad.

3.5 Fruit Exports

Pakistan produces a wide range of fresh fruits which includes temperate, subtropical and tropical fruit species. Export levels during the last four years of the most important fruits are detailed in Table 3. The export of kinnow and mangoes predominate primarily due to the concentrated production areas of the crops, the maintenance of quality at the point of export and private sector investment in packhouses, cold stores and some quality assurance programs. Other crop such as apples, guava and apricots are produced widely with production volumes of 440,000, 525,000 and 126,000 tons per annum respectively (Government of Pakistan 2002). However, these fruit crops have not been able to compete

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[8]Both kinnow and mango packing is either 3 or 5 ply Garton, with net weights of 1.75 to 10 kg boxes. The potatoes and onions although are still dispatched in 40 kg bags, for some markets are also packed in 10 kg mesh bags or telescopic Gartons. Grapes for export are packed in 5 kg expanded polystyrene boxes.

[9]From 21 days to as little as 16 days to arrive at Rotterdam.

effectively in the export market for a number of reasons; (i) there is varietal variability with the product not being uniform (ii) the fruit quality is comparatively poor (iii) there are problems with pest and disease (scab, shot hole, stem borer etc) (iv) the post harvest infrastructure is not in place (many of the apple cold stores are government owned) (v) raw material prices are not competitive as the economies of scale are not achieved with comparatively smaller land holdings, scattered production units and in the case of the temperate crops the production units have poor physical market access (road and transport).

packhouses, which account for approximately 60% of the fruit's export volume, each take product from between 150 to 200 farmer suppliers. Many packhouse owners also have their own production units to partially secure supplies.

The harvesting season lasts for 4 months, starting from mid December to midApril. There is a comparative advantage over the Indian crop grown in Punjab that only has a season from mid December until the end of February. With storage at between 4 to 6°C at 90% relative humidity, the season can be extended by between 4 and 6 weeks and the fruit can be exported by sea in reefer containers to the distant markets of Russia, Philippines and Indonesia.

Table 3 The Export of Major Fresh Fruit

Fresh Fruit	2000-2001		2001- 2002		2002 -2003		2003 -2004	
	Tons	PRs Million	Tons	PRs Million	Tons	PRs Million	Tons	PRs Million
Citrus (kinnow)	97,028	958.0	121,692	1,278.0	94,806	1,268.0	149,587	1,771.0
Mango	53,444	990.0	47,541	861.0	58,844	1,030.0	77,468	1,348.0
Dates	6,622	145.0	4,654	127.0	3,352	97.0	2,645	74.0
Bananas	1,414	4.8	3,689	11.3	7,233	41.3	6,052	39.7
Grapes	36	1.3	284	10.4	401	13.6	573	16.3
Total ($million)		**44.0**		**46.0**		**46.0**		**57.0**

Source MINFAL (20 04) fruit, Vegetables and Condiments Statistics of Pakistan 2003 - 2004, Islamabad.

The principal fresh fruit export values have remained relatively steady over the last four years; although during 2003-04 exports reached $57million, as a direct result of improvement in quality and more effective export market penetration. The two main export crops are mangoes and kinnow and a great deal of trade promotion is being undertaken in the two fruit crops to increase market share in existing markets (Indonesia, Philippines, Malaysia) and penetrate new markets (Russia, China, Eastern Europe and the Central Asian Republics).

3.5.1 Kinnow

Citrus, primarily the mandarin type kinnow (Citrus reticula) is the largest sector by volume and is a major export revenue earner. Export volumes have risen from 100,000 tons in 2002 to 150,000 tons in 2003 with a value of approximately $35 million. However national production is 2.1 million tons[10]. According to provisional estimates, the 2005 crop which was completed at the beginning of May, volumes were down by 50,000 tons because of rains occurring during harvesting.

Ninety five percent of all citrus plantations are located in Punjab province. The major kinnow production area is located in the Bhalwal/Sarghoda region with over 60 packhouses located in this area. All of the packhouses have entered the export market. The packhouse capacities vary from 100 to over 14,000 tons annually. The 100 ton packhouses are rudimentary in structure and process and only export to the Middle East, mainly through the wholesale markets on a commission basis. It is estimated that there are approximately 6,000 kinnow farmers in the area. The eleven larger

The country's exports of citrus have grown by 42% in quantitative terms during the last ten years with destinations to more than 50 countries (Muhammad, Ali & Awan, 2005). Seventy five percent of the export by value in 2003 was destined to Indonesia (29,042 tons) UAE (29,575 tons) Afghanistan (25,524 tons) the Philippines (15,778 tons) and Saudi Arabia (14,484 tons). During the past five years, growth was particularly significant in the Indonesian and UAE markets (20% per annum) whereas according to trade statistics, the market in the Philippines has contracted an an average by 35% per annum. In fact, this is not the case: a large volume of Pakistani kinnow is landed in the Philippines via Singapore. The Philippines authorities only licensed three or four Pakistani companies to export kinnow with the non licensed exporters using the Singapore trans-shipment route. Other markets that have shown growth over the Same period of time are Taiwan, Oman and Vietnam.

Until the last season, Indonesia was a key target market for Pakistani kinnow. Pakistan's exports to Indonesia have increased rapidly over the period, yet the product now faces growing competition from citrus supplied by China. Chinese exporters have apparently improved the quality and presentation of their product. During the 2005 season, Pakistani exports to Indonesia dramatically dropped (by 40%) following the imposition of a punitive 25% import tariff. The Chinese product has a zero duty rating. Even packing materials that have a real unit cost of $3.5 to $4 were arbitrarily rated at $10 by the Indonesian officials. These steps have seriously eroded the competitiveness of Pakistan's citrus in the Indonesian market.

[10]Export target values have been set by PHDEB to achieve values of $44, $183 and $306 million in the shot-term (1-2 years), medium-term (3-5 years) and long-term (5-7 years), respectively

In the UAE market, Pakistan was the leading supplier with a 65% market share by value in 2003. However, during the past several years, significant inroads have been made into that market by both South Africa and Australia, as consumers demand improved quality and a more uniform product. Pakistan has a captive citrus market in Afghanistan. In 2003 it commanded a 99% market share with only one other competitor-- Iran.

The Government and exporters have identified Russia and the Former Soviet Union and Eastern European countries as potential markets for kinnow exports. The Russian market is beginning to open up after a trade visit during February 2004. Exports to Russia were 2,500 tons in 2004. Other markets that are being investigated include Romania, Poland and the Ukraine. The Western European market for Kinnow is not considered an option, as although the product is easy to peel it is a seeded fruit and not to the liking of consumers in those nations.

3.5.2 Mangoes

The main mango varieties produced in the country are Sindhri, Chaunsa, Daseri, Langra, Anwaratol, Siroli, and Beganpali. The mango season is from late May through to August; however there are late varieties such as Black Chaunsa that will produce fruit in October. Mango production in Pakistan is approximately 1.3 million tons per annum, although only 5% of the crop is exported. Punjab Province produces 67 per cent of the national crop an 248,595 ha. In 2003-2004 export volumes stood at 77,000 tons ($23.5 million), up from 59,000 and 47,000 tons in the two prior

The global export of mangoes has shown an average annual growth of 7% by value and 12% by quantity during the period from 1999-2003. Pakistani mangoes have been dispatched to nearly 30 markets with 82% of the value realized from the export to four countries; UAE, Saudi Arabia, UK and Oman, during 2003. Most of the current markets for Pakistani mangoes exhibited growth during the last five years, due to improved quality, packaging and a more efficient freight network leading to shorter transit times.

The UAE market received supplies predominantly from India and Pakistan with their respective shares of 50% and 34%. Other major suppliers are Kenya commanding 10%, South Africa and Australia each having 2% shares by value in 2003. During 2003, the predominant supplier to the Saudi Arabian market was India with 75% market share followed by Pakistan and South Africa. A limited number of suppliers are competing in the Oman market with Pakistan commanding 49% share in value. The market in Afghanistan is only supplied by Pakistan with no other competitor.

Taking advantage of the 9% growth in the UK market between 1999 and 2003, Pakistan's export of mangoes to the UK has grown by 8% in value and 2% in quantity during the same period. Most of Pakistani mangoes are destined for the ethnic market and are imported by companies that are mainly owned or managed by South Asians. Some exporters supply fruit to supermarkets at a price of £ 1.80 per 1.75kg box in comparison to £1.30 to £1.50 per kg an the ethnic market. The main advantage of the supply to supermarkets is they require 6 to 8 fruit per box, which are small fruit and considered third grade fruit by the exporters.

There are between 40 and 50 companies that export mangoes with volumes ranging from 50 to 10,000 tons of the product. The major issue regarding the export of Pakistani mangoes is the shelf life, which is limited to 2 weeks mainly due to the high brix levels as compared to the Florida-type varieties. This implies that apart from the Middle East, all other exports have to be air freighted to the market making the product more expensive than its competitors that either grow mangoes with a longer shelf life or have more sophisticated storage techniques available such as controlled atmosphere or modified atmosphere packaging or even the use of irradiation techniques (i.e. for the US market). Correct control in the chain from picking through packing, particularly time/temperature and handling will also have significant

3.5.3 Dates

Date exports from Pakistan are predominately in dried form. During 2003/2004 the country exported 62,784 tons of dried dates with a value of $22.5 million. This is in comparison to the export of fresh dates which in the corresponding year was 2,645 tons with a value of $136,000. The exports of fresh dates have been in decline as a direct result of the poorer quality Pakistan product in comparison to the other exporters including Tunisia, Iran and Israel. Pakistani dates are exported to 23 markets, among which the main destinations are India, USA, Canada, UK, Germany and Nepal. The Indian market, which is the single largest market for Pakistani dates, taking 84% of the total exports of dates, has shrunk by 10% per annum, during the last five years. The Indian market is further characterized by strong competition from Iran which does produce a better quality product.

3.5.4 Grapes

Pakistan currently exports limited quantities of grapes to Bangladesh and UAE which had a value of $286,000 with the total volume of 573 tons during 2003. In the Bangladesh market Pakistan's market share was 16% with competition from Australia, USA and India. There are two main companies that export grapes to Bangladesh and during the 2004 exported 1,350 tons between them sourcing their grapes mainly from Balochistan but some supplies were brought in from Afghanistan. Although packaging and grading improvements have taken pace, the Pakistani product is inferior to other exporter nations, which includes India. Although sweeter, the Pakistani grape tends to be smaller and less uniform, due to inappropriate thinning at the time of fruit set. Hence, Pakistani grapes have a minimal market share in more discerning markets such as the UAE (0.09% market share) and Saudi Arabia (0.36% market share).

3.5.5 Temperate fruits

Temperate fruits such as cherry, apples, peaches, pear, plums and apricots have limited export potential primarily because the post harvest infrastructure and logistics for maintaining the highly perishable fruits are limited and the production areas are located at a distance from the country's export

The official export volumes of apples and pears are in decline. Over the last four year the volume of apple exported has diminished from 1,475 tons to 97 tons and pears from 132 tons to 75 tons. Apricot exports have increased from 62 tons to 87 tons. There are no records of the export of plums, peaches and cherries.

3.6 Vegetable Exports

Vegetable production continues to increase slowly with a national harvest of 2.88 million tons in 2003. Vegetables are generally produced an irrigated lands by smallholders. The primary exception is larger potato production units in Punjab province that have landholdings in excess of 25 hectares. Asian vegetables such as okra, eggplant and the various cucurbits are not exported in any significant quantities. The more perishable vegetables of cauliflower, broccoli, cucumbers and tomatoes are supplied to the markets in close proximity to Pakistan, namely the Middle East and Afghanistan. The major fresh vegetables exported are detailed in the Table 4 below.

Table 4 The Export of MajorFresh Vegetables.

Fresh Vegetable	2000-2001		2001 2002		2002 2003		2003-2004	
	Tons	PRs Million	Tons	PRs Million	Tons	PRs Million	Tons	Prs Million
Potatoes	48,450	389.00	56,987	374.00	69,348	398.00	56,042	334.00
Onions	77,168	601.00	53,379	333.00	63,711	356.00	49,452	369.00
Cucumber	176	0.42	627	2.20	859	5.20	2,345	1.50
Cauliflower & Broccol	--	--	87	0.42	231	1.70	965	6.70
Tomatoes	7	0.04	234	0.92	2,413	1.10	1,566	9.90
Total ($Million)		**16.5**		**14**		**14**		**13**

Source. MINFA L (20 04) Fruit, Vegetables and Condiments Statistics of Pakistan 2003 - 2004, Islamabad.

The export values ofthe major fresh vegetables have stagnated over the past four years, primarily as a result of the traditional export market for vegetables (the Middle East) receiving produce from other countries that are better quality and yet competitively priced. Most vegetables in the main Middle Eastern markets are sold on commission in the wholesale markets. For onions and potatoes, a small proportion of the crop is marketed through importers, in countries such as Sri Lanka, Indonesia and Malaysia where quality standards are required.

3.6.1 Potato

Potatoes are grown on approximately 110,000 ha, with a total production of 1.7 million tons, distributed over eight different agro-ecological zones. 70 - 80% of the production is concentrated in the irrigated plains of the Central Punjab and Southeast North West Frontier Province (NWFP). Approximately 18% of total production is stored for potato seed and 20% of the total production is wasted primarily due to improper handling and lack of proper cold storage facilities. Some 4% of total potato production (56,000 tons) is being exported. The crop has three distinct seasons depending on the location (Table 5). The main export varieties are the white Potatoes; Diamond and Santee and the red potatoes: Desiree and Cardinal.

Table 5 Potato Croping Season

Season	Sowing month	Harvest month
Autumn crop	October	January
Summer crop	January	May June
Spring crop	April May	August – September

Exports have declined in potato from a peak of 121,000 tons ($18 million) (of which Sri Lanka imported 91 % of the crop) in 1999, to 56,000 tons ($6 million) in 2003/04. The main reason for the drop in export volumes to Sri Lanka was the importer nation imposed a US33 cent per kg import duty on imported potatoes to protect the domestic potatoes producers. Secondary markets are Malaysia, Afghanistan, UAE, and Singapore.

3.6.2 Onions

Onion production in Pakistan is Concentrated in 21 districts which account for more than 76% of the total production. Over 50% of the total production comes from seven districts, namely Hyderabad, Mirpurkhas, Sanghar, Swat, Mastung, Kalat and Turbat. Approximately 90,000 ha are under onion production with a production volume of 1.1 million tons of which less than 5% is exported. Onions can be grown all year round in the country as seen in Table 6 below.

Table 6: Onion Cropping Seasons

Province	Sowing	Transplanting	Harvesting
Punjab	October/November	December/January	May - June
NWFP	October	December/January	June - July
Lower Sindh	July/August	September/October	January - February
Upper Sindh	October	December/January	April - May
Balochistan	Direct sown	February/March	August - November

No storage facilities specifically for onions are available in Pakistan outside the research system and onions are therefore stored in mixed stores with other products or left in the field. Mixed stores are unsuitable as they have a relative humidity factor (90 to 95%) which leads to problems of disease infection. The availability of onion storage is a major constraint and leads to serious post harvest losses in Pakistan. The major competitor of Pakistani onions is India. India has a network of large onion stores that can regulate the flow of product out of store and maintain it in a reasonably good condition. It has also effectively promoted inexpensive, on-farm storage technologies.

Pakistan currently exports onion to 10 markets, the principal market being UAE accounting for a 58% share, followed by Malaysia and Sri Lanka In the UAE, Pakistan commands a 15% share whereas India has a 76% market share. Similarly India is the dominant market player in the Malaysian market, achieving a 54% share by value with Pakistan having only 2% of that market in 2003. Imports of onions to Sri Lanka mainly came from India (96%) and Pakistan (4%) in 2003.

3.7 The Fruit And Vegetable Export Sector SWOT Analysis

A SWOT assessment for the fruit and vegetable sector is provided in Box 3.

3.7.1 Strengths

For the prominent exported fruit and vegetables a number of strengths were identified:

- Several export crops are grown in agroclimatic zones that are conducive for a quality product, particularly in the case of kinnow, mangoes, grapes, potatoes and onions. This encourages buyers and exporters to procure product in several distinct locations, thus reducing the transaction costs of procurement in comparison to purchasing from production units that are scattered around the country. Concentrated production in agroclimatic zones has created inherent production and marketing expertise.
- The cost of labor is relatively low; laborers receive $1.30 to $2.00 per day depending an the task. This issimilar to prevailing wages in rural India.
- Traditionally, there have been strong trading links between Pakistani exporters and the Gulf markets, with the latter being an extension of Pakistan's wholesale market system. Other strong regional market linkages are the Bangladesh market for grapes, the Sri Lankan market for potatoes, and the Afghan market for fresh produce. There are also strong ties with the ethnic food distribution systems in the UK.
- A number of exporter packhouses have been proactive in gaining HACCP certification. Although the benefits are not clear at present, they will be in the future as the traditional export destinations of Pakistani produce begin to insist on safe food.
- Over the last 10 years, packaging has improved and there is now a clear differentiation between the type of product and packaging for the domestic market to that for the export market.
- Niche markets do exist for high quality products, for example; mangoes in China, which have been well accepted due to the varieties offered and their sweetness characteristics. The mangoes can be offered at a higher retail price than the Chinese and Australia equivalent. The prices for Chinese and Australian mangoes are 18 Yuan ($2.17) and 20 Yuan ($2.42)/kg respectively as opposed to 25 Yuan ($3.02)/kg for mangoes of Pakistani origin.

Box 3 A SWOT of the Fruit and Vegetable Export Sector

Strengths

Conducive agroclimate and a large production base in areas of concentrated production.
Low labor costs
Strong trading links in some markets
Some exporters are proactive with their packing plants having HACCP certification
There is differentiation between product and packaging between domestic and export markets.
There are potential niche markets.
The govemment actively supports measures to enhance the Country's SPS capability.

Weaknesses

Limited producer capacity to implement GAP
Pakistani produce is in the lower price range in most export markets.
Supply chain fragmentation, with poor vertical integration, leading to limited product traceability
Absentee landowners and the Market Commission Agents compound weak value chain linkages.
Over reliance an government to support export activities
Duplication of public support through the Ministry of Commerce and MINFAL (PHDEB, EPB, PAMCO, DALPMG, DPP etc)
Inappropriate officials in trade negotiations with limited technical expert support support
Pest risk assessment research and documentation limited
The road network is in a poor condition, significantly adding to transportation costs.
Proliferation of govermnent agencies (e.g. PAMCO and the Provincial Govemment Marketing Ministry in Punjab).
Proliferation of donor/bank projects (DFID, UNDP, World Bank and ADB etc) in trade, agribusiness, and WTO agreement, with the same objectives and similar goals.

Opportunities

South - South market opportunities
Contra season opportunifies (Australia and South Africa)
Free Trade Agreements
Cluster development and specialization
Agribusiness Support Fund for international compliance, technical upgrading and new market development
International supermarket chains entering the market.

Threats

Other South exporting nations (China and India) and their Free Trade Agreements
Punitive tariffs and protectionism.
Increasingly more stringent SPS measures that are enforced in existing markets
TBT through SPS protocols and MOUs
Greater land fragmentation
Food miles relating to the air freighting of mangoes.
Change of govemment policy away from export promotion

- The govermnent through MINFAL and the Ministry of Commerce actively supports measures to improve SPS capability and is aware that food safety protocols will become more stringent in the existing export markets. The 'Vision' of MINFAL and the Government seeks to "create an enabling environment for making Pakistan's agriculture more productive, profitable, and competitive in the domestic and international markets"

3.7.2 Weaknesses

There are a number of weaknesses identified in the fresh horticultural produce sector:

- Growers have difficulties conforming to GAP. The major problems are that there is still an over reliance on pesticides and the lack of knowledge regarding environmental and soil conservation measures. The production base is the limiting factor of the whole supply chain. Growers have little idea what the export market requires regarding IPM and ICM and there is little guidance from the packhouses in that respect. Exporter or packhouse field support is weak with field staff, if provided, only on farmer suppliers production units just before or at the time of harvest. Govenment extension capability in such production factors as pest and disease monitoring and the rational use of recommended pesticides and their harvest intervals is poor.

- All too offen Pakistani produce is placed at the lower end of the price range an the basis of quality and shelf-life, but that is sometimes not the case. Most exporters are salespersons rather than marketers. The mindset of many exporters is to buy cheap and sell cheap. Only in certain cases has Pakistani produce maintained high prices. The Gulf market is considered a market for a competitive low priced product. In many cases Pakistani exporters are their worst enemies, offen undercutting each other an price[11]. Pakistani grapes an the Bangladesh market realized a price of $1.3/kg, whereas better quality Australian grapes an the same market sold at between $1.55 to $1.70/kg.

- The supply chain is weak and fragmented, leading to poor product traceability. All too offen product for export markets is being procured from the wholesale markets or through middlemen or commission agents. The linkages between the players in the supply chain are tenuous and for export it is not satisfactory for two main reasons (i) Pakistani exporters cannot provide the recods to trace the product back to the farm and are not monitoring their supplier food safety risks and therefore are unable to satisfy due diligence defense[12], if a product was deemed hazardous in an export market and (ii) the transaction costs are higher than direct farm procurement with the product passing through a number of hands each of which takes a margin. There is not a strong producer/ supplier to exporter relationship.

- Absentee landlords and market wholesalers compound the constraint of traceability, with landlords selling the crop months prior to harvest passing the management of the crop over to contractors that have no idea what SPS signifies and there is limited record keeping.

- Exporters have in the past relied an government support to identify and visit export markets and undertake exposure trips, the entrepreneurs have looked to the government for a partial grant to undertake such visits. However waiting for government to react and for approval of payments has led to trips being delayed to well within the particular product's harvest and marketing window rendering the Business trips as partially ineffectual.[13]

- Officials in the trade negotiations and MOU formulation are often inappropriate or not effectively supported by the technical and scientific staff required. In the post harvest treatment protocols negotiated between Pakistan and China and Iran, the treatment specified for mango and citrus and agreed on were inappropriate when taking product quality and shelf-life into consideration.

- The pest risk assessment is either based an pre-partition work, or an scant or non existent information, thus allowing importer countries to lay down conditions that dictate treatments for pest and pathogens that may not be present or prevalent.

- Although road improvement is continuing, the road network in some production areas is poor; more motorways are required to reduce transport charges and journey times.

- The duplication of resources in government departments and agencies in trade and export promotion and development. The Situation as it stands now is causing confusion among thevarious stakeholders in the horticulture industry and is impeding the growth of horticulture exports from Pakistan; (i) there are two agencies designated (and functioning) in the area of SPS/TBT. Both of them are under the auspices of MINFAL; the DPP and the WTO Wing in MINFAL (ii) there are three organizations working in the area of SPS pesticide and or heavy metal contaminants the DPP, PNAC and DALPMG, they are housed in two different ministries (iii) there are three different agencies working in the area of grading and Standards for horticulture produce for exports and are under two different ministries, one is officially designated for this purpose (DALPMG), one has been practicing it for quite sometime (EPB) and one has just ventured into this arena without any mandate from the govemment (PHDEB). The proliferation of there various departments and agencies for regulating and promoting horticulture development is creating more

[11]On the Russian market during 2004 the wholesale price for kinnow was between $7 to 7.50 per 10kg box, in 2005 the price was set at $7.25/ l0kg box, but Pakistani exporters undercut and Soldat $6.5 to 6.75 per l0kg box, in fact prices went as low as $5.75 per l0kg box.

[12]Taking every precaution to ensure that the food product is Safe for human consumption, which includes traceability and record keeping to provide the exporter with such information regarding what agricultural inputs the crop received, when and how.

[13]For example the Russian market kinnow visit in 2004 took place an February 1 and the kinnow season began during mid December. The Chinese mango visit was during August 2004 when the season had started two months earlier.

hurdles for the grower and exporter. The mandated departments and agencies are not adequately equipped for this purpose, both technically and in terms of human resources. The laws under which they operate and under which they have been mandated are outdated. There is hardly any interaction between the departments and agencies. More importantly, none of there departments and agencies are sufficiently equipped or are knowledgeable enough to advise the grower and exporter an the established SPS Standards.

A number of multilateral and bilateral projects are involved with trade, agribusiness and WTO matters, many have the same objectives and goals based an MINFAL requests for support and presentations to visiting missions, there is a risk of "competition" between projects and that duplication of activities will occur with conflicting outcomes. Such projects include:

i. The Agribusiness Development Project (ADB);

ii. The Trade Related Technical Assistance Project (EU/UNIDO)

iii. Trade Initiative for Human Development Perspective (UNDP)

iv. Capacity Enhancement Assistance to MINFAL in WTO Related Policy and Strategy Development and project Formulation (FAO) ; and

v. Trade Policy Project (DFID).

3.7.3 Opportunities

The opportunities that have been identified are as follows:

- The development of South-South trade particularly in Asia and in light of the Free Trade Agreements (FTA) negotiations that are now taking place. FTAs are opportunities that have to be negotiated; this is particularly true of countries that are placing punitive tariffs on Pakistan's main export products, e.g. Indonesia and Kinnow. FTA is now in place between Sri Lanka and Pakistan the agreement was signed in February 2005 of which citrus is included and a tariff rate quota for a paltry 1,000 tons of potatoes. The country is in the process of negotiating FTA with Indonesia, China and Malaysia.
- There are more marketing opportunities opening up for certain fruit crops, including Iran for kinnow and mango, Russia for kinnow, China for kinnow and mango. In terms of flavor, the kinnow is said to be better than the Chinese mandarin[14]. Pakistan should be looking to expand its presence in the East European markets (Poland, Czech Republic, Hungary, and Romania) which have a high per capita consumption of citrus particularly in the winter months that correspond partly to the Pakistan kinnow season. Pakistani kinnow is an easy peeler with a slightly pungent taste that mixes well with Vodka and other drinks. This is said to give it an edge over the competition from Turkey, Egypt, Cyprus, Israel, Spain and Morocco.
- If SPS measures can be satisfied, counter season opportunities exist for mango and mandarin in the southem hemisphere countries, particularly South Africa (mango season January March and mandarin April September) and Australia (mango season November April and mandarin May- September).
- An effective mechanism to bring institutional capacity building and support to the agribusiness sector and production areas is the formation of clusters where within certain production or processing zones businesses have access to training, credit and legal services, production, business and marketing advice and the necessary physical infrastructure to be competitioe both nationally and intemationally. At the present time no cluster exists for horticultural produce, but there are successful examples in other industrial sectors (Box 4). UNIDO[15] is looking into establishing certain kinnow and mango production clusters in Punjab Province.

Box 4 Sialkot Cluster Development

Export Processing Zones are already being established for sporting and surgical products, auto parts, electrical appliances and knitwear. There are examples of areas that have developed industries, in spite and not because of government. One good example, unfortunately not in horticulture, is Sialkot in the manufacture of hand made footballs and surgical instruments. Sialkot is the market leader in hand made footballs and has one fifth of all the global market in surgical instruments, all the products come from die town and it environs. The special characteristics to make an area a success are;

- **the growth is within the community,**
- **inherent skills are built up through the generation,**
- **the companies or enterprises work independently of the government and create synergies, they have created a niche in the market for their products,**
- **they are all small to medium sized industries and there is no peer dominance**
- **they have grouped for strength and although the companies market independently all are aware of the export markets, their characteristics through dialog between them and can react quickly to customer demands (Feldman and Francis 2001).**

[14]According to a taste trial Set up in one ofthe Chinese supermarkets, during an exporter trade mission (August 2004)
[15]The restructuring and modernization of SME clusters in Pakistan.

- By the end of 2005 there will be a $21 million Agribusiness Support Fund (ASF), implemented by the ADB Agribusiness Development Project that will provide matching grants to fmance eligible services to enterprises that wish to develop or enhance their existing managerial, marketing or productioe capacity in agribusiness. Eligible enterprises will be required to finance 50% of the cost of the service or activity, the remaining 50% being contributed by the ASF. Services related to export development and improving SPS measures will be eligible for ASF fmance. The type of activities that would eligible to receive fund match are as follows:

  i. The development and promotion of international product markets through the fmancing of specific overseas market awareness, exposure and benchmarking visits and incoming visits from international importers and distributors;

  ii. upgrading enterprise knowledge-based technology, but excluding the fmancing of capital equipment;

  iii. Support to individual farmers and farmers' groups in the formation of agribusiness enterprises;

  iv. demand-driven research by private or public sector research institutions that will lead to increased and better quality production, improved production processes, or meeting an identified market demand; and

  v. the development of private sector extension services/field support to be provided to small-scale farmers proposing to supply raw materials to agribusiness enterprises, including exporters.

International supennarket chains are beginning to establish or Show interest in investing in Pakistan. Makro has assigned a technical team to assess the potential and determine where fresh produce can be procured from and Carrefour is in the process of establishing its first supermarket in Karachi. The company's first outlet is a prime site which was formerly the Mid East hospital located in the Clifton area. It is expected that the supermarkets will encourage their suppliers to improve quality and hygiene standards within the country as has happened in other countries (Box 5).

3.7.4 Threats

The threats identified are as follows:

- India and China have large and rapidly growing horticultural production and export sectors and they are major competitors in Pakistan's existing export markets. India is competing directly with Pakistani mangoes in the Middle East, onions in Malaysia and Sri Lanka and grapes in Bangladesh. Both countries, and in particular India, are promoting horticulture and providing partial grants to develop post harvest management, marketing and exports and provide freight subsidies. The effect of the China-Indonesia FTA has already been felt by Pakistan in the case of kinnow, following the imposition of a punitive 25% import tariff with Chinese citrus entering the country an a zero tariff,
- Punitive tariffs and protectionism have already had an effect an kinnow dispatched to Indonesia and potatoes to Sri Lanka;
- More stringent SPS measures are inevitable, even in many of the country's traditional market outlets (i.e. in the Middle East). Already fresh produce exported to the UAE in dry boats or open topped containers is coming under increased scrutiny by import authorities who are concerned about the food safety implications of such freight handing methods;
- The fragmentation of land holdings is a continuous process due to the distribution of land through the generations and the split inheritance between several heirs. Already the smallest farm areas that fruit exporters will deal and procure from are approximately 5 acres. It is not easy to work with a number of small farmers instead of one large producer. There are problems with product uniformity, product traceability and variation in cropping programs which all lead to a greater management input and puts the exporter at a disadvantage in comparison to other exporter country competitors; and
- At present the govemment is actively promoting exports and international compliance, a change of govermnent policy away from export promotion could be detrimental.

3.8 International Market Requirements and SPS Compliance

The principal destinations for Pakistani produce are the Middle East and Afghanistan, where SPS and traceability are

Box 5 The Supermarket Effect

In Latin America, the major effects of supermarkets are their procurement systems of large volumes of products from suppliers. Stiff competition from both small retailers and other supermarkets does result in cost cutting and raising quality and the diversity of products for sale. Cutting costs in turn requires the improvement of all aspects of procurement including product and handling costs. This is done by improving coordination and logistics through distribution centers, logistics platforms, contracts with wholesalers and producers and the imposition of in-house (private) standards specifying, quality, safety, volumes and product packaging (Reardon and Berdegde, 2002)

generally not factors taken into consideration or, at least, not rigorously enforced. Pakistani products have been the subject of EU Notifications. According to the annual summary reports for the EU Rapid Alert System, the number of consignments from Pakistan which were rejected entering the EU was 16 in 2004, 12 in 2003, and 7 in 2002. In 2004, Pakistan ranked 32nd in terms of the numbers of consignments rejected. For comparison, 6 countries had over 100 consignments rejected and two (Turkey and Iran) had over 200 such rejections. The majority of the alert notifications are for processed products, where there is scope for adulteration. In the case of Sudan 1 and Sudan 4 colorants, or due to unsatisfactory post harvest and processing techniques which provide the build up of aflatoxin or erucic acid or the development of Ochratoxin A. In the case of high value crops there have thus far been limited produce quality and SPS issues (Table 7).

Table 7 Some Quality/SPS Issues Faced by Pakistan

Export Market	Product	Issues
EU	Chick peas/lentils	Faeces of rodents
EU	Red chilies	Aflatoxin
EU	Apricot kernels	Hydrocyanic acid present
Sri Lanka	Onion	Pesticide residues/contaminants
Philippines	Citrus	Fruit fly

Source MINFAL and European Commission:Rapid Alert System for Food and Feed Weekly Reports 2004-2005

Some of the export markets are beginning to insist an specific fresh produce post harvest treatments, in conjunction with the inspection of both the horticultural production units and the packhouses and pest risk assessments. Already there are agreements signed with China and Iran to that effect.

3.8.1 Pesticide Residues

Of the international markets targeted by Pakistani exporters only Canada and UK supermarkets are insisting an maximum residue level (MRL) testing and this is undertaken by the importer. The Pakistan DPP has gas chromatography with mass spectrometry that is capable of analyzing pesticide residues in foods, but does not have the reference samples. The DALPMG also has new gas chromatography equipment but as yet it is not commissioned and the private sector company SGS does not have MRL testing equipment. However SGS can test for bacterial load and heavy metals.

There have been limited studies to determine pesticide residues in Pakistani fruit and vegetables. Most of the work was undertaken by Masud and Hasan between 1991 and 1995 (Richardson,1995). Results from that testing program showed that MRLs were regularly exceeded. Of 550 samples taken, 214 (39%) contained residues of either organophosphate, organochlorine or synthetic pyrethroid insecticides. Of there 79 (14%) samples were above the MRLs Set by CAC.

Examples where MRLs were exceeded included:

- The MRLs for the organochlorine DDT were exceeded by 10.3 times in cauliflower, 8.6 times in cabbage and 8.1 times in okra;
- The MRLs for the OP methyl parathion in coriander was exceeded by 7.5 times, malathion in onion was exceeded by 9.2 times and in beet sugar by 8.6 times; and
- The most significant overuse involved the synthetic pyrethroids, with the MRL for fenvalerate being exceeded by 20.0 times in turnip and that of cypermethrin was exceeded in turnip by 30.0 times and 34.3 times in okra.

In the USA and UK, where comprehensive monitoring schemes exist, MRLs for fresh fruit and vegetables are typically exceeded by very small amounts (i.e.1-2%). The findings for Pakistan suggest potentially serious misuse of pesticides.

In 2000 f further residue analyses of vegetables and fruit were undertaken (FAO, 2001). One kilogram samples of 4 vegetables were taken from four locations around Multan city and six samples of apples from around Quetta City. All vegetable samples were found to contain pesticide residues, of which two-thirds were in excess of Codex MRLs. The pesticides exceeding their MRLs were carbofuran, dichlorvos, methyl-parathion, fenitrothion and azinphos methyl. All the apple samples also contained pesticide residues with 60% of the Samples having excess MRL values of carbofuran. If there results are indicative of a wider picture, they suggest that major adjustments would be needed for Pakistani produce to gain access to more discerning markets. They also suggest the need for more regular monitoring in the domestic market as some high levels of residues might even adversely affect the health of Pakistani consumers.

3.8.2 Traceability

For exporters traceability is not considered an important factor when supplying their focal markets and buyers. The only groups of exporters that have a limited form of traceability are the kinnow exporters who have their packhouses located in the production area and use field staff, but only during harvest, to work with farmers to maintain quality. Some exporters that dispatch mango, onions and potatoes also work with the producers, but many procure from wholesale markets. Even those exporters that procure directly from the production units their record keeping is still basic and in many cases consignments from different production units are mixed at the point of grading. Grading

practical when, depending an the market, size fruit is graded into 6 size ranges. Farm records an the production units are primarily to record volumes and dispatches, spray schedule record keeping is a rarity.

3.8.2.1 Terrorism Impacts

An issue that is directly linked to traceability but as yet, is not a major issue for Pakistani exporters is the increasing emphasis an food security issues based an international terrorism concerns particularly in the USA. The Food and Drug Administration has implemented the Bio-terrorism Act of 2002, the regulations include (i) registration of all food facilities (ii) prior notifications for imports (iii) additional product detention authority (iv) more processor record accessibility (v) declared country-of-origin labeling for all foods (USFDA 2004). The regulations enhance more scrutiny and control to determine product origin and for food safety. If Pakistani exporters were dispatching product to the USA they would have to comply with the Act, as they "process, pack and hold food". The exporters will need to maintain supply records of their immediate suppliers (one level down). As yet, the Act is not being applied down to the level of individual farms.

3.8.3 HACCP Certification

HACCP certification is considered as a marketing tool in ensuring credibility and consumer confidence for Pakistani products in the export markets. The PHDEB has encouraged a number of exporters to obtain HACCP certification, in spite of the fact that most markets that they are supplying do not require that the packhouses have that type of certification. The rationale is that most responsible exporters believe that in the future their existing markets will insist an HACCP certification and some have aspirations to increase sales into OECD markets. As yet, none of the exporters have combined their HACCP certification with ISO 9000 for quality assurance. In more advanced produce export industries, i.e. in Chile, SouthAfrica, and Kenya, this is now normal practice.

To date, six packhouses have been certified; two by Société Generale de Surveillance (SGS) and four by Bureau Veritas (BVQI) and five more exporters are in the process of contracting consultants to undertake hazard analysis and prepare the plants for certification of which four need a second audit and the fifth will have an audit next season. The actual cost of consultancies and certification varies between PRs 0.5million ($8,000) to PRsl million ($16,000) depending an the upgrading that is required and the length of time reaching compliance. The average annual sales of packhouses that are undertaking HACCP certification are approximately between $500,000 and $2.63 million per annum. The costs for reaching compliance are $30,000 to $50,000, which is 2 to 6% of annual turnover. The costs include such items and constructions as:

- Uniforms and protective gear for the workers;
- Plant layout, isolating and retaining walls;
- Sewerage and waste disposal that could lead to cross contamination;
- Vermin and pest control;
- Food grade paneling in cold stores and paint in the clean areas;
- Bathroom reconstruction or relocation;
- Meshes over windows and light fittings, or repositioning of light fittings;
- Personnel training and awareness in safety, hygiene and production systems; and
- Improved record keeping.

Through HACCP, the packhouse site-wide hazards that affect food safety will be under control, at times the transportation, the raw material production and its storage is not, which is a pre-requisite program for HACCP. Most product recalls are due to failure of the prerequisites, which in many cases in Pakistan is not under the control of the packhouse or exporter. Therefore with HACCP it would have been prudent for packhouses to achieve Good Manufacturing Practices (GMP) and for the exporters to fully assess their farmer suppliers for Good Agricultural Practices (GAP). In fact HACCP functions as the final stage of an integrated food safety program that includes the GAP, GMP and Sanitation Standard Operating Procedures (SSOP's). HACCP can only be effective if there other programs are in place and functioning properly.

Although fruit and vegetables are not a common source of food borne disease, the types of hazards that could occur from the field are as follows;

- Violative pesticide residues;
- Wood splinters in fruit from the traditional packaging materials (particularly in mangoes);
- Cross contamination in the farm to packhouse transport;
- Fruit and vegetables are susceptible to contamination with Salmonella, Campylobacter, Listeria and Small Round Structured Virus (SRSVs), through the use of manure containing animal faeces and through contaminated water;
- Sewerage water contamination by Escherichia coli, Salmonella spp, Vibrio cholerae, Shigella spp, Cryptosporidium parvum, Giardia lamblia, Cyclospora cayetanensis, Toxiplasma gandii, Hepatitis virus and the Norwalk virus; and
- Worker illness and poor hygiene spreading bacteria/viruses to the produce.

If hazards are identified and as a means of reducing the risk of a particular hazard the corrective action in HACCP would execute of range of controls, for example, change supplier would be one option. During the study there has been no indication from any packhouse or exporter that any current supplier has been blacklisted and barred from supplying based an poor plant health and hygiene standards.

3.8.4 EUREPGAP

As part of a long term strategy PHDEB is now beginning to promote EUREPGAP certification for the farm production units. Although a number of British, Dutch, Swiss and Scandinavian supermarkets are requiring that their suppliers

are to be certified for compliance with the EUREPGAP protocol, there is little evidence that (i) Pakistani fresh produce is placed in those supermarkets and (ii) few exporters want to place product in supermarkets because of the complexity in obtaining the certification. Few farms are in a position to gain certification; in fact many farms do not produce fruit and vegetables under a GAP regime, where ICM and IPM practices have to be observed. EUREPGAP takes GAP a stage further incorporating worker health, safety and welfare and environmental issues. When assessing the control points and compliance criteria, only one farm visited would achieve EUREPGAP with certain modifications and additions to the farming systems, management and record-keeping. However that particular farm is not undertaking the measures to gain a foothold in the export market but merely to increase productivity in terms of employee output and crop yields through worker welfare and soil and crop improvement practices respectively (See Box 6)

Box 6 A EUREPGAP Candidate

An 800 acre farm in Sindh that produces mangoes and bananas for the domestic market. Part of the unit has 170 acres being farmed by tenants and the other sections are spilt between teams of workers that have Team Leaders. The owner, in his desire to improve worker health, safety and welfare has implemented a number of initiatives; all workers have uniforms, are issued with bicycles and are provided with housing that has clean water and proper sanitation. The farm has records detailing die type of inputs used and when applied and crop yields including growth rates from the managed blocks, but not for traceability purposes, merely as a tool to assess the best performing blocks in order to award prizes to the workers and tenant farmers. The prizes are financial in nature as well as giving the winners opportunities to see other parts of the country through travel. On average the farm pays 25% more to its workers as compared to other production units in the area. The owner has built a floodlit cricket pitch and established a recreational/conservation area for the employees to enjoy in their spare time. The production units utilize bio-fertilizers which are prepared on-farm and have an IPM regime in place.

If necessary, the farm could achieve EUREPGAP certification, by implementing certain employee training programs, undertaking hazard risk assessments and instigating self inspection procedures, improving input storage and in-field toilet facilities and reformatting the farm record keeping system.

3.8.5 Post Harvest Treatments

Post harvest treatments are stipulated or required by some exporting countries. In the cases of mangoes and kinnow, both China and Iran insist that depending on the fruit, it needs to be treated in order to ensure fruit fly *(Bactrocera dorsalis* and *B zonata)* amongst other pathogens and pests, are controlled. The post harvest treatment methods are at the limits of the fruit's tolerance and will affect quality and shelf life:

- Iran specifies for mango a hot water dip at 45°C for 75 minutes. Normally the treatment parameters will vary according to the variety or the pest or pathogen to control, for example hot water treatments can be 50°C+/- 2°C for as little as 10 to 40 minutes depending an the fruit size and the variety. The treatment will also control Anthracnose and Botrydiplodia. The lower the water temperature the longer the duration required for control. If the temperature is too high or length of treatment too long it will cause intemal breakdown of the fruit, which is characterized by the presence of spongy tissues in the inner portion of the mesocarp. Affected fruits will show no outside damage and the symptoms are not seen until the mangoes ripen.
- Iran and China specify for the post harvest treatment for kinnow; to keep the product in a cold store at 2°C +/- 0.1°C for between 21 to 22 days or for 17 days at a temperature below 1.7°C In the case of Iran in situ and for China in transit. Citrus is sensitive to chilling at the temperatures specified for that length of time, it would be advisable to pre-condition the fruit to prevent chilling injury to hold the fruit at 16°C for 3 days prior to dropping the temperature, once again the shelf life of the product will diminish.

The issues that are raised regarding the post harvest treatment requirements:

- The treatment required is at the limit of the fruits tolerance for either chilling or heat which is to the detriment of product quality and shelf-life, making it difficult for exporters to treat the fruit and with the reduction in quality putting the marketability of the product at a severe disadvantage which is a disincentive for packhouses to export to countries that impose such treatments and therefore can be considered as a technical barrier an trade;
- Further research needs to be undertaken to determine tolerances, to the hot water and cold store treatments;
- Vapor heat treatment may be a more efficient and practical solution, but there is only one 50 Kg capacity machine (donated by the Japanese over 10 years ago) in the country which is still undergoing trials;
- If the importing countries accept irradiation, this could be utilized instead of the specified post harvest treatments and it is up to the Pakistani trade negotiating team to raise the matter; and

- The treatments specified in some circumstances are for pests that may or may not be present, further research an the target pest's prevalence is required to justify or not the post harvest treatments.

A number of packhouses are building cold stores primarily for the storage of kinnow; the investment in cold stores is between $150,000 and $250,000 for cold stores that have a capacities of 600 to 1000 tons. All the cold stores are being purchased to extend shelf life and therefore the marketing window. Additional cold storage capacity is not being installed in order to undertake the chilling phytosanitary measures required by some importing nations.

In the case of exporting potatoes to Malaysia, because of consumer preferences, post-harvest treatments such as the use of sprout inhibitors, fungicides and even washing is prohibited. The potatoes should not be cured which leads to the tubers having a shorter shelf life[16] and the dirt is removed by blow driers, as washing is not permitted. In this case the conditions laid down are not concerned with SPS compliance, the Malayan consumer prefers a potato that is easy to prepare (no peeling) and cooks quickly.

3.8.6 Irradiation

The Export Development Fund (EDF) Board has sanctioned ($1million) to fmance one of two irradiation plants based an cobalt 60 located at Lahore and is a joint venture between the Pakistan Atomic Energy Commission (PAEC) and PHDEB. A second plant is proposed to be located in Karachi. Including working capital $9,000 and the cost of land and building $300,000 the latter being the PAEC contribution the overall project cost of the Lahore plant is $1.3 million and will be run by a board of directors in the name of PARAS Food (Pvt) Ltd. The plant will have a capacity of 60,000 tons per annum to irradiate food items like rice, wheat, cereals, fruits, vegetables and processed food, spices and potatoes (to inhibit spouting). Irradiating fruit and vegetables will increase shelf-life and control insects, but it can make producers more relaxed about stricter phytosanitary controls during the production process and will cover up SPS problems in the production process.

In some importing countries, doubts remain about the benefits of irradiation and concerns persist about the dangers of irradiated food. However the main and future export markets for Pakistan's fruit and vegetables do accept radiated food[17]. Worldwide, over 30 countries approve some form of irradiation and many groups of consumers readily accept these products. Japan irradiates produce and South Africa routinely irradiates mangoes, papaya, and other vegetables. Canada has a facility dedicated to irradiating potatoes. Currently all member states of the European Union (EU) have their own set of rules governing which foods they permit for irradiation and at what doses. In the USA food irradiation has been approved an potatoes since 1964 for sprout inhibition and fruit and vegetables since 1986 to increase shelf life and control insects.

3.8.7 Pest RiskAssessment

Under the SPS agreement it is stipulated that "in assessing the sanitary or phytosanitary characteristics of a region, Members shall take into account the level of prevalence of specific diseases or pests, the existence of eradication or control programs, and appropriate criteria or guidelines which may be developed by the relevant international organizations" and that Members should recognize the concept of pest or disease-free areas and areas of low pest or disease prevalence.

During discussions with Multan mango farmers it came to light that there may be a case to claim that mango fruit fry is not evident in the area for the first two months of the harvest season and that Pakistan should have pest free status for the mango seed weevil *(Sternochetus mangiferae).*

Pakistan being an exporting nation must provide the necessary evidence in order to objectively demonstrate to an importing nation that such areas are and are likely to remain, pest or disease free areas or areas of low pest or disease prevalence, respectively. For this purpose, reasonable access has to be given, upon request, to the importing Member for inspection, testing and other relevant procedures. Although some pest risk work has been undertaken in particular for the mango seed weevil[18] a great deal of work is required before importing countries relax their strict sanitary requirements in such crops as mango and kinnow.

3.8.8 Importer Country SPS and Quality Requirements

The main cause of Pakistani fresh produce rejection is based an quality and appearance factors, which is as a direct result of the produce not being pre-cooled, harvested prematurely or graded and packed badly. Last year one exporter had a consignment rejected prior to dispatch when a pre-shipment inspection found that the pallets had broken rendering the palletization unstable with a risk that the product would be damaged in transit and arrive at the destination port in a poor condition.

The figure below highlights the spectrum of markets currently serviced by the Pakistani fruit and vegetable industry, ranging from minimal to highly intensive demand for and enforcement of food safety and/or plant health measures.

During the course of the study a picture was built up utilizing information from exporters of fresh produce, particularly mangoes, kinnow and potatoes regarding the importing country's SPS and quality requirements, taking into consideration such factors as the necessity for grades and

[16] Potatoes that are not "cured" have a thin, poorly developed skin and are easily bruised and damaged which leads to shriveling or decay and can only be stored for short periods. Curing potatoes for 8 days at 15 °C and 95% relative humidity will allow extended storage of up to 5 months. For greater storage time potatoes are harvested, cooled to 15 °C treated with a sprouting inhibitor, packed and shipped.

[17] Bangladesh, China, Indonesia, Iran, Russia, South Africa, Ukraine and United States.

[18] CABI Bioscience *(2003) Survey for Sternochetus spp. Associated with mango in Pakistan* (Lahore)

Country Ranking in Accordance to SPS Enforcement

Least Strict →					Most strict
Afghanistan	Middle East	Malaysia	China	Canada	UK supermarkets
	Russia	Indonesia	Iran		
			UK wholesale markets		
			UK ethnic importers		

sizes, packaging and labeling, observing post harvest treatment protocols, the need for importer in-country Field and site inspections, the observance of MRL tolerances, product traceability, packhouses are required to have HACCP certification, the requirement for phytosanitary certificates, farmers have observed GAP and any social and environmental measures applicable. The various country requirements are detailed in Table 8. Potential suppliers/exporters need to take these requirements into account when developing and refining their commercial strategies. It is also imperative to closely monitor changes in this regulatory and commercial environment. Both government and private sector organizations should play an active role in monitoring (and anticipating the potential of new and stricter requirements) these developments and fostering the needed adjustments within Pakistan to maintain compliance and broader competitiveness.

Table 8 Selected Import Country SPS and Quality Requirement for Kinnow (K) Mango (M) and Potatoes (P)

	Middle East (K & M)	China (M)	Iran (K & M)	Afghanistan (K,M & P)	Russia (K)	Indonesia (K)	Malaysia (P)	Canada (M)	UK Supermarkets (M)	UK wholesale Markets
Grading Size	C/D	A	A	D	A	A	A	A	A	A
Packaging/Labeling	C/D	A	A	D	A	A	A	A	A	A
Post Harvest Treatment	D	A	A	D	D	D	B	D	D	D
Field Inspection	D	E	E	D	D	D	D	D	C	D
MRL Tolerances	D	D	D	D	D	D	D	A	A	C/D
Product Traceabili	D	D	D	D	D	D	D	D	C	C/D
HACCP Certification	D	D	D	D	D	D	D	D	A	D
Phytosanitary Certification	A	A	A	D	A	A	A	A	A	A
GAP	D	D	D	D	D	D	D	C	C	D
Social/Environmental	D	D	D	D	D	D	D	D	C	D

A Strictly enforced by importing company or country
B Consignment spot checked for compliance
C Enforcement stipulated but not observed by importing country or company
D Not found to be required
E Farms and production units to be inspected and certified prior to product dispatch

4 Meat And Livestock International Markets And Compliance

The livestock sector has an important role in the country's national economy with a share in national and agricultural GDP estimated to be 11.4 and 49.1 % respectively with an estimation of more than 6.5 million families involved in the sector (Government of Pakistan 2004).[19]

4.1 Domestic Livestock Production

According to the 2003 -2004 livestock census, there were 23.8 million head of cattle, 25.5 million buffaloes, 24.7 million sheep, 54.7 million goats and 800,000 camels. The livestock population is distributed throughout the country (Table 9) and lacks modernization, commercial and export orientation and continues to operate primarily at subsistence level.

Table 9:Livestock Population Distribution as a percentage of Population

Province	Cattle	Buffaloes	Sheep	Goats	Camels
NWFP	21.5%	6.3%	13.3%	17.5%	8.3%
Punjab	43.2%	60.8%	24.3%	37.1%	18.6%
Sindh	28.9%	31.8%	18.2%	23.8%	29.7%
Balochistan	6.4%	1.1%	44.2%	21.6%	43.4%

Source: Economic Survey (2003-04)

The rural population is engaged in livestock farming, rearing on average between two or three cattle and buffaloes and five to six sheep or goats per family and deriving between 30 to 40% of their income from their livestock. Livestock rearing has remained the least commercialized in comparison to arable and horticultural production and is mainly at the subsistence level. Besides offering a dietary contribution to the farming family, livestock also serves as a security against crop failure particularly in rain-fed agriculture. Livestock essentially acts as a bank deposit that can be cashed in times of a financial crisis or need.

The majority of livestock breeds in Pakistan fall into the non-descript category and are not recognized as beef or milk breeds. Cattle and buffaloes are not reared exclusively for beef production. Some efforts have been made in the past to develop a beef breed in Pakistan by crossing the *Bhagnari* breed in Balochistan with Drought Master to develop a cross bred *Nari Master* that has a better growth rate and earlymaturity compared to indigenous cattle. The results have been disappointing. Most of the beef produced comes from animals raised in extensive production systems on small units of mixed farms. Intensive beef production and feed lots are virtually non-existent in the country.

4.1.1 Livestock Diseases

The principal diseases of importance in Pakistan from a trade perspective are Rinderpest, Foot and Mouth Disease (FMD), Hemorrhagic Septicemia, Avian Influenza and some Clostridia infections.

Pakistan's trade in beef and poultry, especially to the Middle East, has been affected by FMD and Avian Influenza. Similarly because of uncertain status regarding BSE, being in EU Category-II List, its trade in sheep casings and bone meal to the EU was impacted. The Rinderpest disease is known to have occurred in cattle and buffaloes in the country since the beginning of the last century. Two epidemics were recorded in the 1950s, when hundreds of thousands of cattle and buffalo died. Since then, the disease has been under control, with occasional outbreaks. Pakistan has now been declared provisionally free of Rinderpest, after mounting a Rinderpest Eradication Program[20]. Nevertheless, keeping in view the seriousness of the disease and the threat of reemergence, Pakistan needs an efficient disease monitoring and surveillance program.

Pakistan is free from BSE, provisionally free from Rinderpest and *peste des petits ruminants* (PPR small animals Rinderpest*),* yet FMD continues to be endemic in certain belts of the country, along with, Black Quarter and Anthrax. The measures for containment of epidemic diseases rely heavily on vaccination, through seasonal campaigns in the affected areas, which at times are not effective because of the infrastructure and equipment available and staff capacity and capability. Vaccination campaigns have helped contain some of the diseases, yet due to the lack of refrigeration in outlying areas many vaccines are rendered ineffective.

At times, the country's ability to freely export fresh meat and livestock is compromised by the country's animal disease status, as determined and notified by OIE. It has affected Pakistan's trade in livestock and livestock products in the Middle Eastern market in the past and is likely to be a key problem in the context of international trade in the future. An animal health strategy to support the livestock and beef trade isrequired to ensure[21]:

[19] The analysis here provides only a preliminary assessment of the pertinent challenges and opportunities in the lievestock sector and follow-up work is needed entailing a broader process of consultation and strategic planning.

[20] With support from the FAO/TCP', Preparatory Assistance Program for National Rinderpest Eradication Project'

[21] Of course, these measures need not be justified primarily or purely to promote trade. More effective management of animal disease is also critical to increasing the productivity of Pakistani livestock, enhancing the asset value and incomes of farmers.

- Disease control measures are complied with, through an effective quarantine system, disease control and prevention programs;
- Contingency plans for FMD, Rabies, Anthrax, Rinderpest, emerging disease problems like BSE, Avian Influenza / Bird Flu are in place; and
- Animal health related projects need to be supported that are concemed with the control of trade-related animal health issues, such as (i) Support for Emergency Prevention and Control of Main Trans-boundary Animal Diseases and (ii) Strengthening of Veterinary Services in Pakistan-Rinderpest Eradication.

With assistance from the ADB, a Pakistan Automated Livestock Diseases Information System (PALDIS) was introduced and its effectiveness was demonstrated. The System could not be sustained, however because of the lack of commitment on the part of government and lack of resources to sustain the activity.

4.2 Domestic Market

Domestic livestock markets generally lack basic infrastructure. The private sector has established few animal stock holdings and pens to ensure greater raw material health and quality control. Meat production and technology have remained a neglected area, with traditional methods still prevailing in livestock slaughtering, meat processing and marketing. More than 70 percent of meat is produced from animals slaughtered in the rural areas, while less than 30 percent of meat is produced through approved slaughterhouses. The transportation used is not refrigerated, and on the whole supply chain is unhygienic and is not compliant to international standards.

The pricing policy in the country is consumer orientated and does not help the livestock producer. Local government fixes mutton and beef retail prices through the Price Committees. The enforcement of the price fixing is erratic and retailers do sell their products above the recommended retail price, as it is a sellers market. The intervention on the part of the public authorities defeats the concept of a market oriented sector and is a disincentive towards the development of quality products and in the context of SPS management in particular.

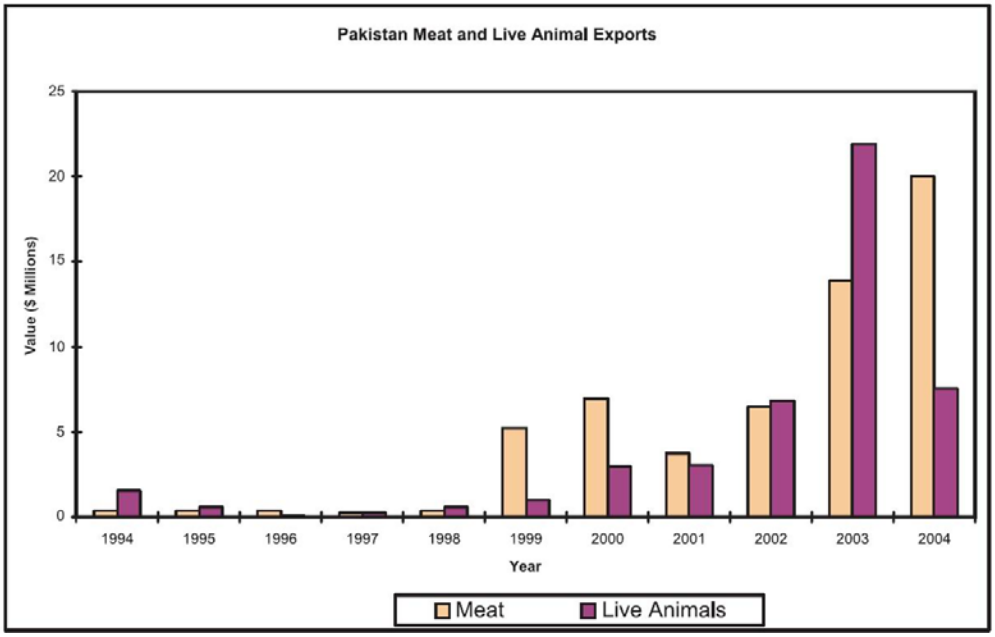
4.2.1 Imports

Pakistan has also been importing livestock products. In 2001-02 the country's livestock, dairy, meat, and poultry imports were valued at $118 million. The Government has recently allowed the import of meat and livestock from India. Cross border smuggling of meat between the countries has always been carried out. Now Pakistan plans to set up quarantine facilities on the border at Khokhrapar. Both countries do need to collaborate in disease control and surveillance programs and enter into equivalence arrangement for managing animal disease risks.

Livestock and meat products have now been placed on the zero duty list[22]. Although the import of livestock has been liberalized with a quarantine period fixed at 22 days, the limiting factor is there are no holding yards to ensure the quarantine period is fulfilled.

4.3 Exports

Until recently Pakistan has not been a traditional exporter of livestock and livestock products. Pakistan's livestock exports were limited to leather products, wool and rugs. However, in recent years a growing trade in livestock and meat product exports has emerged. This is highlighted in the figure below.



Source: UNCTAD Statistics on line, FAO data and Export Promotion Bureau (2004-2005)

[22]Cabinet decision 3 May 2005

The country was able to gain a foothold in some markets, when the European exporters were unable to export owing to the BSE crisis. Following a drop in exports during 2001 the export volumes have increased between 2002-03 and 2003-04 in all categories apart from animal casings and values are projected to rise during 2004-05 (Table 10).

Animal casing exports witnessed a huge decline from 2002-03 and 2003-04. The reason for the fall was Pakistan's placement in the EU Category II lists regarding the export of sheep casing. Similarly, Romania orte of the leading importers of animal casings from Pakistan, placed a ban on imports as there were fears that the casings were contaminated with insecticide. Following a visit by a Romanian veterinary plant health delegation the ban was lifted on condition that Pakistan's inspection procedures were improved, which they were.

In the latter half of year 2001, exports of meat to the country's two importer nations -- Saudi Arabia and the United Arab Emirates were banned. This impacted on Pakistan's overall meat exports which fell by more than 50 per cent. The ban was caused by concerns over hygiene in the country's processing plants. However, the ban on meat export from Pakistan to Saudi Arabia was lifted during 2002 as soon as plant hygiene was improved. At that time, the Government laid down a certification service for the country's livestock industry and called in delegations from meat importing countries to inspect the processing plants and review their standards, procedures and record keeping.

slaughtering cattle and sheep in separate units;

- improving hygiene through more regular cleaning and wash down schedules;
- replacing worn out and antiquated machinery and equipment; and
- improving cold and freeze stores with the use of food safe lining and surfaces.

Exports of live animals registered a significant increase in 2002-03 over the previous year, from 32,935 to 101,070 head of livestock, but then declined in the succeeding year owing to export restrictions imposed by the Government of Pakistan (Table 11). The Government imposed this ban on exports of live animals, apparently under pressure from the Butchers Association *(Anjuman-e-Qureishian)* which was concerned about shortages of raw materials for the butchery trade. Currently, a No Objection Certificate is required before any livestock can be exported. Live animals are exported to Iran, Afghanistan and the Middle East.

Table 11: Live Animal Export Values from Pakistan

2003-2004	$7.5 million per annum
2002-2003	$21.9 million per annum
2001-2002	$6.8 million per annum

Source: Foreign Trade of Pakistan (July-June 2003-04) EPB

Table 10: Value of Pakistan's Key Livestock Exports ($million)

Products	2001/02	2002/03	2003/04	2004/05(Estimate)
Total meat	3.6	10.6	15.0	20
Fresh meat	2.7	4.5	12.9	Na
Prepared meat	0.23	0.34	0.59	Na
Leather products	672.0	695.0	774.0	790
Animal casings	9.1	101.2	14.0	Na

Source: Export Promotion Bureau (2004-2005) and Foreign Trade of Pakistan (July-June 2003-04) EPB and UNCTAD Handbook of Statistics on line.

Currently, fresh, chilled or frozen meat of bovine, sheep and gaots is exported to the Middle Eastern countries, Afghanistan and Malaysia. Most meat exports are in the form of full carcasses and cuts, owing to the lack of modern processing facilities in the country. Through effective animal disease management and improved hygiene in processing, and by diversifying its livestock production and processing base, Pakistan could secure an increased share in the international beef market, especially for *Halal* beef in the Middle East and elsewhere, where there is growing demand for *Halal* meat. Recently a number of Islamic countries, including Malaysia, have shown interest to increase meat imports from Pakistan. To augment market share in Malaysia, Pakistan can increase its meat processing capacity and improve quality and safety by:

- using slaughtering units specifically for export and

4.3.1 Export of by-products

Hides and skins are important by-products of the slaughtering process. A total of 48.5 million skins and hides were produced during 2003-04 amounting to a domestic sales value of $188 million. In comparison, exports of hides and skins are minimal. Approximately 90% of the hides and skins produced at slaughterhouses are collected and sold to commission agents for onward sale to the tanneries for processing. No grading and salting of hides and skins is carried out at the slaughterhouses. The remaining hides and skins enter the value chain supplied from butcher stores and religious slaughtering. In general the skins and hides are poor in quality because of the lack of trained butchers and in most cases the skins are damaged during slaughter.

Leather and leather products produced revenue of $774

million during 2003-04. Leather (tanned) contributed 33.8% of that revenue, while leather garments & leather foot wear contributed 55.7% and 10.5% respectively. Leather exports increased by 7% compared to the previous year. Major export destinations for the products were Hong Kong, Italy, South Korea, China and Germany.

4.3.2 Exporters and Slaughterhouses

There are six main export companies that are involved in the livestock and meat business. These are located in either Karachi or Lahore. Several have erected state-of-the-art abattoirs. Similarly 36 animal casings export units are registered with MINFAL and located in Karachi, Lahore, Multan, Gujranwala, Quetta and Peshawar.

The domestic meat market is largely unregulated and accounts for almost 70% of the total slaughtered animals. This is apparent when taking into account the number of abattoirs and the population in the cities. Both Karachi and Lahore presently have only five commercial and traditional abattoirs while in Islamabad, a modern abattoir facility was erected in the 1970s, which is in a poor state of repair. Many of the government run slaughterhouses are also in disrepair[23].

Currently all the slaughterhouses excluding a few in Karachi cater for the domestic meat market. Many units have limitations regarding a shortage of potable water, the butchers lack training especially in the area of personal and meat hygiene, the infrastructure is basic and equipment outdated and old. Although a govermnent regulation, pre and post mortem inspection in the slaughterhouses is non-existent and its enforcement ineffective. Over the last few years the private sector has improved the slaughtering of animals in order to gain a foothold in the export markets under its own initiative (see Box 7). There are now six export-oriented slaughterhouses in operation; two in Karachi, three in Lahore and one in Sialkot. Substantial investments were needed to bring these operations up to international standards.

4.4 MeatAnd Livestock Swot

A SWOT of the meat and livestock sector has been developed (Box 8)

Box 8 A SWOT for Livestock/Meat Sector

Strengths

- A low input production system prevails, with less veterinary products used.
- The large size of national herd
- The population is growing fast and meat supply cannot keep pace"

Weaknesses

- The nondescript breeds in the country are inefficient meatproducers
- The production base involves small farmers with practically no contract animal rearing and farming to enhance quality control and sanitary measures
- Nutritional and feed shortages are prevalent
- There is a lack of processing facilities
- Health hygiene awareness poor
- Weak SPS regulatiry framework
- Poor enforcement of SPS laws
- Inefficient disease control and quarantine

Opportunities

- New markets for *Halal* meat Malaysia and Indonesia
- Domestic and foreign private sector investment interest
- The establishment of feed lots and fattening yards attached to slaughterhouses.
- Donor support to manage SPS issues

Threats

- Loss of existing markets through competition and their introduction of better quality and safer meat products.
- Imports, particularly from India
- The introduction of exotic diseases

Box 7 Private sector slaughterhouse initiative

Among the slaughterhouses operating in the private sector, one unit has been able to export a substantial quantity of mutton and beef to the Middle East. Out of its total mutton exports, 75% is destined for Saudi Arabia. However as three are no separate slaughtering facilities for cattle and sheep, Saudi Arabia has requested a separate cattle slaughterhouse, before beef can be imported further. The facility is in the process of bring erected with the assistance of an Australian company and is scheduled to be operational by July 2005. The Company also exports live animals; camels and cattle to the Middle East. The company's abattoir is fully automated and it is video monitored to ensure procedures and processes are observed. The plant has a current slaughtering capacity of 180 animals daily and a chill storage facility of 42 to 50 tons with six reefer vans. The Company claims to be ISO 9001 and HACCP certified and has built ante and postmortem facilities. Foreign market authorities have inspected and approved the facilities.

[23]A decade ago, with financial support of ADB, a Livestock Development Project was implemented. The activities included increasing the capacity and upgrading abattoirs in more than six locations. A number of the abattoirs are lying idle or are in disrepair and there are plans to privatize the units.

[24]Pakistan's population in 2001 was 141 million inhabitants with an annual per capita income of $420, it is estimated that the population will grow to 344 million by 2050, the middle income consumer market would be 69 million, larger than that in many countries (World Bank, 2003).

4.5 SPS and Supply Chain Issues

There are major factors that affect the health and hygiene of the product, within the supply chain, all of which have and will affect its marketability in export markets. They are:

- Animals are slaughtered in most cases in non-regulated private slaughter places. Even in slaughterhouses that are run by local govemment most of the operations are not hygienic with limited fresh and clean water available, inadequate routine cleaning, substandard and out of date equipment, etc;
- There is a Code of Practice for slaughterhouses stipulating grades for carcasses and animal casings which has been developed by the Pakistan Standards and Quality Control Authority. In general this has not been observed or enforced;
- The cold chain and cold storage facilities are limited, apart from a few export orientated operations there is a major risk of product spoilage and cross contamination. The microbiological quality of the meat deteriorates rapidly which renders meat unsafe particularly during the hotter months;

  Port and airport facilities have limited cold storage facilities. The cold chain concept should be expanded to include the whole supply chain, refrigerated transport, blast chilling capability etc;
- Food safety is the weakest link in Pakistan's regulatory framework with Government unable to provide the framework for the maintenance of food safety, quality and animal heath, across the supply chain "from farm to fork'. Food safety laws and SPS regulations, directives, standards, policies and procedures, which form the foundation for a food control system, are weak and their enforcement is poor; and
- The preliminary studies (Alvi A.S. 1988) on meat hygiene have indicated a high incidence of *Salmonella* infection in raw meat, from the Samples collected from butcher's shops. A sample of 100 carcasses, each of beef and mutton, from various butcher's shops in Faisalabad showed that among 1,715 isolates, 55.98% were Gram-negative. The relative incidence of different bacterial species was estimated to be: *E. coli 31 %, S. aureus 22%, S. epidermidis 14%, C. perfringens 5%, A. aerogenes 5%, B. subtilis 4%, S. fecalis 7%, C. pyogenes 3%, S. typhimurium 3%* and *S .enteridis 1%*

Table 12 below highlights the supply chain issues.

Table 12 Supply Chain Management Issues

Activity	Issues	Requirements
Livestock Production	No concept of herd health management Limited vaccination cover Weak and unhealthy stock and breeding lines	Shift to feed lot or farmer production groups in rearing yards Effective disease monitoring and control
Slaughter	Abattoirs in disrepair with limited current expenditure Small number of regulated slaughterhouses Limited private sector participation Code of Practice not operational Weak ante mortem and post mortem inspection No chilling facilities except in few private abattoirs No Veterinary and Plant Health Authority	Privatization of state owned slaughter houses Foreign/Local investment SPS management through Veterinary Plant Health Authority Meat Standards and an industry Code of Practice HACCP for Meat processing Meat Inspection Laws
Transport	Open transportation in trucks/vans without refrigeration Delay in delivery	Refrigerated Vans Storage and chilling facilities
Marketing	Through middlemen in big cities, without chilling/storage facilities	A robust value chain, improved linkages with roducers.
Retail	Retail outlets unhygienic No chilling facilities No meat safet control	Regulated outlets Consumer awareness of the benefits of a hygienic product.
Export	Few operations Poor regulation	Investment-driven incentives and effective regulation and standards Exposure visits for exporters

4.5.1 Proposed measures

To ensure that market share is increased in Pakistan's target markets for meat, which are the *Halal* markets in Middle East, Afghanistan and Malaysia, a number of measures and activities are proposed:

- There is a need to promote consumer awareness of the benefits of wholesome and healthy foods. If the domestic market consumers can be encouraged to purchase a hygienic and quality product that is produced within a cold chain then processors will pay more attention in improving product quality and hygiene. Increased consumer power can work as a stimulant for inducing and managing change at all levels, including producers, distributors and sellers. The PNAC has a program and this could be built on, in conjunction with promotion campaigns that EPB, PHDEB and the ADB Agribusiness Development Project programs are running or will be implemented in the future;
- As yet only one of the abattoirs or processing plants is HACCP certified. It is essential in meat products that the plants are HACCP certified in order to give food safety confidence to the buyers and their customers. A program can be developed to build awareness, provide training, and provide technical assistance to SME and other operators within the sector;
- If the importing country permits irradiation then the product should be irradiated as the last critical control point. Malaysia already accepts irradiated spices and may accept it for beef. Regulatory developments in this sphere should be carefully tracked.
- Greater product diversification by the processors is needed. Processing of meat can be as simple as preparation of retail cuts of meat, or it may involve grinding, flaking, sectioning, seasoning, salting, curing, forming, smoking, heating, fermenting, drying or combination of these treatments;
- The improvement of packaging utilizing food grade materials and the greater use of vacuum packing; and
- Greater research or collaborative research with other countries into food safety and veterinary and plant health, for example (i) improved detection and screening techniques for residues of antimicrobials and their metabolism in animal products (ii) the presence of drug metabolites in animal products destined for human consumption (iii) The role that antimicrobials or their residues play in food sensitization and subsequent hypersensitive reactions in humans (iv) the associations and frequency of antibiotic resistance and (v) detailed studies to assess the microbiological contamination at different stages ofprocessing.

The above recommendations are based on a very limited review of this sector. There is a need to form a multi-stakeholder task force to examine the pertinent issues of disease control and quality and food safety management and to develop an action plan for implementation by industry, the govermnent, and other parties. This is detailed further in the chapter on Recommendations.

5 Fishery Exports and EU Compliance

The country's commercially important fishery resources are comprised of some 250 demersal fish, 50 small pelagic, 15 medium-sized pelagic and 20 large pelagic fish. In addition, there are 15 commercial species of shrimp, 12 of squid, cuttlefish and octopus, and 5 of lobster. The fisheries sector plays an important role in the national economy. It provides direct employment to approximately 379,000 fisher-folk in some 12,000 boats. In addition another 400,000 people are employed in ancillary industries, such as ice-making, packaging, and distribution.

The fisheries sector is also a major source of export earnings. Trade in fish and fish products has been the largest component of Pakistan's non-traditional agro-food exports. Trade in these products peaked in 1997 at just over $140 million and have varied between $66 and $100 million up until 2002-03 (UNCTAD, 2003). The total export of fish products during the year 2003-04 saw a substantial rise to $153 million, as detailed in the figure below.

Source: UNCTAD Statistics on line, FAO data and Export Promotion Bureau (2004-2005)

Shrimp and other shellfish products account for more than half of this trade. Until recently, the EU and Japan were the two largest market outlets, although significant trade has also been carried out with the United States, other high income Asian countries and countries in the Middle East. The annual average seafood catch in Pakistan amounts to approximately 500,000 tons; 35% is consumed locally, while a similar quantity is used in the preparation of fishmeal for the local poultry industry.

There is a total lack of added value products. Pakistan is exporting fish and fish products in raw form either frozen, chilled, dried etc. At present about 40,000 to 45,000 tons of sardines are landed and converted in fishmeal and 20,000 to 25,000 tons of tuna fish is exported in dried salted form to Sri Lanka at very low prices[25]. These can be used for making canned product of high value. Similarly, by-product production such as chitin and chitinosis products can be made from shells of shrimp and crab, which is presently being used in fishmeal reduction. In addition, various types of feed, such as highly vitaminized food supplements, fish protein concentrates, fish flour and fish leather offers the potential for diversification.

Over the years there have been periodic problems with food safety and sanitary compliance of the products in the destination markets. The industry has and is facing considerable challenges meeting food safety requirements in their major export market. The EU stipulates harmonized requirements governing hygiene in the capture, processing, transportation and storage of fish and fish products and EU legislation lays down detailed requirements regarding the landing of fish, structure of wholesale and auction markets and processing facilities (for example construction of walls and floors, lighting, refrigeration, ventilation, staff health and hygiene etc.), processing operations, transportation, storage, packaging, checks on finished products, laboratories and water and ice quality. More generally, it requires that fish processing facilities undertake 'own checks', which refers to all actions aimed at ensuring and demonstrating compliance with standards laid down by EU legislation and are broadly based on the principle of HACCP (Henson and Mitullah 2004).

[25] www.pakistan.gov.pk/divisions/ContentInfo.

Processing plants are inspected and approved on an individual basis by the Marine Fisheries Department (MFD) to ensure they comply with these requirements. The European Commission undertakes checks to ensure that the so-called "Competent Authority" carries out the task in a satisfactory manner and to ensure provisions of the Fisheries Directive[26] are complied with. Imports from Third Countries are required to manage systems that are at least equivalent to those of the EU. Further, specific import conditions are established according to the particular health situation of that country. In most cases the Commission undertakes periodic inspections for the purpose of determining local health conditions and establishing specific import conditions for the country concerned. Only establishments approved by the Competent Authority are permitted to export to the EU. The Competent Authority provides the Commission with a list of approved establishments and this is subsequently published in the Official Journal of the European Communities.[27]

In early 2005 an inspection visit to Pakistan was undertaken by the EU's Food and Veterinary Office (FVO), to assess compliance with the special conditions governing imports of fish products originating in Pakistan[28]. The evaluation covered the entire fisheries production chain; vessels, landing areas, auctions, establishments, potable water, ice facilities, shrimp peeling facilities and the surrounding environment. The delegation found significant areas of non-compliance with EU regulations, in relation to the country's regulatory enforcement system in the operating methods and facilities of many of the country's licensed fish processors and exporters and in other parts of the fish export supply chain, the non compliance issues are detailed in Appendix E**.** Significant adjustments are needed to maintain Pakistan's favorable (List 1) status in accessing the EU market (and perhaps other markets) for fish products. It should be noted that although the inspectors found widespread shortcomings in regulatory enforcement and in systems throughout the supply chain, not a single consignment of Pakistani fish had been rejected entering the EU market during the prior two years**.**

Following the inspection visit and as a result of the subsequent findings presented, the Government instigated a self-imposed suspension of fish product exports to the EU. The value of the EU exports of Pakistani fish products was reported as $45 million per annum, however it has been reported that the loss in revenue was $40 million during the first four months of the suspension[29]. The closure of that market has encouraged the industry to change and attempt to fully comply, by investing in hygiene and fish product safety measures. The investment, if undertaken correctly, will benefit the industry financially and increase the standards throughout the industry and the number of processors that will have access to the EU and other lucrative markets, a short term loss for a long term gain, as has happened in other countries (see Box 9)

The potential in the fisheries sector is estimated to be very good[30] which has created a major interest within the Government and at policy level to drive change. The Medium Term Development Framework of the Government's Planning and Development Division has determined that through the

Box 9 The Bangladesh Experience

On 30 July 1997, the EU banned imports of fish products from Bangladesh. EU Inspections found serious deficiencies in the infrastructure and hygiene in processing establishments and insufficient guarantees of quality control by Bangladeshi government inspectors. The ban was estimated to cost the Bangladesh shrimp-processing sector nearly $15 million in lost revenues from August to December 1997. The Country had to improve the safety and quality of its exports. Some upgrades were in progress at the time of the EU ban. By 1997, the Bangladesh shrimp processing industry invested $17.6 million in plant upgrades, the government $382,000 in laboratory and personnel upgrades, and outside partners invested $72,000 in Bangladesh training programs. Unfortunately, these improvements were not in place early enough to prevent the ban.

Subsequent inspections by the EU determined that some plant improvements did meet its requirements and the ban was lifted for those companies. By July 1998, eleven processing facilities had been approved to export to the EU. Since then, further upgrades by individual companies and the implementation of support and/or regulatory programs by the Bangladesh Department of Fisheries, the Bangladesh Frozen Food Exporters Association, and others have strengthened the industry. By 2004, there were fifty-seven fish processing plants meeting the EU requirements.

While significant investments were required to upgrade the quality and food safety profile of the industry, this investment has paid off. Bangladeshi shrimp exports in recent years have been considerably higher than their mid-1990s level. While previously Bangladeshi shrimp received discounted pricesdue to lower or inconsistent qualitymany exporters now obtain regular market prices. Another positive trend is the movement toward exports of value-added products, such as individually quick frozen, peeled and cut shrimp and cooked products. Such products accounted for 35% of Bangladeshi shrimp exports in 2003.

Source: Cato and Subasinge (2004)

[26] Council Directive 91/493/EEC

[27] Countries for which the European Commission has approved local requirements as being at least equivalent to those in the EU and for which specific import requirements have been established are subject to reduced physical inspection at the border.

[28] as laid down in Commission Decision 2000/83/EC of 21 December 1999

[29] www.DW-World.DE, July 23, 2005

[30] A preliminary value stream mapping work has reported the opportunity to expand the current fish product income of $147 million to $2 billion (Secretary MINFAL and the Export Promotion Bureau)

proper exploitation of marine resources and through fish farming, total fish production will increase to 597,000 tons in 2005-06 as opposed to 574,000 tons during the previous year.

With the objective of lifting the suspension there are major issues that need to be addressed and resolved:

- The understanding of the inspection service and stakeholders is weak in relation to the regulatory requirements, which has led to gaps in the system in relation to specific organisms and with regards to histamine sampling. Furthermore the Service is unsure of the public health significance of a lack of specific controls;
- The Marine Fisheries Department (MFD) under MINFAL is the Competent Authority and has weaknesses in the inspection system in terms of organization, responsibility, authority, methodology and a poor understanding of the significance of the public health risks including their causes and suitable controls;
- Regular inspections are undertaken by MFD and reports written using a standard format. Although non compliance is documented, none of these reports mention corrective actions and deadlines for their completion. The organization is poorly defined and new inspection procedures are required which clearly define an organized approach as to who inspects, what and when, with corrective action and completion deadlines;
- The MFD responsibility is unclear or unallocated with respect to verifying the performance of other stakeholders with a mandate for control e.g. Karachi Fish Harbor;
- The sanctions available to MFD are not clearly documented, there has to be a removal of approval numbers from vessels if they are unfit for purpose, similarly for landing sites and auction halls;
- The inspection methods in terms of sampling plans, freshness criteria, checklist design, report formats are flawed and inappropriate;
- The industry has not exercised the control of public health within their supply chains. The need for the companies to operate supplier assurance programs and verify appropriate control within capture, handling, storage and transport is not fully understood. The vessel owners and harbor authority also lack the understanding regarding the consequences of poor control and have only just begun to initiate programs to achieve increased control; and
- Processors lack an understanding of HACCP and competitive levels of GMP.

5.1 Vessels

There are approximately 2,000 vessels that are currently unloading fish in the Karachi port and auction, which supply the processors that are EU-approved. The fleet is composed of traditionally made wooden fishing vessels; fish product chilling is by the use of ice either crushed block ice or flake ice. Ice is supplied by a number of ice plants that are located in close proximity to the ports. The existing Hela boat or the larger vessel designs did not meet the requirements of Council Directive 92/48/EEC; therefore practical guidance in the form of a vessel design code of practice and inspection checklist is required. Sixty vessels have been upgraded and 15 have now passed inspection and are awaiting approval certificates. All of the initial vessel inspections resulted in non-compliance issues such as no hand-washing facilities, fuel oil control and spillage containment, container and hold materials used, cleanliness and design etc. Therefore the competent authority would not issue vessel approval numbers. Hand washing and toilet facilities accompanied by training will significantly reduce potential pathogens from faecal and oral routes. Furthermore the correct icing; handling and storage of the fish will reduce microbial growth, which at present has all been reported as bruised, spoiled or unfit by the EU inspection team. The protection of the product from potential fuel oil contamination at the point of fish reception is an issue and designs are needed to be put in place.

5.2 Landing Sites

The Fishermen's Cooperative Society (FCS) has the mandate to enforce the sanitary requirements on Karachi port landing sites and auction, under the technical guidance of the competent authority. It is noted that other ports exist that supply approximately 10% of fish products exported to the EU, they are not under official control. The ports are Korangi, Gwadar and Pasni.

Landing site inspections were undertaken at the Karachi main harbor which is the proposed EU corridor[31] and Korangi harbor. Inspection reports were completed for both Karachi landing sites and approval was withheld until recommended actions were completed.

The handling of the fish products at the landing sites does reduce the quality and hygiene status of the product, more bruising occurs and product freshness is an issue. The amount of ice used in the plastic boxes at unloading is insufficient to maintain the required temperature for chilled products.

The proposed EU corridor design as part of an improved Karachi Port, overcomes all of the failings recorded in the initial inspection report and further the proposed physical separation of the area and control of personnel movement and handling will significantly reduce public health risks. This site is also intended as a demonstration site and will enable the auction hall and landing site management systems to be installed and tested The congestion in the harbor resulting in delays before off-loading will need to be addressed through improved fleet management, furthermore the handling of product at the quay side was also of concern; particularly the throwing of the product and the picking of large fish using spikes to enable easy removal from compressed ice.

[31] The channeling of all fish product exports through an avenue of commercialization using boats, landing sites and processing plants that are all compliant to EU directives, in order that there is the dispatch of safe fish products to the EU.

5.3 Auction Halls

The Karachi auction hall inspections highlighted complete management failure in maintaining infrastructure and hygiene controls necessary to protect public health. The auction is not protected from the exterior, e.g. open doors and windows and gaps on roofs, which does not prevent the entry of undesirable wildlife such as birds and cats. The absence of the provision of basic sanitary facilities for hand washing and toilets, no control of cross-contamination from sewage and pests on the auction hall floor all demonstrated poor control. The infrastructure in all proposed auction hall areas requires modification to ensure pest control, personnel hygiene and proper product handling and storage. . A further visit by a design engineer provided by UNIDO has resulted in clear advice on how this area can be upgraded.

5.4 Exporter Plants

Many of the country's processing units are over 40 years old. An Inspection Mission of European Commission visited Pakistan in December 1997 to evaluate conditions of seafood production and processing and pointed out certain shortcomings especially in hygienic conditions in Karachi Fish Harbor and in processing establishments. The Mission recommended that the quality control of fish and fish products should be exercised under appropriate legislative cover. Therefore in 1997, the Pakistan Fish Inspection and Quality Control Act, 1997 was promulgated.

There are 22 processing plants/exporters listed to export fish products to the EU. However, only 11 plants were considered, by the inspection team, to have the potential to comply with the provisions of the EU legislation after making only minor corrections in their operations. The other plants have either withdrawn from exporting to the EU and are therefore de-listed or after correcting the serious deficiencies (concerning structures, equipment and maintenance procedures and practices) could be considered to be compliant. None of the enterprises were operating management systems that focused on waste reduction or cost control. Therefore it would appear that competitiveness is based on low material costs, low labor costs with a relatively low burden of legal requirements.

Some of the deficiencies that can present risks for consumer health, are as follows:

- The leaking of ammonia from the chill and freeze stores which could contaminate the fish products;
- Fish products are dipped in water with a free residual chlorine content of between 5 and 13 ppm;
- Cold stores temperatures that should be at - 18°C for frozen products are maintained at temperatures above that level;
- Fumigation practices in working premises with non-approved chemical substances; and
- Zinc trays are used for plate freezing with potential contamination of the product from toxic chemical substances ; and
- The proofing of the building and pest control is poor.

5.5 Discussion

As far back as 1984 it was reported (Howgate 1984) that there were deficiencies in the health and hygiene of Pakistani shrimp processing and a code of Practice was drafted. In 1999, an EU FVO mission was mobilized, as there were still concerns regarding the health and hygiene of Pakistani fish products being exported to the EU. The findings of that mission allowed the drafting of Commission Decision 2000/83/EC, which governs the exports of Pakistani fish products into the EU and provides guidelines for the country's fisheries sector in order to maintain market access. The mission also identified corrective actions that were required and the MFD was given the responsibility to ensure their rectification. The corrective actions were not rectified, they were:

- The insulation of all fishing vessels by 2002;
- The production of ice in hygienic conditions to be supplied to fishing vessels by December 1999;
- Inter-laboratory proficiency tests regularly done every six months; and
- The continuous recording of temperature in establishment cold rooms by November 1999.

Following the inspection visit to Pakistan by the EU's Food and Veterinary Office (FVO) in early 2005 to further assess the industry, it was evident that some major non compliance issues had still not been rectified and a serious “wake up call” was required. MINFAL took the decision to impose a voluntary suspension in order not to forfeit the nation's classification as a List 1 exporter. It is assumed that with the establishment of the EU Corridor and greater authority given to MFD that the suspension will be lifted, but only for those boats and processors that conform and comply.

MFD as the competent authority technically monitors and guides the various associations and authorities to inspect fishing vessels, harbor landing site and auctions and establishments for compliance with EU directives. However non-compliances are repeatedly stated in the inspection reports produced without detailing corrective actions and deadlines to rectify non compliance factors and with little evidence of follow up and no enforcement. The industry appears to play “lip service” to the health and hygiene issues and MFD has “no teeth” to enforce and its capacity is limited. MFD needs to rise to the challenge and provide strong leadership to all stakeholders. Deficiencies previously within their structure and lack of authority are being addressed through a structured action plan, in order that non compliance follow ups can be undertaken and to ensure that any rectifications are enforced. MFD staffs are receiving training in order that the capacity of the staff is improved.

The safe production of seafood is a mandatory requirement for

both local supply and for EU market access. However, the operation of the Karachi Fish Harbor is still of grave concern with no tangible improvement of practices or standards since the inspection visits, these being of the lowest order e.g. urinating, spitting within the site and washing of fish products in sewage.

The enterprises that were evaluated just achieve EU legal minimums and in terms of overall performance are well short of being at the level of GMP\GHP performance that would give them a competitive advantage. None of the establishments currently achieve best practice standards that would equate to British Retail Consortium approval. Commercially, the processors are taking positive measures to improve their operations and to address the deficiencies reported by the EU. A number of fishing boats have been upgraded and more are in that process. The Provincial Government of Sindh is aware of the urgency and need to undertake a leadership role. The effectiveness to deliver the harbor improvement required may be a 'rate limiting' factor with regards to the lifting of the voluntary suspension. However the action plan prepared by MFD emphasizes that the CA will assure supply from approved chains, not only the EU Corridor, hence leaving options available to the country to re-open supply from any chain which meets their approval including Pasni direct to factory, Korangi harbor modifications, the EU corridor upgrade or improvements to the main harbor.

The weaknesses identified are being addressed through the design and implementation of an inspection system in the form of a manual. This documents the authority's role, responsibilities and powers of the different agencies and includes a framework management system incorporating inspection schedules, methods, checklists, report style and agreed sanctions for non-compliance designed to reduce inconsistency. Approved supply chains will now be rigorously inspected and monitored therefore ensuring control. Guidance has been provided to support the existing activities to improve vessels, landing sites and auction halls. The industry has been given guidance and training on improvement after a detailed analysis of their deficiencies. The combination of an improved inspection system and physical infrastructure in agreed supply chains should enable MINFAL to confidently lift the suspension. MFD has made observable progress and now have an evidence based management plan to be shared with the EU. The plan is time-bound and scientifically based to ensure the reduction of risk. The final recommendations provided give guidance to further improving control and managing food supply.

5.6 Environmental Issues

The environmental impact of the fish sector is likely to grow significantly and if the planned growth of markets is achieved through value addition and aquaculture then the impact will be more evident. None of the enterprises evaluated had an Environmental Management System (EMS) in place or were planning to develop an EMS and all had significant environmental issues to address mainly (i) excessive waste (ii) the use of ozone depleting refrigerants and (iii) the lack of water treatment facilities.

More serious are the environmental issues that can be considered out of the control of the fishery sector, which is contaminant build up in the sea, particularly heavy metals which have entered the fish product food chain. It is estimated that more than 300 million gallons per day of untreated sewage and industrial waste enter the sea from Karachi and it environs[32] which contaminate fishing grounds. Karachi has three treatment plants that have the capacity to only treat 30% of the city's sewerage and with more than 10,000 industrial plants of which few have an EMS, the situation is critical. Already there are traces of heavy metals such as cadmium, chromium, lead, mercury and zinc found in fish products captured off the coast, as detailed in Table 13.With the rapid urbanization of the nation the environmental impact will get very much worse in the long term.

Furthermore there are peri-urban commercial dairy farms located in and around Karachi. Some of them are big farms called colonies of over 2,000 milking animals. They are heavy polluters of the waterways and groundwater, much of which finds its way to the sea. These hazards pose risks to Pakistani consumers, plus important trading partners (especially the EU) who, in the future, will be paying closer attention to the presence of heavy metals in food.

Table 13: Heavy Metal Contamination Levels in Fish Products

	Chromium (ppm)	Cadmium (ppm)	Lead (ppm)	Zinc (ppm)	Mercury (ppm)
Safe limit	0.00	2.00	6.00	105	0.50
Fish	10.11	2.10	7.40	292	0.29
Lobster	2.90	3.28	1.30	195	0.08
C rab	29.50	73.11	8.20	704	0.62
Shrimp	17.05	22.62	7.50	478	0.20

Source, Pakistan Council for Scientific and Industrial Research

[32]The Dawn Newspaper 28 May 2005

5.7 Fisheries Sector SWOT

On the basis of the evaluation a SWOT analysis is presented in Box 10, below.

Box 10 A SWOT of the Fishery Sector

Strengths

- Low material and labor cost
- Market opportunities do exist
- Pakistan is still an the EU List 1
- The government actively supports measures to enhance the Country's SPS capability
- Senior management and MFD strong commitment to improvement
- Availability of added value species

Weaknesses

- The industry's food safety and sanitary compliance
- Process technologies and packaging formats outdated
- MFD's SPS understanding and inspection capability MFD's responsibility is unclear
- HACCP understanding limited by all players in the sector
- Traceability weak
- Industry's poor compliance record
- Boat and process unit design
- Lack of intemationally recognised certification, ISO, BRC etc
- Widespread lack of education and training

Opportunities

- Potential to increase eaming to $2 billion per annum with value addition and aquaculture.
- Vendor Assurance Program to be implemented
- EU Corridor
- Entrepreneurs and govemment willingness to invest
- Certain processors will attempt to obtain the tougher BRC Global Food Standard

Threats

- Heavy metal and pollutant contamination
- Processing plant environmental issues and no EMS in place.
- Denial of markets due to quality management operations or weaknesses in Govemment supervision.
- Ever more stringent compliance requirements Competition from neighboring countries
- Risks posed by development of aquaculture (chlormphenicol, bio degredation etc)
- Depletion of stocks by unmanaged fishing e.g. damage to nursery areas etc

6 Recommendations

Pakistan's quality and SPS management capacity and the ability to comply with food safety and agricultural health requirements in export markets can be considered relatively low in comparison with other developing countries such as Kenya, Thailand and a number of Latin American nations (Mexico, Argentina and Chile). However apart from Europe for fish and the UK and Canada for fruit, for the majority of Pakistan's existing export markets SPS issues are not considered a priority. It is evident that the situation is changing particularly with respect to meat to the Middle East and other Asian countries and horticultural produce to some Asian countries. On a limited scale, SPS issues have been raised, product entry prohibited and temporary bans put in place. The stakeholders are aware that product entry in the country's export markets will become stricter and would like to improve its SPS capability.

Implementation of this study's recommendations would require considerable investment by the Govermnent as well as the private sector. In some areas, extemal assistance, including technical assistance, training and/or investment resources will be required. It is proposed that a multi-stakeholder task force, centered around the Consultative Group (CG) an WTO which has representation from exporters, civil society, farmers, the Ministries of Health, Environment, Commerce and Agriculture and its SPS Committee be activated and convened to consider the recommendations made in this report, to draw up a coherent action plan and to outline a program of priority reforms and investments, together with the responsible parties (the scope of work is detailed at the end of this chapter). The team should consult with the implementing agencies for ongoing or planned development assistance programs to determine the scope for implementing these reforms and investments through those programs. Some gaps may be identified,

6.1 Institutions and Legal Framework

The overall contention is that SPS management capacity should be developed in a strategic manner that focuses an the opportunities to exploit export markets in a manner that engenders competitive advantage and/or minimizes the associated costs (World Bank, 2005). A great deal of work is required to even focus an establishing the core elements of SPS management capacity in terms of (i) the institutional and legal framework, its efficiency and effectiveness (ii) food safety and quality (iii) plant and animal health (iv) testing capability and capacity and (v) international policy and regional dialogue.

There is a requirement to promote education and awareness of food safety, quality and SPS capacity management, so there is greater understanding and awareness and recognition of its importance. Such a program should be directed at both the political and administrative levels of the Govemment, key private sector players and other stakeholders. This might take the form of Seminars and workshops, at least initially, more decentralized campaigns, at industry and local levels should be pursued. The PNAC has a program and this can be built upon, in conjunction with promotion campaigns that EPB, PHDEB and the ADB Agribusiness Development Project are and will be running.

With four ministries and more than 5 departments concerned in part with trade related SPS issues, coordination is required in order to avoid duplication of effort of limited resources. One possibility is to mandate the SPS committee that was nominated by the WTO consultative group to study the activities of the players involved and make recommendations accordingly.

There is a recommendation to review and harmonize the regulations and laws dealing with food safety and animal and plant health relating to the WTO agreement. Although the basic legislative framework is in place, a more extensive and updated framework of regulations needs to be promulgated and institutional structures strengthened in light of the WTO agreement. On the basis of the suggestions and experience of the relevant staff, the govemment in conjunction with the SPS focal points, do need to move forward an amending the relevant Acts. The ADB Agribusiness Development Project which will be implemented in the latter part of 2005 does have activities proposed and consultancies budgeted for, to undertake the work and will be assisting the government to attain the tack.

The govemment must ensure participation in the SPS process, in the meetings of SPS Committee, CAC, OIE and IPPC and other standardization agencies meetings. Support should be extended for private sector involvement in the Standard setting process, by encouraging a participatory and consultative process. The Chambers of Commerce, PSQCA/MOST and MINFAL can j ointly take initiatives in this regard.

The establishment of a Food Safety and Veterinary Public Health Authority (FSVPHA) and Codex Contact Point should be considered, this could be supported by a primary Bill in Food Safety as discussed earlier in section 2.6. Such an authority would need to be established by an Act approved by the Parliament, to work as an independent food safety and veterinary and public health watchdog in the country. For this purpose the existing Livestock Wing needs to be remodeled with an added focus an veterinary public health and trade-related animal health issues. FSVPHA office needs to be linked to a VPH Laboratory. The proposed laboratory should have internationally recognized protocols and state of the art technology and have the capacity and capability to test emerging health and safety hazards. Such a laboratory should provide rigorous Quality Assurance through International Inter-Laboratory Proficiency Testing Schemes and Standards, in line with for example, SAC-SINGLAS-ISO Guide 17025. The present National Veterinary Laboratory can be upgraded to the level of VPH Central Laboratory. The Codex Contact Point would provide a link between CAC and local industry.

Other recommendations include:

- To invest in the development of quality infrastructure and

institutionalized food quality and safety system which includes a network of accredited laboratories observing good laboratory practices for cross border supply chain management;

- Build up further the technical capacity for developing and administering science-based SPS measures including risk assessment;
- Institutionalize an early warning system for pest and diseases together with residues and contaminants. The Grain Quality Testing Laboratories located at Karachi and Islamabad with financial and technical support could help develop systems and protocols that can be used by the relevant agencies;
- Employ a mentoring and twinning arrangement to proactively learn from and share experiences within the area of quality control and SPS management, with other WTO Members, especially regarding notification processes, legislation and development of quality infrastructure; and
- Information conceming SPS and food safety issues is required in the public domain; such information includes the regulatory framework, authorities responsible for formulation and implementation of laws and the global animal health and food safety scenario. It is recommended that the information and data be provided as (i) a SPS/Food Safety Portal and (ii) a Compendium of Food/SPS Laws and Standards. This facility needs to be integrated with National SPS Enquiry Point.

6.2 Horticulture

The supply side of the industry is the weakest link in the export of fresh produce for international compliance. Already some packhouses and exporters have taken the initiative and are gearing themselves up and preparing for the SPS measures that they face or are to face in the future. The good work that they have put in by obtaining HACCP certification and bringing their health and hygiene systems up to international standards will be of no importance if the raw material supply is not controlled. The industry needs more vertical coordination in order to achieve product control and traceability. Apart from the kinnow, mango and potato supply to a few packhouses[33], the supply chain is weak particularly regarding monitoring agronomic practices and the number of players in the supply chain, which affects traceability. The Government must support and provide incentives for greater direct farm to packhouse procurement to achieve full traceability and the private sector needs to be made aware of the consequences if the supply chain remains weak. The future Agribusiness Support Fund (ASF) can offer the packhouses, entrepreneurs and farmer enterprise groups matching grants for such interventions. The funding needs to be utilized effectively to:

- Ensure that farmers are made aware and trained in GAP which entails ICM and IM and good record keeping, all of which will go towards satisfying international compliance for fresh produce production; and
- Encourage packhouses to establish their in-house extension support network that works closely with the farmer suppliers (all year round) in order that the raw material procured satisfies the market specifications and standards required.

An effective mechanism to bring institutional capacity building and support to the agribusiness sector is the development of clusters within areas of agroclimatic comparative advantage, where production units and the buyers are brought together and they both have access to markets, training, credit and legal services, business advice etc. providing the necessary physical infrastructure to be competitive both nationally and internationally. Concentrated horticultural production does and has created inherent production and marketing expertise in certain areas in the country. There are examples around the world of production zones specializing in a particular crop and as a result such areas have become major producers and exporters of that crop within that cluster[34]. At the present time no cluster exists for horticultural produce, however there are known concentrated areas of production for mango, kinnow, grapes, dates, potatoes and onions. UNIDO[35] is considering the cluster approach for the kinnow and mango crops in Punjab Province; this should be promoted and supported.

Pest risk assessment is either based an pre-partition work, or on scant or non existent information, thus allowing importer countries to lay down phytosanitary conditions that dictate treatments for pest and pathogens that may not be present at the time of harvest or prevalent, for example, fruit fly and seed weevils in fruit. There is a requirement for Pakistan to commission pest risk assessments for a number of insect pests in order that the research can be presented at the time of negotiating export agreements and protocols. CABI Bioscience based in Rawalpindi has the capability to undertake such assessments in specific production clusters. Further research is also required in the various fruit post harvest treatments used in order that they do not affect the quality and shelf-life of the product.

There has been limited research to establish and/or monitor MRLs for important pesticides and fruits and vegetables. The monitoring of fresh produce for pesticide levels has to be more formalized in order to monitor, ascertain and control the indiscriminant use of pesticides in the production process. A fund needs to be created in order to provide recurrent expenditure to undertake the work as aleady DPP and

[33]The author estimates between 6 and 11 packhouses that are beginning to comply.

[34]Argentina produced 1.1 million tons of lemons in 2002 (USDA, 2003) of which 207,000 tons were exported fresh. The majority came from Tucuman province and the area under production has increased by 90% in the last decade. Because of the large production base or cluster, there is an abundance of raw materials, management and technical Support; the agro processing industry is now well established with 9 integrated processing plants to produce juices, aromas, essential oils and dehydrated skins for pectin and 40 packhouses for fresh fruit distribution/export.

[35]The restructuring and modemization of SME clusters in Pakistan.

DALPMG have the equipment, but not the budgetary and manpower resources to undertake the work.

6.3 Livestock and Animal Health

To improve animal health care services a phasing in of the privatization of govermnent veterinary services is required. State veterinarians can then be entrusted with the responsibility of Veterinary Public Health (VPH). In the context of the WTO General Agreement an Trade and Services there are opportunities to negotiate with WTO Members for the Import and export of services and goods in the animal and veterinary public health sector. Pakistan should look into the possibility of importing disease diagnostic and VPH services.

There is need to promote the rational use of veterinary medicine by employing therapeutic drug monitoring, counseling and education, along with the regulation of imports and the well monitored local production of veterinary drugs, to discourage indiscriminate and injudicious use of veterinary medicine. Provincial livestock departments have to take a lead in this regard, in collaboration with civil society organizations such as consumer associations and networks. Veterinary medicines and vaccines also need to be licensed, after thorough screening, according to the Manual of Drug Law, 1988. A Food and Drug Administration Committee under a proposed FSVPHA can help oversee the imports of veterinary drugs in the country.

The Pakistan Automated Livestock Disease Information System (PALDIS) developed and introduced under the ADB assisted Livestock Development Project needs to be reactivated and supported. PALDIS is required to collect epidemiological data an livestock diseases, maintain a data bank and utilize it in support of animal health monitoring and service delivery systems. At present no effective disease reporting system exists that can meet trade related demands. At the same time is an urgent need to train veterinarians in the area of epidemiology and disease surveillance.

There is need to develop a system for standardization of diagnostic methods, and certification of the competency of diagnostic laboratories to undertake diagnostic services on behalf of the livestock and meat industry.

To satisfy the growing consumer demands in terms of quality and food safety, especially in the destination markets, an institutionalized grading and tracking system is required for meat and livestock production and processing. There should also be a registering and accreditation scheme for both production and processing units, with the inspection and issuance of permits based an traceability and performance in complying with standards and health and hygiene requirements. Only units that have satisfied such standards would be permitted to export meat and would receive a *Meat Export Certificate*, similar to schemes in other countries or trading blocks.

A Livestock and Dairy Development Board (LDDB) is being formed under the ADB-assisted Agribusiness Development Project in order to (i) coordinate national and provincial activities in the livestock and dairy sub-sectors (ii) promote investment (iii) provide the private sector with a strong "voice" and (iv) promote livestock as the primary vehicle for poverty reduction. The LDDB will identify and work with enterprises and processors that are eligible for ASF support for technology, marketing and international compliance upgrading, assist in expanding existing export markets and opening new export destinations, as well as identifying the extension and research needs of the industry. Consideration should be given to the mandate of the LDDB and expand it to cover the promotion of livestock and meat exports, as opposed to establishing a separate Livestock and Meat Development and Export Board.

The privatization and modernization of slaughterhouses is required and the Slaughterhouse Act 1963 needs to be reviewed. At present regulated slaughterhouses are mainly in the public sector, the majority of which are run down having little access to working capital. Modernization through privatization is immediately required to promote food safety and boost meat exports from Pakistan. These slaughterhouses should have well-equipped meat hygiene laboratories attached to them which at present does not exist in any of the public sector slaughterhouses.

6.4 Fish

Recommendations here are divided between those applicable to the 'competent authority' and those related to enterprises within the sector.

6.4.1 Competent Authority

The EU action plan drawn up by the EU assessment team should be monitored an a weekly basis and the file updated with objective evidence to provide the guarantees required by the EU. The other activities and actions include:

- the specific actions to address public health issues should be highlighted, monitored and verified i.e. modified vessel design, training of handlers, auction hall modifications etc;
- the actions to address improvement in enforcement consistency and control should be highlighted and monitored utilizing such tools as the inspection manual, schedules and inspection records;
- the actions to address the gaps in law and authority should be highlighted, monitored and verified, for example amendments to legislation, new inspection checklists ensuring fitness for purpose of markets, vessels, landing sites etc;
- the phase 1 EU corridor plan and work scheduled should be monitored and verified. The location and basic design of the proposed 'EU Corridor' has been agreed as a lead option and it has been affirmed that tenders are already placed for phase 1 to rehabilitate and modify part of the Karachi harbor to serve approved boats that are EU compliant. The civil works began in mid-Jure 2005 and has since been completed;

- the vessel approval program should be fully documented and an approved list maintained;
- the agreed changes to practices an the auction/market should be verified with product now sold by lot in ice, the product not to be Sold an floor etc;
- the füll implementation of the fledgling quality system outlined for MFD in the document, control, audit, and corrective action protocols should be implemented;
- the traceability system discussed for product movement through an assured supply chain should be fülly designed, installed and tested;

cleaning procedures (iii) removal of melt water (iv) the temperature, location and layout of the fish hold (v) vessel operation (vi) catch protection, handling and storage (vii) refrigeration and ice quality (viii) end of trip cleaning procedures (ix) on-board fish preparation (x) equipment used and (xi) crew health and hygiene.

Without exception the processors need to review their HACCP studies, none of which were acceptable, with Critical Control Points being left unidentified and hazards missed. HACCP training needs to be provided and that it is customized specifically for the Pakistani Marine Fisheries, giving worked examples of key products and a formalized Codes of Practice that will form the basis of a pre-requisite program. Control measures prior to raw material intake are required (See Box 11)

Box 11 Control Measures Raw Material Intake.

- Vessel approval - design specification e.g. toilet, sinks, hold area, potable water
- Vessel inspection at least once per year and inspection records
- Verification of crew training an personal hygiene, contamination control etc
- Crew training in minimizing time, temperature abuse and proper use of ice
- Crew health certificates
- Microbial records of batches from the approved boats
- Similar as above for the landing site/auction area - i.e. control prior to arrival at plant Traceability checks to ensure batch is from agreed vessel

- MFD should formalize management systems and seek IS09001 certification. This would provide systems to deliver continuous improvement and performance review and would give credibility to the management systems;
- a set of Codes of Practice should be developed. This will form the Basis for EU Export approval and as a transparent guide to processors wishing to seek approval ; and
- Pest Control Standards are well below expected norms and are absent at the Karachi Fish Harbor. It is proposed that a Code of Practice for Pest Control is developed with providers and that this becomes a required standard for boats, landing areas and processors.

Pakistan's systems for inspection and surveillance of the fishery supply chain have been focused on wild caught fish. Yet, the country also has ambitious goals in promoting commercial aquaculture. Considerable efforts will be needed to promote 'good aquaculture practices' and to put in place suitable systems to monitor and enforce standards related to fish feed ((i.e. GMOs and PCBs), drug utilization (i.e. antibiotics), water quality (i.e. heavy metals, pesticide residues) and end products (i.e. pathogens).

6.4.2 Enterprises

In view of the unhygienic conditions of the operations undertaken on-board and that of the actual fishing fleet, recommendations in the form of a check list have been developed to cover the (i) hold and Container design (ii)

which will allow an almost immediate upgrade of Enterprise HACCP systems. A bespoke HACCP course should be urgently developed and delivered. This has been provisionally scheduled for the middle of July 2005.

There is strong evidence that environmental damage is significant and that the knowledge of Environmental Management Systems is poor, as is the awareness of opportunities to reduce waste and improve operational costs. An environmental impact study is essential and recommended.

The Standard of factory design and construction is below the standards required despite a high commitment to investment. It is clear that expansion is planned and needs supporting. It is recommended that a factory design workshop is provided. It is also recommended that specific projects to improve cold chain control be commissioned.

Traceability systems are weak and could be supported to actually provide a significant marketable advantage that would support enterprises and help promote the whole Pakistani fishery sector. Both EU and US legislation calls for key trace forward and trace back control systems. A project to deliver computerized traceability is proposed providing a "boat to fork" system, utilizing systems from paper-based or barcode and radio frequency identification (RFID). Traceability would (i) provide supply chain confidence (ii) reduce the liability of any recall (iii) reduce the likelihood of a future ban or voluntary suspension and (iv) be a focal point to

illustrate the controls in place and advantages of buying Pakistani fish products.

It was repeatedly expressed[36] during discussions that the enterprises should not aim at minimum standards or simply EU compliance but should aim for higher levels set by commerce. It is recommended that a group of volunteer enterprises are assisted in obtaining the British Retail Consortium Global Food Standard which is a benchmark of GMP and HACCP standards. A program of this nature would involve two international experts, to aid speed and to account for unexpected loss of services (illness etc) and the selection of one or more National Experts either from consultancy or the MFD.

The Pakistani industry has considerable, yet unfulfilled potential to add value to its fish and to service various higher value segments of the consumer market, in Europe and elsewhere. A center to support the development of technologies for processing, packaging etc is recommended, in order that the sector can produce higher value products. The facility can provide enterprises with technical assistance for new product development and process upgrading and that also can provide a link to academia and research organizations. One approachwhich has been successful in Norway, for examplewould involve the formation of a seafood export or marketing council. This could be funded by a levy system on exports, but managed largely by the industry which would direct its activities. The council's mission would be to drive real value addition within the sector through research, enterprise training, market linkages, etc.[37]

6.5 Conclusion

The overall picture regarding SPS management and the ability to comply with food safety and agricultural health requirements in export markets is of a generally low level of capacity development within both the public and private sectors. There are examples of enhanced capacity that have evolved in response to particular problems complying with export market requirements (for example for fish and fish products) or the emergence of acute SPS problems (for example outbreaks of animal disease). In most cases the enhanced capacity has been induced by immediate market access problems, promotion by an industry Board (PHDEB and HACCP awareness) or with funding from bilateral and/or multilateral donors.

The stakeholders need to adopt a more proactive approach to SPS management issues. There is much talk and in certain instances a lot of effort has been put into SPS issues, but all very adhoc and certainly not coordinated. The recommendations cover three agribusiness sectors and the fear is that they will, as they have been doing, continue to work in isolation. It is time for all agribusiness sectors to work together for the common aim of achieving a robust SPS management system. This can only be undertaken by consensus. The Consultative Group (CG) on WTO and its SPS Committee has to be fully activated with some of its members forming a Task Force comprising of a balanced cross section of stakeholders with all agribusiness sectors represented to elaborate a working document that will include a coherent action plan with realistic time horizons, the scope of work for the committee will include the following:

- To review the findings of this report and evaluate the recommendations further, in order to outline a program of priority reforms and investments, together with the identification of responsible parties that can implement the activities proposed;
- to study the activities of the players involved in quality and SPS management and make recommendations to (i) clearly define and demarcate the roles and responsibilities of the different federal and state government and other agencies (ii) promote the establishment of technical agreements among them and (iii) establish and monitor the implementation of pertinent policies and strategies;
- To assess the effectiveness and performance of the formal mechanism that has been put in place at federal level to achieve greater coordination of national efforts related to promoting quality and managing SPS risks;
- To develop a concerted campaign to raise both awareness and recognition of the importance of SPS management capacity to Pakistan's competitiveness in international markets for agricultural and food markets and the country's ability to exploit potential opportunities;
- To determine the financial resources required and what is available to develop and maintain SPS management capacity;
- To study the impact of SPS measures, quantifying the costs and benefits, associated with any changes in standards and SPS measures;
- To determine how to incorporate SPS management capacity into broader efforts to build the competitiveness of agricultural and food exports and to enhance the productivity of the agricultural and food processing sectors;
- To evaluate how Pakistan can make concerted efforts to encourage and participate in the development of SPS management capacity and sharing of resources at the regional level;
- To make recommendations on how the government of Pakistan can enter into a dialogue with private sector leaders on collaborative efforts to enhance SPS management capacity;
- Utilizing a public-private sector platform, identify the most immediate risks and opportunities which the country faces in relation to SPS matters and trade as well as on

[36] In discussions with: Secretary, MINFAL, Secretary Science & Technology &Additional Secretary for Commerce

[37] The Grimsby Institute operates a new product development center in the Humber region of the U.K.. This assists firms in the creation of new product concepts, does test marketing, and assists in any necessary factory or linere-designs. The vast majority of all value added frozen seafood in the U.K. is now manufactured within a 25 mile radius of Grimsby.

important medium-term priorities; and

- To determine specific areas and activities in which external and technical assistance is required.

An action matrix has been prepared in Table 14. In each case, the specific action required, the players involved in capacity-development and the related timeframe are noted. The priority of each of these items is also indicated in an attempt to provide guidance to the Government of Pakistan what needs to be done first. Some of these action points are in pursuit of the strategic directions identified above, while others address the specific areas of capacity weakness identified throughout this report. The more specific measures needed to strengthen the work of the competent authority in the fisheries supply chain are noted above and are not repeated in Table 14. Given the major challenges in that industry to ensure (and be seen to be

Table 14 **Action matrix for enhancing trade-related SPS management capacity:**

Technical or Policy Issue	Actions Recommended	Requirements					Agencies/Actors Involved	Timeframe	Priority
		Define strategy	Change Policy / Law	Promote Awareness	Reform Institutions	Technical Assistance for Capacity Building			
Strategy and priority setting	Highlight SPS management constraints and issues, prioritize them and elaborate an action plan	X				X	WTO Consultative Group/Task Force	Short-term	Very high
	Awareness campaign an SPS management capacity issues and to conduct dialogue with the private sector. Develop SPS information systems in the public domain.	X		X			Private sector, MINFAL, MOC, MOH, MOST	Short-term	High
	Improvement of the existing formal mechanism for strategic planning and institutional coordination and matters of trade-related quality and SPS management	X				X	MINFAL, MOC, MOH, MOST private sector, research & WTO Consultative Group/Task force.	Short-term	High
Institutional efficiency and effectiveness	Review of existing institutional arrangements to minimize overlaps and ensure most effective use of limited technical and staff capacities. Evaluate further the need for FSVPHA and any privatization required.	X			X	X	MINFAL, MOC, MOH, MOST, SPS Focal Point & Agribusiness Development Project	Short-term	High

Technical or Policy Issue	Actions Recommended	Requirements					Agencies/Actors Involved	Timeframe	Priority
		Define strategy	Change Policy / Law	Promote Awareness	Reform Institutions	Technical Assistance for Capacity Building			
Food safety controls in food and agriculture	Awareness-raising and training in fish products, horticulture, meat and livestock sectors regarding HACCP, GAP, GUT etc.			X		X	MINFAL, MOC, private sector	Short-term	High
	Promote and support the implementation of HACCP, GAP, GMP etc. throughout the supply chain utilizing loans, fund match grants etc.					X	MINFAL, MOC, Agribusiness development project and private sector.	Medium-term	High
	Implement and enhance food safety controls in slaughterhouses, fish processing plants, packhouses etc. via awareness-raising, certification, surveillance, auditing, etc.	X	X	X		X	MINFAL, provincial & local govermnents	Short to Medium-term	High
	Continue to invest in upgrading hygiene facilities at Karachi Harbor,					X	MINFAL & Provincial government	Short to Medium-term	High

Technical or Policy Issue	Actions Recommended	Requirements					Agencies/Actors Involved	Timeframe	Priority
		Define strategy	Change Policy / Law	Promote Awareness	Reform Institutions	Technical Assistance for Capacity Building			
Enhancing food quality standards in raw material producers	Implement initiatives that build on strengthening the raw material supply chain to supply high-value markets for agricultural and food products. Develop codes of practice for the various food sectors.			X		X	MINFAL, Agribusiness Support Fund, private sector	Short to Medium-term	Very High
Phytosanitary control measures	Update and amend legislation on animal and plant health controls to become fully intemationally compliant.		X			X	Govemment of Pakistan, MINFAL	Medium-term	Medium
	Raise awareness and training in practices for animal and plant health control including GAP to include ICM and IPM.			X		X	MINFAL	Medium-term	High
	Address immediate problems which threaten to undermine trade or productivity (including fruit fly, seed weevil, BSE, FMD etc.)	X				X	MINFAL	Short-term to Medium -term	High
	Enhance scale and effectiveness of surveillance and assessment of plant pests and diseases	X			X	X	MINFAL	Med to Long-term	Lower

Technical or Policy Issue	Actions Recommended	Requirements					Agencies/Actors Involved	Timeframe	Priority
		Define strategy	Change Policy / Law	Promote Awareness	Reform Institutions	Technical Assistance for Capacity Building			
Animal health controls	Continue updating animal health legislation and quarantine procedures at the border		X		X		MINFAL, MOC	Medium-terrn	Medium
Animal health controls	Enhance scale und effectiveness of surveillance for unimal diseases	X			X	X	MINFAL	Medium to Long-term	Medium
Use und Registration of pesticides	Review arrangements for pesticide registration und explore equivalency of approval processes in other countries		X		X		MINFAL	Short-tern	High
	Improve pesticide residue analysis in horticulture crops und pharmaceutical residues in meat products	X				X	MINFAL	Short term	High
Laboratory capacity	Upgrade laboratory capacity for food safety, plant and animal health in a graduated manner building upon existing initiatives					X	MINFAL, MOH, MOST	Medium to Long-term	Medium

Technical or Policy Issue	Actions Recommended	Requirements					Agencies/Actors Involved	Timeframe	Priority
		Define strategy	Change Policy / Law	Promote Awareness	Reform Institutions	Technical Assistance for Capacity Building			
Advisory and certification services	Develop competitive market for advisory and certification services involving both public and private suppliers	X	X			X	MINFAL, MOC, private organizations and companies	Medium to Long-term	High
International relations related to SPS matters	Enhance capacity to attend and play a more active role in meetings of the SPS Committee, Codex Alimentarius, OIE and IPPC		X			X	MINFAL, MOC, MOST, MOH	Long-term	Lower

Key: Time Frame: Short-term: 18 months; Medium-term: 18 months to 3 years; Long-term:3 to 5 years.

Appendices

Appendix A References

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Appendix C Distribution of Land ownership in Pakistan

Classification of Farmers	Size of Holding in Acres	Number of Landholdings		Total Area - landholdings	
		Number	%	Area	%
Marginal Farmers	Less than 1	735,771	11.1	338,925	0.7
	1.0-2.5	1,653,656	25.0	2,586,248	5.1
	2.5-5.0	1,425,579	21.5	4,896,780	9.7
	Sub-total	**3,815,006**	**57.6**	**7,821,953**	**15.5**
Small Farmers	5.0-7.5	966,320	14.6	5,576,336	11.1
	7.5-12.5	891,451	13.5	8,515,653	16.9
	12.5-25	579,738	8.8	9,613,919	19.1
	Sub-total	**2,437,509**	**36.8**	**23,705,908**	**47.0**
Medium Farmers	25-50	260,523	3.9	8,209,834	16.3
	50-100	77,886	1.2	4,846,996	9.6
	Sub-total	**338,409**	**5.1**	**13,056,830**	**25.9**
Large Landlords	100-150	15,108	0.2	1,687,394	3.3
	Above 150	14,024	0.2	4,153,107	8.2
	Sub-total	**29,132**	**0.4**	**5,840,501**	**11.6**
	Total	6,620,056	100.0	50,425,192	100.0

Source: Census of Agriculture 2000

Appendix D Sea Freight Destinations, Journey Times and Costs

Type	Destination	Journey time	Cost (($)
Dry (boat)	UAE	3 days	300
Reefer	UAE	3 days	2,000
Reefer	Saudi Arabia	3 days	3,000
Dry (open top)	Malaysia	7 days	2,000
Reefer	Indonesia	15 -18 days	2,800
Reefer	Europe	16 - 21 days	3,200
Reefer	Canada (Vancouver)	20 - 25 days	4,500
Reefer	Russia (St Petersburg)	26 - 30 days	5,000
Reefer	Singapore	9 -12 days	2,400
Reefer	Port Louis (Mauritius)	15 - 20 days	4,100
Reefer	Sri Lanka	5 - 6 days	1,900
Reefer	Bangladesh	15 -18 days	2,300
Reefer	Philippines	15 -18 days	2,800

Source: PHDEB and Author

Air Freight Destinations and Charges

Destination	Cost ($/kg)
China	1.09-2.00
UK	1.09
Japan	3.00
USA	4.80*
Canada	1.80

Source: PHDEB and Author

*Pakistan has no access to USA markets for fruits and vegetables due to quarantine issues and the freight tariff is for non perishables.

Appendix E EU Food and Veterinary Office Inspection Team Findings (2005)

Legislation There are no foreseen provisions in the Pakistan Fish Inspection and Quality Control Act 1997 and Rules 1998 for:

- Performing organoleptic checks by the CA on each batch of FP;
- the Limits for total volatile base nitrogen (TVB-N);
- the presence of washing basins equipped with non-hand operable taps in establishment working areas;
- the compulsory use of potable water in auctions and wholesale markets;
- limits of heavy metals, in particular for cadmium and lead in FP;
- the microbiological criteria and limits for *E. coli* and *Enterococci* in potable water, according to the requirements of Council Directive 98/83/EC.

Marine and Fisheries Department's (MFD) Performance. Under the technical guidance of MFD, Fishing vessels, harbor landing site and auctions and establishments are inspected for compliance with EU directives, non-compliances are repeatedly stated in the inspection reports without detailing corrective actions and deadlines to rectify non compliance factors, with little evidence of follow up.

Additionally, in December 2004 and January 2005, five inspection visits had been carried out by the CA to assess the own-checks/HACCP plans, facilities, hygiene and other topics using a new inspection checklist and form which was more detailed than the previous one. The mission was informed that the format would be used in the future.

Other checks not carried out as laid down in the directives, were:

- Organoleptic checks on FP were not carried out particularly in the auctions prior to sale.
- TVB-N analyses were carried out randomly and final products and results observed were below 25 mg/100 gm.
- Trimethylamine-Nitrogen (TMA-N) analyses were not carried out.
- Histamine analyses on final products were carried out with a rapid ELISA-based test which is not the one that is mentioned in Council Directive 91/493/EEC. Only one sample was taken, instead of the 9 as stipulated in the Directive. However, histamine related fish families are exported in small quantities to the EU.
- Results of analyses on Mercury, Lead and Cadmium an FP were found to be below the levels set in EC Regulation 466/2001 on Food Contaminants.
- Microbiological analyses were undertaken for every consignment for *Salmonella*, *Vibrio cholera* and *parahemolithicus* and *E. coli*, but not for fresh fish sent by airfreight.

The MFD Laboratory is in the process of accreditation against ISO 17025, as required by Council Directive 93/99/EEC. The premises were adequate and the microbiology laboratory was temperature controlled. Equipment was adequate and well maintained. However, inter-laboratory proficiency tests were not carried out.

The Fishing vessels failed to comply which Council Directive 92/48/EEC as:

- They have wooden holds which were not waterproof and cannot be easily washed and disinfected;
- Some vessels were improved and equipped with Fiber glass or inox holds, but they were still dirty;
- The FP reception area was found to be dirty and contaminated with engine oil which does not guarantee hygienic FP and can lead to possible chemical contamination;

- The storage of FP was done in such a way that bruising could not be prevented, particularly in the lower levels of the holds (first catches), due to the extended fishing period;

- Personal hygiene was not guaranteed as there were no washbasins, showers, toilets or soap on board;

- The presence of pests, namely cockroaches, was observed in some of the visited vessels.

Landing sites (Karachi Fisheries Harbor) During unloading, FP were handled in such a way that bruising was not prevented (stuck fish was forcibly pulled out from the ice). The FPs were quickly placed in plastic boxes but the amount of ice used was insufficient to maintain the required temperature for chilled products. The FP observed during unloading presented signs of un-freshness.

Karachi Auction/chilling room The auction was not protected from the exterior, e.g. open doors and windows and gaps an roofs, and was not preventing the entry of undesirable animals such as pigeons and cats. A damaged floor was observed in one of the halls.

A chilling room for storage of FP was kept at 12 °C instead of a temperature approaching that of melting ice with some fish and crustacean species stored in boxes without ice or with small amounts of dirty ice. All products observed presented bruises and rottenness.

Establishments A list of deficiencies that were noted, some of them present risks for consumer health, as follows:

- Zinc trays were used for plate freezing with potential contamination of FP from toxic chemical substances;
- Severe leaking of ammonia from freezing equipment was observed in several plate freezers with potential contamination of FP from toxic chemical substances;
- FP were dipped in water with a free residual chlorine content of between 5 and 13 ppm;
- Cold stores were kept higher temperatures than required for frozen products: -12 to 16°C instead of - 18°C;
- Fumigation practices in working premises with non-approved chemical substances was documented.

Finally the guarantees sent by the MFD recording the corrective actions undertaken further to the recommendations of the FVO mission in 1999 (which allowed the drafting of Commission Decision 2000/83/EC) were found to be never implemented:

- Insulation of all fishing vessels by 2002;
- Production of ice in hygienic conditions to be supplied to fishing vessels by December 1999;
- Inter-laboratory proficiency tests regularly done every six months;
- Continuously recording of temperature in establishment cold rooms by November 1999.