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# SKILLS FOR TRADE AND ECONOMIC DIVERSIFICATION (STED) IN BANGLADESH

The case of  
Pharmaceuticals  
and  
Agro-Food

Con Gregg  
Erik von Uexkull

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First published 2011

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#### ILO Cataloguing in Publication Data

Skills for Trade and Economic Diversification (STED) in Bangladesh : the case of pharmaceuticals and agro-food / Con Gregg, Erik Von Uexkull ; International Labour Office. - Geneva: ILO, 2011

1 v.

ISBN: 9789221259305 (print) ; 9789221259312 (web pdf)

International Labour Office.

economic diversification / economic development / trade / skill requirements / pharmaceutical industry / food industry / Bangladesh

09.05.5

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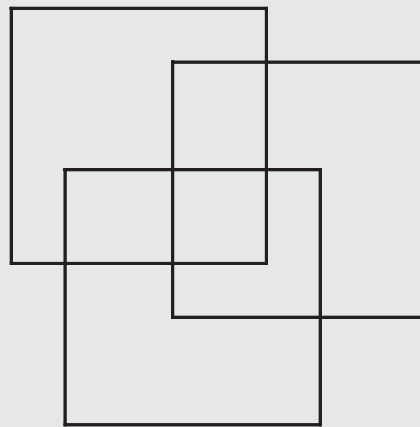
Design & Layout: Masuma Pia/Matri,

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# PREFACE

*“Skills development is [...] essential to address the opportunities and challenges to meet new demands of changing economies and new technologies in the context of globalization.”*

Conclusions on skills for improved productivity, employment growth and development,  
International Labour Conference, 2008

This report presents an application of the Skills for Trade and Economic Diversification (STED) methodology to two sectors – agro-food and pharma – of Bangladesh’s economy. STED has been developed in recognition of the fact that having the right skills among workers is crucial for firms or industries to succeed in trade, and vice versa understanding trade is important to provide workers with the right skills. Availability of skilled workers contributes to higher and more diversified exports, more FDI, higher absorption of technology, and more sustainable growth and productive employment creation. At the same time, skills are the key determinant for a worker’s success in finding a good job and making a living.

Providing the right skills at the right time is anything but easy, and it is not just a question of putting in more resources. Around the world, we observe situations where highly educated workers remain unemployed, while at the same time firms find it difficult to fill vacancies for skilled positions. Such mismatches, where the skills taught by the education and training systems do not fit with what is in demand on the labour market, constitute a large economic loss, as well as a personal tragedy for those affected by it. In order for skills supply to match skills demand in the labour market, it is necessary to take a forward looking perspective, and to ask not just what skills are in demand today, but what skills will be in demand in the future. This is what STED does.

STED is the result of cooperation between the Skills and Employability Department and the Trade and Employment Programme in the ILO’s Employment Sector. Together, the two units combine expertise on skills policy development and skills anticipation, educational and vocational training reform, trade analysis, trade and employment linkages, and policy coherence between trade, investment, labour, and education policies. STED also builds upon the ILO’s unique tripartite structure and its ability to bring together governments, workers, and employers to work together for more and better jobs.

The application of STED in Bangladesh exemplifies this cooperation on the ground, and its integration with on-going ILO technical assistance. Two existing projects are closely linked to STED work in Bangladesh: The project “Technical and Vocational Education and Training (TVET) Reform” provides support at the macro and sectoral level to increase the relevance of TVET and implement mechanisms for skills anticipation, namely through industry skills councils in four pilot sectors. The project “Assessing and Addressing the Effects of Trade on Employment” (ETE) has established a high level policy dialogue on coherence between trade and labour market policies and promotes a better understanding of the linkages between the two. Both projects provide a strong platform to support follow up and implementation of STED recommendations in Bangladesh.

STED has completed its development and testing phase in 2011 with pilot applications in Bangladesh, Ukraine, Macedonia, and Kyrgyzstan. The methodology is now taking an important place in the ILO’s toolbox to promote decent work. We expect it to inform technical assistance in the area of skills and trade, and to make a strong contribution to their effectiveness in the future.

**André Bogui**

Director

ILO Dhaka Office

**Christine Evans-Klock**

Director

ILO Skills and Employability Department

**Marion Jansen**

Head

ILO Trade and Employment Programme

## ACKNOWLEDGEMENTS

This report was written by Con Gregg (Technical Specialist, ILO Skills and Employability Department) and Erik von Uexkull (Economic Officer, ILO Trade and Employment Programme) under the guidance of Christine Evans-Klock (Director, ILO Skills and Employability Department) and Marion Jansen (Head, ILO Trade and Employment Programme). This work would not have been possible without the support of José Manuel Salazar-Xirinachs (Executive Director, ILO Employment Sector) and André Bogui (Director, ILO Dhaka office).

Many others have made substantial contributions to the STED work in Bangladesh: Gagan Rajbhandari (Deputy Director, ILO Dhaka Office), Arthur Shears (Chief Technical Advisor, ILO TVET Reform project), Francis de Silva (Advisor, ILO TVET Reform Project), David Cheong (Chief Technical Advisor, ILO ETE project) and Hasina Begum (National Coordinator, ILO ETE project) provided invaluable advice and support during all stages of the project.

Shaquib Quoreshi (Secretary, Bangladesh Employers' Federation) organized the dissemination workshops and managed the enterprise interviews. The interviews were carried out by a team of consultants led by Mridul Kanti Biswas (Chief Executive, Enterprise Development Initiative), and comprising: Prodip Bhowmik (Researcher, Agro-Food), Motaher Hossain (Researcher, Agro-Food), Nazrul Islam (Field Investigator, Agro-Food), Rajasree Nandi (Researcher, Agro-Food), Sourav Saha (Field Investigator, Pharmaceuticals), Chinmoy Roy (Field Investigator, Pharmaceuticals) and Sujon Bose (Field Investigator, Pharmaceuticals).

Logistical support was provided by Sumona Sharmeen (Administrative Assistant, ILO Dhaka office), and Veronica Rigottaz (Secretary, ILO Headquarters). Julia Seiermann (ILO intern) provided excellent research assistance.

Many industry stakeholders from government, private sector, and trade unions generously gave their time and insights during workshops and interviews.

All errors and omissions remain the responsibility of the authors.

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# 1. INTRODUCTION

Bangladesh's economy has grown well over the last two decades. Real growth about 5 percent in the 1990s, and 5.8 percent over the first decade of the new century. The government's Vision 21 envisages that growth will accelerate, reaching 10 percent in 2021. The poverty rate has fallen significantly, reaching 31.5 percent in 2010, and the government's ambitious 5 year plan anticipates a further sharp fall, to 22.0 percent by 2015, based on more inclusive growth.

Rapid export growth – albeit from a low base – has contributed significantly to Bangladesh's achievements. Growth in exports of ready-made garments has been a particularly important source of export driven employment. Greater dynamism within the domestic economy has also made a major contribution to employment growth.

Basing an export strategy purely on ready-made garments would imply significant risks. While the sector is employment intensive, value added per worker is low, and there will be risks to competitiveness as real labour costs rise over time, as tariff arrangements change, and as new competitors emerge. Fortunately, Bangladesh's export dynamism is not confined to ready-made garments. Leather goods, ship building, pharmaceuticals and parts of the agro-food sector are among the manufacturing sectors that are performing well, although all but leather goods are at a rather early stage of export growth. There is also early evidence of potential for success in traded services.

This report examines the growth potential of two of these sectors – agro-food and pharmaceutical manufacturing – and analyses which skills the country's labour force needs in order for Bangladesh to exploit this potential. This is done using the ILO's STED (Skills for Trade and Economic Diversification) methodology that provides guidance for the integration of skills development in sectoral policies. While STED has the potential to be applied to a broad range of sectors in any given economy, time and resource constraints often restrain the analysis to a small number of sectors. On the basis of the sector-selection criteria stipulated in box 1, agro-food and pharmaceuticals have been chosen for the purpose of this report.

The agro-food sector processes raw materials produced by Bangladesh's farming and aquaculture/fishery sectors. The sector is primarily domestically focused, but has significant exports. It is a globally important exporter of frozen shrimp, and has significant exports in spices and in ethnic foods of Bangladesh. For the purpose of this report, the sector was chosen because there appears to be potential to grow exports, because the sector is relatively labour intensive, because increasing demand for raw materials could benefit large numbers of agricultural producers, and because the TVET Reform Project already has a strong involvement in the sector. In addition, the sector had already been identified by the TVET Reform Project as one of eight growth-oriented industrial subsectors in a study performed by the Bangladesh Institute of Development Studies. In the context of the TVET Reform Project, an Industry Skills Council had been established for this sector, which provided a useful institutional context for the work on this report.

## Box 1: STED sector-selection

The main criteria for sector selection in STED are as follows:

- Apparent export potential, or the exposure of the sector's existing markets to a market access shock;
- The contribution that the sector can make to economic diversification;
- Potential for employment creation, taking account both direct and indirect employment; and
- The priorities of ILO constituents in the country.

Other factors taken into account include:

- The availability of a suitable counterpart in the country such as an interested sector organization or an industry skills council; and
- Synergy with existing ILO technical assistance, which improves the research team's access to people and information, and which may provide a channel through which some of the STED initiative's findings can be implemented.

Also the pharmaceutical sector had been identified in the TVET Reform Project study as a sector with growth potential in Bangladesh's economy.<sup>1</sup> The sector is currently primarily focused on the domestic market, and accounts for 97 percent of domestic pharmaceutical sales. Exports are increasing rapidly from a low base, mainly to middle income and low income countries. Additional criteria for selecting the pharmaceutical sector for the purpose of this report included the fact that it is a significant employer, and because it is Bangladesh's leading mainly indigenous high technology sector. There is also a wider trade policy interest in pharmaceuticals. The industry benefits from an exemption for least developed countries from compliance with trade rules regarding intellectual property (TRIPS<sup>2</sup>). This is currently due to expire at the start of 2016 – four years from now – although the government of Bangladesh has proposed an extension to 2026.

<sup>1</sup> The remaining six sectors are: textiles, furniture and fixtures, pottery and china ware, leather and leather products, transport equipment (principally shipbuilding) and information technology.

<sup>2</sup> Trade-Related Aspects of Intellectual Property Rights.

To evaluate the two sectors' export potential and upcoming sectoral skill requirements, STED proceeds according to six steps that will be reflected in the sectoral discussions in the following chapters:

- The methodology starts by analysing a sector's position and its outlook, paying particular attention to trade and competitiveness issues.
- Based on this analysis, it proposes a vision of the sector's future under which it performs well on trade.
- It then identifies the business capabilities that the sector will need to improve if it is to succeed in achieving the vision.
- Next, it identifies the types of skill that will be needed to underpin those business capabilities, and also areas where it is necessary to improve skills in order to tackle existing deficiencies.
- Based on this, and on information about the adequacy of the skills supply, it identifies the main features of the gap between demand and supply of skills that will emerge in the absence of a response by industry, government or education and training systems.
- Finally, it makes proposals as to the sorts of response that are required at policy, institutional and enterprise level.

The analysis finds strong potential for export growth in both sectors. There is potential to continue growing exports of the products in which the agro-food sector is already a significant exporter, and there is also potential to develop new (at least to Bangladesh) products for mainstream export markets. Bangladesh also has the potential to become a significant supplier of generic pharmaceuticals to global markets, both to the low and middle income countries where it is currently experiencing most export growth and to developed countries.

However, the analysis also identifies substantial gaps in the business capabilities of each sector that will have to be bridged if the potential is to be achieved. These gaps have been identified through a combination of: sectoral analysis, including review of existing data and literature, tripartite workshops with representatives from employers, workers and government, and structured interviews with firms. A first workshop was conducted jointly for both sectors in September 2011 to validate sector selection, initial findings, and proposed directions of research. Sector specific workshops were organized in December 2011 to validate and prioritize main findings, and promote dialogue on follow up activities. Structured interviews took place in October and November 2011 with 20 companies in each sector.

Tackling these gaps requires action across a range of areas. Issues such as infrastructure development and improvements to the business enabling environment have been addressed well in research by others. This report focuses on the skills requirements, which are varied, substantial and essential to success.

## 2. AGRO-FOOD SECTOR

### 2.1 Sector Characterisation

#### *Overview*

According industrial survey data from the Bangladesh Bureau of Statistics, the agro-food sector contributed 4.7 percent of GDP and 1.1 percent of total employment in 2005/6. Unfortunately, more up to date statistics were not available at the time this report was written. This makes agro-food the second largest manufacturing sector in terms of value addition after leather, clothing and textiles (combined). In addition to its direct employment and GDP contribution, the sector is also important for a substantial number of employment and value added creation in the agriculture and fishing sectors, which supply its raw materials.

According to World Bank (2008)<sup>3</sup>, there were 6,139 companies operating in the agro food processing sector in 2006. Over 90 percent of these firms were found to be small (less than 50 employees), and the majority of them were rice milling (3,885) and bakery (1,145) companies. Other significant categories are grain milling (226), vegetable oil (133) and confectionaries (100). Roughly two thirds of the agro-food companies are found to be located in rural areas. It is worthwhile to note that with the exception of frozen shrimps, only a very small fraction of food products produced in Bangladesh are exported while most are sold in the domestic market.<sup>4</sup> Similarly, only few, typically large companies in the sector are engaged in exporting (this will be further explored in the section on “firm level characteristics” below).

With increasing incomes and ongoing urbanization, it is estimated that food consumption patterns in Bangladesh will continue to shift from subsistence agriculture towards consumption of processed foods, leading to projections of strong growth in domestic demand over the next decade (World Bank 2008).

#### *Patterns and Trends in Trade*

Frozen shrimps account for the bulk of Bangladesh’s agro-food exports, exceeding 550 mln. USD in 2010. Recent export patterns have been rather volatile, with substantial growth in 2007 and 2010, but declines in 2008 and 2009. Among the causes for these fluctuations was a complaint from EU buyers of Bangladeshi shrimp over hazardous substances found in several shipments, which led to the introduction of a voluntary suspension of freshwater shrimp exports in 2009 until the issue was resolved.

World market demand for frozen shrimps has, in value terms, grown at an average annual rate of about 4 percent over the period 2002-2010<sup>5</sup>. Bangladesh is well positioned in terms of serving the largest segments of the world market – EU and US – but has not yet established significant exports to the third largest importing country, Japan. Market demand for processed shrimps – currently not exported by Bangladesh in significant

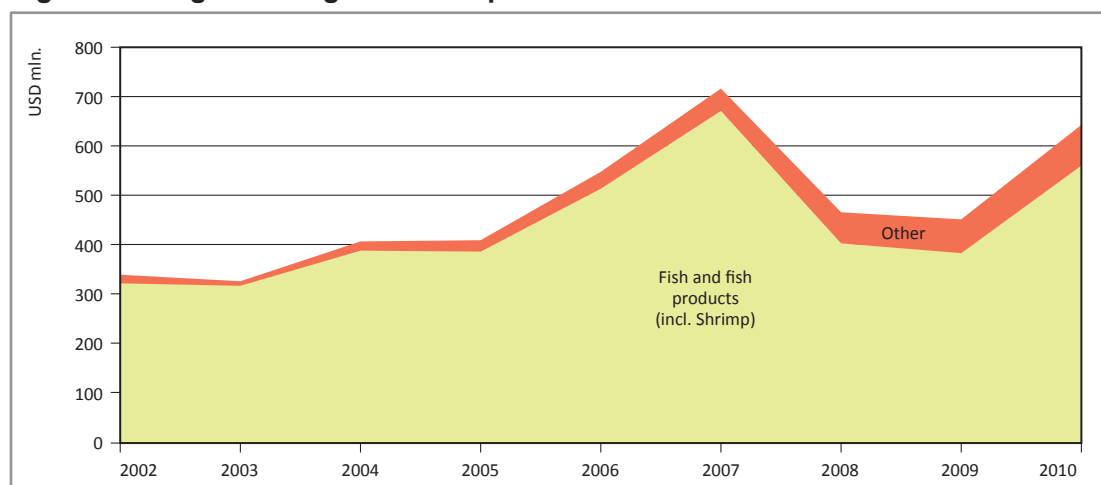
<sup>3</sup> World Bank (2008): High-value Agriculture in Bangladesh: An Assessment of Agro-business Opportunities and Constraints, Bangladesh Development Series Paper No. 21.

<sup>4</sup> It should be noted that tea and coffee, which are also exported in substantial amounts, are not considered processed food items for the purpose of this report and are thus not covered in this section.

<sup>5</sup> Global import data from COMTRADE

amounts – has been more dynamic, growing on average at 10 percent p.a. over the same period, but overall accounts for a smaller share of the world market than frozen shrimps (3 bln. vs. 11 bln. USD respectively in 2010)<sup>6</sup>.

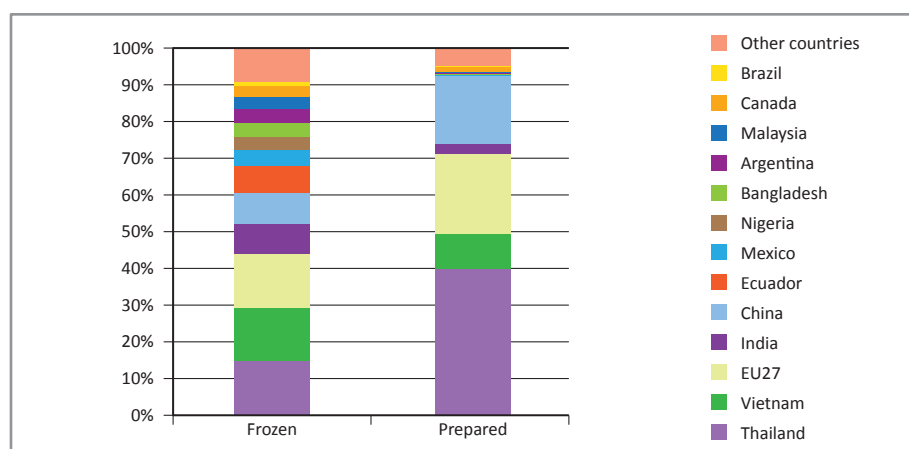
**Figure 1: Bangladesh Agro-Food Exports**



Source: COMTRADE (2002-07), Bangladesh Export Promotion Bureau (2008-10)

A number of other South and East Asian countries – mainly Thailand, Vietnam, India, and China – have developed as Bangladesh’s main competitors in the global market for frozen shrimp. The EU and some Latin American countries also hold substantial shares of the world market. However, rather few exporters of frozen shrimp have also been able to establish themselves with substantial exports of processed shrimp. 90 percent of the world market for these products is currently served by Thailand, the EU, China, and Vietnam. This illustrates the difficulty of adding value to the shrimp industry domestically by moving into processing activities, a step that Bangladeshi producers have so far not undertaken on a significant scale. On the positive side, world market demand for these products is more dynamic than for frozen shrimps (see above), and there are fewer competitors in this segment of the market.

**Figure 2: Shrimp Exporters: Global Competitors**

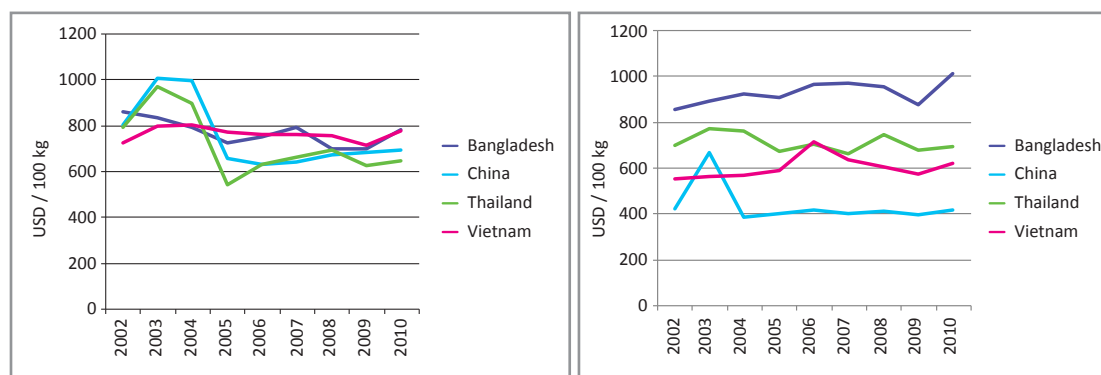


Source: COMTRADE

<sup>6</sup> Global import data from COMTRADE

Figure 3 shows unit value data (value / quantity) which is based on EU import statistics for shrimp from Bangladesh and selected competitors in the region. Unit values are relatively stable over time in USD terms.<sup>7</sup> The data also shows that for certain varieties of shrimp – categorized as “frozen, other than Penaeus” - Bangladeshi exporters fetch significantly higher market prices than their regional competitors. A potential explanation is the finding in World Bank (2008) that the low-intensity methods of shrimp farming used in Bangladesh make it possible to raise larger shrimp than the competitors. These typically attract a price premium in world markets.

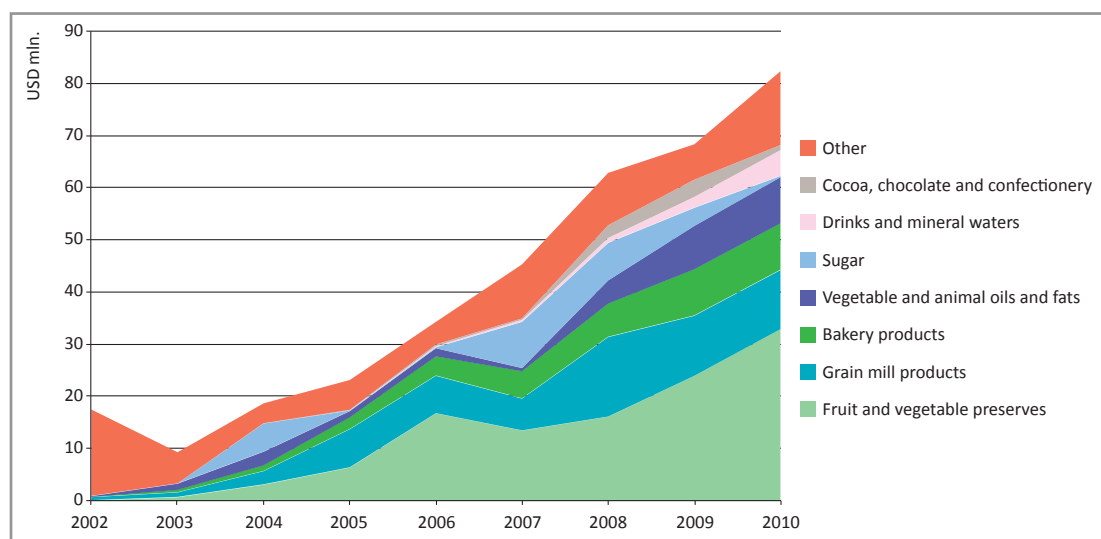
**Figure 3: Unit values (value / quantity) for Penaeus (left) and other frozen shrimp (right) imported by the EU (in US\$)**



Source: EUROSTAT, converted to USD based on average annual exchange rates

Although other agro-food exports remain relatively small compared to shrimp exports, a number of products in this category have shown strong growth over the past years and thus contributed to the diversification of the sector. These include Fruit and Vegetable Preserves, Grain Mill and Bakery Products, Vegetable and Animal Oils and Fats, and Drinks (mainly fruit juices).

**Figure 4: Bangladesh Agro Processing Exports other than Fish and Fish Products (incl. Shrimp)**

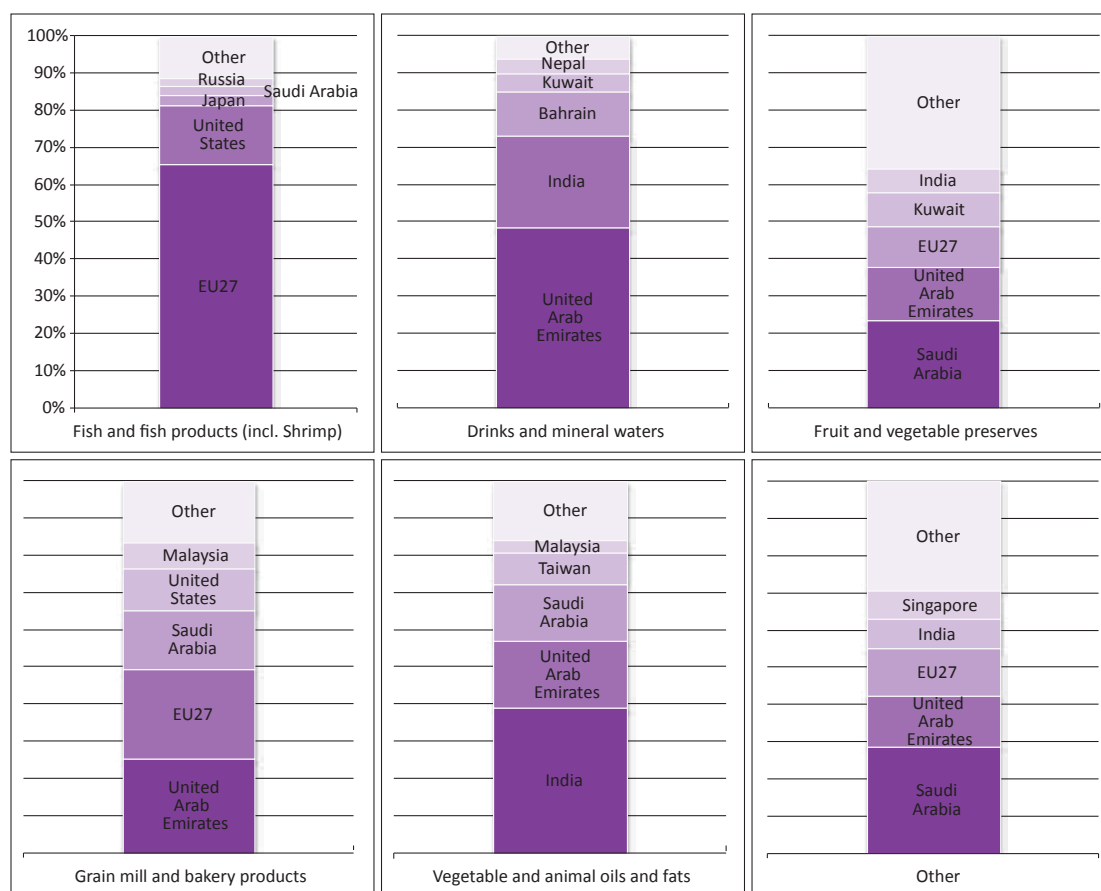


Source: COMTRADE (2002-07), Bangladesh Export Promotion Bureau (2008-10)

<sup>7</sup> It should be noted though that this represents a rather substantial decline in the EUR value reported by Eurostat, given the devaluation us the USD against the Euro over this time period.

Despite the difference in scale, a major difference between shrimp and other agro-food products concerns the markets that these exports are currently reaching. While Bangladeshi shrimp exporters have managed to position themselves in the main high-end markets, other agro-food exports are currently very concentrated on a number of regional markets, mainly targeting the ethnic food niches in countries with strong Bangladeshi diaspora, such as the United Arab Emirates, India, Saudi Arabia, and other Gulf countries.

**Figure 5: Bangladesh Agro-Food Exports by Destination Markets (2010)**



Source: Bangladesh Export Promotion Bureau

### Value chains

Value chains for agro-food industries are typically rather complex, with a number of middlemen involved between the usually small scale producers and the processing firm.

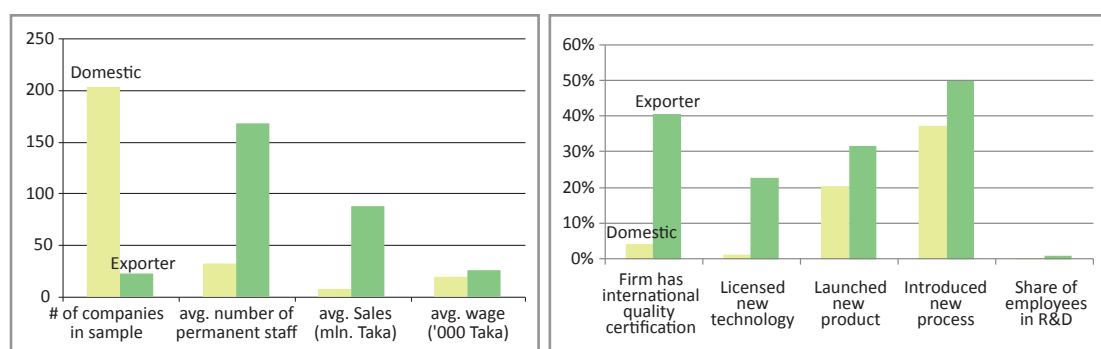
The complexity of the value chain poses challenges for many agro-food companies to ensure that they get the type and quality of raw materials they need at the right time. Stakeholder responses from firms revealed that managing inbound logistics, including relationships with suppliers, cold chain, and transport management, is seen as a major challenge by the industry.

In terms of the downstream value chain, there are substantial differences between the shrimp industry and other emerging food exports. The shrimp industry typically sells to large international buyers, who in turn supply major retailers in overseas markets. Most other food exports, however, are organized through more relationship based networks, often built around diaspora traders, smaller ethnic retailers, and targeting native Bangladeshi consumers in a limited number of overseas markets as shown in the previous section. While this model has supported substantial export growth over the past years, it is clearly limited in terms of scale, leaving the challenge for the industry to increasingly work with larger international buyers.

### **Firm Level Characteristics**

The World Bank's Enterprise Survey of Bangladesh from 2007 makes it possible to profile firms in the sector by exporting status. The summary data is not representative because no survey weights were applied and very small firms are underrepresented. Nevertheless, it illustrates that exporting behaviour is to a large extent determined by firm level rather than sectoral characteristics. Only roughly one tenth of companies in the sample are exporters, and the data shows that these companies are typically much larger both in terms of employees and in terms of sales. They are also found to pay higher wages. This is related to the fact that exporters tend to perform much better than domestic firms on a number of indicators related to innovation and productivity. For instance, they are much more likely to have an international quality certification, or to license and use new technologies. Exporters are also more likely to launch new products or introduce new processes, and they have a higher share of employees in R&D activities.

**Figure 6: Firm Characteristics in Agro-Food Sector**



Source: World Bank Enterprise Survey Bangladesh 2007

## **2.2 Business Environment**

### ***Market Access and Export Incentives***

As an LDC, Bangladesh enjoys duty- and quota free access to the US and EU markets. In addition, stakeholders in the sector are optimistic about increasing demand and better market access to key emerging markets as well as Japan, Russia and Australia. However, most Gulf countries maintain relatively high tariffs on food imports from Bangladesh.

The government currently provides a 10 percent cash incentive programme as well as VAT exemptions for agro-food exporters, which many stakeholders in the sector see as a key for their competitiveness in the global market.

### ***Laboratory and Testing Facilities***

Compliance with sanitary and phytosanitary standards, in particular in high end destination markets, remains a concern for many Bangladeshi agro-food exporters. In addition, many buyers increasingly use their own rather strict standards, which makes compliance even more difficult and costly. Affordable laboratory testing and certification facilities in the country are thus of utmost importance for exporting firms. Stakeholders indicate some progress in the availability and accessibility of such facilities in recent years, but cost and time of testing procedures are still seen as a major obstacle to competitiveness.

### ***Logistics and Cold Chain***

Inbound logistics and cold chain management continue to present a problem to the food processing industry, in particular when dealing with easily perishable goods. Reliable and affordable (cold) storage and transport infrastructure is often unavailable, which leads to substantial post harvest losses in the agricultural sector and difficulties to secure continuous high quality supply for businesses. Unreliable electricity supply adds to the problem and further increases costs as firms are forced to use generators.

## **2.3 Envisioning the Future**

The Bangladeshi agro-food sector has important positions in a number of markets.

- It is the main supplier of processed food to its domestic market. With a growing population and rising incomes, demand from the domestic market for processed foods will continue to grow.
- It is a major, internationally well known, supplier of freshwater shrimp. This often carries country of origin branding at retail level. However, the trade data indicates substantial fluctuation in shrimp exports in recent years, and world market demand for frozen shrimp has not been very dynamic while competition is stiff. In addition, stakeholders indicated that a number of processing plants are frequently operating below capacity due to insufficient supply of raw materials. New opportunities for growth may exist in terms of quality upgrading and branding as well as the development of more heavily processed shrimp products.

- It has significant success in exporting Bangladesh food products to centres of the ethnic Bangladesh diaspora. Rapid growth in exports to these markets has provided a number of food processing firms with exposure and experience in exporting over the past years. However, the business model of exporting to ethnic markets based on diaspora networks is bound to reach its limits given that it is focused on a rather small fraction of the world market. New opportunities in this area would depend on developing access to new markets, consumer groups, and retail networks.

Thus, in order to continue its export growth in food processing, the industry will need to innovate to bring new or modified products to new markets, taking the sector outside its zone of existing comfort in product development, marketing, supply chain management and a range of other areas.

It has not been possible within the scope of this study to undertake a comprehensive scan of export opportunities available to Bangladesh's agro-food sector, but it seems apparent that at least two types of opportunity exist.

- **Opportunities to supply lightly processed food products to mainstream international markets.** A specific example seen in the course of the research is that of mango juice, whether in the form of drinks formulated to appeal to mainstream markets or bulk supply. This is an example of what could be a much wider source of opportunity. For example, the supply of fruit and vegetables from agricultural producers to the agro-processing sector is constrained far more by weaknesses in infrastructure and supply chain management than by the productive capacity of the sector. There may be scope to process fruit and vegetables for export that might otherwise not be grown, might be left to rot on the farm, or might be lost in transport or storage due to problems with logistics systems.
- **Opportunities to supply more heavily processed food products to mainstream international markets.** The analysis of trade data on shrimp exports has shown that other major shrimp exporting countries are increasingly adding value to their produce, with their exports of processed shrimp growing faster than exports of frozen shrimp, but that this is not happening in Bangladesh. There may also be scope to produce more heavily processed foods from other Bangladeshi primary foods (such as fruit, vegetables, dairy or meat) for mainstream markets.

There are several types of opportunity in food exporting available to agro-food businesses in terms of the route the product takes to market that should be considered by Bangladesh's agro-food businesses. The choices they make have implications for the capabilities required by food companies.

- Producing branded products for sale in the export market. While this may be feasible in some cases, substantial investment in brand development may be required. For markets distant from Bangladesh, issues around shelf life and the

additional cost of shipping food in consumer packaging will also be an obstacle for many types of product. In many countries, particularly in developed countries, markets are so overcrowded with brands that launching a new brand is both costly and prone to failure.

- Supplying products in bulk, rather than packaged for consumers. These may then undergo final processing and packaging by consumer food businesses closer to market.
- Supplying own-brand products to retail groups. Where these are supplied packaged, issues around shelf life and shipping costs may again arise. “Own-brand products” are products that are branded by the retailer rather than the manufacturer.
- Food ingredients for use by other food processing businesses internationally. This is a major market, which is particularly important as an opportunity where a food processing sector is remote from its markets.

Other possibilities include:

- Selling food products as commodities.
- Selling lightly processed products with country of origin branding, as with frozen shrimp.

Apart from addressing the above mentioned issues, a comprehensive vision for the sector should also take into account the following key points:

- Ensuring the quality and safety of the food supply within Bangladesh. This is necessary for the benefit of Bangladesh’s 160 million people. It is also necessary to underpin the sector’s reputation in international markets, which could suffer in the event of a food safety scandal within Bangladesh.
- Improving food processing practices. There is substantial scope for improvement in food processing practices across the agro-food sector. Efficiency and food safety are common issues, with considerable scope to improve productivity across the sector, and with a widespread requirement to improve food safety practices. The need to improve food safety is at two levels – the need to comply rigorously with Bangladesh’s own food safety regulations and the need for processing of foods destined for export to comply with regulations and specifications required by customers and food safety authorities in export markets.
- Growing food exports in ways that benefit prosperity, and are consistent with food security within Bangladesh. Growth in exports that grows employment opportunities in agro-food processing is positive. Export growth that also creates better market opportunities for farmers is better, and can bring decent work to a much wider population.

- Moving into mainstream international markets for foods. Opportunities exist in areas including food ingredients, supply of bulk products to packagers closer to market, supply of own-brand products and supply of branded products where the barriers to market entry are not too high. This is likely to be pioneered by large agro-food businesses that have the resources to invest in product development, production capacity meeting international standards and export marketing, and which are large enough to partner credibly major international retailers and major international food processing businesses requiring supplies of food ingredients.
- Taking advantage of opportunities for growth in markets in which the Bangladesh agro-food sector is already strong. Key areas with continuing potential for export growth include frozen shrimp, and exports of ethnic food to centres of Bangladesh's diaspora. It is necessary, however, to recognise that there are constraints on growth in these areas, notably limits to potential demand from the diaspora for ethnic food, and limits on the availability of locations whose optimal use is for shrimp production. Firms already strong in these areas, particularly those already involved in exporting, are likely to be best positioned to grow exports.
- Cutting food waste within Bangladesh. Problems with logistics, supply chain and cold chain arrangements in Bangladesh mean that an excessively large amount of food is wasted each year. The most visible part of this is with fruit and vegetables that cannot be sold, or which are spoiled along the way. This issue is closely linked to exporting, as processing fruit and vegetables into products suitable for export is likely to be one of the most practical uses for the produce. Once a supply chain is established, moreover, processors are likely to be able to incentivise and coordinate producers to time planting and cropping so as to smooth the greatest peaks in supply over a greater period, reducing the severity of peak season gluts.

## **2.4 Gaps in Business Capabilities Required to Meet Objectives**

If the Bangladeshi agro-food sector is to meet the objectives outlined above, it will have to bridge a number of gaps between the business capabilities it has now and the business capabilities required to meet the objectives.

The analysis undertaken and stakeholder consultations point to seven main capability gap areas:

1. Export marketing, product management, channel management
2. Supplier capability
3. Product development
4. Operational effectiveness and food safety
5. Regulatory compliance
6. Logistics / supply chain / cold chain
7. Regulation

### ***Gaps in Business Capabilities - Export Marketing, Product Management, Channel Management***

The sector has significant strengths in marketing, linked to its strong position in a number of markets, as discussed in the previous section.

However, to open up other channels for export-based growth it will be necessary to innovate and bring new or modified products to new markets, bringing the sector outside its zone of existing competence in marketing. As suggested earlier, this largely means entry into mainstream international markets for both lightly processed and more heavily processed food products. It also means entering into the food value chain in a number of ways, including: supplying products in bulk; supplying own-brand products to retail groups; supplying food ingredients for use by other food processing businesses internationally; and producing branded products for sale in export markets.

Success in these areas will depend on developing strong capabilities in marketing of food in areas including export marketing, product management and channel management, applicable to the new product markets to be targeted.

The industry interviews showed the EU, the USA, the Middle East and the Gulf Region as the markets traditionally perceived as most attractive, because of high prices received and prospects of substantial sales. However, other markets, including Russian Federation, Japan, China, Australia, Malaysia, and Singapore, are expected to show increased demand for Bangladeshi food exports over the immediate future.

65 percent of firms consulted saw international marketing as very important to their future success. 65 percent also saw international distribution channel management as very important. 60 percent saw selling to major international retailers as very important. 60 percent saw brand development as very important.

### ***Gaps in Business Capabilities - Supplier Capability***

One of the major challenges of developing new export markets will be to develop the capabilities of the suppliers of agricultural produce on which new products are based. Success will be built to a significant extent on developing a base of suppliers that delivers what the agro-food company needs.

This may affect any or all aspects of agricultural production.

For example, it may affect choices about:

- varieties of fruit or vegetables and other crops to be planted, or the types and quality of animals (including shrimps and fish) to be raised;
- use of fertiliser, pesticides, other forms of pest control and veterinary interventions (vaccines, antibiotics, hormones etc.), in terms of what is applied, how it is applied, when it is applied and recording what has been done;
- timing of planting and harvesting of fruit and vegetables, and of livestock births and sales;
- types of feed to be used for animals, and amounts of feed to be used;

- techniques for harvesting and handling crops to maximise value to the agro-food processor and minimise waste, thereby maximising the potential return to the producer;
- investment in machinery and equipment, and subsequent use and maintenance;
- coordinating with other producers and with agro-food companies, logistics providers and cold chain operators.

Getting choices such as these right, and implementing them effectively, will require the development of much stronger capabilities among agricultural (and aquaculture) suppliers and intermediaries.

Farming practices can impact on access to export markets not just through their ability to supply produce that meets the agro-food processor's physical requirements, but also through requirements from some major retailers that production practices for some products be certified as complying with Good Agricultural Practice (GAP) standards. Obtaining GAP certification can be challenging for farmers in developing countries.

GLOBALGAP is the most widely adopted GAP standard, and it aspires to establish a single global standard for Good Agricultural Practice. It was originally established by several European supermarket chains and their major suppliers, and was known as EUREPGAP.

75 percent of firms interviewed saw "sourcing high quality agricultural or aquaculture inputs" as critically important to their success. As noted earlier, firms identified low agricultural productivity as a significant threat to the agro-food sector's success.

### ***Gaps in Business Capabilities - Product Development***

Bangladesh's agro-food sector should be moving into developing products that are new (at least to itself, if not globally), and modifying existing products so that they better meet the requirements of export markets.

Successful product development in food requires a combination of technical and business capabilities – technically perfect food products that can be produced efficiently will not sell if they fail to meet consumer wants, and products that consumers love will fail if they cannot be manufactured and distributed cost-effectively, to high quality and with an adequate shelf life.

While much of the requirement for skills will be within businesses, there may also be a role for an agro-food research centre to assist businesses with product development. India's Central Food Technological Research Institute (CFTRI), established in 1950, was highlighted as an exemplar in consultations with industry.

75 percent of firms consulted were planning to launch new products in the near future.

### ***Gaps in Business Capabilities - Operational Effectiveness and Food Safety***

It is necessary for the sector to improve operational effectiveness and their implementation of food safety practices. These are closely connected, as both operational effectiveness and food safety are outcomes of the design of production processes and procedures, the technologies used and the reliability with which procedures are followed.

Strong capabilities in this area are founded on good design of production processes, effective and appropriate use of technology and proper implementation of food safety methodologies including HACCP (Hazard and Critical Control Point Analysis). In many countries, food safety authorities provide Good Manufacturing Practice guidelines for the food sector that particularly emphasise food safety.

Design of production processes is not static – improvements in productivity and quality come from continuously or periodically re-examining production processes to find better ways to work. Professional experts including food scientists, engineers and food safety professionals typically contribute to this, but in many food businesses globally production workers and their supervisors also contribute, often through structured team-based improvement initiatives.

For products with short production runs, processes may need to be fine-tuned for each run, and technicians and production workers may have a significant role in this from day to day.

Well designed processes and procedures are not enough by themselves. If they are not followed, this can cause outcomes such as deficiencies in quality, problems with food safety, waste of materials and loss of production efficiency. Strong capabilities in this area, therefore, depend also on a culture of compliance, backed up by effective quality assurance systems.

70 percent of firms surveyed saw safe handling of food as critically important to their future success. 70 percent also saw quality management as critically important.

### ***Gaps in Business Capabilities - Regulatory Compliance***

Many export markets have explicit rules on the import of food products designed to protect health and for other policy purposes. These rules are regulated by the 1995 WTO Agreement on the Application of Sanitary and Phytosanitary Measures (also known as the "SPS Agreement"). Under this agreement, countries can set their own standards and choose different methods of inspecting products, so long as the regulations are based on science, do not arbitrarily or unjustifiably discriminate between countries, and are applied only to the extent necessary to protect human, animal or plant life or health.

Examples of types of measures covered by the SPS Agreement include: "regulations which address microbiological contamination of food, or set allowable levels of pesticide or veterinary drug residues, or identify permitted food additives, fall under the SPS Agreement. Some packaging and labelling requirements, if directly related to the safety of

the food, are also subject to the SPS Agreement.”<sup>8</sup>

There may also be a need to comply with rules agreed with specific customers. Many major retailers in export markets have demanding specifications, substantially in excess of national legal and regulatory requirements, that suppliers are required to follow. These include, but are not limited to, the GAP standards described earlier.

80 percent of agro-food firms surveyed for the study saw regulatory approvals as critically important to future success. 80 percent also saw regulatory compliance as critically important.

### ***Gaps in Business Capabilities - Logistics / Supply Chain / Cold Chain***

A critically important issue for both agriculture and agro-food processing in Bangladesh is that significant parts of its logistics systems do not work well.

The most obvious issue is that the poor cold chain infrastructure limits the volume of perishable agricultural products that can be brought to market or exploited by agro-food processors. The problem is partly that it is difficult to develop agro-food markets without a stable supply chain, and partly that substantial volumes of fruit and vegetables are often lost.

The more general issue for developing exports of agro-food products is that well designed logistics systems, incorporating cold chain features where appropriate, are required to bring produce from farms to processors, and to bring processed products to international markets. Good design is required for efficiency, for the predictability of supply that is required by international customers, and to ensure that products get to market in good condition and with sufficient remaining shelf life. Success in developing exports to new markets has to be underpinned by effective supply chains.

As a discipline, logistics emphasises quantitative analysis and optimisation. It is not enough to show that a product can be brought to market if logistics capacity is available; for any specific investment in logistics capacity, it is also necessary to show that the likely benefits outweigh the costs. Private investment in logistics capacity is likely to take this approach unprompted. However, if the government of Bangladesh gets involved in developing logistics infrastructure for the agro-food sector, it will be important that its decision-making gives due weight to economic efficiency, in the context of competing political priorities.

75 percent of firms interviewed saw “sourcing high quality agricultural or aquaculture inputs” as critically important to their success, and stakeholder discussions highlighted that operating an efficient logistics and cold chain was seen as a key prerequisite for this.

### ***Gaps in Business Capabilities - Regulation***

Ensuring that Bangladesh’s agro-food sector consistently complies with standards for food safety requires more demanding and intrusive regulation of the sector. This is partly a matter of consolidating responsibility for regulation, and partly a matter of upgrading the

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<sup>8</sup> [http://www.wto.org/english/tratop\\_e/sps\\_e/spsund\\_e.htm](http://www.wto.org/english/tratop_e/sps_e/spsund_e.htm)

capability of the main players in the regulatory system.

As noted earlier, 80 percent of firms surveyed saw regulatory compliance as critically important to their future success.

## **2.5 Implications for Types of Skills Needed**

Each of the gaps in business capabilities identified has skills aspects. These are discussed for each business capability gap.

### ***Implications for types of skills needed - Export Marketing, Product Management, Channel Management***

The need is for marketing and sales skills at a variety of levels, from call centre staff to process orders and deal with routine issues to senior executives capable of setting international marketing strategies, running effective international sales and marketing operations, and establishing and managing relationships with retailers, industrial customers (e.g. for food ingredients), agents and distributors in international markets.

There will be a significant requirement for marketing professionals with skills in export marketing, product management and channel management. All of these will require some specialist expertise in food business, science and technologies, with product managers needing significant knowledge of food science, consumer tastes, supply chains, food safety and other specialist areas, as well as marketing. Marketing skills required span industrial and consumer marketing.

### ***Implications for types of skills needed - Supplier Capability***

There is a broad need to improve the performance of farmers who will supply the raw materials for products to be exported to new markets, and indeed also many farmers who are already supplying exporters. This is partly a matter of providing good advice and up-to-date information, and partly a matter of improving their skills.

At the most basic, improved skills in harvesting, handling and packing of products are needed, along with advice on issues that may include use of agricultural inputs, timing of planting and harvesting, and choice of plant varieties among others. The skills should be easily within the reach of farmers, subject to suitable skills development and advisory arrangements being put in place.

At the most advanced level, very significant skills are required to comply fully with Good Agricultural Practice standards, which it may be challenging to achieve for many farmers.

### ***Implications for types of skills needed - Product Development***

The main skills required in food product development are at professional level in food business (including marketing), food science and food technology/engineering. Typically, these have a relevant degree plus significant food industry experience.

Expert chefs, dieticians and other food related occupations can also play a useful role.

Packaging is an important aspect of product development, implying demand for specialist skills in technical and marketing aspects of packaging design.

People with these skills may be employed within the agro-food business itself, at a separate institute similar to India's CFTRI (mentioned earlier), in professional services firms, at a university, or by suppliers of equipment or of packaging supplies.

### ***Implications for types of skills needed - Operational Effectiveness and Food Safety***

Improving capabilities in operational effectiveness and food safety requires development of skills at all levels within production operations, notably including:

- Operatives, supervisors and production technicians
- Quality control and quality assurance staff
- Laboratory technicians
- Production managers
- Scientists and engineers
- Trainers

Good Manufacturing Practice guidelines for food companies give guidance as to the skills required for food safety. Knowledge of proper use of dyes and food colourings is important at operational level to control their use.

Skills requirements for operational effectiveness include both skills required to carry out work from day-to-day and skills required to improve performance over time. Skills required for both of these include specific technical skills relating to work and core skills such as communication skills, problem solving and teamworking skills. Strong core skills are ideally required, even at operative level, as forms of work organization with collaborative elements, and in which workers take responsibility for producing high quality outputs efficiently, frequently work well in food processing.

### ***Implications for types of skills needed - Regulatory Compliance***

Major skill needs relating to regulatory compliance are:

- Skills in quality assurance and documentation of compliance for quality assurance specialists; and
- The skills in food safety and safe food handling described earlier, backed up by the skills required to document compliance where appropriate, and by an approach to work that favours strict compliance.

### ***Implications for types of skills needed - Logistics / Supply Chain / Cold Chain***

Skills in logistics and supply chain are required at a range of levels. The key requirement is for high level logistics and supply chain professionals capable of designing and optimising logistics systems, and capable of the wider job of developing supply chains that integrate upstream with farmers and farming groups (and in some cases with intermediaries) and downstream with customers in export markets. The quality of the work done by logistics and supply chain professionals will have a major impact on the competitiveness of exporting industries.

### ***Implications for types of skills needed - Regulation***

It is a characteristic of regulation globally, across all sectors, that it is difficult for regulators to reconcile facilitating the development and operation of the regulated sector with the need for rigour in regulation. It requires high calibre, strong minded leadership to understand what may compromise the regulatory system, and to prioritise the sector's long term interests over short term convenience by refusing to bend to persuasion, pressure or established convention. It also requires high calibre leadership to recognise problems with the regulatory system that add no value, and to rectify these openly.

Upgrading the capabilities of Bangladesh's food safety regulatory systems is likely to require more staff at a range of levels. At senior levels, it will be important that at least a proportion of staff are very well qualified, capable of making sound judgements on food safety and public health, and capable of leading an organizational culture that enforces regulations effectively and ensures that inspection regimes are effective in checking compliance with standards and good practice, and in ensuring that corrective action is taken when problems occur.

At other levels, it is important that staff should be technically competent in areas such as laboratory analysis of food samples, inspection of food processing operations and sampling of food products. It is important that they should be conscientious and able to withstand pressure to overlook poor practices or to facilitate agro-food businesses in improperly passing inspections.

## **2.6 Projected Skill Demand Versus Current Supply**

### ***Recruiting New Workers***

It has not been feasible within the scope of this study to undertake a thorough analysis of the supply of relevant skills in Bangladesh. The research relies, instead, on assessments by industry as to the adequacy of the supply, and on expectations by industry as to how the balance between supply and demand will develop into the future. Assessments such as these generally form an important input into analysis of the adequacy of skills supply in any case, as estimates of skills supply and demand made without reference to industry knowledge often turn out not to be comparable in practice.

Based on the interview survey undertaken for this study, food technicians, scientist and laboratory technicians with suitable expertise are relatively difficult skills to find. About 70 percent of firms consulted rated difficulty in finding suitable people for jobs as equipment technicians or as laboratory technicians at a 4 or 5, on a scale from 1 to 5. 60 percent rated difficulty in finding food technicians at 3 to 5. Part of the problem with technician skills is not just a general shortage of technicians, but just as much a matter of finding people with the right expertise and experience. There are also some difficulties in finding quality control and quality assurance people with the right skills. Finding people for a top management position was also rated as difficult, at a 4 or 5, by 30 percent of firms.

Finding food processing operatives, sales people and mid-level managers was rated as relatively easy. This finding on sales people and managers appears to particularly reflect people oriented towards serving the domestic market, and people oriented towards selling to the diaspora. High level skills in selling and marketing to, and in supplying, mainstream international markets appear to also be in short supply.

While there is no shortage of potential recruits for many roles, there are problems with the quality of people available at entry level. Most respondents to the interview survey reported that the general education and training background of their recruits did not give them the skills required to perform effectively. Many observed that general, education and training did not adequately expose their recruits to the sort of performance expectations that a real business would have. Specific areas of skills deficiency highlighted were in technical skills in food handling and processing; food safety and sanitation and food testing procedures.

Looking to the future, skills requirements in the sector will rise at each occupational level. Developing overseas markets, developing new products, and developing logistics systems and supply chains will require more people with high level professional and management skills. The level of skill required among technicians may increase with more complex production equipment and more demanding food testing requirements. The need for strong core skills at operative level is likely to increase over time.

### ***Skills of Existing Workers***

Firms consulted in the interview survey were not unhappy with the skills of their existing workforce. Despite this, they unanimously felt that skills could be improved substantially, and that this could have a very positive impact on productivity.

There was considerable discussion of the barriers to training at workshop held to disseminate the results of the research. Employers and worker representatives at the workshop came to a consensus that firms and their workers simply do not take enough interest in skills, and as a consequence place too low a priority on skills development.

Other barriers to skills improvement identified through the research are highlighted in Table 1. It is noteworthy that, aside from cost, the top issues highlighted relate to problems with identifying training needs or delivering suitable training. Concerns about retention of workers once they have been trained exist, but appear to be less pressing.

**Table 1: Main barriers to skills improvement highlighted by interview survey**

Barrier	Identified by % of Respondents
Difficulty assessing what training is needed	60%
Cost of training	50%
Lack of suitable providers of education or training services	50%
Difficulty providing suitable training internally	40%
Workers may not stay long enough to justify training	30%
Would have to pay workers more to retain them if they were better trained	30%
Cannot recruit people with the right skills in Bangladesh	30%
Workers are not sufficiently well educated to acquire the skills that are needed	20%
Colleges and universities are not educating people with the skills needed	20%

Source: Structured interviews with firms

## 2.7 Proposed Response to Future Skills Needs

The business capability and skills improvements required by the Bangladesh agro-food sector are extensive. The responses required are also extensive. In many areas, different options are available, or it may be necessary to use a combination of approaches.

### ***Agro-Food Industry Skills Council***

The sector already has an Industry Skills Council, established with the objective of guiding and assisting with the agro-food work of the TVET Reform Project, which is due to continue its work through 2012. The industry has itself established a Centre of Excellence for the sector, to provide training and other common support services.

Bangladesh's Skills Development Policy, approved by the Government of Bangladesh in 2011, envisages the formation of Industry Skills Councils to "bring together major enterprises and industry bodies in an industry sector to discuss skill development issues affecting their industry sector". It envisages that the Industry Skills Councils would have a range of functions in identifying and anticipating skills needs, developing policies, planning, improving skills development capabilities, and other aspects of building and maintaining strong skills development systems for each sector. The functions set out in the Skills Development Policy are listed in more detail in the chapter on the pharmaceutical sector. Further strengthening and extending the role of the existing Industry Skills Council to cover all these functions will provide an ideal mechanism to bring together the various interested organizations and groups and to approve (or reject), prioritise between, refine and coordinate the implementation of the detailed responses suggested by this study.

### ***Technical Assistance***

Many of the proposed responses set out here could usefully be supported by technical assistance from international partners including the ILO.

### ***Response - Export Marketing, Product Management, Channel Management***

Increasing exports, bringing new products to market, and selling to different types of international customers is creating a need for more people with high level skills in marketing and related disciplines.

It is likely that a mix of the following approaches will be required to meet these skill needs.

- Executive education for managers and for sales and marketing professionals, to develop the additional skills they need to operate effectively in marketing and selling to export markets. In many other countries, this sort of education is provided by business schools, through professional institutions, or sometimes through private training providers. It is common for major businesses to send key staff to executive education courses at leading international business schools.
- Placing marketing professionals from Bangladesh downstream in distribution channels for a period may also be a good way to develop skills and experience.
- Recruiting from other countries, attracting members of the diaspora where they are available and have the right skills, but also recruiting people in export markets. It will be necessary to have some people working in-country. Local sales and marketing staff may bring important insights into the local market, and may be able to leverage existing relationships. They will be closer to the market in culture and language than expatriates from Bangladesh.
- There will be a need for people to work in telephone-based customer service roles serving foreign markets, but based in Bangladesh. Aside from appropriate language skills and a good basic education, these roles will mostly not have specific qualifications requirements, so language skills are the main potential constraint. So long as call centres can operate in English, or in Bangla when dealing with members of the diaspora, there should be no shortage of suitable people who can be trained for these roles. Where other languages are required, there may be a greater need to recruit in-market.
- There is scope for professional networks to make an important contribution to skills development in marketing and sales.

### ***Response - Supplier Capability***

In developing suppliers, a key requirement is that interventions will be attractive to the farmer, in terms of being easy to assimilate and not interfering with important work. The following types of mechanism are likely to be effective.

- Short training courses
- Visits from agricultural (and aquaculture) advisors and/or assessors linked to Good Agricultural Practice schemes

- Just-in-time information and reminders of good practice that could potentially be delivered by mobile phone. According to the Bangladesh Telecommunication Regulatory Commission, there were 72 million active mobile subscribers in March 2011, equivalent to almost half the population.

A range of mechanisms could be used to deliver this. Agro-food firms that have a direct and continuing relationship with farmers could provide a training and advisory service. Where the agro-food firm deals with farmers through intermediaries, the firm could provide train-the-trainer support to the intermediaries, to help them maximise the value of agricultural output.

Alternatively, where there are other advisory services in place, agro-food firms could help train advisors in the skills and knowledge they need to best meet the needs of the firms.

### ***Response - Product Development***

The key types of skills interventions required to enable product development include the following.

- Bachelor and masters degree courses in food science, food technology / engineering and food business.
- Executive education courses in food product development for people already working in the sector, ranging from substantial part time courses leading to qualifications such as diplomas or higher degrees, to short courses focusing on specific topics.

Interested bodies in the sector should consider the possibility of establishing an institute specialising in food technology and product development analogous to India's CFTRI. The institute could both provide services to the sector and provide education and training services in support of product development.

### ***Response - Operational Effectiveness and Food Safety***

Improving capabilities in operational effectiveness and food safety requires development of skills at all levels within production operations, notably including:

- Operatives, supervisors and production technicians
- Quality control and quality assurance staff
- Laboratory technicians
- Production managers
- Scientists and engineers
- Trainers

Key areas where skills development is required are in the following areas:

- Food safety training and certification for all in operations, at levels appropriate to their role.

- Training to support improvement initiatives, undertaken as part of the initiative. An example of such an initiative is the Kaizen initiative that has been undertaken with support from the TVET Reform Project.
- Training in materials handling and processing technologies for those already working in the sector.
- Technician training in laboratory and machine operations, making use of the food technician qualification established at the initiative of the TVET Reform Project where feasible.
- Bachelor degree courses in food process engineering and industrial engineering.
- Initiatives to develop or update skills in food process engineering and industrial engineering among people already working in the sector, including executive education courses, activities by professional societies, and professional networking activities.
- The agro-food sector has significant numbers of apprentices, but most are employed and trained without formal registration under the 2008 Bangladesh Apprenticeship Training Rules. The sector should move to comply with the Rules, and should receive technical assistance to do so.

### ***Response - Regulatory Compliance***

Major types of intervention likely to be required are:


- Substantive training for new and existing quality assurance and documentation managers and specialists
- Courses in regulatory compliance for managers, supervisors and technicians throughout sector's supply chain and manufacturing operations.

Outside formal training interventions, there is also a need for industry associations, firms and agencies involved in food safety to promote regulatory compliance, with regulatory and management policies in place to support it.

### ***Response - Logistics / Supply Chain / Cold Chain***

The response to the need for skills to underpin capabilities in logistics, supply chain and cold chain could include the following:

- A centre of expertise in supply chain and logistics, possibly based at a university, to provide access to high level skills in the area, and to provide education and training.
- Primary degree and master courses in supply chain and logistics.
- Consideration of possible training, apprenticeship or education courses in mid-tier skills such as freight forwarding, warehouse management, and transport supervision.



Universities, firms, industry associations and government could all usefully be involved in delivering on these issues.

### ***Response - Regulation***

Stronger regulation will require stronger skills, sourced both through upgrading the skills of the existing workforce and through recruiting small numbers of highly qualified people. High levels of skill and knowledge are crucially important to the ability of staff at a regulator to make good decisions in the context of the competing pressures under which they work.

Mechanisms to upgrade skills may include:

- Training for inspectors.
- Placements with regulators in the main regulated markets.
- Upgrading qualifications through studying towards higher qualifications.

## 3. PHARMACEUTICAL SECTOR

### 3.1 Sector Characterisation

#### *Overview*

The Bangladeshi pharmaceutical sector is made up of almost 200 active pharmaceutical companies, most of them domestically owned, along with a small number of multinational operations. Local companies have a 90 percent share of the domestic market, multinationals operating in Bangladesh have another 7 percent, and imports account for just 3 percent of the market.<sup>9</sup>

The 97 percent share of the market accounted for by domestic manufacture is the outcome of Bangladesh's Drugs Policy, enacted in 1982, which restricts imports of pharmaceuticals that are supplied by at least four firms in Bangladesh, and has the effect of limiting imports to products not manufactured within Bangladesh.

The sector also exports pharmaceuticals, principally to unregulated markets in less developed countries. Exports to developing countries are growing strongly, although from a small base. Some of the leading companies have certification to export products to regulated markets, including the EU and Australia among others. Trade patterns are reviewed in more detail in the next section.

Data from the Labour Force Survey of 2005/6 showed employment of 64,000 in the sector, of whom 3,000 were female. Data from the Labour Force Survey of 2010 is not yet available, but indications from industry are that there has been strong growth in employment, driven mainly by growing domestic market sales, but also by significant growth in exports.

The Bangladesh pharmaceutical sector's principal activities are in formulating drugs from imported ingredients, packaging them and marketing them within the country. The country has a very large number of retail pharmacies. Pharmaceutical companies mostly sell to them directly, through large sales forces.

Most of the products the sector sells are classified as branded generic products. Generics are pharmaceuticals that are similar to a reference branded product, in terms of form, strength, means of administration, intended use and performance, and may be supplied by multiple manufacturers. Branded generics are generics that are branded by the business that produces them. There are approximately 8,000 branded generic pharmaceutical products in the domestic Bangladesh market.<sup>10</sup>

Exports are mainly also of branded generic pharmaceuticals, although, with no investment in branding in export markets, the branding may not necessarily be meaningful to customers.

It is reported that the domestic market was worth 938m USD per annum as of Q3 2010<sup>11</sup>, at that time growing at almost 25 percent per annum. A 2009 forecast by Business Monitor International projected that the market would continue to grow rapidly, and would be worth 1,720m USD by 2014. Exports were worth about 45m USD in 2010, also growing rapidly.

Market prices of pharmaceuticals in Bangladesh are very low by international standards.

<sup>9</sup> Data from industry sources

<sup>10</sup> Data from industry sources

<sup>11</sup> [http://www.thefinancialexpress-bd.com/more.php?news\\_id=127926&date=2011-03-04](http://www.thefinancialexpress-bd.com/more.php?news_id=127926&date=2011-03-04)

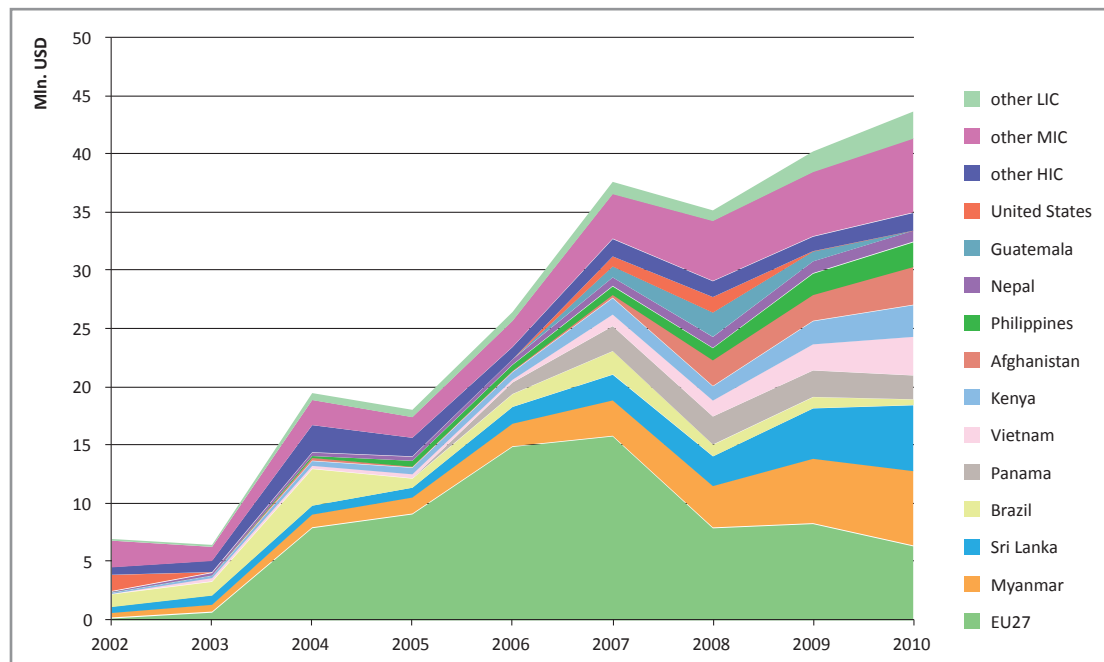
The low prices are also reflected in the prices at which exports are sold. The sector would account for a much larger share of global pharmaceutical production if viewed in terms of volume of products sold, rather than in terms of the value of its sales.

### ***Patterns and Trends in Trade***

Exports of pharmaceuticals from Bangladesh are still small in scale at just 45m USD in 2010, worth approximately 5 percent of the value of sales in the domestic market. However, they are increasing rapidly – at a compound annual growth rate of 26.1 percent between 2002 and 2010. Most of the growth is coming from exports to middle income countries and to nearby low income countries (Myanmar, Afghanistan, Nepal). While exports to the EU reached almost 15m USD in 2007, they have fallen off since. In addition, a significant amount of Bangladesh’s reported exports to the EU is for anti-Malaria drugs, the import of which is not confirmed by EU reported data. Most likely, this reflects purchases of European aid agencies destined for third countries.

Most exports are to markets where pharmaceuticals are unregulated to medium regulated. Even relatively lightly regulated markets can be challenging to access, with significant delays to obtaining approval. For instance, industry stakeholders highlighted that getting market approval in Myanmar can take up to five years.

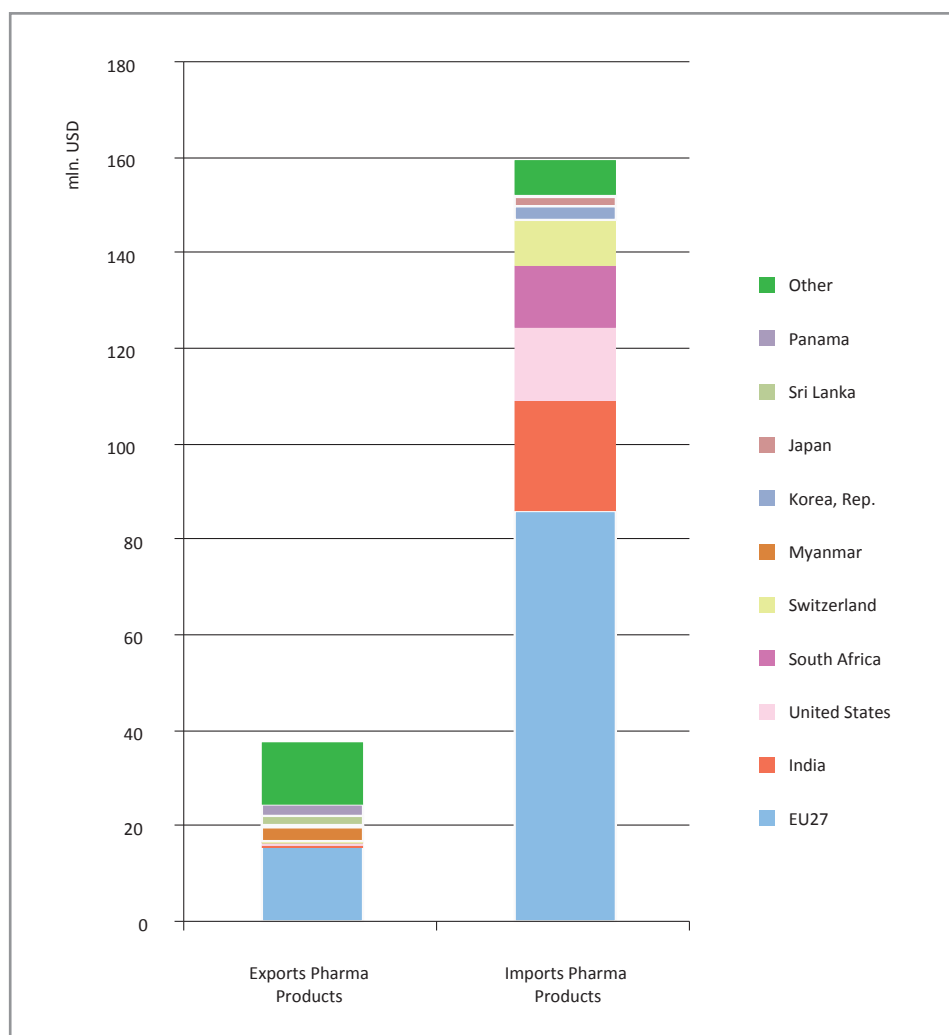
**Figure 7: Bangladesh pharmaceutical exports, by destination, 2002-10 (in 1000 USD)**



Source: COMTRADE (2002-07), EPB (2008-10)

Imports of pharmaceuticals into Bangladesh substantially exceed exports, amounting to 160m USD in 2007. This mainly reflects imports of pharmaceutical inputs used by pharmaceutical businesses, but also the supply of a small share of Bangladesh’s end market for pharmaceuticals with products that are not produced within the country. Most of these imports come from developed countries, but India has also become an increasingly important source, reflecting its position as a key supplier of out-of-patent APIs.

**Figure 8: Bangladesh imports and exports of pharmaceuticals by origin and destination, 2007\***

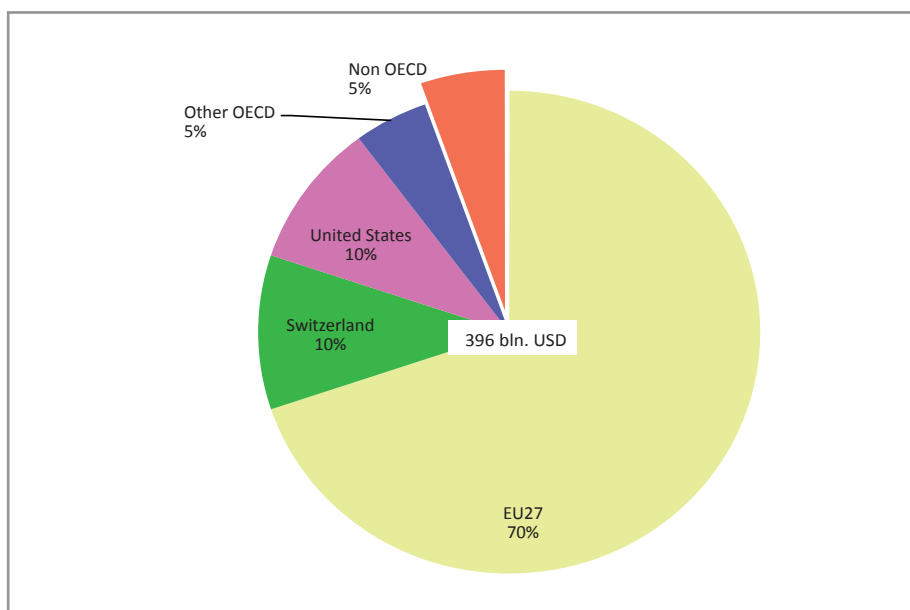


\* 2007 is most recent date for which COMTRADE provides data for Bangladesh  
Source: COMTRADE

In addition to compounds classified as pharmaceuticals, pharmaceutical businesses also use large volumes of compounds classified as organic chemicals. Bangladesh's main sources of supply of organic chemicals in 2007 were India (28 percent), China (25 percent) and EU27 (19 percent). Bangladesh's exports of organic chemicals were insignificant.

The global market for pharmaceuticals is dominated by developed countries, particularly European OECD countries. Non-OECD countries accounted for just 5 percent of global exports by value in 2009.

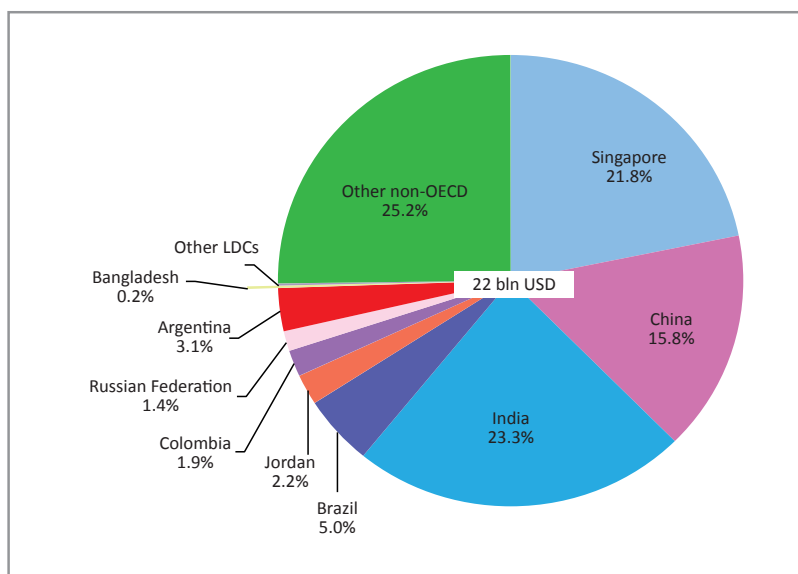
**Figure 9: Export Shares in World Pharmaceutical Market (2009)**



Source: COMTRADE

Accounting for just 0.2 percent of non-OECD pharmaceutical exports in 2009, Bangladesh has a tiny share of the global market – 0.01 percent in 2009. Even so, it has by far the largest pharmaceutical sector, and the largest pharmaceutical exports, of all Least Developed Countries.

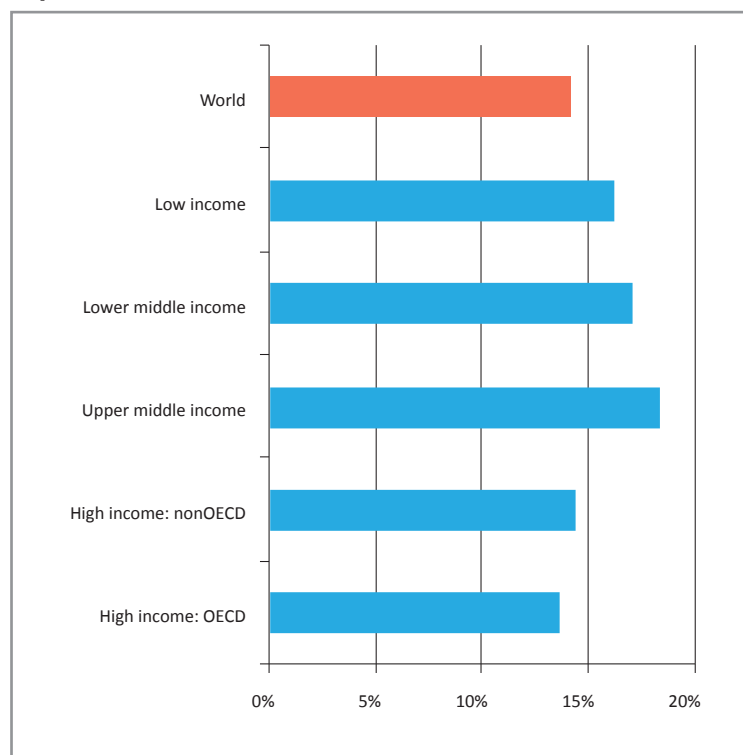
**Figure 10: Export Shares in World Pharmaceutical Market, Breakdown of non-OECD exporters (2009)**



Source: COMTRADE

Globally, demand for pharmaceuticals is increasing rapidly, with global imports growing at 14.1 percent per annum between 2003 and 2009. Demand from high income OECD countries is growing a little slower, at about 13.5 percent between 2003 and 2009. Demand from low and middle income countries, which are the main markets for Bangladesh's pharmaceutical exports, is growing even more rapidly, at 16.1 percent per annum for low income countries and 18.3 percent per annum for upper middle income countries between 2003 and 2009.

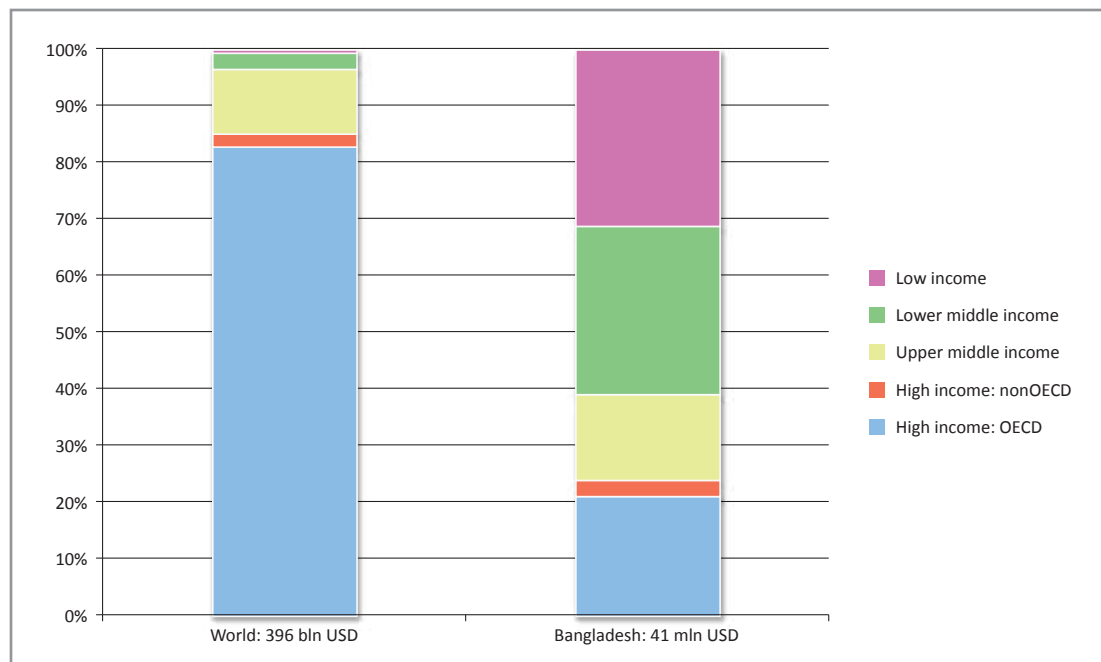
**Figure 11: Average Annual Import Growth of Pharmaceuticals (HS30) by Income Group 2003-9**



Source: COMTRADE

Just like the export side, imports of pharmaceuticals are also dominated by high income countries. 85 percent of global pharmaceutical exports went to high income countries in 2009. However, only 24 percent of Bangladesh's pharmaceutical exports went to these countries. Instead, 31 percent of Bangladesh's exports went to low income countries, and 45 percent to middle income countries. Thus, Bangladesh is currently positioned as a niche exporter supplying mainly the low and middle income country segment, which accounts for a small share of the world market for pharmaceuticals.

**Figure 12: Import Shares by Income Group for World and Bangladesh Exports (2009)**



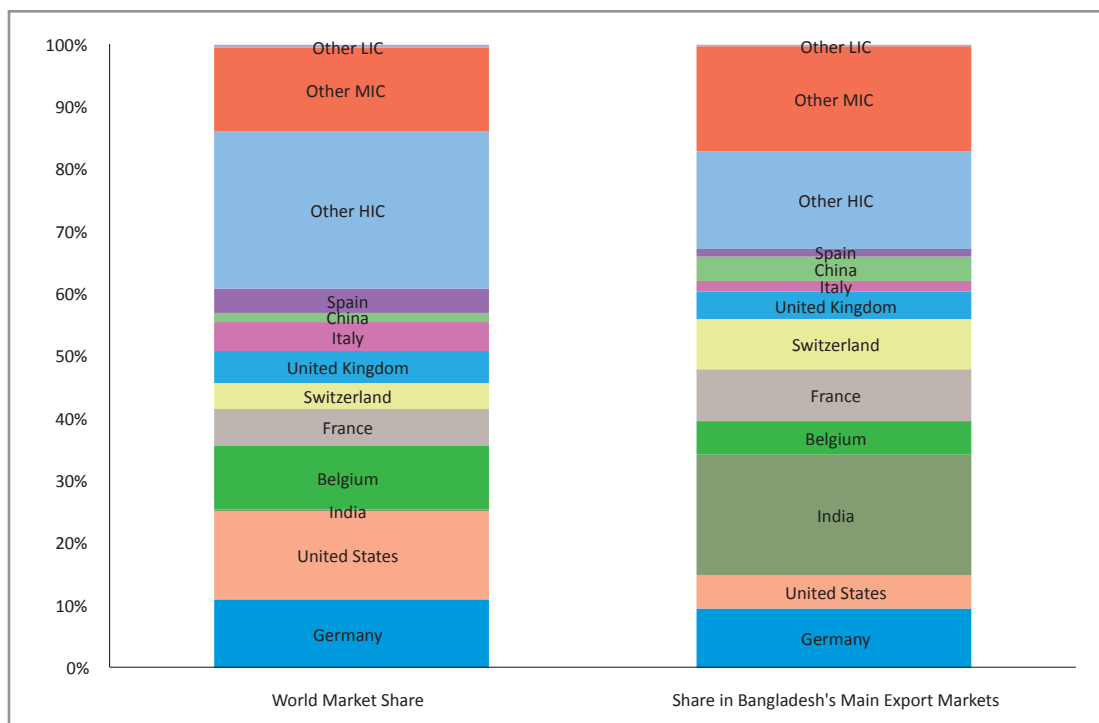
Source: COMTRADE and EPB

This pattern of exports reflects the low price positioning of Bangladesh's pharmaceutical exporters. Low prices are more important to prescribers and consumers in low and middle income countries than in high income countries. The lack of developed country regulatory approval for most of Bangladesh's pharmaceutical exports is a greater barrier to market access in high income regulated markets than in low income unregulated or lightly regulated markets.

Competition in global pharmaceutical markets is overwhelmingly dominated by exports from high income countries. However, if export markets are weighted by the significance they have for Bangladesh's exports, India, China, and other Middle Income Countries emerge as accounting for a substantially higher share. This reflects the fact that pharmaceutical exporters from these countries tend to target markets similar to those currently served by the industry in Bangladesh, with a similar market positioning based on low prices.

Rising competition and large scale exports (India: 6.1 bln USD, China: 4.5 bln. USD in 2010 (COMTRADE)) from these countries therefore poses a more significant threat to the industry in Bangladesh than competition from high income country producers. At the same time, the growth and transformation of the pharmaceutical industries in China and in particular India bears some interesting lessons for Bangladesh which will be discussed later in the report.

**Figure 13: Competitors in Global Market and in Bangladesh's Main Export Markets**

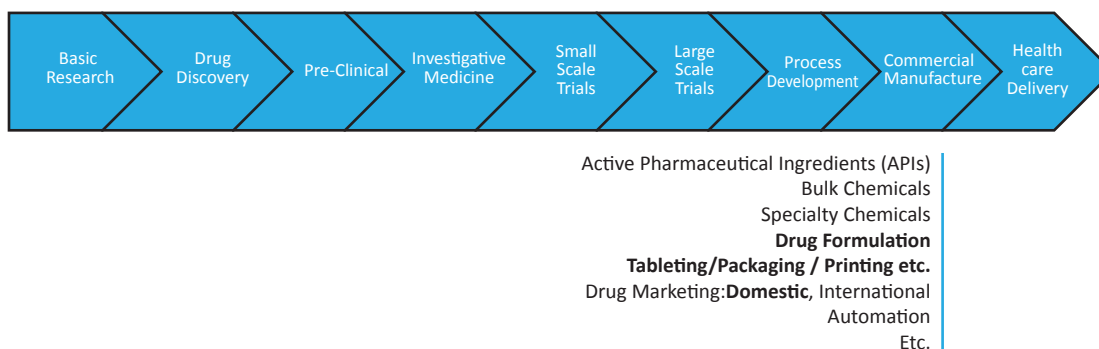


Source: COMTRADE and EPB

### Value Chain

The Bangladesh pharmaceutical sector's activities are mainly focused on just part of the global pharmaceutical value chain. Most of its activity is in drug formulation (combining ingredients), in putting the formulated drug into a form suitable for sale (tableting, pre-prepared injections, packaging, printing etc.) and in sales and marketing activities in the domestic market.

**Figure 14: Pharmaceutical Value Chain**



The country has very little activity in the stages of the value chain that precede the commercial launch of new pharmaceutical products, although there is some relevant medical research activity that could drive drug discovery, and there is also some activity in clinical trials.

A key issue for the sector is that it imports most of the ingredients for its products, including most Active Pharmaceutical Ingredients (APIs). However, the country's leading pharmaceutical businesses are investing in the capability to produce APIs domestically. Some APIs are now produced within the country, and the range is increasing. The government and industry are jointly planning the development of an "API Park" at Bausia, about 40km from Dhaka, to concentrate API process development and production in a single location. Services and infrastructure (such as an incinerator and an effluent treatment plant), can be shared. Approximately 40 pharmaceutical businesses are likely to establish API production in the Park. There are hopes that the API Park can become operational in 2012.

Pharmaceutical businesses moving into API production typically invest in process development activities, to develop or refine the chemical processes that they will use in API production, and to provide ongoing support to API production facilities.

In technology terms, the sector's products are almost all based on small molecule APIs, synthesised using chemical processes. The sector has had very little involvement to date in the large molecule APIs produced through biotechnology that have become a major focus for pharmaceutical innovation in recent years. The current push into API process development and production is mainly focused on small molecule APIs. The sector has significant activity in vaccines.

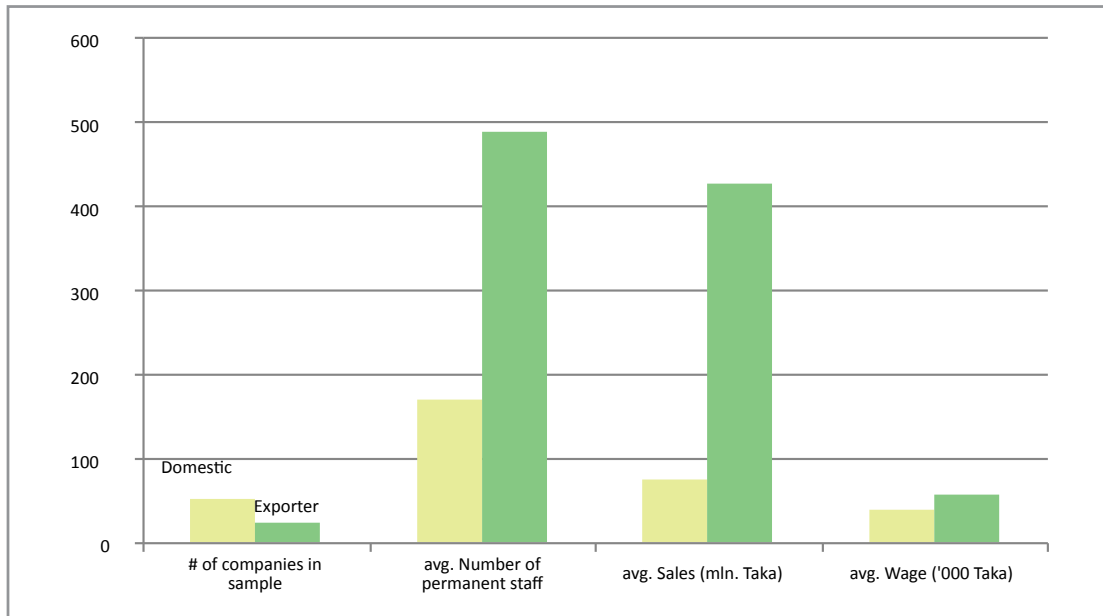
While the sector engages intensely in drug marketing within the country, it has little involvement in drug marketing in export markets. In most cases, Bangladesh businesses sell products to a distributor, which takes full responsibility for marketing and sales within the foreign country.

### ***Firm Level Characteristics***

The World Bank's Enterprise Survey of Bangladesh from 2007 makes it possible to profile firms in the sector. Exporting pharmaceutical companies employed almost 500 on average, while domestically trading companies employed an average of approximately 180.

Sales per worker were higher in exporting companies, which also paid their workers better on average.

**Figure 15: Firm Characteristics in Pharmaceutical Sector**

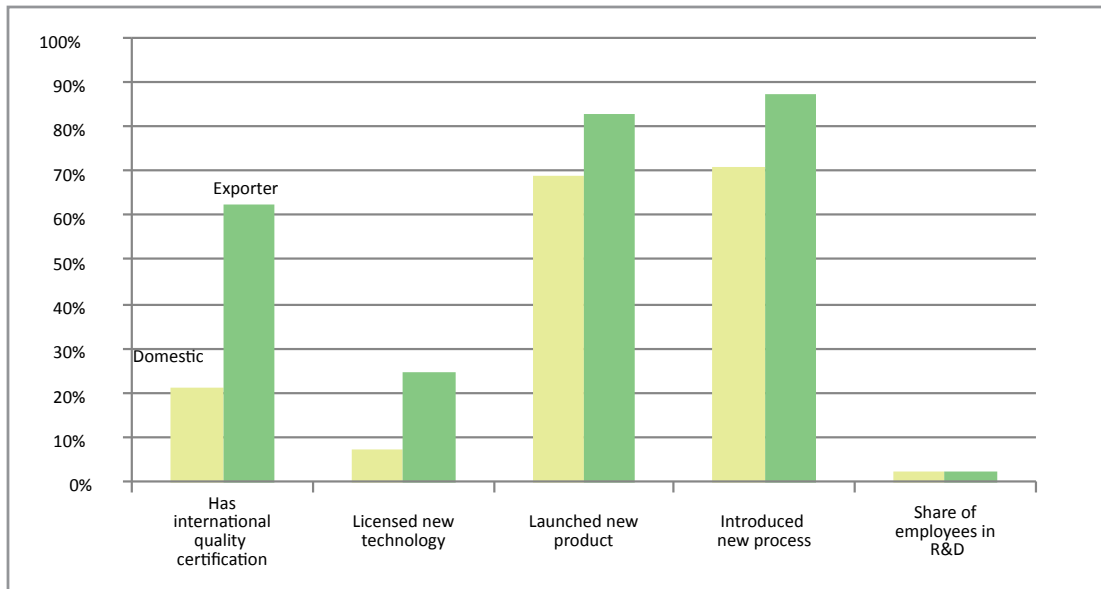


Source: World Bank Enterprise Survey Bangladesh 2007

More than 60 percent of exporting firms had some form of international quality certification, in comparison with just over 20 percent of domestically trading firms. 25 percent had licensed new technology, compared with 8 percent.

Exporting firms were more likely to have introduced a new product, although not by a large margin. The same applied to introducing a new process. Only about 2 percent of employees were involved in R&D, whether in the exporting or non-exporting sectors. These similarities between exporting and non-exporting companies seem to be because all companies were focused mainly on the domestic market. The differences seem to be mainly because larger companies were more likely to get involved in exporting to supplement their domestic market sales.

**Figure 16: Firm Characteristics in Pharmaceutical Sector**



Source: World Bank Enterprise Survey Bangladesh 2007

### ***Occupational Structure of Pharmaceutical Firms***

Table 2 shows the occupational structures of three sample pharmaceutical firms, from the interview survey.

Four broad groups are particularly noteworthy.

1. There are significant numbers of operatives – mainly in formulating and tableting, and in packaging and filling.
2. There are significant numbers in technician and similar roles, particularly in large companies.
3. There are significant numbers of chemists and pharmacists, particularly in the large and the medium company, reflecting the fact that a range of types of high level work are done by these professions.
4. There are very large numbers of sales and (in the case of the small company) marketing workers. This reflects mainly the emphasis on direct sales to retail pharmacies in Bangladesh.

**Table 2: Occupational Structure of Pharmaceutical Firms**

Occupational Position	Number of Workforce		
	Large	Medium	Small
Pharmaceutical operatives–formulating and tableting	9.8%	8.2%	8.1%
Pharmaceutical operatives–packaging and filling	4.5%	8.2%	4.6%
Pharmaceutical operatives–API processes	0.7%	2.7%	-
Factory supervisors	0.7%	1.6%	0.6%
Quality assurance and GMP / regulatory documentation workers	0.3%	1.6%	1.6%
Equipment technicians	8.4%	1	0.6%
Laboratory technicians	1.4%	1.4%	0.6%
Chemists and pharmacists	13.0%	8.2%	1.2%
Bioscientists	0.0%	0.5%	-
Chemical engineers	-	0.3%	-
Other engineers	2.4%	0.5%	0.9%
Regulatory affairs specialists	0.2%	0.3%	0.5%
Purchasing staff	0.7%	0.8%	1.2%
Marketing staff	3.1%	2.7%	20.3%
Sales staff	41.6%	54.6%	46.5%
Transport workers (drivers etc.)	2.9%	2.7%	2.3%
Administrative, clerical and accounting workers	7.4%	1.6%	5.8%
Workers in support roles such as catering and security	0.5%	1.6%	3.5%
Production managers and other factory managers	0.8%	0.8%	1.2%
General managers and other non-factory managers	1.5%	0.3%	0.6%

Source: Structured interviews with firms

### ***Business Structure, Networks and Clustering***

It is common for larger Bangladesh firms to have businesses in several unrelated sectors. This pattern extends to pharmaceuticals, where many businesses form part of larger firms with businesses in unrelated sectors. This contrasts with the ownership structure of pharmaceuticals businesses globally, which are mostly specialist businesses.

While diversified groups of unrelated businesses are generally considered to be inefficient in developed countries, this business structure has been found to often be very effective in developing countries. Studies suggest that “business groups act as substitutes for imperfect capital, labour, and product markets in many countries, thereby enjoying competitive advantages that are not available to independent firms” (Kim et al. 2004)<sup>12</sup>.

While competition for sales in the domestic market is intense, many of the leading pharmaceutical businesses are taking a cooperative approach to developing their capabilities, as exemplified by their joint work on the API Park. Some have indicated that they will cooperate in building up the range of APIs that are produced within the country, prioritising getting an adequate range of APIs into production for the sector as a whole over going into head-to-head competition, and supplying each other with the APIs that they need.

Collaboration on regulatory affairs seems likely to be a significant consequence of this. As noted later, Bangladesh’s pharmaceutical sector needs stronger capabilities in obtaining and maintaining regulatory approval to sell in regulated markets. Leading companies have a shared interest in having all APIs produced in the country approved for use in formulated drugs for these markets, and are likely to assist each other, even if only out of self-interest.

In a sector in which scale is important to operational efficiency and to the capability to compete internationally, these factors should benefit the sector by boosting the effective scale at which Bangladesh’s pharmaceutical businesses operate.

## **3.2 Business Environment**

### ***Possible End of TRIPS Exemption***

Along with other LDCs, Bangladesh has an exemption from the World Trade Organization's (WTO) Trade-Related Aspects of Intellectual Property Rights (TRIPs) agreement. The exemption is currently due to expire at the start of 2016. The TRIPs exemption allows Bangladesh (and other LDCs) not to provide patent protection for drugs that are required by TRIPs to be protected by patents elsewhere in the world.

The government of Bangladesh has proposed that the exemption should be extended to 2026, but it is not yet clear whether this will happen.

The chief benefit of TRIPs exemption to the sector in Bangladesh is that it allows companies operating in Bangladesh to develop generic versions of drugs that are under patent protection elsewhere, and to sell these products. They can be sold on the local market. They can also be sold in markets where the patent owner has not filed for protection, or to other LDCs or non-members of the WTO which have not implemented patent protection, which gives the sector some advantages in export markets.

A further benefit is that Bangladesh is now one of very few countries that can fulfil an export request for a compulsorily licensed pharmaceutical product originally patented after 2005. Under Article 31 of TRIPs, a government can over-ride a patent to compulsorily license a pharmaceutical product for public health reasons.

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<sup>12</sup> HICHEON KIM, ROBERT E. HOSKISSON, LASZLO TIHANYI, JAEBUM HONG, The Evolution and Restructuring of Diversified Business Groups in Emerging Markets: The Lessons from Chaebols in Korea, 2004, Asia Pacific Journal of Management

In some cases, Bangladesh companies that are already producing a generic version of a patented drug may have a head start in exporting it to global markets when it comes off patent protection.

Bangladesh has tariff-free access to the EU, USA and Japan for pharmaceuticals. It has reduced tariffs for exports to India and China under the South Asian Free Trade Area and the Asia Pacific Trade Agreement. This favourable market access is not related to TRIPs.

The benefits that the Bangladesh pharmaceutical sector derives from the TRIPs exemption are limited by the fact that it purchases most of its Active Pharmaceutical Ingredients (APIs) from countries compliant with TRIPs. Most of the APIs under patent protection that it purchases are therefore licensed by the patent holder, and this is reflected in prices paid.

The Bangladesh pharmaceutical sector is investing heavily in the capabilities needed to develop its own APIs. If the TRIPs exemption is extended it is likely that it will be able to replace many licensed in-patent APIs with its own generic versions, significantly cutting its costs. Conversely, if the exemption is not extended, some holders of pharmaceutical intellectual property might use their greater leverage to enter Bangladesh's domestic market, possibly limiting access by the Bangladesh sector to APIs, or to raise prices for APIs charged to Bangladesh businesses.

### ***Rapid Growth of Pharmaceutical Sector Activities in Emerging Economies***

One of the major trends in the global pharmaceutical sector is rapid growth in activity in emerging economies – notably India and China.

Both India and China have developed strong pharmaceutical industries that serve their domestic markets. Both have substantial and rapidly growing API production activity that both serves domestic market needs and forms the basis for large volumes of exports. A 2009 World Bank discussion paper<sup>13</sup> found that India produced 2 bln. USD of APIs, of which 75 percent was exported, while China produced 4.4 bln. USD of APIs, of which 77 percent was exported. Chinese firms are more likely to focus on chemical precursors for APIs, while Indian firms are more likely to focus on the final API manufacturing stage. Activity in both countries is increasing rapidly, driven both by increasing domestic demand for pharmaceuticals and by taking an increasing share of growing global markets for APIs.

The World Bank discussion paper argues that this is driven by cost advantages. It quotes research showing that the cost to develop, test, manufacture and market a generic medicine in India is 20 percent – 40 percent of the cost in the West.

In API manufacture, it points to lower costs for Indian and Chinese businesses, arising from: lower labour costs; lower energy and water costs; lower transport costs and transaction costs arising from a local network of suppliers for raw materials and

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<sup>13</sup> Exploratory Study on Active Pharmaceutical Ingredient Manufacturing for Essential Medicines, Janet Bumpas and Ekkehard Betsch, World Bank, September 2009.

intermediary products; and use of less expensive equipment that leads to lower depreciation costs. These advantages are only partially offset by much higher productivity in plants in developed countries associated with automation.

The paper also points to less onerous environmental regulations in China and India, but notes that this source of cost advantage will decrease in significance as regulations are tightened. It further points to Indian and Chinese firms more often operating at a large scale than their international competitors.

India has also become a major centre for clinical trials.

### ***Trends in Competitiveness Relative to China, India and other countries with low manufacturing costs***

Bangladesh's most significant source of competitive advantage in manufacturing industry is its low labour costs. Different sources make different estimates of the extent of Bangladesh's labour cost advantage relative to China and India, but all agree that it is substantial.

Bangladesh also claims a significant advantage in energy costs over competitors, arising from low natural gas prices.

A 2008 analysis estimated the cost of producing 1 mln. tablets in the US at 18,000 USD, in India at 8,000 USD and in Bangladesh at 6,500 to 7,500 USD.<sup>14</sup>

Bangladesh's advantage in labour costs does not, by itself, make Bangladesh a competitive location for industry, particularly in relatively capital intensive sectors such as pharmaceuticals. Deficiencies in infrastructure, weaker local supply networks and less advanced accumulation of knowledge and know-how in Bangladesh are among the factors that give industries in China and India compensating advantages.

However, Bangladesh's infrastructure is improving, and pharmaceutical companies are investing in their own knowledge and capabilities, and in developing local supply capacity (particularly in APIs). This appears to be narrowing the gap on non-cost factors.

It is not possible to be certain, based on the extent of research undertaken for this study, whether this advantage will be sufficient for success in global markets in competition with the pharmaceutical industries of other countries with low labour costs. Even just in terms of cost competitiveness, economies associated with scale and high utilisation of production facilities are important at the low cost end of the pharmaceutical market, and if firms in Bangladesh cannot match international competitors on this, this may do much to offset advantages on labour costs.

Non-cost dimensions of competitiveness (such as, for example, customer perceptions of quality) are also important, and pharmaceutical firms from Bangladesh are inexperienced in a range of areas where they will have to perform strongly for success in export markets. The need for stronger business capabilities in these areas, and the implications that this need has for skills, are major themes of this study.

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<sup>14</sup> Doing Business in Bangladesh, World Bank, 2008

## ***Rising Labour Productivity in Pharmaceuticals Sector***

Rising labour productivity will be a significant factor affecting pharmaceutical sector employment in Bangladesh into the future. Businesses will have to invest in newer equipment in order to meet international standards, and this equipment will be capable of producing substantially greater output relative to the number of operators employed.

This reflects a wider reality in the pharmaceutical sector globally that newer and improved technologies are continually improving productivity in the sector at a rapid rate as they are deployed. For any individual operation the increases in labour productivity tend to occur in jumps associated with investment in production equipment or in automation, but appear as quite rapid continual productivity growth when viewed at the level of the sector.

### **3.3 Envisioning the Future**

Demand for pharmaceuticals is increasing rapidly, with the value of international trade in pharmaceuticals growing at a rate well in excess of 10 percent per annum. Within the wider market for pharmaceuticals, demand for generics is also growing rapidly. The global market is reported to have been worth 108 bln. USD in 2009, projected to rise to 129 bln. USD in 2014. This represented 13.3 percent of the global market for pharmaceuticals by value in 2009.<sup>15</sup>

As noted earlier, demand from middle income countries is rising faster than for developed countries. This is driven by faster growth and increasing investment in healthcare in these countries.

While this market represents an attractive opportunity for a pharmaceutical sector with the right capabilities, competition in the market is already strong. The generics industry is well established globally. Existing players have efficient production facilities producing drugs that are already approved by regulatory authorities in developed countries. They have a history of strong investment in marketing, and in many cases have generic brands that are well established in the main markets.

It is relatively easy to take a small share of the global market in the face of this sort of competition, by focusing on the most price sensitive segments and giving attractive terms to intermediaries already embedded in the markets, as the Bangladesh pharmaceutical sector has done so far. Taking a bigger share in the face of competition from the generic sector's incumbents will be much more challenging.

It is not possible to be precise about where the best opportunities for the Bangladesh sector lie.

- Its position as a low-price supplier will suit the medium income and low income countries where it has had most of its exporting success to date, and its sales and marketing experience in its own domestic market may be applicable in some of these markets.

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<sup>15</sup> The share by volume would have been much greater than this, as prices for pharmaceuticals tend to fall once generic versions are released, and prices for generics with many sources may be very low by reference to original price of the patent-protected drug.

- However, there may also be opportunities in wealthier markets. In many cases, market prices for generic drugs are still much higher than the likely cost of production and distribution from Bangladesh, leaving room to undercut established generic brands, or to supply on a subcontract or outsourced basis. Relatively low labour costs in Bangladesh may make the cost of developing and gaining approval for a generic less than among its competitors, making small product market segments viable that might not be worthwhile to competitors with higher costs.

While there are clearly good opportunities available to the sector, there are also threats. The sector currently depends on foreign suppliers of APIs for most of its products. Continuity of supply and the cost of these inputs depends on suppliers whose interests may not all be well aligned with the Bangladesh sector's development plans. This poses threats that the sector is endeavouring to address by establishing its own API production capacity. The effectiveness of this strategy will depend in part on the efficiency of Bangladesh API production operations.

The Bangladesh Pharmaceutical Industry Association has set out a vision of growth for the future, called Pharma Vision 2015.

Major points set out in the vision include.

- "To safeguard public health of 160 mln. people (i.e. Bangladesh's population) by providing quality product to be produced by all companies"
- "To become a global hub for pharma industry"
- "To export generic products worth USD 5 bln.
- "To get approval for 30 companies by the regulatory authorities of developed countries"
- "To get DMF/EDMF<sup>16</sup> of API for 40 API producing companies"

Key elements of the wider context for these objectives are as follows.

- Leading businesses are investing heavily in developing the capability to produce the APIs they require, rather than having to rely on imports. This requires both investment in skills-intensive process development that requires high level skills in pharmaceutical chemistry, and more capital intensive investment in the chemical process equipment required to implement the process. As noted earlier, there are plans to centralise API activities at an API Park that is being developed by the government of Bangladesh.
- Businesses are working on implementing international standards in their operations by implementing Good Manufacturing Practice (GMP), and are moving to comply with requirements for approval of their products by the regulatory agencies of major markets such as the US (Food and Drug Administration) and the EU (national agencies and the European Medicines Agency).

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<sup>16</sup> A DMF or Drug Master File is confidential documentation submitted to a regulator by a pharmaceutical manufacturer as part of the process of gaining regulatory approval.

- Many businesses are aiming for strong export growth over the next few years. They see a large and growing global market for generic pharmaceuticals, and believe that they are well positioned to take a significant share of the market. They see that similar industries in other countries with low costs, notably India, have been successful in taking share from producers in developed countries. They believe that they can quickly develop their capabilities to the point where their exceptionally low labour costs allow them to compete internationally on a large scale.
- Based on the above, they anticipate very strong growth in sales. 5 bln. USD of exports by 2015 is very ambitious, representing compound growth in exports of over 250 percent per annum between 2010 and 2015, and should possibly be regarded as aspirational rather than a firmly founded projection of what is feasible. It is clear, however, that the vision is for very strong growth in exports, even if the actual growth achieved is significantly less than this.
- The impact of this sort of growth on employment will be complex.
  - o Unit labour productivity in existing production operations producing finished products from ingredients is not very high by global standards. Many companies are investing in new production equipment as part of implementing Good Manufacturing Practice, reducing the number of workers needed in existing operations per unit of output to a level more consistent with international practice. As a consequence, employment of lower skilled workers in this area will not rise in proportion to the increase in sales. Depending on the actual rate of growth in exports, it is possible that improvements in labour productivity could outpace increases in output, leading to net job losses among this group of workers.
  - o New API development and production activities will employ significant numbers of additional scientists, engineers and technicians. The Bangladesh Small and Cottage Industries Corporation, which is developing the API Park, has said that it anticipates employment of 25,000 at the Park.<sup>17</sup>
  - o The profile of sales and marketing employees for products destined for export will be quite different to that for the domestic market. The sector employs relatively large numbers of sales people to sell directly to pharmacies within Bangladesh. It will use more intermediaries in international markets, which will require much fewer direct employees per unit of sales, but will require people who are more highly skilled.

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<sup>17</sup> [http://www.thefinancialexpress-bd.com/more.php?news\\_id=100496&date=2010-05-19](http://www.thefinancialexpress-bd.com/more.php?news_id=100496&date=2010-05-19)

- o If this vision of the future is realised, it seems likely that the net effect on employment will be to add some thousands of jobs to the sector over the next five years, and that there will be some shift in the composition of employment away from low skilled jobs and in favour of medium skilled and high skilled jobs.

### **3.4 Gaps in Business Capabilities Required to Meet Objectives**

If the Bangladesh pharmaceutical sector is to meet the objectives outlined above, it will have to bridge a number of gaps between the business capabilities it has now and the business capabilities required to meet the objectives.

The interviews and analysis undertaken point to seven main capability gap areas. These are capabilities in:

1. Good Manufacturing Practice
2. Regulatory affairs and compliance
3. Producing APIs
4. Biologics
5. Export marketing, product management, channel management
6. Clinical trials
7. Regulation

#### ***Gaps in Business Capabilities - Good Manufacturing Practice (GMP)***

Good Manufacturing Practice is a set of principles for the manufacture of drugs and active pharmaceutical ingredients, often backed up by specific regulations and guidelines. It is abbreviated to GMP or cGMP (current Good Manufacturing Practice). It is necessary for pharmaceutical firms to implement Good Manufacturing Practice principles and practices in order to bring the sector in line with international standards. This is necessary for access to regulated markets, and is required to position Bangladesh as a source of high quality pharmaceuticals for unregulated and lightly regulated markets. It is also required under the 2005 National Drug Policy, which states that the WHO's current Good Manufacturing Practices should be strictly followed and that manufacturing units will be regularly inspected by the Directorate of Drugs Administration (DDA).

Reputation is important in pharmaceutical markets, and reputational problems in one part of Bangladesh's pharmaceutical sector could damage other parts of the sector, both in export and domestic markets.

Some of the sector's leading firms have already made good progress on implementing Good Manufacturing Practice, with some leading firms already holding certifications from developed country certifiers. Exporting firms, and those with ambitions to establish themselves in export markets, will have to implement Good Manufacturing Practice rapidly across all their pharmaceutical operations. It is likely that other firms will have to follow if they are to continue to operate.

All companies consulted rated Good Manufacturing Practice as critically important or very important to their future success. All large companies rated it as critically important.

55 percent of large companies interviewed rated quality management as critically important, and 30 percent as very important to their future success. All medium companies rated it as very important. Among small companies, 10 percent rated it as critically important and the other 90 percent as very important.

45 percent of large companies interviewed rated efficient manufacturing operations as critically important, and 45 percent as very important to their future success. All medium companies rated it as very important. Among small companies, 40 percent rated it as critically important and 50 percent as very important.

### ***Gaps in Business Capabilities - Regulatory Affairs and Compliance***

Access to the major developed country markets for pharmaceuticals is subject to gaining approval under rules-based regulatory systems. Even for generic drugs that substantially replicate drugs already approved, gaining and retaining approval under these regulatory systems is challenging and imposes significant costs. However, the rules-based nature of the systems tends to level the playing field between producers in developing and developed economies by making the requirements for market access explicit and non-discriminatory. Once developing country producers comply with the same rules as their developed country competitors, they can gain approval, and get access to the market.

In addition to providing access to developed country markets, gaining approval for a drug in regulated markets serves as a useful signal of quality for the unregulated and medium regulated markets that are, and should continue to be a major destination for Bangladesh's pharmaceutical exports.

Obtaining and retaining regulatory approval for generic drugs requires not just that the producer demonstrates that the product is equivalent to the already-approved drug being copied, and properly manufactured. It also requires that this is documented thoroughly in ways that satisfy the regulator.

This requires strong capabilities in regulatory affairs and compliance. Parts of these capabilities are general, in the sense that the different developed country regulatory systems have much in common, and require broadly similar approaches by the firm seeking and maintaining approval. Parts are also specific, in the sense that there are significant differences between systems, and the know-how required to deal with each regulator is different.

Some of Bangladesh's pharmaceutical firms have small numbers of drugs approved for regulated markets (mainly in Europe), but even these need stronger capabilities in regulatory affairs, to allow them to obtain and maintain approvals for additional drugs cost-efficiently and time-efficiently, and to ensure that approvals are consistent with using efficient production processes and cost-effective approaches to sourcing raw materials. Other firms with exporting potential, and all API-producing firms, will need to invest in strong capabilities in the area.

70 percent of large companies interviewed rated regulatory approvals as critically important, and 30 percent as very important to their future success. Among medium

companies, all rated it as very important. Among small companies, 25 percent rated it as critically important, 50 percent as very important, and 25 percent as a little important.

60 percent of large companies interviewed rated regulatory compliance as critically important, and 40 percent as critically important to their future success. Among medium companies, all rated it as very important. Among small companies, 40 percent rated it as critically important, 40 percent as very important, and 20 percent as a little important.

### ***Gaps in Business Capabilities - Producing APIs***

Bangladesh's pharmaceutical sector is making a major strategic move into producing the APIs it requires, rather than importing them. Concerns about cost and security of supply of APIs are important concerns behind this move. Bangladesh pharmaceutical firms see sourcing of critical inputs as a challenge that is of major strategic importance to them.

It seems logical that this might eventually lead to significant exports of generic APIs as well as of finished pharmaceutical products using the same APIs.

Producing APIs requires a range of capabilities that notably includes:

- Process development, to produce the required chemical efficiently and reliably;
- Process scale-up, taking the process from laboratory to an industrial scale;
- Process plant design and installation, to design and install the equipment and software required to implement the process at industrial scale;
- Process operation, using the process to convert raw materials into a pure form of the API.

Some of the leading firms in the sector already have some APIs in production, and are investing heavily in process development to produce more. Plans to have approximately 40 firms operating out of the API Park imply a considerable scaling up of this activity, both in terms of the number of firms producing APIs and in terms of the scale of activity by those firms already active in the area. More companies will need API-related capabilities, and many of those that already have significant strengths will need to further strengthen their capabilities.

Bangladesh's Board of Investment indicates that Bangladesh imports about 80 percent of its APIs, implying that it produces about 20 percent itself.

30 percent of large companies interviewed rated process development for chemical/small molecule APIs as critically important, and 30 percent as very important to their future success. Among medium companies, none rated it as more than a little important. Among small companies, 40 percent rated it as very important.

The importance of API development is closely tied to that of sourcing. Even a business that has little interest in developing APIs itself, has an interest in a cost-efficient local source of supply of key inputs. 60 percent of large companies interviewed sourcing inputs as critically important, and 40 percent as very important to their future success. Among medium companies, 75 percent rated it as very important. Among small companies, 50 percent rated it as critically important and another 25 percent as very important.

### ***Gaps in Business Capabilities - Biologics***

In addition to producing small molecule APIs using chemical processes, some firms have ambitions to move into large molecule, biotechnology based APIs. At least one major firm produces a finished biotechnology product for the domestic market based on an imported API (insulin).

There is already significant activity in vaccines in Bangladesh, and capabilities in the area appear quite strong.

Bio-technology-based products are a major focus of innovation for the global pharmaceutical sector, and the number coming off patent will increase in future years.

It is much more challenging to develop and gain approval for biotechnology-based generics than for small molecule APIs, and they are not yet an important focus of the major generic pharmaceutical sectors in other low cost economies, such as in India. Most biologics are still made in developed countries.

While generic biotechnology-based APIs will be difficult, the rewards for success could be substantial. Significant barriers to entry make this a relatively high margin part of the market for pharmaceuticals, and there is a prospect of being among the early movers among countries with low costs. An early mover positioning frequently leads to greater market share and higher profitability over a product category's life cycle.

At headline level, the broad types of capability required for biotechnology-based APIs are similar to those for small molecule APIs, but the specifics are based on biosciences rather than chemistry, and major differences in equipment requirements mean that the capabilities required to design and install production capacity are different.

30 percent of large companies interviewed rated process development for biotech/large molecule APIs as critically important, and 55 percent as very important to their future success. Among medium companies, none rated it as more than a little important. Among small companies, 30 percent rated it as critically important and another 30 percent as very important.

55 percent of large companies interviewed rated vaccine process development as critically important, and 30 percent as very important to their future success. Among medium companies, all rated it as very important. Among small companies, 40 percent rated it as critically important and another 40 percent as very important.

### ***Gaps in Business Capabilities - Export Marketing, Product Management, Channel Management***

The Bangladesh pharmaceutical sector has significant strengths in marketing, but its experience is mainly in the domestic market. It mostly sells directly to pharmacies, so experience with managing distribution channels operated by other businesses is limited.

While firms in the sector sell to a number of export markets, their involvement in the market is most often quite distant – selling to an agent or distributor that takes full control over marketing and distribution of the products in-country, and passes very little information back to the Bangladesh supplier.

While this approach to export marketing may be viable when the intention is to gain incremental sales without much investment, deeper engagement with markets will be required to grow sales sustainably, and to maximise the economic return.

There is no single optimal approach to this. In some cases, selling through an exclusive agent may be best. In other cases selling directly to the main pharmaceutical distributors in the country may be preferable. In some cases, it may be best to delegate marketing and promotion activities to an agent. In other cases, it may be preferable for the Bangladesh firm to take lead responsibility for sales and marketing. Many of the firms consulted for this study indicated that they were considering establishing sales operations in key markets.

At a minimum, it will be necessary for the Bangladesh firm to have an involvement in setting or approving market strategies, including pricing strategies, to ensure they are aligned with the Bangladesh firm's interests, and to ensure that the benefits of low factory gate prices do not only accrue to an agent or distributor.

Some aspects of pharmaceutical marketing have substantial economies of scope and scale. Marketing organizations selling large ranges of pharmaceuticals in significant volumes are often much more cost efficient than otherwise similar organizations selling smaller ranges in lower volumes. Given the fragmented character of the sector, with fairly large numbers of firms exporting or with ambitions to export, it seems likely that there will be scope for at least some firms to collaborate on export marketing to take advantage of these economies of scope and scale, perhaps forming marketing groups for this purpose. Negotiating these issues effectively will require firms to develop much stronger capabilities in areas of marketing, including export marketing, product management (responsible for making commercial and marketing decisions about specific products) and channel management (responsible for managing the distribution channels through which products reach the market).

30 percent of large companies interviewed rated international marketing as critically important, and 55 percent as very important to their future success. 25 percent of medium companies rated it as critically important and 25 percent as very important. Among small companies, 10 percent rated it as critically important and 50 percent as very important.

60 percent of large companies interviewed rated international distribution channel management as very important to their future success. 50 percent of medium companies rated it as very important. Among small companies, 10 percent rated it as critically important and 40 percent as very important.

30 percent of large companies interviewed rated brand development as critically important, and 40 percent as very important to their future success. 50 percent of medium companies rated it as critically important and the other 50 percent as very important. Among small companies, 20 percent rated it as critically important and 70 percent as very important.

By comparison, 15 percent of large companies interviewed rated marketing within Bangladesh as critically important, and 55 percent as very important to their future success. 25 percent of medium companies rated it as critically important and 25 percent

as very important. Among small companies, 21 percent rated it as critically important and 50 percent as very important.

### ***Gaps in Business Capabilities - Clinical Trials***

Clinical trials are important to the future of the sector for two reasons:

1. Regulatory approval of generic pharmaceuticals by the main developed country regulators requires bioequivalence testing to confirm that the active ingredient of the new generic will be similar in efficacy and safety to a comparator product that has previously been approved. This involves testing in a sample of healthy humans. The large numbers of generic drugs requiring testing for regulatory approval will generate a substantial demand for bioequivalence testing from the Bangladesh pharmaceutical sector. A base of local suppliers of bioequivalence laboratory services could supply this service at lower cost than international competitors.
2. Clinical trials represent an enterprise development opportunity in their own right. India has become a major global player in this part of the pharmaceutical value chain, based on characteristics (large population, low costs, lack of universal access to high quality medical services) that are shared with Bangladesh to a significant extent. There may be room for Bangladesh to become a significant player too.

So far, Bangladesh's clinical trials sector is small. Even if it only to service the need for bioequivalence testing, it will need stronger capabilities.

70% of large companies interviewed rated clinical trials as critically important, and the remaining 30 percent as very important to their future success. 50 percent of medium companies rated it as very important. Among small companies, 10 percent rated it as critically important and 30 percent as very important.

### ***Gaps in Business Capabilities - Regulation***

Ensuring that standards across the whole pharmaceutical sector in Bangladesh rise to international standards will require more demanding and intrusive regulation of the sector. While this is partly a matter of changing regulations, it is also a matter of upgrading the capability of the regulatory system.

## **3.5 Implications for Types of Skills Needed**

Each of the gaps in business capabilities identified has skills aspects. These are discussed for each business capability gap.

### ***Implications for types of skills needed - Good Manufacturing Practice (GMP)***

A programme to implement Good Manufacturing Practice in a pharmaceutical firm has implications for skills throughout its manufacturing operations.

It reshapes the work involved, thereby modifying skills needs, in all major production-related occupations, notably including:

- Operatives and production technicians
- Laboratory technicians
- Production managers
- Chemists and pharmacists
- Engineers (production, chemical, mechanical, electrical, software/computer/automation etc.)

It also increases the requirement for quality assurance and documentation specialists, and may change the work they do significantly.

The training required for the transition to Good Manufacturing Practice, and for its upkeep, will create a need for significant numbers of specialist trainers.

### ***Implications for types of skills needed - Regulatory Affairs and Compliance***

Gaining regulatory approval for substantial numbers of products across a range of developed country regulatory systems will create a need for significant numbers of highly skilled regulatory affairs professionals. As noted earlier, capability requirements are a combination of general regulatory affairs capabilities applicable across all regulatory systems, and specific capabilities relevant to specific regulatory systems. This is reflected by a need for regulatory affairs professionals who have both general skills and skills specific to one or more of the regulatory systems with which their firm engages.

There is also a more general need for managers, scientists, engineers and other professionals to acquire basic skills in regulatory affairs, to help them comply with regulatory requirements and take proper account of regulatory considerations in their decisions.

More broadly, there is a need for managers and workers to adopt a mindset of strict compliance with regulations, accurate paperwork and rigorous implementation of Good Manufacturing Practice. For some firms, this will mean no change. For others, the change will be significant.

### ***Implications for types of skills needed - Producing APIs***

The main skills associated with each of the main business capabilities associated with APIs are:

- Process development: High level skills in chemistry and pharmacy, from bachelor degree to PhD level, with a need for support from chemistry technicians.
- Process scale-up: More high level skills in chemistry and pharmacy, from bachelor degree to PhD level, plus chemical engineers, again supported by chemistry technicians.

- Process plant design and installation: Engineers and technicians from a range of engineering disciplines, including chemical engineering, mechanical engineering, electrical engineering, software/electronic/automation engineering and instrumentation engineering.
- Process operation: Skilled operatives and production technicians, laboratory technicians, chemists, pharmacists, production supervisors/team leaders, quality assurance and documentation specialists and production managers.

As activity should increase substantially in all these areas, demand for all these types of skill should be strong.

### ***Implications for types of skills needed - Biologics***

The immediate requirement if a firm wishes to work on generic biotechnology-based APIs is for high level biosciences skills, from bachelor degree to PhD to work on developing biotechnology solutions to producing the biologics. A mix of biosciences disciplines is required, which is likely to at least include biochemistry, microbiology, cell biology, genetics and biotechnology. The content of these disciplines overlaps to significant extent. Specialist support from technicians is required to help the equipment.

Over the longer term, if the firm is successful in developing and gaining regulatory approval for a generic biologic, a key requirement will be for bioprocessing technicians to operate the production processes, along with the laboratory technicians, pharmacists, bioscientists, production supervisors/team leaders, quality assurance and documentation specialists and production managers.

These requirements overlap to a significant extent with the skills required for vaccine development and production, so Bangladesh already has some relevant strengths in the area.

### ***Implications for types of skills needed - Export Marketing, Product Management, Channel Management***

The need here is for marketing and sales skills at a variety of levels, from call centre staff to process orders and deal with routine issues to senior executives capable of setting international marketing strategies, running effective international sales and marketing operations, and establishing and managing relationships with agents and distributors in international markets.

There will be a significant requirement for marketing professionals with skills in export marketing, product management and channel management. All of these will require some specialist expertise in pharmaceuticals, with product managers needing significant knowledge of pharmaceutical sciences, healthcare and regulatory affairs as well as marketing.

### ***Implications for types of skills needed - Clinical Trials***

Major areas of skill in clinical trials include:

- Clinical trials managers
- Statisticians
- Scientists (various branches of the human health sciences)
- Regulatory affairs professionals

Much of the practical work in clinical trials is done by medical professionals and medical care teams in mainstream healthcare settings, with that work being coordinated by clinical trials managers. Statisticians play a key role in the design of trials and the interpretation of data. Scientists in the human health sciences are centrally important to the design and overall management of trials, to obtaining meaningful results and to ensuring the safety of participants. Some regulatory affairs professionals are required to ensure that trials meet regulatory requirements.

Some types of testing, including bioequivalence testing, are undertaken with healthy test subjects, allowing testing to be centralised rather than undertaken wherever patients happen to be located in the general healthcare system. A centre undertaking bioequivalence testing requires laboratory technicians to operate equipment, with the testing process led or overseen by scientists or healthcare professionals.

### ***Implications for types of skills needed - Regulation***

Upgrading the capabilities of Bangladesh's pharmaceutical regulatory system is likely to require more staff. The work will be demanding, requiring strong skills relating to regulation and strong scientific and technological skills in relevant disciplines, such as pharmacy. At least a proportion of the senior staff should be educated to doctoral level.

It is a characteristic of regulation globally, across all sectors, that it is difficult for regulators to reconcile facilitating the development of the regulated sector with the need for rigour in regulation. It requires high calibre, strong minded leadership to understand what may compromise the regulatory system, and to prioritise the sector's long term interests over short term convenience by refusing to bend to persuasion, pressure or established convention. It also requires high calibre leadership to recognise problems with the regulatory system that add no value, and to rectify these openly.

## 3.6 Projected Skill Demand Versus Current Supply

### *Recruiting New Workers*

It has not been feasible within the scope of this study to undertake a thorough analysis of the supply of relevant skills in Bangladesh. The research relies, instead, on assessments by industry as to the adequacy of the supply, and on expectations by industry as to how the balance between supply and demand will develop into the future. Assessments such as these generally form an important input into analysis of the adequacy of skills supply in any case, as estimates of skills supply and demand made without reference to industry knowledge often turn out not to be comparable in practice.

Despite pharmaceuticals in Bangladesh being positioned as a low cost sector relative to its international peers, within Bangladesh it is an attractive employer that offers good pay and stable employment, at least among medium sized and large firms. It allows university graduates to make good use of their skills and knowledge, and offers good opportunities for career development. Its access to labour is not greatly constrained by competition from other sectors, and is unlikely to be so constrained over the medium term future.

Even so, the supply of skills is not as strong as many firms in the sector would like. Larger firms are positioned better than smaller firms to attract the best people, and to provide training to address skills deficiencies, so smaller firms face more pressing skills challenges.

The main hiring difficulties highlighted by large firms are in recruiting for high level management positions. This is a fairly common feature of fast-growth industries in economies that are developing rapidly – they have not had the opportunity to build up a base of high level talent. Larger firms are able to recruit people from the best institutions, and with the best academic records. As they have the capacity to provide appropriate training to their people.

In medium sized firms, unfilled vacancies exist for every type of role, but the numbers of vacancies are small. The vacancies appear to be mainly a consequence of finding experienced people during a period of rapid growth. Medium sized firms highlight shortcomings in technical knowledge and experience among prospective recruits

Small firms in the sector consulted say that they have difficulty in recruiting and retaining people at all levels because their pay structures are not seen as attractive, and because of cashflow problems. They can recruit workers and entry level graduates, but they have difficulty in recruiting enough experienced workers, or professionals for mid-level and top level management positions. This pattern of small firms being squeezed by competition from larger better resourced firms for experienced talent is familiar emerging high growth sectors internationally.

The overall view from firms is that the supply of new bachelor level graduates in relevant scientific and engineering disciplines is sufficient. Some have indicated that they do not anticipate shortages in future, although the view was expressed in one workshop that there is a need for more courses in pharmacy.

According to the Board of Investment, “six public and 16 private universities offer BSc and MSc courses relevant to the pharmaceutical sector. The total number of graduates each year in each discipline is as follows:

- Pharmacy - 660
- Chemistry - 360
- Microbiology - 150
- Applied Chemistry - 120
- Chemical Engineering – 210”

We suggest that the sector should undertake analysis to confirm that the supply of graduates is adequate, taking account of the needs of firms of all sizes, as the planned rapid ramp up of activity in APIs could cause a substantial jump in demand for skills used in process development, scale-up, plant design and installation and operation.

For the very highly skilled people required – people with a good quality PhD and/or with long industry experience – sources in the sector suggest that Bangladesh’s diaspora includes significant numbers of such people, and that many of them are interested in moving home if a good opportunity appears. This would be consistent with the experience of other countries with a history of high skilled emigration, where returning emigrants have made an important contribution to the development of their sector. A well-known example is in the Indian information technology sector, where studies have found many professionals moving to the US after graduation, and returning to India later in their career.

### ***Skills of Existing Workers***

Large companies consulted are broadly happy that the skills of their existing workforce are appropriate to their existing needs. One area where they highlight a need for improvement is in sales management (managing the work of sales people).

Priority areas mentioned by large companies for skills improvement include: skills relating to improving productivity; institutionalizing international best practices like cGMP (Good Manufacturing Practice); information technology; and presentation and communication skills.

Barriers mentioned by large companies include: scarcity of skilled and competent trainers; limited budgets for human resources development; slow adaptability of workers; lack of good infrastructural facilities for training and development; indifference of managers; lack of a standard compensation policy with a company; lack of availability of appropriate vocational training provision; and people being very busy with their existing workload.

All of the large companies consulted provide necessary training. Multinational companies have global trainers, resources and modules, but local companies are constrained by a lack of resources.

Medium sized companies consulted are broadly satisfied with the skills of their existing workforces, but see a need for more training in GMP (Good Manufacturing Practice), product development, compliance and regulatory management. Key areas where they

would like to improve include improving selling skills, improving management skills and developing the capacity of employees in technical areas.

Barriers to achieving improvement they identify include: scarcity of skilled and competent trainers; limited financial capacity to fund extensive training; risk that trained employees will move to a different employer; insufficient pre-existing technical knowledge and training; and concerns about the possible business impact of unethical practices in the sector.

All of the medium sized companies consulted provide suitable training, but there is lack of suitable trainers in the market.

Small companies consulted are not satisfied with the skills of their existing workforces. Key areas where they would like to improve include sales management, operations productivity and technology skills.

Barriers they identify include lack of financial resources, lack of qualified trainers and lack of skilled management. All companies consulted provide suitable training, but say there is a lack of suitable trainers.

### **3.7 Proposed Response to Future Skills Needs**

The business capability and skills improvements required by the Bangladesh pharmaceutical sector are extensive. The responses required are also extensive. In many areas, different options are available, or it may be necessary to use a combination of approaches.

#### ***Pharmaceutical Industry Skills Council***

There is a significant range of organizations that are interested in the development of skills in the pharmaceutical sector. These include a number of industry organizations, representatives of workers in the sector, several government ministries and government agencies, and providers of education and training that provide skilled workers or services to the sector.

Bangladesh's Skills Development Policy, approved by the Government of Bangladesh in 2011 envisages the formation of Industry Skills Councils to "bring together major enterprises and industry bodies in an industry sector to discuss skill development issues affecting their industry sector".

It envisages that the Industry Skills Councils would have the following range of functions.

- a. Monitor and review skills development practices in the industry sectors and identify and overcome deficiencies;
- b. Develop industry specific skills development policies and practices;
- c. Develop industry's capability to deliver the skills training and upgrade their employees in order to improve productivity and enhance the welfare of employees;
- d. Provide leadership and strategic advice to the skills system on skills development needs and priorities for those industry sectors covered by the council;
- e. Support the delivery of industry relevant training and/or professional development programs for instructors and trainers;

- f. Contribute to the development and review of skills standards and qualifications and participate in the development and review of new training curriculum;
- g. Advise the National Skills Development Council on the industry sector demand for skills;
- h. Advocate and facilitate workforce development activities in industry;
- i. Produce sector skills development plans as required on a regular basis;
- j. Support strengthening of industrial apprenticeship programs; and
- k. Develop partnerships with training providers and support improvement of skills programs in schools, colleges, industry and enterprises.

An Industry Skills Council for the pharmaceutical sector, with these functions, will provide an ideal mechanism to bring together the various interested organizations and groups to perform these functions for the sector, and to approve (or reject), prioritise between, refine and coordinate the implementation of the detailed responses suggested by this study.

### ***Technical Assistance***

Many of the proposed responses set out here could usefully be supported by technical assistance from international partners, including the ILO.

### ***Response - Good Manufacturing Practice (GMP)***

Developing skills in Good Manufacturing Practice cannot be separated from implementing GMP. To the extent that it has not already been implemented in full, all firms should have GMP change programmes that incorporate training for all their existing staff involved in operations. There will continue to be a need for periodic training to update or reinforce skills once GMP is in place.

There will also be a need for GMP skills to be incorporated in training for new staff.

Key groups to be trained include;

- All operatives
- Production supervisors
- Production technicians
- Laboratory technicians
- Production managers
- Quality assurance and documentation specialists
- Scientists and engineers involved in production.

Based on the research, it is clear that the availability of suitable training capacity within Bangladesh could act as a brake on the adoption of GMP. There is, therefore, a need to develop capacity to provide GMP training on an adequate scale. The training needs are fairly similar across companies, although some elements of the training required are specific to the individual company's production processes and documentation systems.

There is, therefore, scope for joint action. Strategies could include some combination of the following:

- Development of new TVET level qualifications aimed at operatives and technicians that emphasise GMP. This could be the subject of future ILO technical assistance – similar qualifications have been developed in other sectors by the TVET Reform Project. It could include the development of a set of industry standard training materials.
- Collaboration between the industry and education and training institutions to develop courses in GMP at various levels. A suggestion was made at one workshop that there is a need for diploma courses in GMP for professionals working in the sector.
- Establishment of a Centre of Excellence, similar to that established in the food processing sector, in which the TVET Reform Project is active, to provide training and advice.
- Collaboration between firms to establish a system of private training provision in GMP, perhaps by encouraging international providers of professional services relating to GMP to establish Bangladesh-based operations, or perhaps by encouraging the development of local training service providers. Encouragement could come in the form of advice and a (time-limited) guarantee of a predictable stream of business.

### ***Response - Regulatory Affairs and Compliance***

It is likely that some combination of the following approaches will be appropriate in responding to the need for skills in regulatory affairs for regulatory affairs professionals, and for other managers and professionals working in the sector.

- The main international regulatory affairs professional societies provide training services and networking opportunities.
- Various international services firms provide advice and training on regulatory affairs. Bangladesh pharmaceutical companies may be in a position to use their services to assist in accumulating the expertise they require within the country.
- Providers of education and training, such as universities, can include regulatory affairs content within courses such as bachelors and masters courses in chemistry and pharmacy.
- Universities could provide courses in regulatory affairs and compliance for managers and professionals, possibly in the form of a diploma, or at masters level.
- There should be scope to establish a network of regulatory affairs professionals within Bangladesh, possibly centred on the planned API Park, to provide mutual support and learning opportunities.

Firms, industry associations, universities and the API Park could collaborate in driving the regulatory affairs skills agenda forward.

## ***Response - Producing APIs***

Moving into producing APIs is creating a requirement for more chemists and pharmacists at levels from bachelor degree to PhD, and for significant numbers of chemical engineers.

While graduate numbers appear sufficient at present, there is a need to map out likely future recruitment patterns to identify whether larger numbers of new graduates will be required in future.

Key responses to skills needs are likely to include the following:

- Collaboration between industry and universities to ensure that graduate skills match industry requirements.
- Possibly, more places on some types of course. For example, as shortages of chemical engineers frequently occur at times of growth in API production in other countries, there may be a need for more graduates in chemical engineering in Bangladesh over the next few years.
- As pharmaceutical companies of all sizes are facing shortages of very experienced people with skills relevant to APIs (such as PhD chemists), and as there is a significant base of skills among Bangladesh's diaspora, it may make sense to make a systematic effort to attract people with the skills needed back to the country. This could be an area for collaboration between companies, possibly involving the industry organization and even the government.
- API production ideally requires significant skills even at operative level. The work requires that operatives be able to contribute intelligently to managing the production process, and to comply with procedures and regulatory requirements. It is common internationally for operatives to be trained to a junior technician level, and it is likely that similar training would assist the Bangladesh sector in establishing API production operations in line with international standards. Developing a common training programme and qualification for operatives in the sector would have a good fit with the work of the TVET Reform Project. The training programme could be delivered by existing education and training organizations, by a Centre of Excellence developed by the sector (most likely located at the planned API Park), or potentially by larger firms on their own behalf (with external validation).
- In many industries, networking between professionals makes an important contribution to learning. As firms have a shared interest in developing APIs, and as API related activities will be concentrated in a single main location (the API Park), it should be possible for the sector to encourage this sort of activity. The industry association, relevant universities and the API Park itself can encourage networking by organizing technical networking events, facilitating activities by professional groupings, and ensuring that facilities for meetings, social events and informal socializing are available at or near the API Park.

- In many countries with significant API production activities, pharmaceutical companies contract engineering services companies to do much of the technical work involved in designing and installing chemical process plants, both in terms of the physical design and in terms of process control and automation systems. Successful engineering services companies specialising in this area are good at developing the specialist skills required, using mainly graduates from engineering disciplines such as mechanical engineering, chemical engineering and software engineering. It may be worthwhile for the industry, in collaboration with universities and the API Park, to take an initiative to develop local engineering services businesses to supply the capabilities they need in plant design and installation.

### ***Response - Biologics***

The main requirements in biologics will be to continue to educate the biosciences graduates needed by firms producing vaccines, and to obtain enough biosciences graduates with the skills required to develop biotechnology-based generics.

This implies a need for collaboration between universities and industry to ensure that sufficient graduates in biological sciences are produced, and that the content of the courses meets the needs of firms developing both vaccines and biotechnology-based APIs. It also implies a need to attract highly skilled people in the diaspora with experience of the biopharmaceutical sector internationally to return to Bangladesh.

Over the longer term, if firms are successful in developing biotechnology-based generic APIs, there will be a need for significant numbers of people with bioprocessing technician skills at a range of levels to staff production operations. At upper levels of technician skill, this is likely to require college-based courses. However, experience from a number of countries shows that the lower level technicians that are needed in greatest numbers can be trained in relatively short courses positioned at TVET level, either before entering employment in the sector, or through training while working as operatives. This lower level training could be carried out in a suitably equipped training centre at the planned API Park.

### ***Response - Export Marketing, Product Management, Channel Management***

Increasing exports, and taking more direct control over sales and marketing in export markets, will create a need for more people to work in export sales and marketing, many of whom will have to be very highly skilled and capable of operating at a senior level.

It is likely that a mix of the following approaches will be required to meet these skill needs.

- Executive education for managers and for sales and marketing professionals, to develop the additional skills they need to operate effectively in marketing and selling to export markets. In many other countries, this sort of education is provided by top business schools, or through professional institutions. It is common for businesses to send key staff to executive education courses at international business schools.
- Placing marketing professionals from Bangladesh downstream in distribution channels for a period may also be a good way to develop skills and experience.

- Recruiting from other countries, attracting members of the diaspora where they are available and have the right skills, but also recruiting people in export markets. Even if firms continue to rely heavily on intermediaries, it will be necessary to have some people working in-country. Local sales and marketing staff may bring important insights into the local market, and may be able to leverage existing relationships. They will be closer to the market in culture and language than expatriates from Bangladesh. Getting the right senior level marketing skills at headquarters in Bangladesh may in some cases also require recruiting from other countries.
- There will be a need for people to work in telephone-based customer service roles serving foreign markets, but based in Bangladesh. Aside from appropriate language skills and a good basic education, these roles will mostly not have specific qualifications requirements, so language skills are the main potential constraint. So long as call centres can operate in English, there should be no shortage of suitable people who can be trained for these roles, in the specific skills for the role, in cultural sensitivity, and in the use of neutral accents.
- As with regulatory affairs skills and with scientific and engineering skills, there is scope for professional networks to make an important contribution to skills development in marketing and sales.

Establishing marketing groups may give small and medium sized firms access to skills in export marketing and sales that they could not otherwise afford.

### ***Response - Clinical Trials***

Development of a clinical trials sector will require clinical trials managers, statisticians, medical technicians and regulatory affairs professionals, and will require the involvement of medical practitioners. Clinical trials managers typically already have an existing medical or paramedical qualification before starting to work in clinical trials.

A centre of expertise in clinical trials based at a university medical school may offer a suitable mechanism to provide courses for these groups.

### ***Response - Regulation***

Stronger regulation will require stronger skills, sourced both through upgrading the skills of the existing workforce and through recruiting small numbers of highly qualified people. High levels of skill and knowledge are crucially important to the ability of staff at a regulator to make good decisions in the context of the competing pressures under which they work.

Mechanisms to upgrade skills may include:

- Placements with regulators in the main regulated markets
- Upgrading qualifications through studying towards higher qualifications such as PhDs
- Training for inspectors
- Participating in the design of a more rigorous regulatory system

## 4. CONCLUSIONS

In this report, possible growth scenarios for the agro-food and the pharmaceutical sectors in Bangladesh are analyzed. These are two sectors that have the potential to significantly contribute to exports and economic diversification in the country. Propositions are made as to the skill policies required in order for each of the two sectors to exploit its growth potential and contribute to the creation of decent employment.

The analysis presented in this report has been conducted on the basis of the ILO's STED (Skills for Trade and Economic Diversification) methodology that provides guidance for the integration of skills development in sectoral policies. This methodology starts by analysing a sector's position and outlook, paying particular attention to trade and competitiveness issues. Based on this analysis it proposes a vision for the sector's future and identifies business capabilities that will need to be strengthened in order for the sector's growth scenario to be fulfilled. In the case of Bangladesh's pharmaceutical and agro-food sectors, business gaps have been identified through a combination of: sectoral analysis, tripartite workshops with representatives from employers, workers and government; and structured interviews with firms. In a next step, skills needed to underpin those business capabilities have been identified and have been compared with the existing skill supply in Bangladesh to identify the main features of the gap between demand and supply of skills that will emerge in the absence of a response by industry, government or education and training systems. The sector-level analysis concludes by proposing responses at the policy, institutional and enterprise level to overcome this gap.

The two sectors discussed in this report are very different and the potential growth scenarios proposed in this report also differ significantly. Bangladesh's agro-food sector processes raw materials produced by Bangladesh's farming and aquaculture/ fishery sectors. The sector is primarily domestically focused, but has significant exports. It is a globally important exporter of frozen shrimp, and has significant exports in ethnic foods of Bangladesh. Two types of growth opportunities in agro-processed food have been highlighted in this report:

- Opportunities to supply lightly processed food products that are currently not exported to mainstream international markets. A specific example seen in the course of the research is that of mango juice, whether in the form of drinks formulated to appeal to mainstream markets or bulk supply.
- Opportunities to supply more heavily processed food products to mainstream international markets. There is potential to export more heavily processed shrimp, but the potential for heavily processed food also exists for other Bangladeshi primary foods (such as fruit, vegetables, dairy or meat) for mainstream markets.

In order for the Bangladeshi agro-food sector to seize these growth opportunities, it will have to bridge a number of gaps between the business capabilities it has now and the business capabilities required to meet the objectives. In the report, seven main capability gaps have been identified. They include the areas of product development, supplier capability, export marketing, operational effectiveness and the implementation of food safety practices, logistics and cold chain infrastructure, regulatory compliance abroad, and the strengthening of domestic regulation.


The second sector analysed in this report, the pharmaceutical sector, is currently primarily focused on the domestic market, and accounts for 97% of domestic pharmaceutical sales. However, exports are increasing rapidly from a low base, mainly to middle income and low income countries. The Bangladesh pharmaceutical sector's activities are mainly focused on just part of the global pharmaceutical value chain. Most of its activity is in drug formulation, and in putting the formulated drug into a form suitable for sale and in sales and marketing activities in the domestic market. The country has relatively little activity in the stages of the value chain that precede the commercial launch of new pharmaceutical product. A key issue for the sector is that it imports most of the ingredients for its products, including most Active Pharmaceutical Ingredients (APIs).

The Bangladesh Pharmaceutical Industry Association has set out a vision of growth for the future, called Pharma Vision 2015. Major points set out in the vision include a significant increase in exports of generic products, an increase in the number of companies getting approval from regulatory authorities in developed countries; and to the development of capacity to produce APIs domestically. If this vision of the future is realised, it seems likely that the net effect on employment will be to add some thousands of jobs to the sector over the next five years, and that there will be some shift in the composition of employment away from low skilled jobs and in favour of medium skilled and high skilled jobs.

In both sectors, significant skills improvements are required in order for the sectors to develop the business capabilities necessary to follow the described growth scenarios. This report contains an extensive and detailed discussion of concrete policy proposals, some of which are summarized below. The policy responses required differ substantially depending, for instance, on the nature of targeted skills, the targeted skill levels, the number of individuals targeted and on whether the delivery of training or education can be geographically centralized.

The report highlights, for instance, that marketing and product development capacities need to be strengthened in both sectors, which could be achieved by providing executive education for managers and for sales and marketing professionals, or through the recruitment of managers and marketing professionals from other countries, in particular members of the diaspora or senior professionals active in targeted export market. Both sectors would also take advantage from strong linkages between industry and universities. In agro-food this could, for instance, be useful to create a centre of expertise in supply chain and logistics, possibly based at a university, to provide access to high level skills in the area, and to provide education and training. In pharmaceuticals, those linkages could contribute to educating the required numbers of graduates in fields like bioscience, medicine and chemistry.

In other areas, the nature of policy responses proposed in this report differs completely across sectors. In the agro-food sector, for instance, the strengthening of the agricultural sector's supply capacity will require interventions that are attractive to farmers, in terms of being easy to assimilate and not interfering with important work. The following types of mechanism are likely to be effective in this context: short training courses; visits from agricultural (and aquaculture) advisors, and/or assessors linked to Good Agricultural



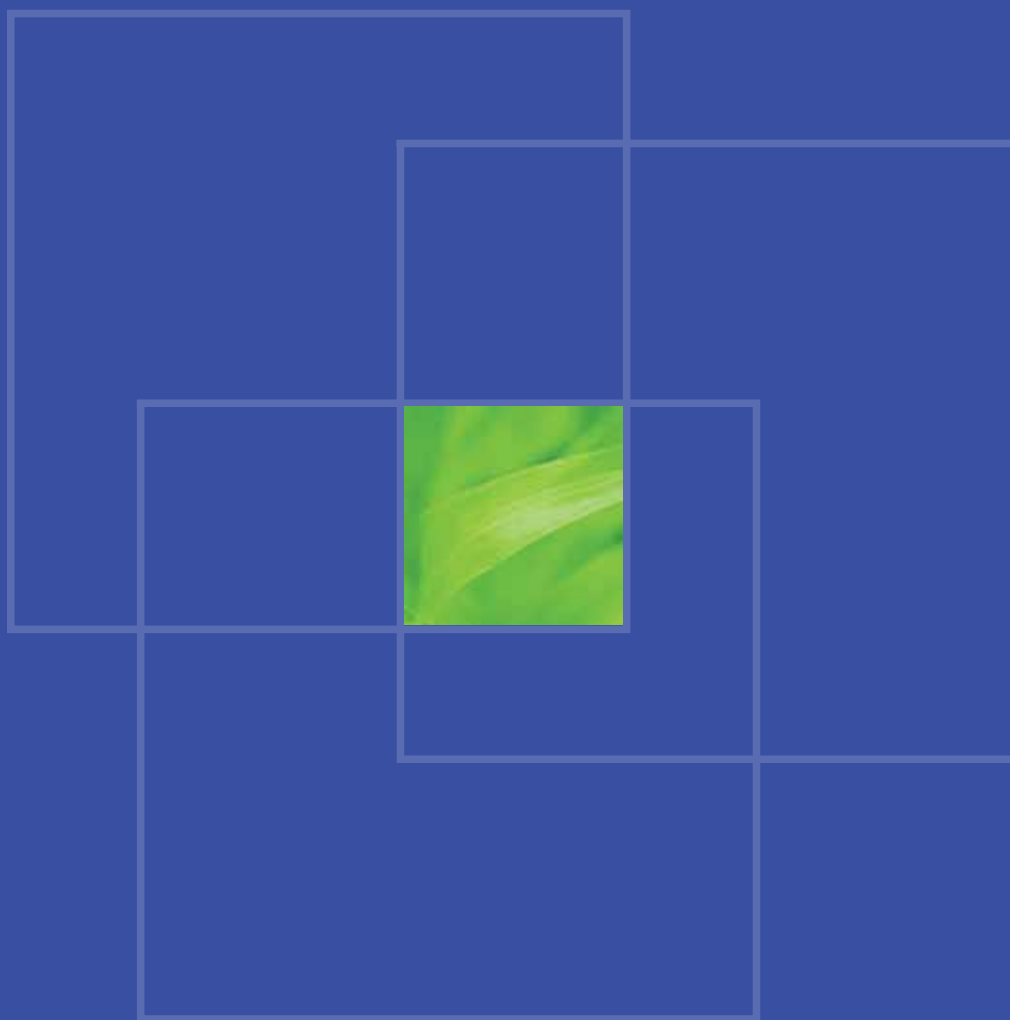
Practice schemes; just-in-time information and reminders of good practice that could potentially be delivered by mobile phone. In the pharmaceutical sector, the development of skills in Good Manufacturing Practice proposed in the report cannot be separated from implementing GMP. The report therefore proposes that, to the extent that it has not already been implemented in full, all firms should have GMP change programmes in place that incorporate training for all their existing staff involved in operations.

The challenges ahead are significant in both sectors, but Bangladesh's recently approved National Skills Development Policy 2011 contains elements that can contribute significantly to overcoming those challenges. The National Skill Development Council (NSDC) which is chaired by the Prime Minister of Bangladesh brought together as many as twenty two ministries related to the issue of skill development under the umbrella of a national coordination body. The NSDC recommendation for a network of a tripartite industry skills working groups was further refined through the development of the National Skills Development Policy. In particular, the Skills Development Policy envisages the formation of Industry Skills Councils to "bring together major enterprises and industry bodies in an industry sector to discuss skill development issues affecting their industry sector". It envisages that the Industry Skills Councils would have a range of functions in identifying and anticipating skills needs, developing policies, planning, improving skills development capabilities, and other aspects of building and maintaining strong skills development systems for each sector. Officially constituted Industry Skills Council for the agro-food sector and the pharmaceutical sector, with these functions, would provide an ideal mechanism to bring together the various interested organizations and groups to perform these functions for the sector, and to approve (or reject), prioritise between, refine and coordinate the implementation of the detailed responses suggested by this study.



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