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**REVISED DRAFT**

# **POLICY PERSPECTIVES OF THE COUNTRY INVESTMENT PLAN FOR FOOD AND NUTRITION SECURITY IN BANGLADESH**

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## Executive Summary

This report presents policy perspectives of the Country Investment Plan (CIP) for agriculture, food security, and nutrition in Bangladesh. The CIP was developed based on the National Food Policy (NFP) (2006) and its Plan of Action (PoA) (FPMU 2009) following extensive discussions before, during and after the Food Security Investment Forum held in May 2010 to provide a coherent set of priority investment programs to improve food security and nutrition in a comprehensive and integrated manner—covering the three dimensions of food security: availability, access, and utilization. The CIP provides a set of 12 priority investment programs to improve food security and nutrition in Bangladesh.

The consultation process with various stakeholders and a policy analysis exercise undertaken for this report feed into ongoing improvements of the CIP by putting focus on some of the particularly important remaining policy concerns impacting the effectiveness of the CIP or some of the required policy environment reforms to ensure the best achievement of results of the CIP. These policy issues are of two types: (i) those affecting the overall effectiveness of the CIP; (ii) those in relation to more specific CIP interventions.

For each of the 12 investments, this report briefly reviews the policy context related to each of the 12 areas, and then assesses the critical policy barriers or promoters for each area. The critical policy issues are highlighted here:

### Overall policy considerations

Three general policy considerations were extensively discussed throughout the consultation process with various stakeholders:

**Access to and tenure of land and water resources.** Land tenure is perceived as a major constraint particularly for the food insecure who, for a large part, do not own the land that they work. They therefore have insecure, prohibitive and unstable access to land through crop sharing arrangements which reduce both the impact of potential CIP interventions on household food security (if production has to be shared) and the incentive for these smallholders to invest as a result of uncertain access to land. Surface water is leased to potential users with insufficient clarity and regulation, leading to lack of incentive for sustainable use and investment in better practices. This is a widespread concern amongst the farming community, Government senior officials, NGOs and civil society;

**Access to credit and other financial resources** was often mentioned by the farming community, entrepreneurs and civil society as a major constraint for them to take advantage of CIP public investment to invest in productive assets. In their difficulties to access the banking system, they point out the governance issue, the complex procedures, the insufficient regulatory and policy mechanisms for agro-processing; as well as excessive collateral and interest rates. In addition, smallholders mention the inadequacy of most of the current microfinance activities to support investment activities.

The direct **subsidized distribution of fertilizers** is having some negative impacts which should be addressed, such as: (i) diversion of budget resources away from potential investments towards subsidies; (ii) distortion in the use of fertilizers (towards more subsidized ones) in contradiction with CIP programme 3 which aims to optimize the use of fertilizers; (iii) distraction of extension agents who spend large amounts of time monitoring the distribution process at the expense of technical work. The possibility to convert into cash subsidies should be explored;

### **Private Sector Investment in agriculture**

All private entrepreneurs met in meetings (forum on 8 Mach 2011) and individually confirm the immense scope for private investment in activities and business in the food security sector, providing the adequate policy environment is put in place. Opportunities exist in agro-processing, in the milk and dairy industry, better quality input supply business. Suitable deregulation has led to the development of the small pump industry as a good contribution to cheaper investment by water users for irrigation benefiting from more accessible equipment. Innovative entrepreneurs invest in contract farming, or new types of milk collection systems, both accompanied with services to the farmers.

However, to take full advantage of these opportunities, some policy elements have to be more conducive. Some of the mentioned ones include fiscal incentives or reduced interest rates to enable the development of infant and risky industries in the agricultural sector; much stronger regulatory framework to allow the development of secured contractual arrangements between actors along the food chain; some revision in the tariff system which are unfavourable for local production; the reduction of artificial support to state entities involved in business activities, resulting in unfair competition and limiting private investment in these activities.

The **role of the private vs. public sector** was indeed extensively debated. In addition to the detrimental and unfair competition by public agencies in some businesses, the roles of private vs. public were questioned in relation to governance and efficiency concerns. Some development partners question the direct involvement of Government agencies or institutions in productive, marketing or other activities that are perceived as better covered by the private sector (e.g. seed multiplication, marketing of fertilizers, irrigation infrastructure). In contrast, a number of smallholders and NGOs highlight the issues related to uncontrolled and dishonest behaviours of some private players taking advantage of their weaknesses. Normative frameworks, control and enforcement mechanisms should be strengthened, not as a constraint to private sector development, but as a way to reinforce the confidence of private agents in the predictability and reliability of market transactions.

### **More specific policy issues incorporated in the design of the CIP are highlighted below:**

An enabling policy for **fostering education** both at a higher level (for research purposes) and a professional level (for extension workers) is required. The “brain drain” should be reversed. In addition, new education curricula should be developed to ensure convergence of education programs in health, nutrition and food.

Policies should enable **fair access to markets** by farmers and consumers, particularly for some commodities key to food and nutrition security (e.g. milk), These could include a **more favorable tariff system** for those imported items that could be produced locally; interventions to avoid quasi

monopolistic attitudes of some market players; the promotion of marketing groups or associations to empower smallholders access markets.

The need for a more effective and better governed **regulatory and quality control of inputs** so as to protect smallholders and enable them to invest in improved techniques and inputs.

A need to further clarify **trade-offs between various uses of food stocks** (safety net to food insecure; price control purpose and emergency stocks) so as to improve management of the PFDS and better evaluate needs for additional and enhanced storage facilities.

The need to improve the nutrition outcome of the CIP by **mainstreaming nutrition outcomes** throughout the CIP programs and strengthening activities specifically dealing with nutrition. This is one of **key defining features of the CIP**.

**Better targeting** of CIP interventions (safety nets, extension activities and others) is essential to optimize their impact on the most food and nutritionally insecure in the country.

The difficult **enforcement** of some existing regulations and rules should be addressed through empowering and disseminating information to communities and grass-root actors.

**Coordination** of food security actions foreseen in the CIP (including food production, safety nets and nutrition) will be a challenge, in particular as it has to be inclusive of non-state actors and development partners.

# 1. INTRODUCTION

## Background and Scope of the Study

The Government of Bangladesh considers agricultural development a major priority alongside food and nutrition security. While Bangladesh has experienced steady advances in food availability and security during the past several decades, including the tripling of its annual rice production, the country faces a number of persistent and emerging challenges. Future agricultural growth and food and nutrition security are threatened by population growth, worsening soil fertility, deteriorating access to increasingly scarce natural resources (such as water and land), increasing vulnerability of improved crop varieties to pests and diseases, and persistent poverty leading to poor access to food. In addition, the impacts of climate change—including an increase in the incidence of natural disasters, sea intrusion, and salinity as well as a decrease in crop output—compounded by minimal investments in agricultural research and deteriorating extension services, may exacerbate food and nutrition insecurity in the coming decades.

The Government of Bangladesh hosted the Bangladesh Food Security Investment Forum in Dhaka on 26–27 May 2010 to discuss and coordinate investment plans, priorities, and strategies to advance agricultural development and achieve food and nutrition security in Bangladesh. A Country Investment Plan (CIP) for agriculture, food security, and nutrition was developed following extensive discussions before, during and after the Food Security Investment Forum.

The policy framework in which the CIP is grounded is the National Food Policy (NFP). It is based on a comprehensive approach to food security encompassing its three key dimensions: availability, access and utilization of food for balanced nutrition. The NFP integrates all relevant policies and strategies developed by the Government and as such represents the platform through which policy considerations relevant to the CIP should be considered.

The Plan of Action of the NFP (2008-2015) translates the provisions of the NFP into 26 areas of interventions and priority actions, providing a comprehensive framework for identifying investment and priorities for policy actions required to achieve food security. As such it provides a policy agenda, enabling the Government to undertake the right decisions, monitor progress toward the NFP objectives and highlights further policy changes to be undertaken. In this regard, the 2010 monitoring report provides a good analysis by the Government of the progress towards the implementation of policy actions in all areas of intervention, analyzes recent developments in these areas and formulates needs for further actions

The CIP is considered a living document to be regularly revised to reflect further consultations with stakeholders, changing circumstances, and feedback from monitoring and evaluation activities.

This report presents a policy analysis for the CIP. Information for the policy analysis came from the following sources:

- A rapid rural appraisal commissioned by IFPRI to collect information from farmers (crop, horticulture, livestock and poultry, fish and shrimp), input suppliers, and feed dealers located in 6 locations in Bangladesh. (hereafter referred to as IFPRI RRA)
- Extensive consultations with various stakeholders. (hereafter referred to as IFPRI consultations)
- Select interviews using the Net-Map method (a participatory stakeholder mapping method) used to map out the regulatory systems for key CIP issues. (hereafter referred to as IFPRI Net-Map) For more information on this method, see Annex A.
- A recent review of the literature on agriculture and food security policy research in Bangladesh carried out by IFPRI helped identify critical knowledge gaps to better understand current and emerging food security and agriculture development issues in the country and prioritize policy research to bridge the knowledge gaps.
- Review of papers presented and discussions held during the Food Security Investment Forum in May 2010.

The CIP provides a set of 12 priority investment programs to improve food security and nutrition in Bangladesh. Based on the collective information, the policy analysis in this report is carried out for each of the 12 investment programs under the three components of food security.

## **A Conceptual Framework of Food Security**

Improving food security is a matter of supreme importance to many millions of people in Bangladesh, and an issue of paramount concern to those responsible for the nation's welfare. Since the three components of the CIP address the food security issues of food availability, access and utilization, a conceptual framework of food security is presented here to facilitate a clear understanding of these issues.

Food security is broadly defined as access by all people at all times to sufficient food to meet their dietary needs for a healthy and productive life. One essential element of food security is the availability of adequate food at a national level. Another essential element is the access to adequate food at household and individual levels. Some literature views the first to be synonymous with national food security, while the second element is viewed as synonymous with household or individual food security. However, the availability of and access to adequate food are necessary, but are not sufficient conditions for a healthy life. Hence, the third essential element of food security is the effective biological utilization of food, which depends on a number of other factors, such as the health and sanitation environment, and household or public capacity to care for vulnerable members of society.

Food availability at the national level is determined by domestic food production, public and private food stockholding, food imports including food aid, and food exports. With the liberalization of international trade, global availability of food is of increasing importance for national food security. Availability of food at the household level depends on the household's own capacity to produce food, household food stockholding, and availability of food in the local markets, which, in turn, is a function of market operations, infrastructure, flow of information, and seasonal variations in domestic food production.

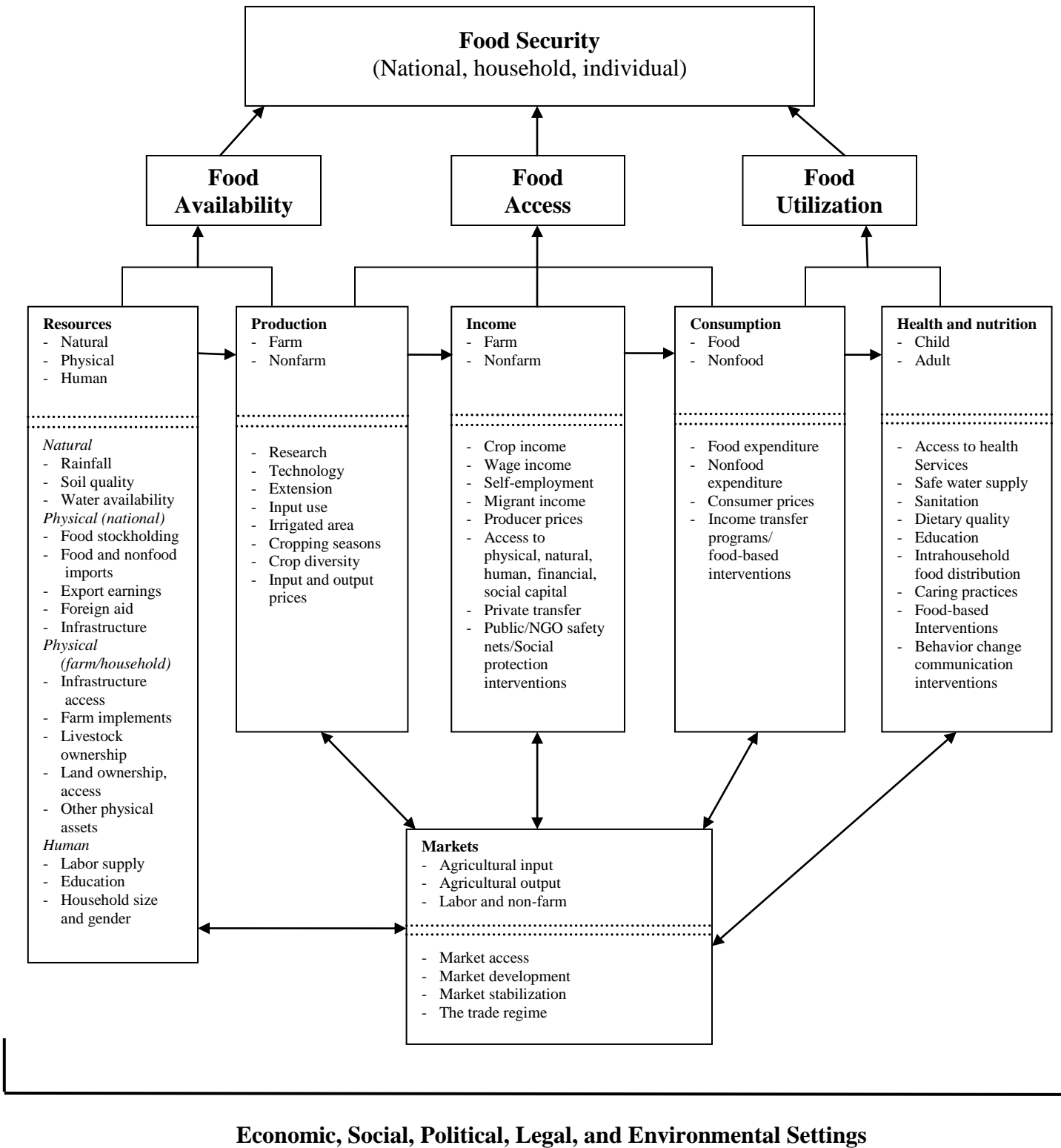


A country's access to globally available food is a function of export earnings, world prices, and debt-service obligations, as well as policies and capacities of food aid donors. Household's access to food depends on food prices, household income, and assets or resource base. Increased income of households can improve household food security in terms of improved access to food. In addition, expanded asset bases reduce the vulnerability of households to short-term disruptions in income flows, because part of the asset base can be sold in times of adversity. This helps to prevent degradation of household food security. Poverty is a major determinant of chronic household food insecurity. The poor do not have an adequate purchasing power to secure their access to food, even when food is available in local markets. Moreover, the poor are vulnerable to shocks (such as natural disasters, crop failure) that cause transitory food insecurity. Increased food prices also result in transitory food insecurity of the low-income households by lowering their real income and, hence, eroding their purchasing power.

As food availability and access to food increase, hunger may decrease, but not necessarily malnutrition. One reason for persistent malnutrition may lie in the complex interaction between food intakes and illness, affecting the food utilization by the body, which in turn, is influenced by the overall health and caring environment. This is often called the "leaking bucket effect," wherein improvements in availability and access to the foods that are important for good nutritional status may be offset by poor access to nonfood inputs, such as quality health care facilities and services, education, sanitation, and safe water, or ineffective mechanisms for delivering these services. Evidence in Bangladesh and some other developing countries indicates that improvements in household food security do not necessarily translate into the eradication of nutritional risks confronted by vulnerable individuals within the households. The gains from improved household food security and developed health and sanitation facilities at the community level can be effectively brought to children, women, and other vulnerable household members by proper caring practices.

Figure 1 summarizes the diverse determinants of food security status in a general conceptual framework. The framework highlights the hypothesized causal relationships between the various elements of food availability, access, and utilization.

**Figure 1 – A Conceptual Framework of Food Security**



Source: Prepared by IFPRI.

## **2. FOOD AVAILABILITY**

Bangladesh has made commendable progress in domestic food production. In the early 1970s, Bangladesh was a seriously food deficit country with a population of about 75 million. Today, the population is about 160 million and the country is in the brink of self-sufficiency in rice production. Rice production has tripled over the past three decades.

While Bangladesh has experienced steady advances in food availability through the adoption of high yielding varieties and other agricultural innovations, it has not yet been able to achieve self-sufficiency in foodgrains. The country faces formidable challenges to feed its population in the future. The population is expected to increase from 160 million in 2010 to 185 million people by 2020 and 222 million by 2050.

Key challenges to ensuring food availability in the country include water resource and land area constraints, growing water pollution and soil degradation and climate change on the supply side, coupled with a rapidly increasing, increasingly urbanized, and more affluent population on the demand side.

The worldwide skyrocketing of food prices in recent years along with rising prices of energy and fertilizers have made policymakers, researchers, and the general public aware of the thin razor's edge upon which the country's food security rests. The evolving agricultural price regime calls for a fundamental reevaluation of agricultural production and the natural resources it depends on, especially land and water.

### **Program 1: Sustainable and diversified agriculture through integrated research and extension**

Since there is little or no fallow land now available, future production increases in Bangladesh will have to come from higher yields. This will mean developing new technologies and innovations through research to address production problems in flood, drought, and salinity induced stress conditions while at the same time trying to reduce yields gap and push yield frontier further up in high potential areas. Emerging food and agricultural technologies offer significant promise for augmenting agricultural productivity, but only if they are disseminated to farmers through effective extension systems and are supported by appropriate policies and institutions.

Bangladesh has historically relied on growth in rice—the country's major crop in terms of area cultivated and income generated (or, value added). Future agricultural growth, however, will likely need to increasingly emphasize higher-value crops, as well as fish, poultry, and dairy products, in part because of land constraints.

#### **Policy Barriers and Drivers**

To build resilience to future food crises, a transition to viable long-term investments in support of sustained agricultural growth is urgently needed. Investments for sustained agricultural growth include expanded public spending for rural infrastructure, agricultural research, science, and technology; backed by human resource development through quality agricultural education system.

Such investments are particularly needed in view of the emerging stress factors for agriculture from climate change that threaten to perpetuate crisis. In addition, private sector participation in adaptive research for generating technologies in collaboration the National Agricultural Research System (NARS) could be mutually beneficial.

On-farm adaptive tests and extension service need to be expanded and overhauled for improving efficiency in service delivery in conjunction with the private sector. Department of Agriculture Extension's (DAE) capacity to learn about adaptive technologies and new varieties is a key element of successful adaptation by farmers. As most farmers currently report learning about new technologies and farming practices from other farmers rather than from extension officers, it seems that the lack of DAE capacity in terms of sufficient trained staff is a barrier to successful implementation of climate change responses (IFPRI RRA).

New research should be focused on addressing production problems in flood, drought, salinity induced stress conditions while at the same time trying to reduce yields gap and push yield frontier further up in high potential areas. However, the capacity required to do this is a major constraint, given the current challenges with the National Agricultural Research System (NARS) and “brain drain”, and the gross neglect of the agricultural education system in recent decades. The NARS requires large numbers of highly trained agricultural graduates to replenish the capacity. This in turn requires revamping the agricultural universities to improve the quality of education and a dynamic, rapidly growing system of well-staffed and equipped agricultural universities.

Consultations showed that the NARS institutions are neither fully autonomous nor fully government institutions. According to consultations, their governance is basically dominated by the bureaucracy in a way that results in an unfavorable work environment for exercising freedom of thought and judgment, which are fundamental requirements for science. Under such circumstances, action beyond just investing in these institutions will be required to attract and retain the best brains (IFPRI Consultations).

Decentralization of research capacity to address different types of constraints, such as floods, drought, and salinity, is required. This will necessitate some changes in the current configuration of NARS facilities, defining regional mandates of research institutions; for example, bringing agriculture, science and technology universities within the research network.

## **Program 2: Improved water management and infrastructure for irrigation purposes**

Water resources in Bangladesh are the source of livelihoods for much of the population. Water management is critical for fishers, farmers and for life in general. But biophysical environments are complex and floodplain systems including water bodies tend to spread over administrative and sectoral boundaries. Water resources are used by and impact all sectors of the population and the regulation of the resource is covered by multiple government bodies.

Groundwater irrigation is generally more flexible than surface water irrigation and can be used in conjunction with surface water to improve water use efficiency. At the same time, heavy dependence on groundwater has been very costly in terms of resource use—either requiring diesel or electricity, both of which are likely to increase in price and contribute to increased greenhouse gas emissions. Furthermore, given growing water scarcity, groundwater pumping has become less equitable with relatively richer smallholders drawing down groundwater sources of smallholders

who cannot afford deeper tubewell systems. Moreover, groundwater dependence has increased the risk of arsenic contamination in food production. Thus, to comprehensively address agricultural water management challenges in Bangladesh requires improved management of both floods and droughts and growing water pollution levels. In the irrigation sector, groundwater management requires urgent improvement, to address poor monitoring and regulation of local groundwater development, low water use efficiency and poor irrigation technology, lack of fuel-efficient pump sets, and excessive dependence on high-water demanding *boro* rice in the dry season.

### **Key Policies and Regulations**

The government declared the National Water Policy (NWP) in 1999. The six national goals of the NWP were economic development, poverty alleviation, food security, public health and safety, a decent standard of living for the people, and protection of the national environment. The other related government policies that have direct bearing on water sector are the National Environment Policy 1992, National Forestry Policy 1994, National Energy Policy 1996, National Policy for Safe Water Supply and Sanitation 1998, National Fisheries Policy 1998, National Agriculture Policy 1999, and Industrial Policy 1999. Ownership of surface and groundwater rests with the state. There are many legislations relating to the water sector, some dating back over a century.

The Bangladesh Water Development Board, under the Ministry of Water Resources (MoWR), is primarily concerned with the development of major irrigation projects. The Bangladesh Agriculture Development Corporation (BADC) has made efforts in minor irrigation development. The Water Resources Planning Organization (WARPO), also under MoWR, deals with nationwide water resources planning and management.

MoWR has transferred a number of irrigation programs to local communities through the participation of marginal farmers in the Water Management Group (WMG). Thus, the WMG has the power to determine surface water irrigation rules for some farmers, in the same way the Water Management CBO's regulate irrigation rules for its members. Otherwise, surface water irrigation is largely unregulated (IFPRI Net-Map).

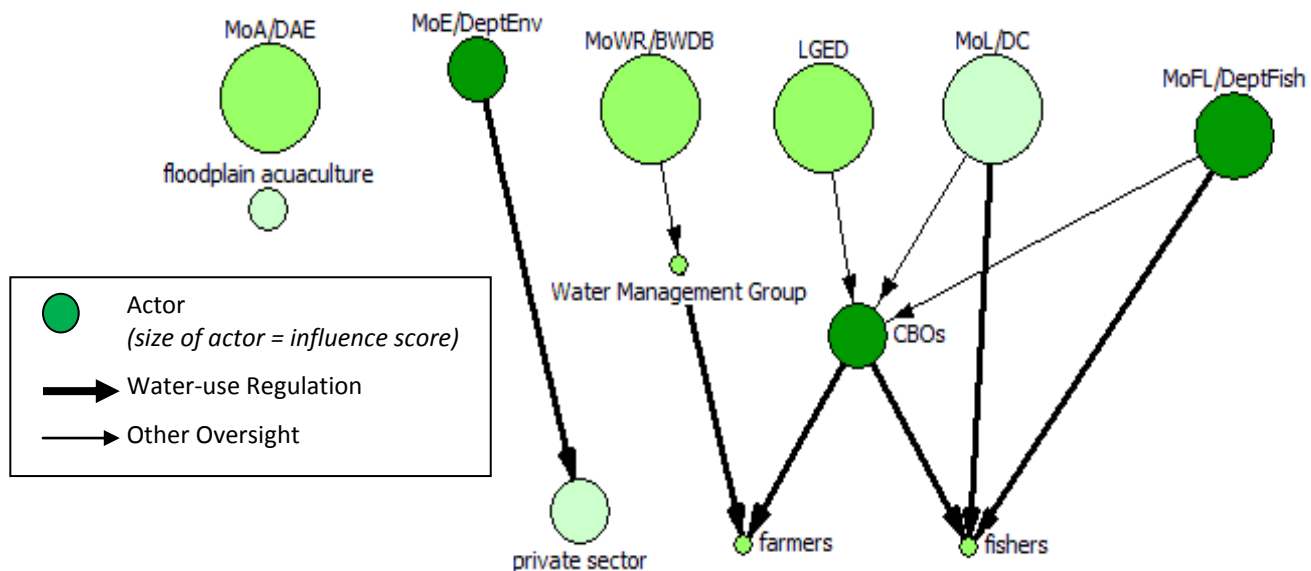
The Ministry of Environment (MoE) regulates the activities of urban developers and other industry as they can impact groundwater quality.

Activities of fishers also impact and depend on water management. The Ministry of Land (MoL) is the legal owner of surface water and technically leases out the land to all fishers. Apart from this revenue-generating mechanism, the activities of fishers are largely unregulated, in spite of the presence of a National Fisheries Strategy. In particular, floodplain aquaculturists are inadequately regulated (IFPRI Net-Map).

## Box 1—Net-Map Case Study: Regulatory System for Water Management

Interviews were undertaken by IFPRI with key stakeholders to assess the water management system (IFPRI Net-Map), using the Net-Map method that captures the perceptions of the interview partners on the influence, goals, and interactions of actors in this network. Here we can see that the management of water is a complex system, overseen by many ministries. An arrow from one actor to another denotes that one actor has the authority or regulatory power over another actor, specifically related to water management. While the Ministry of Agriculture (MoA) is not directly regulating water activities (it is not connected to other actors in this map), it was added to the map because agriculture, through irrigation, is one of the largest user of water in the country and thus its policies can have major impacts on water management. Floodplain aquaculture fishers are relatively new in Bangladesh and are currently unlinked in this map. That is, they are not currently subject to regulation.

**Figure 2: Regulatory system for water management**



The size of the actor denotes the influence of each actor over improving water management, as determined by the interview partners. The Department of Environment, under the Ministry of Environment (MoE), is tasked with regulating the activities of private sector actors, including urban development and industry, as it impacts water quality. However, as depicted by the actor size, the interview partners considered the MoE to have insufficient power to effectively regulate the equally powerful private sector.

One issue that is illuminated in this map is the tension that often comes up between sustainable management of resources and development. While both are important goals, in the shorter term they often seem to be at odds. And while many actors are engaged in managing water use to ensure agriculture growth or industrial growth, there are only a few actors who are primarily seen to promote sustainable water use over development (community-based organizations (CBO), MoE, and the Ministry of Fish and Livestock (MoFL)). In this map, the darker green the actor, the more supportive of sustainable water use, and the lighter green the more supportive of development, according to the perceptions of the interview partners.

## **Policy Barriers and Drivers**

Groundwater is costly, for both the environment and the government because of high subsidies for farmers. Flood control, haor development programs, and others, have been implemented in the past with a view to expand crop production with serious consequences on the ecosystem. Over-extraction of ground water has also created negative effects in some areas. It is unclear if in designing surface based irrigation strategies, potential negative consequences on the ecosystem are being assessed a priori and corrective measures planned so that problems experienced from past interventions are not repeated (IFPRI consultations).

Subsidies on fuel and electricity for lifting underground water promote over-extraction and inefficient use (IFPRI consultations). Technological solutions and other innovations could make irrigation more efficient. For instance, the Irrigation and Water Management Division (IWMD) of the Bangladesh Rice Research Institute (BRRI) has developed a technology, Alternate Wet and Drying that has the potential (FPMU 2009), and the Flood Hazard Research Center promotes a system-based approach Integrated Floodplain Management (Sultana and Thompson 2010).

Another mechanism to ensure responsible use of water resources is to address land rights issues. For instance, fishers and farmers could be given longer-term use rights in order to promote responsible management of land and water. (Discussed in more detail under Program 4.)

The overlapping mandate of the Bangladesh Water Development Board (BWDB) and BADC has produced a sense of competition between them in using certain water sources. In addition, there is lack of empirical information on the extent of water that can be extracted from a given source for irrigation without affecting the demands such as for navigation and fisheries (IFPRI consultation).

Urban developers and industry are regulated by the Ministry of Environment (MoE), but enforcement of regulation is very low, thus the same challenge applies. Their impact on water quality can have major negative impacts on the water quality of the entire system, if not addressed (IFPRI Net-Map).

Also, according to stakeholder consultations (IFPRI Net-Map), the Ministry of Land (MoL) and the Ministry of Water Resources (MoWR) are highly influential in water management issues, but put more emphasis development than sustainable use. Awareness-raising for these ministries may promote them to search out paths for land use and irrigation development that balance development and sustainability. CBOs have been found to be effective in improving management of common pool resources through participation and consensus amongst multiple stakeholders and could be used as drivers for promoting balanced water management.

## **Program 3: Improved quality of input and soil fertility**

A key element of production is a reliable supply of quality inputs that farmers can afford to purchase. Bangladesh has been successful in switching over, largely, to high-yielding varieties (HYV) for rice production, the source of its impressive agricultural growth. Farmers can now manage 2-3 rice planting seasons per year. This has fueled huge increases in production and in food security.

With these new yields comes a requirement for intensive irrigation, use of chemical fertilizer and pesticides, and training in how to utilize these inputs, in order to attain optimum production and promote soil fertility. This program covers supply and sustainable use of seed and fertilizer, but the issues discussed here may also be of value for other inputs, particularly pesticides which have major human health implications if not used properly.

### **Key Policies and Regulations**

The National Seed Board, headed by the Secretary of Agriculture and the Seed Certification Agency (SCA) are the primary bodies responsible for oversight of seed. The Seed Certification Agency certifies and maintains seed quality through Field Inspection, Seed Testing and Variety Testing as per decision of the National Seed Board and regulations provided by the National Seed Policy, 1993, The Seeds (Amendment) Act, 1997, Seed Rules 1998 and Seed Act (Amendment) 2005.

The Bangladesh Agricultural Development Corporation (BADC) is the institution mandated to supply seeds for the country. In addition, a variety of research organizations under the NARS, various public universities, some NGOs, and private companies produce new varieties of breeder seeds. New seed varieties are then certified by the SCA and the National Seed Board. When these seeds are reproduced for distribution they are self-regulated and given the label of Truthfully-Labeled Seeds (TLC) through contract growers.

The development of non-rice food crop varieties primarily falls to Bangladesh Agriculture University, Bangladesh Agricultural Research Institute and Bangladesh Institute of Nuclear Agriculture. While crop seeds are supplied by the various domestic public and private institutions listed above, the majority is self-supplied by farmers; 80 to 85% according to field studies (FPMU 2009). Seed-producing farmers will often sell, trade, or even give leftovers to neighboring farmers. Although in the growing vegetable production market, fueled by rising demand in Dhaka, hybrid seeds, mostly imported, are most commonly used, according to farmer consultations (IFPRI RRA).

The public sector policies on seeds are stated in the National Seed Policy 1993, the Seeds (Amendment) Act 1997, The Seed Rules 1998, The Seeds Ordinance 1977 with amendments made in 1997 and 2005, the National Agricultural Policy 1999, the National Food Policy 2006 and National Food Policy Plan of Action 2007. The objectives and strategies for the seed sector are not narrated in these policy documents exactly in the same manner or language though the main thrust or message seems to be similar. And that is that the government would facilitate a balanced development of public and private sector roles in the production and distribution of quality seeds. What it actually means and how it would be achieved is not uniformly stated in the various documents mentioned above. Thus private and public sector interpret the intentions of these policies differently, causing some controversy, with private sector actors expecting the BADC to retreat from the market and BADC planning an expansion of market share (IFPRI consultations).

### **Policy Barriers and Drivers**

Barriers to productive and sustainable use of agriculture inputs are broadly related to affordability, quality, and training for appropriate use. In general, farmers receive information about inputs primarily from other farmers (Hossain et al. 2003). This demonstrates the inadequacy of DAE officials on the ground, who are meant to be the point of dissemination for advice and technology. Farmers admitted having no training in application of fertilizer or pesticides, and had inaccurate



beliefs about the impact of fertilizer on soil health (IFPRI RRA). Thus farmers often misuse fertilizers, making it an inefficient expenditure and depleting soil quality (IFPRI Net-Map).

Insufficient access to credit is a major barrier when discussing agriculture inputs. A recent study by Manob Sakti Unnayan Kendro (MSUK) determined that there are a large number of landless, marginal and small farmers that do not or cannot get agricultural credit from the government banks (Barkat et al. 2010). Increasing presence of banks in rural areas and educating poor farmers about the benefits of using formal credit sources would help address this.

The National Agriculture Policy supports the promotion of increased use of organic fertilizer through ICM schemes. Given that marginal farmers are cash constrained and often struggle to purchase sufficient fertilizer, these methods could be feasible alternatives to conventional farming practices. However, at this point there is low adoption of the schemes (FPMU 2009) which needs to be understood before scaling-up such programs.

Currently there are universal subsidies on fertilizer (IFPRI Net-Map) and implicit subsidies on seed produced by BADC (IFPRI consultations). It is possible that a targeted fertilizer subsidy would increase productivity by ensuring that the money spent on subsidy would go to farmers who would not otherwise be able to afford the inputs. While there are many great models of such programs being implemented throughout the world, the design must be thought through thoroughly and then piloted to ensure its appropriateness.

District Committees are in charge of overseeing fertilizer quality control. With high rates of fertilizer adulteration reported by the Soil Resources Development Institute (SRDI), this must be addressed for human health and soil health. Thus, District Committees need to be supported to ensure effective enforcement of fertilizer quality and accurate estimations of fertilizer qualities. In addition, finding no national-level government body responsible for monitoring fertilizer quality, such an entity should be created to monitor fertilizer imports and production.

Ensuring high quality of seed is of critical importance. Farmers interviewed said they preferred BADC seed because they trusted the quality, and would buy other seed when BADC seed wasn't available. They also claimed that dealers know which private seed companies are selling bad seed, but since they are getting a commission they still sell the seed without reporting problems (IFPRI RRA). Seed producers and dealers must be held accountable when selling faulty seed. Some mechanism for consumer feedback, quick assessment of fault, and then rapid issuance of fines would increase accountability for seed quality. For self-supplied rice seed, supporting farmers to produce and store high-quality seed will help address quality issues. This can be provided in terms of infrastructure for seed storage, community support such as ward-level *seed huts* to store seeds for the community, and capacitation of Extension Officers to support farmers with own-produced seed in addition to government and private sector seed. Currently, most farmer get information on producing and storing seed from other farmers rather than Extension Officers.

Related to the supply of inputs are issues of private and public sector coordination. The differences between private and public sector perspectives on the seed market are prompted by two factors: (a) lack of accurate data on the size and structure of the seed markets for different crops; and (b) lack of sufficient clarity on the objectives and strategies of the national seed policy. These issues can be a hindrance to affective participation by private sector and should be addressed.

While use of hybrid rice seed could significantly lower seed requirements and enhance productivity, the supply and quality of such seed remains an issue (FPMU 2009). In addition, farmers state that they do not prefer eating hybrid rice—it has a stickier quality than the HYV rice

they are accustomed to. In addition, most small farmers produce their own seed and cannot afford to purchase the hybrid seed, even if they know they can get a better harvest from it (IFPRI RRA). Thus, any plan to promote hybrid rice should be accompanied by recipe testing to see if an acceptable preparation can be found, and then a subsequent communications campaign to promote demand.

The DAE with the District Committees are in charge of determining the fertilizer requirements. Problems with inaccurate estimated requirements causes situations of shortage or glut in different areas, and as it is illegal to trade fertilizer between districts, some farmers do not have access to sufficient fertilizers (IFPRI Net-Map). In farmer consultations, farmers spoke of “fertilizer shortage at peak growing time” that caused them to use less fertilizer than they wanted to on their crops.

In addition, inefficiencies in the fertilizer distribution system should be addressed. Delayed subsidy payments to importers cut into their profits. And weighing down DAE officials with the task of authorizing retailers, among other related tasks, compromises their extension work. Stakeholder consulted suggested taking the local DAE completely out of the retailing process (IFPRI Net-Map; Barkat et al. 2010).<sup>1</sup>

Disparity in pricing of the different types of fertilizer contributes to overuse of some (urea) and underuse of others (NPK) that are imported. Fertilizer pricing policies have been implemented to help regulate the price across types and this should continue (IFPRI Net-Map; FPMU 2009). In addition to measures trying to control the turbulent fertilizer prices through price policy, better education of farmers in terms of soil needs and soil testing would promote farmers align their demand with the soil needs. This is supposed to be taken care of by the DAE, but is not currently happening.

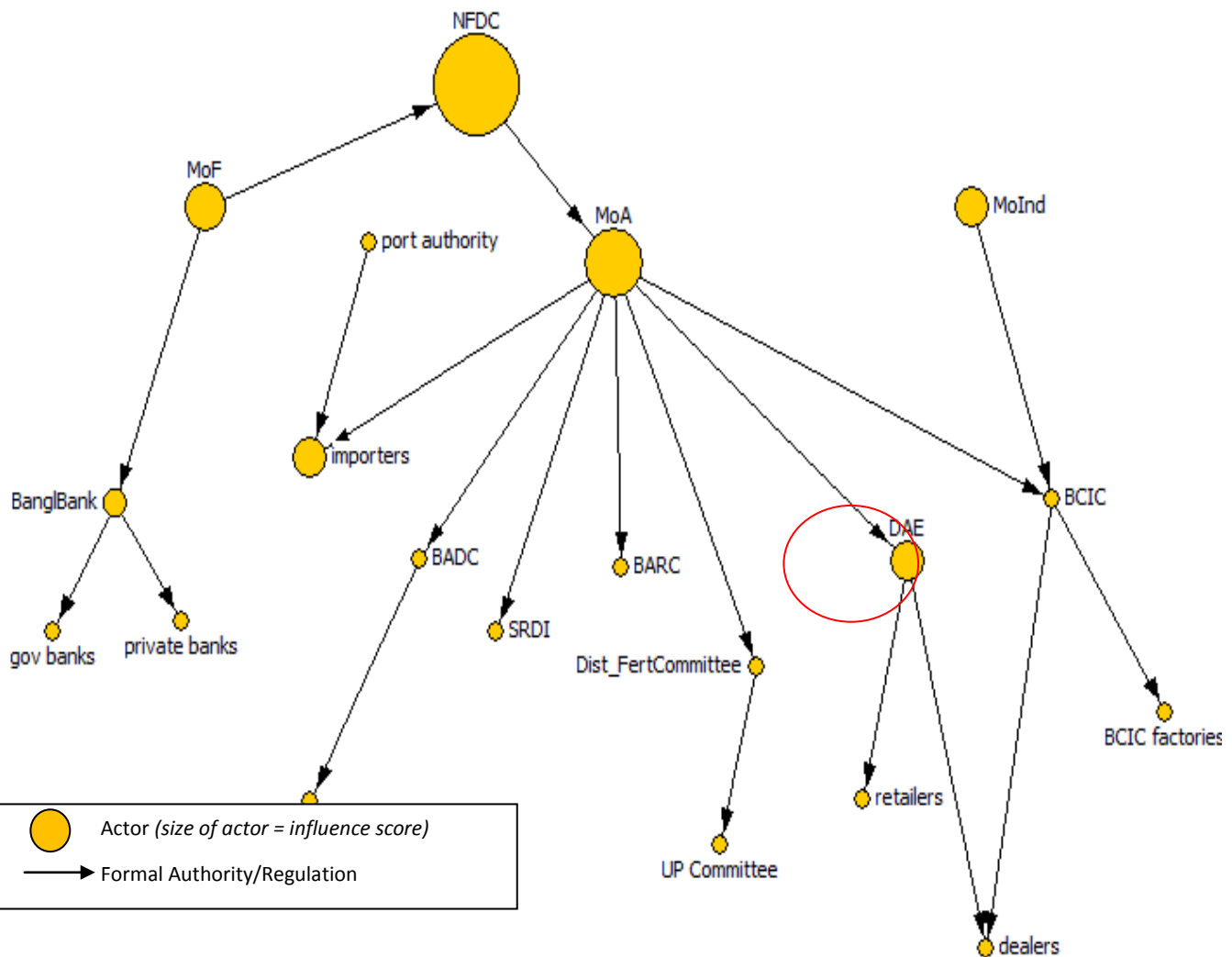
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<sup>1</sup> IFDC is currently undergoing research in Bangladesh on opening the market for fertilizer retailers at the district and Upazilla level. Currently retailers are appointed by DAE, but IFDC thinks that taking this burden off of DAE will free them up to be more effective in farmer support and will increase access to fertilizer (IFPRI Net-Map).

### Box 2—Net-Map Case Study: Regulatory System for Fertilizer

Interviews were undertaken by IFPRI with key stakeholders to assess the fertilizer regulatory system (IFPRI Net-Map), using the Net-Map method. An arrow from one actor to another denotes that one actor has the authority or regulatory power over another actor, specifically related to fertilizer procurement and distribution. The Bangladesh fertilizer system is regulated by government; the quantity to be made available and the prices of various fertilizers are determined at the national level each year. The key regulatory body for this being the National Fertilizer Distribution Coordination Committee (NFDC) co-chaired by the Minister of Agriculture (MoA) and the Minister of Industry (MoInd), determine the quantity required and prices for all the major fertilizer types each year. Private sector actors are also very active in the system, including importers, retailers, dealers and money lenders. The MoA largely oversees the implementation of those decisions through oversight of fertilizer producers, importers, and researchers, and through oversight of the local implementation body, the Department of Agriculture Extension (DAE).

Figure 3: Regulatory System for Fertilizer



The DAE provides fertilizer requirements for each upazilla to the NFDC, based upon District Committee (District Fertilizer & Seed Monitoring Committee) estimates of fertilizer needs for the coming year. Then the DAE appoints fertilizer retailers and ensures that distribution happens according to the NFDC's plan. This means that the DAE, a body meant to be providing technical support and information to farmers, is heavily involved in oversight of the fertilizer marketing system.

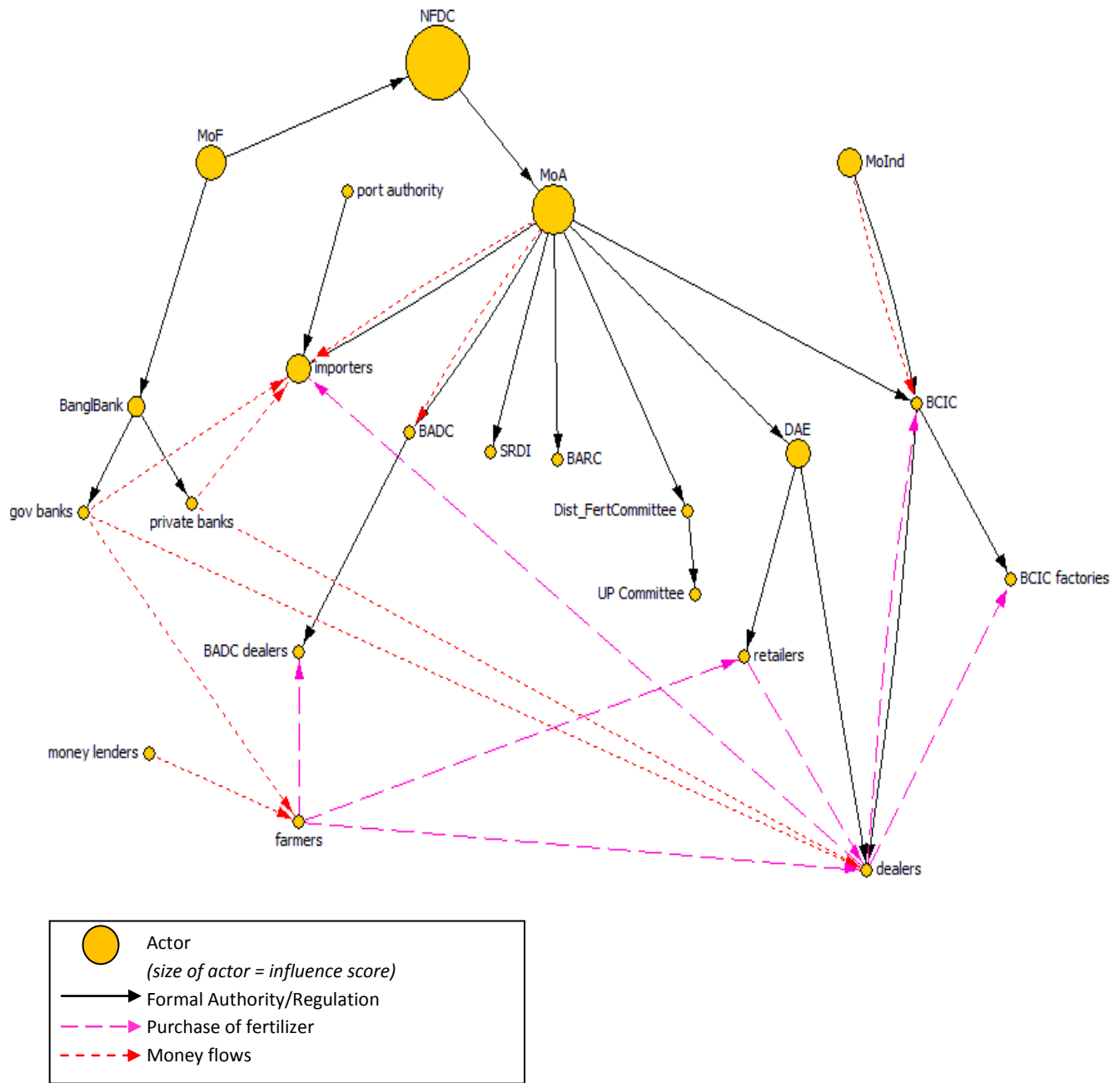
With DAE estimates for fertilizer requirements, MoA then specifies how much the importers are allowed to import and how much the dealers (appointed largely by Bangladesh Agricultural Development Corporation (BADC) and Bangladesh Chemical Industries Corporation (BCIC) and then confirmed by MoA) will be allowed to sell.

The map below in Figure 4 adds money flows and fertilizer purchase to the formal regulation map. This shows flows of credit to farmers for fertilizer; many farmers require credit to purchase fertilizer from dealers and retailers. This may come from government banks or from informal money lenders, but many farmers, particularly small farmers, do not have access to any credit and thus go without sufficient fertilizer. The MoA and MoInd provide funding for the BADC and BCIC, respectively, for production and import of fertilizer. MoA also gives subsidy payments to private sector importers for the difference between the international and domestically set price. In the past, this resulted in long payment delays for private sector, impacting their profits, although it was reported that the situation has improved.

The actor size represents the interview partners' perceptions of the actors' influence over improving the fertilizer system. The NFDC has the highest amount of influence as the key policy actor in fertilizer. The Ministry of Finance (MoF) is also influential in that it must agree to the prices set by the NFDC, as well as any other expenses or payments budgeted for. The MoA has the second highest influence level, as the agency with direct oversight over most actors. DAE is also influential as the local implementer and often enforcer of the distribution system.

Bangladesh Agricultural Research Council (BARC) and the Soil Resources Development Institute (SRDI) both do research on soil nutrient requirements for the country. From BARC's research, the NFDC estimates national fertilizer requirements. SRDI's soil testing results are supposed to guide farmers in their fertilizer application through DAE guidance, but to a large extent farmers are not getting advice from DAE on fertilizer use.

**Figure 4: Formal Regulation and Money Flows in the Fertilizer System**



## Program 4: Fisheries and aquaculture development

The vibrant fisheries sector in Bangladesh accounts for roughly 20 percent of the agricultural GDP. The growth rate in the fisheries sector has improved from 2.33 percent in 2002–03 to 4.11 percent in 2007–08. This growth is largely from intensive technological management practices in agriculture. Pond aquaculture has also been improving and now produces about 866,049 metric tons per year, representing 41.92 percent of total inland fish production (Karim et al. 2010).

Fish production is a major source of GDP and income for smallholders, and also has the potential to improve dietary diversity for Bangladeshis.

### Key Policies and Regulations

In 2006, the government drew up a National Fisheries Strategy. This reflects a shift from the way the subsector had been managed under the 1998 fisheries policy, when the government controlled the sector through its agencies, mostly the Department of Fisheries. Their activities largely included the management and control with direct involvement in supplying some of the inputs such as fingerling. The more recent strategy stipulates that government activities place greater emphasis on fostering participation with local communities, the private sector, and nongovernmental organizations (NGOs); providing advice; and establishing a regulatory framework in which the subsector can function properly. This strategy emphasizes collaboration linkages and partnerships throughout the sector. The strategy also reflects current government concern for poverty alleviation through more targeted activities by all.

#### Box 3—Case Story: Input Prices for Commercial Fish Farming in Barisal (IFPRI RRA)

Khan Asadur Rahman (Age 39), Village Shapania, Union Chor Korla, Barisal Sadar.  
January 28, 2011

Asad is a big fish farmer in the area. He is the owner of three fish ponds. After his graduation eight years ago he came to this profession. He buys young fish fries and cultivates them in his ponds. He obtains his Tilapia fish fries from the BRAC hatchery; Panghash and Thai Puti from Jessore; and Ruhi, Katol and shrimp from Chittagong. And from local wholesalers (paikers) he collects different types of catfish. All types of fish fries are available for Asad to purchase. “Usually I call the paikers by mobile phone and they bring the fries over to my ponds. If one type of fish is not available then another kind will be available so I take the other one.” He buys the fries for 2-3 taka (1 USD =70 taka) per piece. This was 1-1.50 taka per piece 2-3 years ago. “I think fries are available but the problem is with the price. This is increasing,” says Asad.

There are two types of fish in Asad’s ponds. There are surface water level fish, the fish that floats on the water and the other kind is the ones who stay deep under the water. The feed for these two types are different. The floating fishes include Ruhi, Panghash, Katol, Puti and Carp. The underwater fishes include catfish and shrimp. Fish feed is expensive so Asad cannot afford to give enough (as much as required by the fish) fish feed in his ponds. Fish feed is generally available but including transportation cost the feed price is not in balance with the return from selling the fish. Road is there but there is hardly any public transport for Asad to bring the sacks of fish feed to his ponds. As the feed price is not the same everywhere, Asad goes at a distant for a better price of feed.

Some fish are ready to be sold in three months time and others take longer, even six months. This depends on the type of fish. Asad sells all his fish to paikers. He sells fish to them straight from the pond. They come over upon contact over phone. Asad says, "I do not face any problem selling fish. They come and take it from me. I do not sell fish to any specific paiker. I sell to whoever offers me a better deal." Last year Asad sold fish of total 4,200,000 taka. Asad is happy to be a fish farmer.

## Policy Barriers and Drivers

Some elements of the 2006 National Fisheries Strategy have not yet been implemented, though the policy itself is quite extensive. Since June 2009, a number of anomalies and barriers have become apparent in the official Gazette on leasing policy by the Ministry of Land (MoL).

- Although the policy is aimed at productivity enhancement and conservation of aquatic biodiversity, the provision and procedure described throughout the document is more revenue oriented than conservation or production oriented.
- Only a short term provision for a three-year lease is made and there is an incremental contract fee to renew the contract. This is contradictory to fisheries productivity enhancement, favoring revenue income. This is not the goal of wetland management and conservation.
- The land leasing applies to government owned water bodies (Khas Jalmahal), excluding areas surrounding the Khas Jalmahal that are privately owned or may be owned by GOB agencies other than the MoL, NGOs, etc. Furthermore, open water bodies (without physical boundaries) are not subject to management under this policy. Conflicts arise between stakeholders (for example, between leaseholders of public water bodies and owners/users of surrounding areas) and constrain productivity enhancement and sustainable operation of open water fisheries resources.
- The basic structure of the fisheries sector in Bangladesh has changed drastically over the past 40 years. In the past, open-water capture fishery was the main contributor to the sector, whereas now aquaculture is the main contributor. Hence, the policy should include both fisheries and fish farmers in plans and in regulations.
- The implementation mechanism relies more on bureaucracy and the involvement of politicians while overlooking fishers and fish farmers. This may not bring desired reforms. Engaging with fishers' CBO's could benefit implementation.
- The stated policy might be conflicting with National Fisheries Policy and relevant strategies formulated by the Ministry of Fisheries and Livestock duly approved by the GOB.
- The stated policy involves other ministries and agencies but only in a supplementary role. The Department of Fisheries deserves larger role in the district and *upazila* level Jalmahal Management Committees, where they should act as Member Secretaries.

Today the biggest obstacle to increasing the aquaculture production trend in Bangladesh is the genetic deterioration and inbreeding depression in hatchery-produced seeds of various farmed fish species (such as carp, catfish, tilapia, and perch). Incentives for investment in the fish seed/fingerling industry are lacking. In addition, there is a lack of adequate quality extension service, and isolation of fishery extension from rest of agriculture. There is limited access to credit for all kinds of aquaculture activities.

Adulteration of fish and shrimp is widespread due to inadequate food quality enforcement and sometimes due to a lack in sufficient storage infrastructure (IFPRI RRA). This must be addressed. (Discussed in more detail under Program 12.)

## **Program 5: Livestock development, with a focus on poultry and dairy production**

In the livestock subsector, some technological interventions with improved breed, feed, housing, and management systems have greatly improved meat and egg production in Bangladesh. Milk production is also on the rise due to increased use of crossbred cows. Small-scale dairy farming has increased due to introduction of modern milk processing and packaging techniques.

The livestock subsector experienced a growth rate of 5.9 percent in 2006–07. The contribution of the livestock subsector to agricultural gross domestic product (GDP) is 12 percent and to the country's GDP is 2.9 percent. There is increasing trend in the production of milk, meat, and eggs during 2002–08 (Bangladesh Economic Review 2007 and National Medium-term Priority Framework (NMTPF) 2010). The main growth drivers are supply of improved breed, feed, and fodder, veterinary health services, smallholder farmers, and private sector-led investments (Karim et al. 2010).

A wide gap still exists, however, between the current production of and demand for milk, meat, and eggs. A comparison of projected supply and demand shows that there will be a shortfall of about 1 million metric tons of fish in 2015 under a high-demand growth scenario. Overall, challenges facing the livestock and fisheries sectors are wide yield gaps; a shortage of feed and fodder; inadequate supply of veterinary services; the need for institutional reforms of the Department of Livestock Services (DLS); problems of quality control in livestock products, drugs, vaccines, feeds, and breeding materials; a lacking organized market; inadequate coverage of animal health services; inadequate supply of sustainable breed development; poor management of public water bodies; low productivity of fisheries and brackish water shrimp; genetic degradation of carp; climate change effects; and the marginalization of women in the labor sector.

### **Key Policies and Regulations**

A National Livestock Development Policy (NLDP) was prepared in 2007 to address the key challenges and opportunities for the comprehensive and sustainable development of the livestock sector. It promotes sustainable improvement in productivity of milk, meat, eggs, etc., promotes activities to improve income, nutrition, and employment for landless and small farmers, and invites greater participation and investment of the private sector. This policy also provides opportunities and reduces vulnerability and risk in an effort to harness the full potential of the livestock subsector, thereby accelerating economic growth for reduction of rural poverty.

Disease diagnostic facilities are limited. The District Veterinary Hospitals, Regional Field Diseases Investigation Laboratories and the Central Disease Investigation Laboratory of the Department of Livestock Services (DLS) are responsible for providing diagnostic services.



Currently, the government is imposing a 32.8 percent tariff on the import of powdered milk. Milk packaging materials have a much higher tariff (53.5 percent), while the tariff for cattle feed is 32.8 percent (Karim et al. 2010).

### **Policy Barriers and Drivers**

Policy barriers contribute to a number of challenges faced by the livestock subsector. The imperfect dairy market in Bangladesh has allowed milk importers to transfer any increase in price or cost due to rising global prices or taxes/tariffs to consumers immediately without transferring the benefits of such price increases to producers, thereby dissolving any incentives to increase productivity. The opposite situation occurs when global prices or taxes/tariffs fall; the benefit of such a decline has been transferred to consumers very slowly. Thus, the imperfect dairy market has rendered tax and tariff policies ineffective for dairy sector growth in Bangladesh (Jabbar 2010).

The poultry industry in Bangladesh has suffered considerable setbacks due to avian influenza and high feed costs. The private sector is not allowed to have diagnostic kits while public-sector institutions also lack capacity and cannot promptly deal with avian flu epidemics, often resulting in devastating losses in the poultry industry. Although the importation of chicks is not normally allowed, the government often allows some parties to import chicks and eggs when there are shortages. Even countries with incidents of avian influenza have not been excluded from the importation lists. This sometimes resulted in epidemics in the domestic industry. No established safety net measures are operative in Bangladesh, leaving smallholders' poultry—and the livelihoods they realize through farming—vulnerable.

Genetic improvement through crossbreeding with exotic semen contributed to the long-term growth of the dairy sector. But the NLDP 2007 has the provision to promote a limited array of breeds while experts and farmers opinions indicate that breed choices should be made out of a larger array of breeds based on a number of selection criteria rather than just milk yield.

Farmer consultations showed that many dairy and poultry farmers are facing the problem of adulterated and inferior quality of commercial feeds and feed ingredients. Feed labeling and control is inadequate. Most feed millers do not disclose important information on packaging with regards to feed composition, ingredients, date of manufacturing, date of expiry, storage guidelines, energy levels, and protein and vitamin contents. Further, poor packaging causes quicker spoilage and deteriorated quality, threatening both animal and human health. High prices of feeds and fodder are also a problem for the smallholder livestock farmers, exacerbated by limited access to credit for small-scale livestock and poultry farmers. Challenges with feed supply and quality could have a significant impact on the productivity and profitability of this sector.

Farmers also reported to have very limited access to technical support from livestock officers. Poultry farmers admitted never having talked to the *upazilla* Livestock Officer who was based in their area (IFPRI RRA). For medical services, the ratio of veterinary surgeons to farm animals and poultry is as low as one-to-one lakh (hundred thousand) for livestock and one-to-two million for poultry. The problem is aggravated by a poor transportation network that effectively shuts out 80 percent of farmers from veterinary service. Given recent outbreaks of Avian Influenza and Anthrax that have significant impacts on livestock farmers, the lack of veterinary staff and the lack of an effective system for managing such outbreaks pose a serious challenge.

There is no comprehensive poultry policy. Cross-border trade with India is uncontrolled and official trade is sometimes allocated to inexperienced traders. Particularly in the face of Avian Influenza this is a challenge (IFPRI consultations).

Poultry farmers interviewed reported eating eggs and birds that did not meet market standards and thus were unsuitable to be sold. This suggests that promotion of small-scale poultry farming could be a mechanism for promoting dietary diversity of subsistence farmers (IFPRI RRA).

#### **Box 4—Case Story: Commercial Poultry Farmer (IFPRI RRA)**

Mujibor Mia (Age 37), Village Kewa, Upazilla Sripur, District Gazipur  
February 2, 2011

Mujibor Mia's small broiler poultry farm is located within his homestead. Mujibor lives with his mother, wife and two children. Other than his homestead he does not have any land for cultivation. Before becoming a poultry farmer Mujibor worked as a day laborer in other people's paddy field and during off season he worked as a rickshaw puller in the area.

Mujibor said, "Poultry business had become a popular business in Gazipur area in the last ten years. As a rickshaw puller I delivered poultry feed from shops to poultry farms. This way I came to know about poultry farming and became interested. This does not require much land. I thought I could easily build a small farm within my homestead." About five years ago Mujibor took a loan of 18,000 taka from the NGO ASA and invested in building a small poultry farm. He started the business with 300 one-day old chicks. With the first set he had a profit of 7,000 taka. He paid off the loan before it was due. Now Mujibor has two shades for rearing poultry.

Mujibor buys one-day old chicks from Nova Hatchery located close (2 km) to his place. He keeps them in his farm for 28 to 30 days. Mainly he takes care of the poultry in his family. His mother and 14-year old son help him out with poultry care when needed. Caring broiler is more difficult than taking care of the layer chicken, says Mujibor. Broiler needs 24 hours attention. The first five days after arrival they need to be kept under light for 24 hours. He needs to make sure the chicks are not cold and needs to spread them so that the chicks do not become very warm being close to each other and fall sick. "I need to keep an eye on each and every chick. Make sure wind does not come in from any direction. Watch none of them are drowsing or are crippled. Then they become lame or die. This is a full-time job," says Mujibor. This is different from layer poultry farming, where once a day litter needs to be cleaned and food and water needs to be given once a day, says Mujibor. Nobody needs to be around all the time.

He gets his poultry feed from Sripur (5 km) and this feed comes to Sripur from Mymensingh. Mujibor says, "Broiler chicken are less popular in the area as there are no broiler feed dealers here. We need to go to Sripur to get broiler feed. Also there is a loss of five to ten percent of the chickens due to illness." Mujibor continues with proper feeding until the chickens are ready (about 1kg 500 gm) to be sold in 28 days. If they are not sold on time then they become heavier and there is much less demand for the big (2 kg or more) chicken. This is a risk in broiler business.

The road communication is good in Gazipur area and Mujibor thinks this is one of the reasons for the rise of poultry farms in the area. Wholesale dealers from Dhaka Karwan Bazar and other depots come to Jamuna Highway, which is very close to Mujibor's village. The local middlemen bargain for Mujibor and other local farmers. Then once the price is fixed the wholesaler's pick-up van comes to

the poultry farm, weighs the poultry, and takes them to the depots in Dhaka. Usually the dealer leaves some extra chickens from the lot after the total weight. Mujibor's family happily consumes those.

Mujibor says he does not have any problem with quality of chicks or poultry feed for broiler farming. The poultry feed he uses is an imported brand—Ready Mix Chinese Feed. He had high profits when there was anthrax fear in the area and people avoided beef. At that time he had profit of 30,000 taka from rearing 800 chicks. Though the profit is not that much now, Mujibor is still happy with the income from poultry business. He says, "This gives me livelihood. I have a status now and when guests come I can serve them with chicken curry."

### 3. FOOD ACCESS

Poverty and food insecurity are interlinked. The most startling consequence of widespread poverty in Bangladesh is that a quarter of the country's population cannot afford an adequate diet. The poor do not have adequate purchasing power to secure their access to food, even when food is available in local markets. Chronically underfed and highly vulnerable, this segment of the population remains largely without assets (other than its own labor power) to cushion lean-season hunger or the crushing blows of illness, flooding, and other calamities. The poor are highly vulnerable to shocks (such as natural disasters or crop failures) that cause sudden losses of real income, and, hence, transitory food insecurity. Sudden increases in food prices, such as the surge in 2007–08 and again in 2010–11, also result in transitory food insecurity, particularly for low-income households, by reducing their real income. Family coping strategies (such as the consumption of less food, the withdrawal of children from school, and the distress sale of productive assets) often aggravate the risks of destitution.

Sustainable poverty reduction requires broad-based, employment-generating economic growth. Poverty reduction also requires the development of human capital to empower the poor to participate in the growth process. In developing countries like Bangladesh, where most of the poor reside in rural areas and receive a large share of their incomes from agriculture, agricultural growth is two to four times more effective than growth in other sectors in alleviating poverty.

Reduction in food insecurity can be augmented by the process of rapidly increasing the incomes of small commercial farmers. These farmers dominate agricultural production, and expenditure of their rising incomes will provide the basis for employment and income growth for the food insecure. Thus, the solution to food insecurity involves defining the priority actions and processes needed to efficiently increase the income of small commercial farmers, who spend a large share of their incremental incomes on the goods and services provided by the rural nonfarm sector. Safety nets can then concentrate on the small number of families that fall outside the areas affected by such processes, and, in a relatively short period of time, the bulk of food insecurity can be eliminated (Mellor 2010).

#### **Program 6: Improved access to market, value addition in agriculture and non farm incomes**

Bangladesh has historically relied on growth in rice—the country's major crop in terms of area cultivated and income generated (or, value added). Future agricultural growth, however, will likely need to increasingly emphasize higher-value crops, as well as fish, poultry, and dairy products, in part because of land constraints. Overall, dairy and poultry farming generates more regular cash income; and their production, processing, and marketing generate more employment per unit value added when compared with crops.

Generally, labor productivity is known to be relatively low in agriculture compared to other sectors of the economy. In Bangladesh, the capacity to absorb the growing rural labor force in agriculture is extremely limited because of no scope for expansion of the land, the intensity of cropping has almost reached the limit, and the growth of crop production now depends almost entirely on

technological progress, resulting in low employment response of increased output. Therefore, a shift of rural labor force out of agriculture, accompanied by faster agricultural growth, is key to boosting rural incomes. This requires the creation of non-farm employment opportunities in higher productivity sectors.

Important changes in food and agricultural markets have been taking place in Bangladesh in the last decades. The quantities of food marketed and the size of rural-urban value chains have increased significantly because of urbanization and a growing population. This increase in quantities marketed and the growth of the rural-urban linkages leads to different demands toward upgrading of the food marketing system, including infrastructure for transport and marketing and for processing. While these private sector activities create non-farm employment opportunities and income, the public sector should continue to complement private-sector activities. The GOB's role in providing an enabling policy environment for the private sector is crucial in this regard.

The direct role of the public sector in agricultural markets has declined and the agricultural marketing sector is almost exclusively in the hands of the private sector. For example, while the share of the public sector in total imports before that 1990s was 100 percent, this declined to 25 percent in the beginning of the 2000s and to 9 percent in 2007/08. However, an agricultural marketing system that is dominated by the private sector requires a specific facilitating role for the public sector (Minten et al. 2010).

The importance of modern retail and the processing industry has been growing and is expected to further increase in the future. Rice mills are the most important in this sector, generating 40 percent of employment. Processing of high-value products is still limited, however. The further growth of the agro-processing sector might lead to enhanced rural employment given that 70 percent of the jobs related to agro-processing are generated in rural areas. Modern food retail is currently very small, making up less than 1 percent of urban food retail markets, but it is growing rapidly, as in a large number of other Asian countries.

### **Policy Barriers and Drivers**

Liberalized and open agricultural markets can encourage agriculture-led economic growth in Bangladesh through higher levels of input use, increased production, expanding exports, and higher incomes. But ineffective policies, weak institutions, and inadequate infrastructure can harm the poor in a market-oriented economy such as Bangladesh.

The changing demands in domestic and international markets for high-value product markets create challenges as well as opportunities for existing food supply chains. Growing demand for high-value products is likely to provide extra opportunities, especially for rural areas, given the greater willingness of domestic and foreign consumers to spend more on this type of food. First, it has the potential to generate greater employment. Second, high-value product markets lead to higher income for farmers.

However, there are significant challenges in high-value markets. For example, about 90 percent of Bangladesh's milk production is produced by smallholder and landless farmers in rural areas, but due to a weak and fragmented value chain only 9 percent reaches the growing urban markets, requiring the country to import 30 percent of its total dairy consumption needs. Large formal sector processors (such as Milk Vita, BRAC, and PRAN Dairy) have built chilling plant collection centers throughout the country but most are operating significantly under capacity, indicating that building hardware infrastructure alone is not sufficient. Even with improved knowledge of

productivity- and income-enhancing practices, opportunities for smallholder farmers are constrained by lack of access to quality inputs (such as veterinary services, concentrate feeds, and artificial insemination) and lack of access to output markets (Minten et al. 2010).

In consultations with fishers, we learned that fishers who sell fry experience large amounts of loss due to a lack of infrastructure to keep them fresh. Any delay on the highway during transport could mean complete loss of product. Also, adulteration of shrimp is widespread. This is done to increase profits but also to overcome a lack of infrastructure for storage and transport of shrimp (and fish) wherein the product is injected with non-approved preservatives (IFPRI RRA).

For potato farmers, a high cost is paid to middlemen who rent the cold storage facilities and then sub-let to farmers. With a significantly lower potato price this year, the extra cost of storage made potato farming unprofitable. Some farmers reported leaving their potato in the field because it was not worth the time to harvest them (IFPRI RRA).

Continuous investments are needed to stimulate the efficiency of expanding high-value as well as foodgrain markets, as even small reductions in margins can lead to enormous benefits for producers as well as consumers. For example, saving 1 taka/kilogram in the rice marketing margin would lead to annual benefits of 10 billion taka (US\$150 million), to be distributed between producers and consumers. Various interventions and investments are needed to assure that Bangladesh can successfully meet the challenges of production and marketing of high-value products, especially relating to food quality and safety.

As shown by overcapacity in seafood and shrimp processing factories and in milk chilling plant collection centers, investments are required not only in hardware but in software as well. Several interventions are needed to establish a better integrated system of marketing and production to exploit the unrealized potential of the country: a change in policies toward an enabling environment conducive to private trade; infrastructure development; improved access to credit; research and development; and capacity building.

Most of the past analysis of food and agricultural markets indicates that these markets function quite efficiently for the well-connected areas—for example, market integration is high, and three-quarters of the final retail price of coarse rice is paid to the producer—benefiting from past investments in road infrastructure, the availability of mobile phones, and low barriers to entry for trade. However, the recent changes that are occurring in these markets might have important and differential implications on farmers and consumers alike.

There is currently little nationally or geographically representative and solid quantitative information that informs the ongoing policy debate on the needed investments and reforms in agricultural and food markets. Due to the lack of primary information and solid analysis, it is often also not clear what exactly is happening on the ground in these different sectors. For example, there is no knowledge in Bangladesh on the commercial surplus of rice or on private rice stocking behavior. This leads to problems in the evaluation of the impact of public interventions and subsequently priority setting. Evidence-based information and analysis is needed for improved and informed policy formulation and priority setting for public investments and interventions toward more efficiently functioning markets (Minten 2010).

## **Program 7: Strengthened capacities for implementation and monitoring of NFP and CIP actions**

Achieving food security and agricultural development requires substantial improvement in the analytical capacity of the concerned GOB agencies and other organizations and institutions that support the design and implementation of food security related policies and research in Bangladesh. This critical need has been articulated by several speakers and discussions during the Bangladesh Food Security Investment Forum held in May 2010.

A first-rate monitoring system and rigorous impact assessment would provide the needed information to determine the extent to which the potentials of the CIP are realized. The knowledge generated through monitoring and evaluation would enable policy makers to make informed decision of whether to revise or expand various programs included in the CIP. Such system will have direct impact on food security improvement while also providing a strong institutional platform for meeting the growing demand for ready access to needed information, analytical tools, and know-how that will help transform knowledge into development strategies.

### **Key Policies and Regulations**

The revised version of the National Strategy for Accelerated Poverty Reduction (NSPAR II) calls for efforts to strengthen coordination, monitoring and evaluation for implementing the National Food Policy Plan of Action, as key for creating an “enabling framework for food security” (NSPAR II 2009).

The GOB Plan of Action Monitoring Report 2010 provides the mechanism for comprehensively and systematically monitoring the progress made towards achieving the National Food Policy goals and policy targets (PoA Monitoring Report 2010).

### **Barriers and Drivers**

During the Bangladesh Food Security Investment Forum held in May 2010, the inadequate and lack of appropriate institutional arrangements among the organizations that are involved in food security policy design and implementation was identified as a critical issue for achieving food security. Instituting and strengthening proper mechanisms and structures in organizations that deals with food security related policies and programs may require reforms in structure, capacity, service delivery, and coordination and linkages.

A strong information and database is primary requisite for research on policy. Currently, data and statistics relating to the different aspects of food security, agriculture and rural economy are scattered among different ministries and agencies. In addition, there is a duplication of efforts by different ministries and agencies in collecting the same or similar data. The information on private food stocks is not well known. The deficiency of data is particularly serious for non-crop agriculture such as livestock and fisheries. The information on private investment in agriculture is another area of the unknown. The statistics on public investment requires rigorous examination not only in terms of activities to be included in agricultural investment but also in terms of clarification of current and capital expenditures. These are only a few striking examples of deficiency in the information system relating to the agricultural and rural economy. Researchers also face serious problems in accessing available data.

The National Food Policy Capacity Strengthening Programme (NFPCSP) has been mandated to enhance Bangladesh capacity to implement the National Food Policy. The FPMU with support of the NFPCSP has been central in the establishment of the institutional framework for the monitoring of the NFP PoA in general and the CIP in particular on the newly formed Thematic Team on Data Sharing (TT-D).

The NFPCSP has initiated supporting the GOB in the ambitious task of establishing a Food Security Information System (FSIS). The FSIS is embedded in the inter-ministerial institutional setting for monitoring the food security situation. The task of the TT-D is to organize and standardize the exchange of data, thus contribute to the formation of FSIS. The other key element of the ongoing establishment of FSIS is the FENIX Workstation software; a decentralized, web-based, geo-referenced information system. This software is designed to support the institutional framework of the FSIS by allowing different types of users—local and national institutions, international organizations and NGOs—to organize, analyze, share information and disseminate outputs. The FENIX Workstation tool is currently being piloted in a few GOB departments, namely the Department of Agricultural Marketing (DAM) and the Directorate of Food.

Under the recently implemented Policy Research and Strategy Support Program (PRSSP) for food security and agricultural development in Bangladesh, IFPRI intends to build the analytical capacity of selected national institutions to carry out food, agriculture, and nutrition policy research. IFPRI's approach to strengthen the institutional analytical capacity is through collaborative research between IFPRI researchers and their Bangladeshi partners, and based on data collected through household, farm, market, and institutional surveys.

## **Program 8: Enhanced public food management system**

The Public Food Distribution System (PFDS) in Bangladesh has four key functions: (1) to supply foodgrains to various food-based safety nets; (2) to provide price incentives to Bangladeshi farmers for increased production through domestic procurement of rice and wheat; (3) to maintain a security stock of foodgrains to meet emergencies; and (4) to stabilize market prices in order to prevent excessive price rises. The GOB procures foodgrains from domestic market, imports from abroad, distributes the imported and domestically procured foodgrains through different monetized and nonmonetized channels of the PFDS, sets procurement and distribution prices, strives to maintain floor and ceiling prices in order to stabilize seasonal price fluctuation, and regulates private trade. Proper management of public stock is essential for the improved effectiveness of the PFDS. The government has to maintain rolling stocks to cater to the routine needs of the PFDS, including safety net programs and open market sales (OMS), as well as minimum buffer stocks for emergency distribution in times of natural disasters. This calls for careful planning and management of the amount of grains to be stocked and distributed, duration of stocking, and for the establishment of storage facilities and the improved monitoring of existing storage quality (Ahmed et al. 2010).

### **Key Policies and Regulations**

The National Food Policy 2006 (NFP) and the NFP Plan of Action (2008-2015) serve as a basis for identifying and prioritizing the options for investment and interventions for achieving food security



in Bangladesh. The NFP provides strategic guidance for addressing the key challenges Bangladesh faces in achieving food security in all its dimensions, including public food supply and management.

The 2009/10 budget announcement mentioned the creation of an integrated program consisting of food procurement, storage, and distribution, with a substantial expansion of the public storage capacity of foodgrains.

### **Barriers and Drivers**

Food export bans imposed by major grain-exporting countries in 2008 caused policymakers in Bangladesh to reassess the risks of relying on imports from other countries in times of extreme distress or crisis. The recent food price volatility in domestic and international markets calls for a thorough re-assessment of the foodgrain buffer stock management to stabilize price and to maintain effective supply of foodgrains through OMS and targeted PFDS channels to mitigate the sufferings of the poor. Since foodgrain reserves are costly to maintain and divert public expenditure from other investments aimed at increased agricultural production (for example, rural infrastructure and/or improved technology), it is important to determine the minimum level of foodgrain reserve.

It is important to note that the same amount of foodgrain cannot simultaneously serve the three objectives of providing an adequate safety net for the poor, stabilizing market prices, and providing emergency relief. There are inevitable trade-offs between the three objectives. For example, a sudden emergency may require stocks to be drawn so low that normal distribution of foodgrain is no longer feasible and must be postponed or even cancelled or targeted to those most in need. Thus, acceptable stock levels need to be analyzed for each purpose, together with a review of alternative instruments available outside the PFDS (Shahabuddin et al. 2009).

Although public warehouses have the capacity to store 1.7 million metric tons of foodgrains, some of the space is unusable, reducing the effective government storage capacity to 1.5 million metric tons. This might be adequate for minimum national security stock, but not for the additional stock to stabilize prices and continue with the food-based safety net programs. In view of this, pending the construction of new public warehouses, the government may consider using private storage as well. Therefore, an assessment is needed of existing private storage capacity and the willingness of private traders to lease warehouses to government and/or hold temporary stocks on behalf of the government (Ahmed et al. 2010).

There are often spillovers from the actions undertaken by countries to stabilize their domestic prices, and these spillovers increase price instability in world markets. A little researched topic is how to minimize the impact of these spillovers or cope with them (Timmer 2010).

Most of the rice stocks in the country are held by the private sector—farmers, traders, processors, retailers, and consumers. —to even out seasonal production patterns and to keep trade pipelines flowing smoothly. With greater price instability expected in the future and greater uncertainty about the reliability of supplies in world markets, levels of privately held rice stocks will likely increase (Timmer 2010). For efficient public stock management, it is critical to assess and monitor the levels of private stock. Further, the overlooked potential for the private sector to provide greater stability of rice price should be explored.

The collaboration between the GoB and the World Bank on the expansion and upgrading of foodgrain storage facilities is progressing well. In addition, recent decisions and initiatives taken by the GoB (as recommended by the FPMU) to rationalize domestic foodgrain procurement, setting

optimum procurement price, timely activation of the open market sales (OMS) operation, etc. should lead to a more efficient public food management system.

## **Program 9: Institutional Development and Capacity Development for more effective safety nets**

There is a general agreement that the foundation for poverty reduction is broad-based, employment-generating economic growth. Poverty reduction also requires the development of human capital to empower the poor to participate in the growth process and the strengthening of social safety nets to protect the vulnerable from the worst effects of poverty. If well-designed safety net programs can effectively increase the real incomes of the poorest people, then such programs are justified. There may be scope for designing safety net programs that can actually contribute to human capital development and economic growth as well. Safety nets will become even more important in Bangladesh as the country faces economic downturn, food price fluctuations, climate change, and other developments that increase the vulnerability of the poor.

For an efficient safety net system in Bangladesh, the administrative and institutional capacity to target the poorest and to run the programs, and the fiscal affordability of programs are most critical considerations that need to be taken into account.

### **Key Policies and Regulations**

The key GOB policy documents that relate to safety nets for the poor include: Report of the Task Force on Comprehensive Food Security Policy for Bangladesh, July, 2000; subsequent National Food Policy, January 2001; and National Food Policy 2006; NFP Plan of Action (2008-2015); and the revised Poverty Reduction Strategy Paper II (PRSPII - 2009-2011). The PRSPII is the current overarching statement of public policy to combat poverty in all its dimensions, and sets out policies for social protection and safety nets.

### **Barriers and Drivers**

Social safety net programs have been effective in augmenting the incomes of extremely poor households in Bangladesh and helping them cope with stresses and shocks. Nevertheless, important issues remain. Major challenges include:

**Inadequate targeting of the poor:** Inevitable population growth combined with shrinking land area and increased frequency of natural disasters keeps increasing the requirements of safety-net programs. However, providing for the food insecure through safety nets is unsustainable when the food insecure comprises a large proportion of the population. Taking mis-targeting and leakage into account, the safety net programs cover only a fraction of the poor in Bangladesh. The targeting errors of exclusion and inclusion are large in the safety net system. The most disturbing fact is that the majority of rural households—poor and nonpoor—meet the official selection criteria for programs. These criteria, therefore, provide the scope for exercising perverse discretion in the beneficiary selection process (Ahmed et al. 2010).

**Insufficient coverage:** There are serious gaps in program coverage, with some of the most vulnerable groups not being assisted at all or being insufficiently covered. Most safety net programs

in Bangladesh address economic vulnerability but pay little attention to demographic vulnerability. The demographically vulnerable include children, the elderly, and those who are severely disabled or chronically ill. There is also a lack of safety nets available to the urban poor. There are important food and nutrition security issues that remain unattended by the existing programs. These include (a) income seasonality, (b) diet change and its nutritional consequences, and (c) health-related shocks.

**Short-term focus:** Transfer payments help the poor in the short term, but do not by themselves trigger sustainable income growth for the ultra poor. Most of the programs seem to be providing temporary poverty-alleviation impacts.

**Too many programs:** There are over 60 safety net programs currently operating in the Bangladesh. However, most of these programs have limited coverage, are uncoordinated, and are not adequately funded. Resources are spread too thin. Moreover, many programs are short lived and may cease implementation before achieving impact.

To address the issues, an integrated multi-year safety net program needs to be developed. Priority investment areas under such program would include:

- Improving the targeting performance
- Increasing program coverage
- Scaling up effective programs
- Ensuring sustainability of program benefits
- Consolidating and simplifying programs and phasing out high-cost, inefficient programs
- Exploring promising new programs and the use of suitable technology
- Improving the monitoring and evaluation system
- Moving beyond coping approaches (safety nets) to risk-reduction approaches (social protection).
- Integrating investments in human development into safety nets through targeted education, health, and nutrition interventions.

An integrated multi-year safety net program needs to focus on two levels. On the policy level, Bangladesh clearly needs a more robust longer-term vision and policy for productive safety nets and beyond them—for social protection and human development. On the level of implementation, the GOB would need practical support to bring quick and demonstrable efficiency gains to current safety nets and to address the range of issues noted above.

Institutional development and capacity development within institutions are key to an effective safety net system. In this regard, it is important to keep in mind that capacity building is not just about training government staff. What is needed in safety net reform is a comprehensive system of strengthening programs in which institutions are built, not simply their staff.

## 4. FOOD UTILIZATION

Bangladesh has made considerable progress in addressing undernutrition in its population as a whole. However, overall levels of maternal and child undernutrition are still high. About 48 percent of children less than 5 years of age are chronically underweight, compared to only 30 percent in Sub-Saharan Africa. The prevalence of low birth weight babies is estimated at between 30 percent and 50 percent of live births. More than one quarter of women suffer from undernutrition, having a body mass index of less than 18.5. Slightly more than half of pregnant women and one-third of all women are anemic, and iron-deficiency anemia is also a chronic problem among young children. The links between gender and nutrition are of particular concern but not often acknowledged in policies and programs.

Early childhood malnutrition increases the risk of disease and impairs productivity at all stages of the life cycle. Maternal malnutrition prior to and during pregnancy causes low birth weight, which is the main cause of infant mortality. Quite simply, malnourished women are more likely to have babies that are born malnourished. These children will be less likely to survive to school age, less likely to enter school early and to learn in school, and more likely to have low labor productivity. They are thus less able to develop a sustainable livelihood strategy and less likely to be able to escape poverty. They will be more likely to develop diet related chronic diseases later in life, and the girls will be more likely to give birth to malnourished babies.

### **Program 10: Community based nutrition programs and services**

One of the most important causes of widespread malnutrition is the defect in the habitual diet in Bangladesh with cereals contributing to 73 percent of the total dietary energy and other foods contributing much less than required. Higher dietary energy supplied from cereals has been found to be strongly positively correlated with an increased percent of stunting and underweight in children under five years old. In particular, high rates of stunting can be attributed to both intra uterine growth retardation and post natal growth faltering, the latter caused by limited household food availability and poor infant and young child feeding practices, leading to inadequate energy and nutrient intakes and high rates of infection.

Children in rural areas have a higher prevalence of undernutrition (24 percent higher stunting and 29 percent higher underweight) than their urban counterparts. However, children in slum areas are twice as likely to be undernourished as those in non-slum areas and 44 percent more likely to be undernourished than their rural counterparts. The urban-rural gap is much higher in maternal undernutrition compared to child undernutrition; 66 percent of mothers are malnourished in rural areas as opposed to 29 percent in urban areas.

Improvements in nutritional status are associated with, but not entirely driven by, improvements in income. For instance, Dhaka and Chittagong have lowest poverty at 32-34 percent, but do not occupy the lowest ranks in child undernutrition. Furthermore, the highest prevalence of maternal undernutrition (39 percent) is in the relatively income rich Sylhet division (and not in the poorest Barisal), thus suggesting that nutritional issues cannot be solved through economic growth alone (BDHS 2007).

Sanitation services and clean water are both key to improving nutrition. Bangladesh has made commendable progress in water and sanitation coverage in general, but some problems still remain. Arsenic contamination of water is extremely prevalent. Also, progress on sanitation has been lagging, with only 25 percent of households having access to improved sanitation (BDHS 2007). Clean water and sanitation are particularly rare in urban slums, perhaps explaining the extremely high levels of undernutrition in those populations, and making them a high priority group (Sen et al. 2010).

Other characteristics of mothers, including the mother's education, role in domestic decision making, and age at childbearing, have serious implications for the nutritional status of the child. Thus, interventions in food and nutrition security must address impacts on and barriers to women's empowerment to be successful.

### **Key Policies and Regulations**

Bangladesh has an updated draft Health Policy, and a National Food Policy that cover nutrition issues. The National Food Policy (2006) and National Food Policy Plan of Action –NFP PoA (2008 - 2015) have updated the nutrition goals and actions based on the 1997 National Food and Nutrition Policy and the National Plan of Action for Nutrition and embedded them in the NFP PoA with outputs and outcome indicators to monitor progress. These policy instruments are in line with ensuring food security through a comprehensive approach with a core nutrition objective of achieving adequate nutrition for all individuals, especially mothers and children. The NFP PoA includes eight key areas of intervention that include long term planning for balanced food, balanced and nutritious food at minimal costs for vulnerable people, nutrition education on dietary diversification, food fortification and supplementation, safe drinking water and improved sanitation, safe quality food supply, women's and children's health and promotion and protection of breast feeding.

The core goal of the National Health Policy is to achieve sustainable improvement in health, nutrition, and family welfare status of the people, particularly of the poor and vulnerable groups, including women, children, and elderly people with ultimate aim of their economic and social emancipation and physical and mental well-being. In addition, for the first time the health policy also has put a strong emphasis on nutrition issues (FPMU et al. 2009). The Health, Nutrition and Population Sector Programme (HNPS) includes facility-based treatment of acute malnutrition in children, iron-folate supplementation for women, and antenatal care and counseling during pregnancy (Sen et al. 2010) as well as delivery of basic health and nutrition services. And the National Policy for Arsenic Mitigation, and the corresponding 2004 Plan of Action was designed to address issues of arsenic poisoning (FPMU et al. 2009).

The National Strategy for Infant and Young Child Feeding in Bangladesh is focused on direct interventions targeted to child nutrition during the "window of opportunity" from pregnancy through the first two years of a child's life. The major policy instrument for direct interventions to address infant and young child feeding such as food supplementation and counseling for improved feeding of infants and young children is the National Nutrition Program (NNP). However, the NNP is currently undergoing reorganization and will soon be folded into the facility-based MoHFW program HNPS. The NNP will become the National Nutrition Service (NNS) (IFPRI consultations).

A variety of other stakeholders are implementing supporting and smaller-scale interventions related to direct nutrition inputs. Other health and nutrition interventions (such as immunization, iron-folate supplementation, etc.) are implemented through the public health system and private

healthcare providers. Interventions to improve infant and young child feeding are currently implemented with varying intensity and scale, and by different stakeholders across Bangladesh. The International Code of Marketing for Breast Milk Substitutes regulates activity of private sector marketers to ensure that they do not unethically market breast milk substitutes to mothers, which can thwart progress towards appropriate breastfeeding practices (Sen et al. 2010).

In addition, there are government programs that are not intended to be nutrition interventions but do impact community nutrition. The secondary school stipend, Vulnerable Group Feeding program, and Food-for-Work programs are some of these.

### **Policy Barriers and Drivers**

Women and children are the key to ensuring nutrition security. While growth in household income and agricultural productivity are both important levers in addressing undernutrition, they are not sufficient, as shown in the 2007 BDHS survey. Investing in women—their nutritional and health status, their educational status and awareness of child feeding and care practices, and their empowerment in the household—will all lead to healthy and productive children who will become healthy and productive adults.

In general maternal and child nutrition is seen as a priority in Bangladesh. The critical actors in the health sector are seen as supportive. However, the nutrition community itself is divided in terms of what the critical issues are for addressing undernutrition and also in terms of the appropriate treatments and interventions. In addition, there is a general acceptance that while there is still calorie deficiency in Bangladesh, that more nuanced problems like chronic malnutrition and micronutrient deficiency are not priorities (IFPRI Net-Map).

Community-based nutrition activities currently being planned by the MoHFW could be a strong lever in improving nutritional status for Bangladesh if it is wide-spread and easy to access, targets vulnerable groups and remote communities, and has a strong monitoring component to iron out any kinks in design and implementation. Effective scaling-up of these programs requires better coordination of activities and improving the technical capacity of nutrition program staff.

The reorganization of NNP into the National Nutrition Service is intended to promote efficiency and better coordination. For this new organization to be an effective driver of nutrition improvements, it must be accompanied with sufficient attention to capacity strengthening with an emphasis on strategic program content and management capacities as well as mobilizing households to undertake actions relevant for their own nutritional improvement. This also calls for mainstreaming nutrition services not only the health sector but across all relevant sectors. According to health and nutrition experts, health program staff must be fully capacitated in nutrition services with additional hiring to ensure that staff is not overloaded with additional accountabilities so as to facilitate the success of this program (IFPRI consultations).

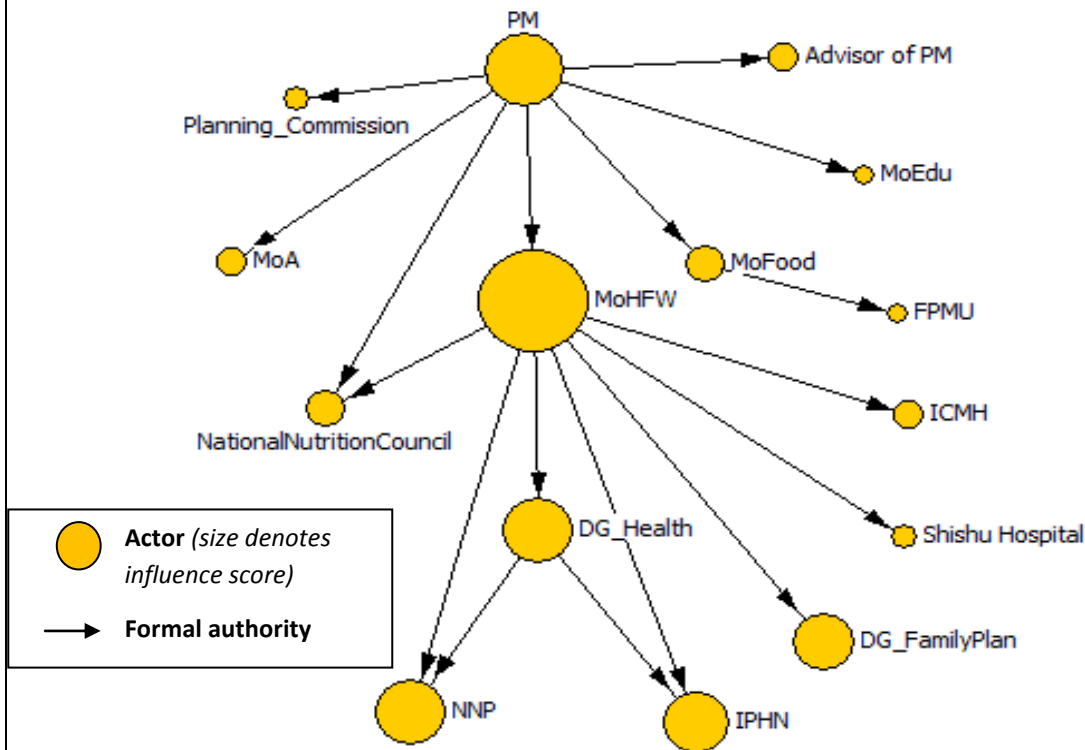
The proposed National Nutrition Service seems to be in line with the CIP's goals under the utilization pillar of food security. There is cross-over in the team advising the CIP prioritization process and in the development of the NNS Operational Plan.

### Box 5—Net-Map Case Study: The Policy Landscape for Nutrition in Bangladesh

An extensive assessment of the policy landscape for nutrition was undertaken by IFPRI recently (Akhtar 2010), using the Net-Map method which captures the perceptions of key stakeholders in a network about their role and the roles of other stakeholders. The map below shows the structure of formal authority for these actors who are involved in the policy landscape for improving nutrition. Each arrow signifies some type of formal oversight of one actor over another. The size of the actor shows how much influence they have over improving policies and programs for better nutrition. (This shows the average response over seventeen Net-Map interviews with key informants.)

The Figure 5 illustrates the position of formal authority held by the Prime Minister (PM), the Ministry of Health and Family Welfare (MoHFW), and to some extent the Directorate General of Health Services (DG Health), as they are the hubs of formal authority. While they do not play a direct role in core nutrition activities, many other ministries are seen as involved in the policy landscape. These include the Ministry of Agriculture (MoA), Ministry of Food and Disaster Management (MoFood), and the Ministry of Education (MoEdu). The attributed influence (scores given by interview partners) correspond well with the formal lines of authority as those who have authority over many other bodies generally have equivalent influence.

**Figure 5: Formal Authority Flows in Nutrition Landscape**



The Bangladesh National Nutrition Council (BNNC), shown above as National Nutrition Council, is the chief policy development body for nutrition, but is not seen as highly influential in improving nutrition policy and practice, as shown by the small actor size. This could be due to a lack of formal

authority over policies and programs and limited capacity to support policy implementation and monitor progress on nutrition outcomes.

Respondents drew the network of information flows related to nutrition issues and they assessed the core priorities of each actor on the map. The select data from this exercise was included in the table below, Table 1, which shows 11 of the key actors from the mapping and their characteristics.

The in-link and out-links refer to the number of actors that they receive information from or give information to, respectively, on nutrition issues. In addition, interviewed stakeholders were asked to determine the top priorities of all the actors on the map, and they could assign up to 3 priorities in decreasing order of importance. Out of 68 total information links on the map (not all shows here), 19 of them are directed to the MoHFW, suggesting that other actors consider MoHFW to be a leader for change in nutrition policy and programs. The Bangladesh Breastfeeding Foundation (BBF) is another actor who is highly involved in information flows, but unlike MoHFW, BBF is actively giving and receiving information and so is a good connector in the network. UNICEF is an outgoing hub for information, with 13 outgoing links thus appears to be actively involved in trying to influence policy change. The BNNC has no in-links, showing that other actors are not trying to influence this body, thus others likely do not see it as a leader for change in nutrition policy and practice.

**Table 1: Information Links and Priorities for a Few Key Actors**

Actor	In Links	Out Links	#1 Priority	#2 Priority	#2 Priority
MoHFW	19	3	chronic malnutrition	food insecurity	micronutrient deficiency
Bangladesh Breastfeeding Foundation (BBF)	7	5	chronic malnutrition		
Institution of Public Health Nutrition (IPHN)	9	2	micronutrient deficiency	chronic malnutrition	emergency nutrition
United Nations Children's Fund (UNICEF)	0	9	chronic malnutrition	emergency nutrition	micronutrient deficiency
Directorate General of Health Services	5	1	chronic malnutrition	micronutrient deficiency	emergency nutrition
Bangladesh Pediatric Association	2	3	chronic malnutrition	emergency nutrition	
Food and Agriculture Organization (FAO)	0	3	food insecurity	chronic malnutrition	micronutrient deficiency (using food based approaches)
World Health Organization (WHO)	0	3	chronic malnutrition	emergency nutrition	micronutrient deficiency
USAID	1	2	food insecurity	chronic malnutrition	micronutrient deficiency
Bangladesh National Nutrition Council (BNNC)	0	1	chronic malnutrition	food insecurity	

It is a challenging exercise to determine an actor's main priority, as most actors are involved in many issues. This seems to show a positive landscape for nutrition as most actors prioritize some aspect of nutrition, however we can get have a glimpse into potential challenges in the nutrition landscape when we look a bit deeper. Even within nutrition, many actors prioritize different aspects of nutrition—emergency nutrition, chronic malnutrition, or micronutrient deficiency. Some



actors work on all components but many prioritize one over the others. In addition, the MoHFW, a critical actor for change, must balance many different health and nutrition priorities, even beyond those listed here. Some interview partners suggested that other nutrition aspects should not be considered a priority at all until calorie needs—a simple interpretation of food security—are met. The urgent need for strengthening multi sectoral collaboration to improve nutrition and maximize impacts has been emphasized. Even within the nutrition sector, many actors disagree about the appropriate policies or interventions for addressing critical nutrition problems. This picture highlights possible challenges in leveraging support for nutrition to promote appropriate policy action, due to the need to balancing many important priorities and disagreement on appropriate responses to those priorities.

The past iteration of the nutrition program, NNP, suffered from a lack of monitoring and evaluation. Building monitoring and evaluation into the new program structure will support successful nutritional outcomes, especially if feedback is combined with incentives for staff to perform well (Sen et al. 2010).

Biomedical science tells us that the first 1000 days of a child's life is the most critical and where nutrition interventions yield the greatest impact. In spite of this, on the policy level, nutrition is often seen as a secondary priority after rice-security (sufficient calories from staple foods) (Akhtar 2010). Awareness-raising activities directed to all the related ministries can support sustained action for child nutrition.

Alleviation of low birth weight will require integrated interventions to improve women's nutrition and health (notably anaemia) and one or more generations to overcome the intergenerational sequelae of maternal malnutrition. Reducing post natal growth faltering and specific micronutrient deficiencies will require improved complementary feeding practices and reduced morbidity and these are outlined as key areas of policy intervention in the National Food Policy Plan of Action (2008 -2015).

The National Policy for Arsenic Mitigation 2004 Plan of Action needs to be implemented effectively. This requires further efforts to raise public awareness regarding arsenic contaminated water, as well as alternative arsenic free safe water sources and mitigation options. There is need to monitor agriculture practices to ensure lowest level of arsenic contamination from food sources such as rice and vegetables with development of a national database on soil, rice and vegetables. This also requires building up local government capacities, expanding training for officials and elected representatives of local government institutions, as well as monitoring mechanisms across agriculture and health sectors.

Progress toward scaling up breastfeeding promotion and support interventions is often compromised by violations of the Code of Marketing of Breast Milk Substitutes. Capacity and funding for monitoring code violations are currently lower than needed, and further investment in the area would greatly support child nutrition (Sen et al. 2010).

Finally, women and children living in slum areas are worse off than any other segment of the population. Without addressing the particular situation of this group, progress on nutrition indicators will be severely slowed. Food quantity and quality are the most direct links between

agriculture, food security and health. The CIP Investments are being proposed in agriculture that support small holder farmers particularly women so as to make significant contributions to preventing child nutrition. Specifically, agricultural interventions are being prioritized to increase the production of energy, protein and micronutrient dense food throughout the year, strengthen the small holder's farmer's resource base and address inequities in household allocation of resources. With the challenges of dietary diversity in the habitual Bangladesh diets, nutrition considerations are incorporated into the agriculture, fisheries and livestock development programs and activities are designed so as to improve availability, access and nutrition through production and consumption diversification. Given the cross cutting nature of malnutrition, there is a clear window of opportunity to implement the government's strategic commitments and multi-sectoral interventions for nutrition.

## **Program 11: Orient food and nutrition actions through data**

### **Policy Barriers and Drivers**

Context-specific and evidence-based understanding of the most effective and feasible programs and investments is critical for success in improving nutrition. Research undertaken to understand the relationship between aggregate food availability and household food consumption and monitoring and evaluation of programming must feed back into the program design process on a regular basis. Food consumption and nutrition data are required to track dietary changes, monitor the prevalence of malnutrition in 'at risk' groups and inform policy decisions to improve the overall quality performance of agriculture and food policy. Dietary assessment including 'total diet studies' can help influence food policy, while nutrition education using the results of these studies can stimulate a demand for judicious food choices. This requires an updated food consumption survey to assess the actual food and nutrient intake of the population; identify the nutritional gaps in the diet and help set food production targets based on nutrition improvement goals and indicators; and help to plan a food supply and promote dietary guidelines that will lead to improved nutrition outcomes. Creation reflected in demand for a healthier food supply can also help to guide food import policies to push for available supplies of diverse and healthier foods.

As diets have altered and their complexity has grown in recent decades, and with the influx of a range of new high-yielding crop varieties, there is need for up-to-date food composition data. The construction of Food Composition Tables (FCT) requires research on the nutrient content of individual foods and food baskets in order to prepare dietary guidelines and monitor standard dietary intake and help construct population group-specific nutrition standards or "recommended daily intakes" for all nutrients (energy, protein, vitamins and minerals as well as bioactive compounds).

Dietary Diversity of the community, the ultra poor, including the urban poor is an area of focus in program 11. While the imperative to meet dietary diversity is widely acknowledged, the need to measure and operationalize it remains unmet. Associations between dietary diversity and nutrient adequacy, and between dietary diversity and household food security, especially for the vulnerable groups, must be identified to create the knowledge base for effective interventions.

Also, regular monitoring and evaluation of nutrition interventions is a requirement for success. In the past evaluating the impact and processes related to NNP itself was not invested in adequately, which raised many criticisms around program design and evaluation approaches.

Awareness and nutrition education through nutrition and health behavioral change communication must emphasize educating mothers on correct feeding practices and nutritional needs of their children.

## **Program 12: Food safety and quality improvement**

Food safety and food quality together constitute another prerequisite for ensuring utilization of food. Food borne diseases are also very common in Bangladesh, mainly attributable to poor water, environmental sanitation status, and food contamination and adulteration. Diarrheal disease is one of the major public health problems, particularly among infants and young children, around 70 percent of which are food and water borne. Impacts of diarrheal disease are enormous, beginning from high disability due to nutrient loss from the body to death (FPMU 2009).

Food contamination and adulteration with dangerous substances, colors and chemicals are widespread in Bangladesh. Unsafe food represents a major threat to public health in Bangladesh; each year million of citizens suffer from illness following consumption of unsafe food. Results of food safety monitoring in 2002-03 showed that out of 3000-6000 suspected food samples usually tested every year at the Institute of Public Health (IPH), 55 percent of the samples were adulterated (FAO/WHO 2004). Among the standardized products, hundreds in the market are being sold without any standard seals or with fake seals (FPMU 2009).

Livestock and fishery sectors are major contributors to food safety issues. Unhygienic animal slaughter, handling and transportation are significant problems throughout Bangladesh. Animals are slaughtered in open places adjacent to the wet markets or on the roadside in areas without proper facilities, sanitation or drainage. Meat production and marketing is disorganized and conducted in various places in the city without municipal control, supervision or veterinary inspection of live animals or carcasses (FPMU 2009). In consultations with fishers, the widespread practice of injecting fish and shrimp with various colorants, liquids, and chemicals was reported (IFPRI RRA).

### **Box 6—Case Story: Shrimp Farmer and Threats of Malpractice in Shrimp Business (IFPRI RRA)**

Md Mahmudul Haque (Age 53), Village Balia Danga, Post Gurugram, Upazilla Douhata, District Shatkhira  
January 26, 2011

Mahmudul is a shrimp farmer in Shatkhira. He has 155 Bigha (51 acres) of shrimp farm water area (Gher). He has taken lease of all the Gher area. He pays eight thousand taka for each bigha. The land in this area in Shatkhira is suitable for shrimp cultivation as the saline water of the high tide enter in this area and makes the area befitting for shrimp farming. Mahmudul says, "We bring in saline water for shrimp cultivation. This affects the salinity of the soil. But at the same time it is required for shrimp cultivation. Shrimp farming is more profitable than rice farming and that is why like

others in the area I have come to shrimp farming.”

In last twelve months he cultivated Bagda, Golda shrimp and others fish in his farm (Gher). “I bring young shrimp fries (Renu Pona) from Agents in Shatkhira Sodor. Sometimes the agents bring their fries to sell to me in my Gher. The agents get their young shrimp fries from Cox’s Bazaar. The other fishes in my Gher come with high tide water. I don’t purchase these fish fries but I make profit by selling these.” In last twelve months Mahmudul had Bhetki, Rui, Katla, Shoul and other fishes in addition to shrimp in his Gher. Sometimes if the number of fishes like Shoul and Bhetki are too much then they eat up the shrimps. Then Mahmudul says, “I apply medicine and kill these predatory fish (Rakkhushhe Much).”

He says the biggest problem the shrimp business is faced with is not predatory fish (Rakkhushhe Much) but “pushing”. Through this bad practice impurities are injected into the shrimp body for increasing weight. He says, “pushing” brings temporary profit but at the cost of the country’s reputation. Earlier Bangladesh had a good name in shrimp export, but now it is in the verge of destruction. Shrimp shipments are returning from Europe and America. This is sad.” When foreign company representatives come to monitor and inspect the depot the owners refrain from “pushing”, but then as soon as the representatives leave they again start “pushing”.

Mahmudul says, “Everybody knows about “Pushing” but nobody says anything. When government people or people from the Fisheries Department come they are bribed. They keep their mouth shut about “pushing”. We helpless and unprotected shrimp farmers are faced with threats of closing down of our business due to this malpractice.”

### **Key Policies and Regulations**

Bangladesh Standards and Testing Institution (BSTI), under the Ministry of Industries, is the Bangladesh focal point for the Codex Alimentarius, a collection of internationally recognized standards, codes, and guidelines for food safety established by the FAO and WHO to provide a high level of consumer protection and ensure fair trade practices in agriculture and food products.. BSTI was established by the Government through an Ordinance passed in July 1985. The Ordinance has been amended as The Bangladesh Standards and Testing Institution (Amendment) Act, 2003. Being the Standardization body in the country, the primary activities of BSTI include standardization of services and products, certification and quality control of food items, provide testing facilities, and preparation, promotion and adoption of national standards (FPMU et al. 2009).

The Bangladesh Pure Food Ordinance, 1959 has been amended recently as Bangladesh Pure Food (Amendment) Act, 2005. The amendments include higher penalties for adulteration and contamination and the formation of a National Food Safety Advisory Council.

The National Food Safety Advisory Council (NFSAC) is headed by the Ministry of Local Government, Rural Development and Cooperatives (MOLGRDC), with representatives from various other ministries and related agencies. Its mandate is to advise the GoB on matters related to food safety, standard and quality control (National and Codex Standards), development of capacity and infrastructure to ensure food is safe for human consumption, and policies and strategies related to food safety (FAO, et al, 2009).

Under the City Corporation Ordinance (2008) and Paurashava Ordinance (2008) there are a number of public and environmental health related mandates. Sanitary inspectors are employed to

uphold those mandates through inspection of food manufacturing, processing, and selling premises as well as to collect food samples for all of Bangladesh's city corporations and paurashavas. Food testing is carried out in the food laboratories of Dhaka City Corporation (DCC), DG Food, Institute of Food Science & Technology, the Bangladesh Atomic Energy Commission and some private sector units (FAO, et al, 2009).

Consultations with health and nutrition experts revealed that the new National Nutrition Services includes plans to reduce the consequences of unsafe food. Plans propose that Institute of Public Health take a strategic role in managing food safety in collaboration with the City Corporations and municipal authorities.

In 2009 the Consumers' Right Protection Act was enacted in Bangladesh, stipulating the establishment of a Central Consumer Protection Council. It builds on the existing laws, updating them to be more relevant to the current realities of the market economy. It clearly defines offenses against consumers related to adulteration and hoarding and stipulates punishments. In addition, a Food Safety Policy and Plan of Action is being prepared by the DGHS, MoHFW in collaboration with partner ministries.

The government has finalized a Fish and Animal Feed Ordinance 2008 (April). In case of commercial feed production and supply, the feed manufacturing companies must follow the guidelines of quality feed production requiring different nutrients. The government has also banned the use of chemical ingredients including antibiotics, growth hormones, steroids and pesticides as raw materials for producing fish and animal feed.

### **Policy Barriers and Drivers**

There are too many entities involved in management of food safety issues without any formal structure for coordination. They should be harmonized and rationalized by reducing the number of agencies involved and redefining mandates. Also it is necessary to complete definition of food standards based local norms rather than developed country norms which are not relevant here and not implementable.

Some policies and enforcement mechanisms need updating to be effective. While the Consumers' Protection Act 2009 clearly defines offenses against consumers, the system by which consumers and consumer groups can have grievances addressed is cumbersome and slow, making it a far less effective disincentive for offenders. There is a demand for amending the consumer protection law to allow the consumers the right to file case directly to the court to make the enforcement system more responsive. In addition, the Pure Food Rules 1967 need to be amended and updated to be in line with the national needs and requirements and adapted in adherence to the Codex Guidelines.

If capacity and infrastructure to support monitoring of food safety and quality is not addressed, improvements cannot be ensured. Sanitary inspectors are too few in number (only 68, countrywide, to cover 6 city corporations and 309 paurashavas) and require better training (there is no formal sanitary inspector training program or certificate of competency). In addition there is only one food laboratory, found in Dhaka (FAO et al. 2009).

In addition to BSTI, there is apparently a parallel system of food safety testing in IPHN & IPH laboratories. The draft operational plan for the National Nutrition Services calls for investment in training and research for the detection of food contamination and adulteration. This is a positive

move, as it shows buy-in in the MoHFW for improving food safety. However, the functions of these systems should be reviewed to avoid duplication and promote synergies and coordination between government bodies dealing with food safety.

Currently the NFSAC plays an advisory role, without real power. The Council needs to be strengthened and empowered so that there is an overall monitoring body to coordinate and oversee activities of all relevant government bodies (FPMU 2009).

Even if national policy and regulatory bodies are capacitated and empowered, implementation at the local government will be a bottleneck if oversight and incentives for local government officials are not considered. Local government must be empowered to enforce food safety regulations. This could include developing food-testing laboratories at divisional and district levels.

Grassroots support can be a powerful driver for local government accountability. In interviews with fishers, it was reported that all people in the community knew who was undertaking adulteration of fish and shrimp, but no action was ever taken even though fishers felt that this behavior was detrimental (IFPRI RRA). Awareness campaigns can help by educating the public on appropriate food safety practices and mechanisms for reporting abuses.

## 5. CONCLUSION

As the narrative in this report repeatedly pointed out, the lack of enforcement of regulations is a pervasive challenge across almost all the program areas. Activating and educating community-based organizations can be a grassroots-driven mechanism to increase awareness of regulations and thus enforcement. Community-action can also promote good behavior through peer pressure. Having women-focused CBO's has the additional benefit of promoting women's empowerment, which has long-term impact on child nutritional status.

Long-term investments in enforcement of regulation across almost every program area should be made, but progress in this area will likely be slow; in-depth assessments of incentive structures at all levels should be made in the short term to determine a specific plan of action for improving enforcement.

Given the multi-sector and multi-stakeholder nature of food security, formal mechanisms for cross-sectoral collaboration need to be implemented. One mechanism could be a multisectoral committee on food security, wherein a food security focal point for each ministry involved in the CIP would facilitate progress on this. The committee could include representatives of key academic and civil society actors. In order to make this body effective, it requires buy-in from the top, thus it should be planned and implemented in consultation with all ministries. In addition, food security focal points must have some formal authority, otherwise the committee risks becoming another powerless body. One suggestion is to require a food security audit for all major ministerial policies and programs, to assess the impacts on food security of these activities, to be undertaken by the food security focal point within each ministry.

Improved environment for private sector should go hand in hand with increasing investments in and effectiveness of the public sector. In addition to the creation of an enabling environment through policy, private sector must be seen as accountable in order to have increased support of their customers, which must be accomplished through effective quality control.

In the seed sector, public sector should increase transparency in terms of policy goals and actions. Private sector needs access to timely and accurate information about the public sector's annual plans in order to plan accordingly and effectively to serve any unmet demand.

The fertilizer sector needs a national-level regulatory body to check the quality of imported and produced fertilizers. Quality-control bodies should have the ability to quickly assess the quality and quickly issue fines when appropriate.

Also, CBO's can be energized and educated to provide feedback to private sector companies if they have problems with input quality for seed, fertilizer, feed, etc. And they can share experiences about which companies they prefer. As a group they can have a louder voice than individually.

Agricultural universities should strengthen links with NARS and the extension system to move away from the theoretical emphasis of the current training structure towards more practical experience. Field experience requirements for university students can help them get practical experience.

In order to improve research capacity in Bangladesh, particularly in the NARS, research institutions must be able to attract high quality researchers. Recruitment and promotion rules and procedures need to be formalized which are largely inappropriate for proper recruitment and promotion; inter-institutional mobility of staff should be supported to promote opportunities for cross-institutional learning through transfer and promotion, and salary and benefits packages should be increased and merit and performance rewards included.

Scholarship programs with study stipends can be offered to promising students in agricultural sciences, along with a requirement for 3-4 years of service in a NARS or some other public sector position, in order to address the current “brain drain” problem. Investments in capacity strengthening of national agricultural/food systems to integrate nutrition outcomes in planning and policy processes will make significant contributions to improving nutrition on a sustainable basis.

The Department of Extension is a critical actor for most of the CIP programs. However, the DAE is also a bottleneck for successful implementation of most of the CIP programs. As such, it is of utmost importance and urgency to address the capacity and motivation of the DAE, particularly the local extension officers. Beyond investments in training and hiring of additional staff, DAE should be taken out of the monitoring for fertilizer marketing and any other non-essential or peripheral duties that take the officers away from their core duties. In addition, new incentive structures to motivate the staff must be put in place.

The key driver to push the national nutrition agenda is the Ministry of Health and Family Welfare along with the support and responsibility of non health sectors such as the Ministry of Agriculture and Ministry of Food and Disaster Management which are actively engaged in policies and programs contributing to the improvement of nutrition in the country. Addressing the challenge of malnutrition requires both short- and intermediate-term and long-term sustainable approaches. A variety of actions, including agricultural and micronutrient interventions and partnerships for improving nutrition, of safe drinking water and sanitation, education and support for better diets, special attention to gender issues and vulnerable groups such as pregnant women and young children, and quality health services along with livelihood improvement will be promoted.

The reviews of policies and consultations with stakeholders have revealed a couple of areas that require considerations for investment within the CIP framework.

First, a plethora of policy documents have been prepared over the last two decades. Several of these documents are impressive for their wide and near-comprehensive coverage of the issues. It is also commendable that, in more recent documents, objectives almost always stress priority to the needs of the poor and vulnerable, with frequent mention of women as a disadvantaged group. That said, policies are often not consistent. The feasibility of policy actions is not always considered. Efforts that are complex are presented with little discussion of the feasibility of their implementation. Some policy documents covered issues handled in other policy documents; e.g., national agricultural policy incorporated seeds, fertilizer, research, irrigation, environment, mechanization, land use and a host of other issues for which there are independent policy documents. But there is a lack of cross reference. In order to overcome such shortcomings, it is recommended to (a) update all the policy documents to bring them in line and make them consistent, (b) in doing so, first decide on a set of key policy documents to be prepared and subsume other issues within those documents rather than writing a separate policy document on every single issue, and (c) where an issue from one policy document is quoted or referred to in another, cross reference should be made.



Second, national surveys like nutrition survey, income and expenditure survey, and census are conducted for specific purposes without giving adequate attention on their potential use. There is little exchange of ideas between agencies and the research community that are potential users of these data sets. Significant value added from these surveys can be obtained by planning and executing them better to make them complementary, and by making them available to the wider research community without the extent of delay currently observed.

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## **Annex A: Net-Map Method**

The Net-Map approach draws on network theory to highlight formal and informal interactions among key actors in the policy process, their degree of influence and hierarchical linkages, the patterns of communication and exchange of information, and the overall political context under which the process took place. From a methodological perspective, social network analysis (SNA) approaches are especially suitable in this regard, as they can help to highlight the formal and informal ties that exist across actors involved in a policy process. SNA explains the achievements of individual actors but also the developments within groups of people or organizations by looking at the structure of linkages between actors. Instead of analyzing the characteristics of an individual or the formal hierarchical structure of an organization, SNA focuses on the networks of actors.

The interviews were undertaken with a small selection of key stakeholders—key informant interviews—following a number of procedural steps and approaches in the following order: preliminary research and planning for data collection; listing the actors involved; drawing linkages among the actors; capturing information flows; determining influence levels; attributing actor goals; identifying any stumbling blocks and critical actors; and aggregating and interpreting maps. We now review these in more detail.

The resultant information provides great insight into the systems assessed with the tool, but quantitative results should be seen as case studies, and the perception of the few stakeholders that were interviewed, as a robust research design was not followed in order to obtain this information.

Key informant interviews were undertaken with the following stakeholders:

- WorldFish, William Collis, 2 February 2011
- FPMU-FAO, Ciro Fiorillo, 2 February 2011
- Flood Hazard Research Center, Paul Thompson, 9 February, 2011
- Narigrantha, Farida Akhtar, 14 February 2011
- IFDC, Ishrat Jahan, I. 8 February 2011

In addition, preliminary data was taken from extensive policy analysis done to understand the policy landscape for Nutrition in Bangladesh for the Alive and Thrive Project. The unpublished report is: Akhtar, N. 2010. "Policy Actor Landscaping of Child Nutrition in Bangladesh: A Study using Net-Map Method." 7 December. Washington DC: International Food Policy Research Institute.