Value Chain Inefficiencies and Market Failures in the Agricultural Sector of Bangladesh: A Case Study
VALUE CHAIN INEFFICIENCIES AND MARKET FAILURES
IN THE AGRICULTURAL SECTOR OF BANGLADESH: A
CASE STUDY

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Abstract

Though Bangladesh has achieved remarkable success in agricultural productivity over the past four decades or so, its agricultural production, postharvest management and marketing practices are far from being efficient and beneficial for farmers and consumers. This study on agricultural value chain identifies the areas of inefficiencies in different value segments and reveals failures in the market ecosystem. To address the failures and inefficiencies, this paper proposes three generic strategic courses of action around the domains of Triple Triangle Framework. The paper is expected to benefit the researchers, extension officials, policy makers and market development professionals involved in agriculture, food and nutrition security, and inclusive and sustainable development.

Key Words: Agriculture and Agribusiness, Bangladesh, Market Ecosystem, Market Failure, Sustainable Development, Value Chain.

1. INTRODUCTION

When countries pass transitional stages of the food life cycle with more modernized systems along the agricultural value chains, food safety hazards become broader. With rapidly changing dietary preferences of consumers in increasingly urbanized settings, food safety hazards occur particularly due to the inefficiencies and failures of incoherent stakeholders involved in the burgeoning market ecosystem. (Sgustafson, 2018). Fresh food items - including fruits and vegetables - are most susceptible to foodborne hazards that stem from changes in the production and consumption practices of such items. According to the World Health Organization, food borne hazards including illness, disability, and premature deaths led to productivity losses of about USD 95 billion in 2016 in low- and middle-income countries (Jaffee, et al, 2019).

Food and nutritional security (FNS) is therefore a global concern today. FNS entails four aspects: (i) food availability, (ii) food safety, (iii) food accessibility, and (iv)

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sustainability. The first concern is whether the world is producing enough quantity of food to feed all the people on the earth and to support the food ecosystem (e.g. to feed domesticated animals). The second issue is whether the food that is being produced is safe, for example, from (a) chemical contamination arising out of excessive use of synthetic pesticide, herbicide, fertilizer, growth hormone, etc. (b) the presence of antibiotic residues, heavy metal contamination, microbial pathogens (e.g. Salmonella, in betel leaf), natural toxins (e.g. aflatoxin, in peanut), etc. and (c) inappropriate use of ripening agents and preservatives (Jaffee, et al, 2019). The third dimension of food and nutrition security involves accessibility of food by all in fair terms, at right times, through right mechanism. The fourth dimension involves sustainable production of food (e.g. through eco-friendly technologies and farming practices) and fair distribution of value among the value chain actors, including farmers and consumers.

In most of the least developed and developing countries, particularly those with large arable land and big population, agriculture has the potential to serve as an essential vehicle for promoting inclusive growth and achieving many of the sustainable development goals. Quite a good number of sustainable development goals (Agenda 2030) involve inclusive growth that aspire to see increased and equitable participation of marginal households as well as micro, small and medium-sized enterprises (MSMEs) into national and global value chains. It also talks about their right to financial services, including microfinance. The first Goal of 2030 Agenda for Sustainable Development advocates sound policy frameworks that would accelerate investment in poverty eradication initiatives, while Goal 2 targets to end hunger and malnutrition and ensure access to safe, nutritious and sufficient food by all people. It further targets doubling of agricultural productivity and incomes of small-scale food growers by ensuring access to inputs, knowledge, markets and financial services and by creating value addition opportunities. Promotion of climate-resilient and sustainable agriculture is also targeted. And, at the same time, it further advocates increased investment in agricultural research, extension and technology development (United Nations, 2015).

Likewise, Goal 8 advocates productivity improvement in high value added labor-intensive sectors through innovation and technological upgrading and development-oriented policies that support, among other things, micro-, small- and medium-sized enterprises. Goal 9 emphasizes on increased access of small-scale enterprises to financial services and their integration into value chains and markets. Goal 12 (Responsible Consumption and Production) targets, by 2030, to reduce per capita global food waste by half and reduce losses in production, post-harvest and along the supply chains. It further aspires to achieve, by 2020, environmentally appropriate management of harmful chemicals and wastes and ‘significantly reduce...
their release to air, water and soil in order to minimize their adverse impacts on human health and the environment’ (United Nations, 2015). Box 1 illustrates the relevance of agriculture and agribusiness for sustainable development goals.

Putting these SDG targets into perspective, it can be said that upgrading agricultural value chains for inclusive and sustainable development deserves to be a top priority, particularly for least developed and developing countries. For example, in Bangladesh, agriculture historically remains to be the dominant sector, with farming being the main occupation of people. Currently, in Bangladesh, 64.96% of people live in the rural areas (World Bank, 2017) and 37.8% of its more than 160 million people are involved in agriculture (BBS, 2019) - for subsistence or commercial purposes. Representing 2.18% of global population (www.worldometers.info, 2018), Bangladesh’s spend 47.7% of their income on food (BBS, 2019). Against this backdrop, promoting safe and sustainable agriculture, upgrading agro-food value chains and supporting farmers and agro-entrepreneurs would be a natural way to ensure food safety and nutritional security and to advance inclusive growth and sustainable development in countries such as Bangladesh.

While ensuring food and nutrition security, promoting inclusive and equitable growth, and attaining sustainable development goals are all tied together, the country is yet to make any significant progress in this connection. Despite the fact that Bangladesh has achieved remarkable feat in increasing overall production of agro-produce, farmers are still deprived of fair price in one hand, and consumers are deprived of safer food on the other. This indicates significant market failures and inefficiencies along different agricultural value chains. This paper therefore attempts to delve into unearthing the nature and reason of such inefficiencies and failures.

### Box 1: Relevance of the Agricultural Sector in the 2030 Agenda for Sustainable Development

**Goal 1: No Poverty**
- By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance
- Create sound policy frameworks at the national, regional and international levels, based on pro-poor and gender-sensitive development strategies, to support accelerated investment in poverty eradication actions

**Goal 2: Zero Hunger**

- By 2030, end hunger and ensure access by all people … to safe, nutritious and sufficient food
- By 2030, end all forms of malnutrition
- By 2030, double the agricultural productivity and incomes of small-scale food producers … through secure and equal access to … inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment.
- By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.
2. LITERATURE REVIEW

The actions or inactions as well as inefficiencies of many stakeholders along the agro food value chains operating under diverse environmental, infrastructure, and socio-political conditions induces market failures. These stakeholders mostly are farmers, food handlers and distributors, food manufacturers, food service operators, consumers, regulators, scientists, educators, and the media (Jaffee, et al, 2019).

As in other developing countries, the agricultural ecosystem in Bangladesh is approaching the modernizing stage where, the agro value chains are experiencing restructuring in the wake of an ardent need of gradual modernization of different actors including the producers, processors, and distributors and even retail sectors. Hence, market failure and value chain inefficiencies occurring during such restructuring process are also impacting the food safety status of the country (Bhatia and Ghanem, 2019).

In case of small holder farmers, low productivity, combined with very limited on-farm processing, poor transportation, storage and other infrastructure, forces farmers to sell their produce in unfavorable market conditions at low prices (Mugano, 2017). At the same time, the smallest of farms neither have the resources to improve productivity nor do they have access to knowledge and modern
technologies, connectivity with other value chain actors and access to different business development services. As such they cannot benefit from the different schemes of Government or that of the big private sectors (Mugano, 2017). Also in terms of credits flowing to agriculture, whether from formal or informal sector, have been short-term and to some extent medium-term which do not have significant impact on farm cultivation and, therefore, does not improve overall output and incomes sustainably.

On the other hand, in the scenario of rapidly modernizing and changing food demand and consumption patterns, the emerging private sector actors as well as the governmental regulatory bodies lack appropriate tools, technologies and capacity to address the challenges stemming from such changes that tend to move faster than their ability to cope (Jaffee, et al, 2019).

Besides, as market failure and value chain inefficiencies tend to appear on national radar screens only during crises due to lack of timely data and thematic leadership, value chain competitiveness and market strengthening measures are developed and adopted in a more crisis management mode rather than deliberative, evidence-based, forward-looking, and consultative manner. Such crisis management approach of strategy formulation and implementation often differ in target, content, approach, and lasting efficacy thereof in supporting a sustainable agricultural ecosystem. (Jaffee, et al, 2019).

The behavior of the value chain actors in such modernizing stage can be shaped by their awareness of food safety hazards; their technical, financial, and other capabilities to apply effective mitigating practices; and prevailing rules, incentives, and other motivators and value chain inefficiencies can be addressed accordingly (Jaffee, et al, 2019). In some developing countries, value chain financing has been emphasized to promote inclusive growth particularly in agrarian economy. Besides, availability of bank credit is the gateway to avail several benefits such as interest subsidy on credit, investment subsidies linked to credit, crop insurance and participation in VCs (Bhatia and Ghanem, 2019). A more important part of inclusion is the design of products and processes that match the needs of the farmers. Accordingly, agricultural finance integrated with other services including input supply, post-harvest and storage, processing, marketing, research and technology, training and extension, among others is perceived to offer an opportunity to enhance the impact of financing by improving efficiency, ensuring repayments, and consolidating VC linkages among participants along the chain (Bhatia and Ghanem. 2019).

In order to feed 9.7 billion people by 2050, the present challenges including the market failures and value chain inefficiencies needs to be addressed among others through mobilizing investments in the sector and the agricultural system, which will
involve increasing public expenditures, encouraging the private sector agriculture and the broader food system, and supporting smallholder farmers to better link to agricultural value chains and produce sustainably. An incremental approach, based on prioritization of critical challenges and matching them with appropriate interventions with greatest impact potential, would be extremely important in the coming days. (Barrett and Mutambatsere, 2005).

Attention needs to be given also on inclusiveness and sustainability. Inclusive growth requires an inclusive market ecosystem, which promotes an increased, equitable, and responsible participation of all market actors – particularly small and economically-challenged individual market players and MSMEs – along the value chains that help reduce poverty and asymmetric distribution of created value (Jahan, 2018). An inclusive market ecosystem is participatory and sustainable in the sense that all value chain actors can create and capture values on equitable terms. As for the agricultural sector of Bangladesh, an inclusive market ecosystem is what smallholder farmers as well as micro, small and medium-sized traders and agro-entrepreneurs deserve dearly.

3. OBJECTIVE AND SCOPE

The overarching objective of this article is to investigate why and how the existing market mechanism has failed to ensure fair price for farmers and safe agro-food for consumers in the context of Bangladesh. Keeping the perspectives in mind, the paper would also delve into offering some generic solution to address the market failures and value chain inefficiencies. However, specific objectives of the paper include the following:

i. to discuss the relevance of agricultural sector from the perspectives of sustainable development goals (SDGs);

ii. to outline the rise of commercial agriculture in Bangladesh and the drivers of change;

iii. to map the agricultural value chain and identify key areas of inefficiencies and market failures;

iv. to discuss value chain upgrading potentials and challenges in Bangladesh and recommend a broad intervention agenda for addressing the inefficiencies and market failures.

In so doing, Bangladesh is taken as the country case and a horticulture value chain (mango) has been chosen as the point of analysis.
4. METHODOLOGY

This is a qualitative research aimed at investigating why and how the market mechanism fails to deliver safe food for the society and fair price for the farmers in the context of Bangladesh. Three data collection techniques have been used: direct observations, face to face interviews, and small group discussions. Major production hubs as well as local landing and trading centers have been the points of primary data collection. In the process, a total of six (6) major production districts namely - Satkhira, Jashore, Jhinaidah, Meherpur, Rajshahi, and Capainawabgonj - have been covered. Besides, two major wholesale markets catering to the city of Dhaka have also been covered under the study. Primary data have been collected from farmers, traders, and other agricultural value chain actors (VCAs) through one-on-one interviews and small group discussions with farmers and traders in aforementioned production hubof Bangladesh. Besides, direct observations of postharvest management practices and trading practices at all major landing and trading centers (of the districts mentioned above) have also taken place.

For analytical purpose, the paper has relied on Triple Triangle Framework (TTF) - augmented Value Chain (TVC) analysis 1. Besides, to have a better handle on the scope, it has used a horticulture value chain - mango - as points of analysis, with Bangladesh as the country case. Focusing on the process of value addition within an industry, the global value chain (GVC) approach captures all value-generating activities starting from conceptualization, research and design to management of production and supply chain into post-consumption recycling (https://globalvaluechains.org). On the other hand, keeping firm competitiveness into perspective, the Triple Triangle Framework (Jahan, 2008) digs deep into three strategically important domains - the firm domain, the industry domain and the macro domain - that largely define the industry dynamics and value addition potentials for creating and sustaining competitive advantage by individual market actors. Appendix A presents a quick summary of the framework.

The Triple Triangle Framework (TTF) - augmented Value Chain (TVC) analysis brings together two analytical frameworks - TTF and GVC. Simply put, through TVC, the analyst takes any value segment and runs a TTF analysis on that segment, and repeats the same for other value segments. A simplified illustration is presented in Appendix B. This process helps optimize the analytical depth and rigor with which value chain (in) efficiencies and market success/failure can be identified better.
5. FINDINGS AND DISCUSSIONS

5.1 Commercialization of Agriculture in Bangladesh

The rise of commercial agriculture

Traditionally, agriculture in Bangladesh has largely been subsistence agriculture. However, over the past three decades, particularly from the 1990s onward, the scenario has changed; the country has experienced a rise in commercial agriculture. Significant progress has been made in such sub-industries as poultry, fisheries, fruits, vegetable, flower, maize, and animal husbandry. Production has increased also in cereal crops, grains and pulses. The sector has also seen innovation and introduction of saline-tolerant, drought-tolerant, flood-tolerant crop varieties. Besides, the utilization of agricultural lands has increased significantly: nowadays, three to four crops a year is a common phenomenon in commercial agriculture.

In the process, the country that once failed (in the mid-1970s) to feed its 70 million people is now feeding 170 million. This is despite the arable land lost to increased demand for housing, urbanization and industrialization. In terms of the world production ranking, the country was the 6th largest in fruit (tropical fresh) and 15th largest in vegetable in 2017 (FAO, 2019). Besides, Bangladesh was ranked third in the world in inland fish production in 2018 (www.DhakaTribune.com, 2018). This by itself is quite an achievement. Resilience and innovativeness of farmers and ever-mindful intervention of successive government regimes have helped achieve this feat. Local agricultural scientists and extension workers also deserve their due share of recognition.

On the other hand, due to poor postharvest management, inappropriate packaging, lack of storage facilities and shabby transportation system, 30%-40% of the fresh agro-produce gets wasted on its way from farm gate to end-market. Likewise, absence of adequate agro-processing industry has worsened the situation further. Besides, grave concern remains over nation’s food and nutrition security: the proliferation of the use of chemical fertilizer, insecticide, pesticide, growth hormone, etc. has resulted in severe soil degradation, created environmental hazards, and put food and nutrition security in jeopardy. Although production of, say, fruits has increased, this phenomenon leaves researchers and policy makers with lot many questions than answers.

The Drivers of Change

The emergence of commercial agriculture in Bangladesh may be explained by three major forces or drivers of change. These are (i) industrialization and rapid urbanization, (ii) increased purchasing power, and (iii) increased participation of the formal sector businesses along agricultural value chains (Jahan, 2012).
First, thanks primarily to the apparel sector, over the past few decades, the country has experienced (moderate) *industrialization, urbanization and internal - rural to urban - migration*. The sector today employs more than 4 million (mostly female) workforce that has migrated from rural to urban and urban-peripheries. Once contributors to the agricultural economy as smallholder producers and farm workers, these workers now depend on those whom they left behind for the production of their food. With ever-increasing rural to urban migration, urban population has increased nearly four-fold: from 9.9% in 1975 to 35% in 2017 (BBS, 2017). Thus, the market ecosystem has evolved over the period to accommodate commercial agriculture to cater to this newly found demand in the urban areas.

Second, buoyed by *ever-increasing purchasing power of the mass*, the demand for diversified basket of food, both in rural and urban areas, has increased significantly. The vast community at the base of the pyramid (BoP) is now characterized by (i) remittance-rich households, (ii) increased private sector employment (particularly in apparel and construction sectors), (iii) job opportunities offered by the non-for-profit sector (NGOs), and (iv) successful rural (agro) entrepreneurship.

The third driver of change is *increased participation of the formal sector businesses* (including large conglomerates) in the agricultural value chains and in related industries. Established conglomerates are getting involved in multiple segments of the value chains, including agro-machineries, agro-input, contract farming, processing, export, bulk trading and retailing. Such participation is likely to give birth to corporate farmers and corporate *arothdars* (trade intermediaries). Consequently, agricultural value chain governance may experience transformative changes.

These drivers of change have collectively kept the wheel of change moving fast in same direction, further fueling the growth of commercial agriculture. However, despite reasonable successes over the past few decades, Bangladesh’s agriculture and agribusiness ecosystem is far from ideal, and study of the agricultural value chains reveals inefficiencies along different value segments, indicating significant scope for upgrading.

### 5.2 Fruit (Mango) Value Chain and Value Chain Actors (VCAs) in Bangladesh

#### The value chain actors

Fruit value chains in Bangladesh are quite complex, with participation of many value chain actors (VCAs) in many different forms. For example, the mango value chain in Bangladesh is usually participated by actors of at least 20 categories, namely-

- **i. Orchard owner** - original owner of the land and orchard
- **ii. Orchard buyer** - ‘buys’ the orchard for 3 to 5 years, resell the orchard every year, often time three to four such ‘hand-changes’ happen
iii. Farm workers - locals employed to take care of the orchard, harvest and perform postharvest activities
iv. Rural petty traders (forias) - cash constrained small traders, buy/collect small quantities from smaller farmers/orchard owners and sell the same to local traders (beparis), and keep a (usually pre-determined) margin in the process
v. Rural traders (beparis) - local larger established traders trade in bulk independently or on behalf of any urban wholesaler or auctioneer
vi. Migrant traders (beparis) - seasonal traders having strong forward market linkages congregate from different parts of the country
vii. Rural auctioneers (arothdars) - act as the bridge between buyer and seller, facilitate transactions for a fee in exchange of service and security
viii. Procurement agents - work on behalf of urban bulk traders and processing companies against (usually pre-determined) commission or margin
ix. Handling workers - engaged in grading, sorting, cleaning, packaging, loading, unloading)
x. Packaging service providers - households crafting packaging material using bamboo, jute, etc. and formal sector businesses producing plastic crates, etc.
xi. Local transport service providers - locally designed/assembled mechanized and manual three-wheelers using local roads and national highways (with risk)

Because of such lengthy value chains and divergent group of small-sized value chain actors (VCAs), three things happen: first, handling cost increases; second, quality deteriorates and wastage increases due to repetitive pack-unpack and load-unload;
and third, as every VCA adds a margin, the price of the produce goes up without benefitting the farmers and the end-consumers. This, as a whole, offers an explanation to market failures in terms of the huge price gap between farmers’ end and customers’ end.

**The value map**

The agricultural value chains in Bangladesh have many segments, participated by a large number of actors (as discussed in the section above). Figure 1 represents a typical mango value chain in Bangladesh.

Broadly speaking, the mango value chain can be divided into four major segments: (i) farming, (ii) local aggregation and trading, (iii) urban wholesaling and institutional buying, and (iv) end-market retailing. In farming/growing segment, major players involved are orchard owners, longer-term leaseholders, and/or seasonal orchard buyers. Together they constitute the ‘fruit owner’ segment of mango value chain. In local aggregation and trading segment, the following market actors are involved: local petty traders (forias), local and regional traders (beparis), local auctioneers (arothdars), distant (urban market) bulk traders (beparis) and representatives or commission agents of distant (urban market) auctioneers (arothdars), exporters and agro-processors. In urban wholesaling and institutional buying segment, the following are the major market actors: urban market wholesalers, auctioneers, retail chains, kitchen market retailers, mobile retailers, and institutional buyers or their agents. Of these, retail chain is relatively a new phenomenon in the country. However, it is also observed that the urban wholesale market has started getting ‘corporate arothdars’ that not only supplies to its retail chain stores, but also feed its competitors. In the final value segment, retailing, two major actors are involved - the retailers and the customers. It may however be noted that across all value segments unskilled and semi-skilled laborers play crucial roles as farming and harvesting workers, handling workers, packaging workers, loading/unloading workers, etc.

**The value chain inefficiencies and market failures**

An in-depth investigation into the real-life practices along the value chains reveals inefficiencies and market failures. In the farming segment, two types of value chain actors (VCAs) are involved: orchard owners and leaseholders of the orchards. Many of the orchard owners, particularly in the North-Western part of Bangladesh, lease out their orchards for three to five years. Some among orchard owners or leaseholders ‘sell’ the orchard to other parties on annual/seasonal basis. In the process, even before flower comes, an orchard may get ‘sold off’ a couple of times. In addition, it gets sold further (even twice or thrice) between flowering and harvesting. In the process, in many cases the fruit owners are not the orchard owners.
remittance-rich households, (ii) increased private sector employment (particularly in nearly four-fold: from 9.9% in 1975 to 35% in 2017 (BBS, 2017). Thus, the market contributors to the agricultural economy as smallholder producers and farm workers, (Jaffee, et al, 2019).

The value chain actors address the challenges stemming from such changes that tend to move faster than technologies, connectivity with other value chain actors and access to different is not done in almost all cases. In fact, among many there is misperception about however, the implementation of the scheme has turned out to be quite challenging and practices (GPP) is the hallmark of

5.2 Fruit (Mango) Value Chain and Value Chain Actors (VCAs) in Bangladesh

The value chain actors reveals inefficiencies along different value segments, indicating significant scope for interventions with greatest impact potential, would be extremely important in the

2. LITERATURE REVIEW

Source: adapted from Jahan (2012)

Figure 1: Fruit (Mango) Value Chain in Bangladesh
Consequently, one of the major market failures involving this segment occurs when the leaseholders (and subsequent buyers) do not follow good agricultural practices (GAP). They often apply excessive pesticide, fertilizer, flowering hormone and the like, creating enormous food safety hazards and causing early destruction of the orchard itself.

Likewise, lack of good postharvest practices (GPP) is the hallmark of the harvest and postharvest segment of fruit value chain in Bangladesh. Market failure starts from the very beginning: the fruit owners often harvest the fruit before proper maturity to fetch higher prices from ‘over-enthusiastic’ (and ignorant) buyers by winning the ‘early-to-market’ race. The race leads to inappropriate and excessive use of chemicals and ripening agents (such as carbide and ethylene) on the immature fruits, creating a huge health hazard. Of course, in order to prevent premature/early harvesting, recently the government of Bangladesh has introduced some initiatives such as setting zone- and variety-specific timeline for harvesting and arranged administrative patrols in production hubs and market places. However, the implementation of the scheme has turned out to be quite challenging and the impact to be rather mixed.

At the postharvest value segment, mishandling happens in many different ways at the farmers end. First, sorting and grading practices are quite rudimentary, and cleaning is not done in almost all cases. In fact, among many there is misperception about cleaning mangoes: many believe that if mangoes come in contact with water, the fruits will get spoiled. Whereas the reality is that hot water treatment of fruits such as mango is an established disease-control shelf-life enhancing technology worldwide. For example, HWT technology protects the fruit from stem-end rots and is also effective in controlling postharvest diseases such as anthracnose. Besides, HWT fruits are less susceptible to disease incidences and weight loss compared to non-treated fruits (Angasu, et al. 2014). However, in Bangladesh market actors and

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Box 2: Hot Water Treatment - A Market Entry Prerequisite in the USA

The United States imports mango from six main Latin American countries: Mexico, Ecuador, Peru, Brazil, Guatemala and Haiti. In order to prevent the fruit flies from entering the United States, some form of quarantine is required for the fruit to be allowed entry, regardless of whether they are organic or conventional. The most common form of quarantine currently used on mangoes imported into the United States is a hot water treatment. Hot water treatment has been used since the method was approved in 1987 and is the most cost-effective method.

Source: [https://www.theproducerd.com/2016/10/why-are-mangoes-hot-water-treated/](https://www.theproducerd.com/2016/10/why-are-mangoes-hot-water-treated/)

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\(^2\) The use of calcium carbide could pose risk as it contains arsenic and phosphorous that are potentially carcinogenic.

\(^3\) Ethylene is not harmful or toxic to humans; however, at extremely high concentrations it is combustible. [https://cris-filter.com/about-ethylene/](https://cris-filter.com/about-ethylene/)
other stakeholders of the agricultural ecosystem have failed to facilitate transfer of such a useful technology to where it matters most.

The traditional market mechanism in Bangladesh necessitates harvested mangoes be taken to local landing centers (LLCs, or haats and bazars) for trading in bulk. Auctioneers (arothdars) in the LLCs are the key transaction facilitators, who extend support to both sellers (i.e. orchard owners, leaseholders and forias or petty traders) and buyers (i.e. end-market wholesalers (heparis), agro-processors, exporters or their representatives). This is the most crucial value chain transaction point that determines if, and to what extent, the sellers would be able to capture value for themselves in the upstream value segment. Although price is largely determined by national demand and supply situation at any given point in time, additional postharvest care - such as cleaning, sorting and grading - offers an opportunity to capture additional values. Yet, due to value chain inefficiencies, this opportunity of bagging gains is largely ignored by VCAs of this segment. This value segment is crucial from the food safety perspective as well. Because, at this stage many unscrupulous traders use such chemicals as calcium carbide and ethylene in a harmful manner, be it through excessive dosages or inappropriate application technique. In this case, both state and market mechanisms have enormously failed in ensuring safe food value chains by educating and/or disciplining the market actors. Figure 2 shows areas of market failures and value chain inefficiencies that come at all levels - farming, local aggregation and trading, wholesaling and retailing.

Additional inefficiencies and failures occur as the produce moves from local landing and trading centers to distant end-markets for wholesaling and last-mile retailing. Three major areas of failures in this segment are: poor bulk packaging practices, lack of proper transportation system and specialized vehicles, and absence of storage facilities. Postharvest loss increases at this stage due to poor bulk packaging practice (that sees as high as 40-80 kg of mangoes pressed in one paper carton or bamboo basket) and poor transportation system (infrastructure and vehicle). Added to this misery is the illegal toll (chanda) collected from transport vehicles at many different points of national highways. According to industry insiders, for example, for a loaded truck to travel from the South-West to Dhaka, such toll needs to be paid at around 20 different points. Transportation from the South-Eastern hill tracts region is even costlier, and riskier too. Absence of proper storage facility - both at production hubs and at trading centers - adds further to the overall postharvest loss.

These three - poor packaging, transportation and storage - together contribute to enormous postharvest loss and value (quality) degradation, which is reported to be 30% or more. Unfortunately, the burden of such a huge loss of value is borne by all market actors along the value chain, starting from the producers to the consumers.
Figure 2: Market Failures and Value Chain Inefficiencies - Fruit (Mango)

Just at one point - local landing center (aoroth) - up to 15% is charged as waste premium

Poor post-harvest handling, packaging, storage, transportation; Estimated wastage is 30% +/-.

Inappropriate use of chemicals, growth agents, ripening agents, preservatives, etc. particularly at these stages of value chains

Source: adapted from Jahan (2012)
For example, to cover up this loss, auctioneers in local landing and trading centers charge up to 15% extra. At the same time, the consumers are needed to pay high (rather for lower quality produce) just to cover the transportation and storage related losses. The current market mechanism therefore produces and distributes suboptimal values for mango value chain actors.

At the distant market wholesaling points, the infrastructure is rather quite rudimentary. They lack proper handling and storage infrastructure, contributing more to postharvest loss and making price volatility a norm, particularly in the cases of supply-demand mismatch. Besides, the presence of strong collusion among trading peers (i.e. transaction intermediaries), known popularly as ‘syndicate’, both sellers and buyers often feel hapless. The absence of actionable market information, backed by asymmetric access to whatever limited information available, is one of the major reasons for ‘syndicate power’.

At the retailing stage, the buyers (individuals and households) have no choice but to buy whatever is available. The customers have no control over quality, nor on price. In terms of price, they suffer most due to retailers’ scale of operation. Except for the chain retail stores (an emerging trend), most are rather micro retailers based in kitchen (wet) markets and on mobile vans. Constrained by limited or no access to finance and poor business acumen, these micro retailers never achieve the scale economy. Consequently, they need to charge higher prices. This leads to huge price differences even between wholesale point and retail point. This very phenomenon explains, to a significant extent, the price paradox that is being observed in agricultural value chains in Bangladesh where an end-customer ends up paying multiple times higher than what a farmer receives at the farm-gate or local landing and trading centers.

A recent development in the mango forward market value chain is the introduction of processing companies. In this regard, Pran, a local conglomerate, is the pioneer in large-scale processing of mango in Bangladesh. Interesting finding in this regard is that many value chain actors (VCAs) have blamed Pran for not procuring and processing high quality expensive mango varieties (such as Langra and Himshagor). According to them Pran procures only the ‘cheap’ mango variety, such as Ashwina.

**Box 3: PepsiCo introduces Tropicana with Bangladesh’s Ashwina**

PepsiCo has brought in the world’s number one packaged juice brand, Tropicana, for the Bangladesh market as part of its efforts to widen its presence in the beverage category.

Tropicana Frutz Mango is expected to offer an indulgent mango experience made from ashwina mangoes grown by farmers in Bangladesh. Tropicana Frutz will be made and distributed nationwide by Transcom Beverages Ltd, PepsiCo’s exclusive bottling partner in Bangladesh.

According to PepsiCo, Bangladesh is a very important market and the company is delighted to introduce the world’s no. 1 packaged juice brand Tropicana here in Bangladesh.

*Source: The Daily Star, Dhaka, 09 April 2019*
Interestingly, when cross-checked with Pran officials, they also acknowledged it, rather proudly. Because, by so doing, Pran also benefits the farmers (Ashwina growers), who are now getting better prices than before. It is just because of Ashwina’s newly-found processing utility. (Of course, Pran has its own economic sense as well: as this particular variety is much pulpier than the others, per unit output is higher in case of Ashwina.) Pran’s participation in the mango forward market value chain (i.e. in processing) has a trickle down impact along other segments of the value chain and market ecosystem. The company has engaged a cohort of procurement agents and set up collection centers, named ‘Pran Hubs’, in major production locations. Besides, additional employment, mostly for local women, has also been created in its processing factory located in Natore.

Following Pran’s footprint, Tropicana, a global brand of Pepsi Co, has recently entered the market and proudly using the name of the same variety - ashwina - in their commercials. This variety therefore is no more a neglected fruit in Bangladesh; it’s a well sought after variety for processors. The market force in the forward segment of the value chain has indeed created an opportunity for the farmers and other VCAs to create and capture more value along the mango value chain.

6. SYNTHESIS

The findings discussed above indicate areas of significant market failures and inefficiencies along an agricultural value chain in Bangladesh. These can be summarized through a simple value chain framework, as presented in Figure 3.

At farming level, farmers lack scientific knowledge regarding good agricultural practice (GAP), including the use of inputs and postharvest management practices. Besides, farmers lack access to good quality inputs, appropriate technology, market information and finance.

At trading level, traders lack proper knowledge regarding the use of preservatives, utility of grading-sorting practice, packaging technique, cleaning and treatment technique, appropriate storage facilities and right kind of transportation vehicle. Besides, traders are not visionary; they lack modern business acumen.

At the forward market end, the quality management remains to be a major issue, by design or by ignorance. The chain is rather supply pushed, not demand driven. Also, because of small scale of retail operation, scale economy remains absent. Consequently, customers end up paying higher.

To sum up, as the produce pass through the chain, often time the real value rather deteriorates, leaving food and nutrition security at bay. This bizarre state severely hinders the inclusive growth mission and harms country’s sustainable development agenda. Unlocking the upgrading potentials along agricultural value chains is therefore an urgent issue for Bangladesh.
The findings discussed above indicate areas of significant market failures and other VCAs to create and capture more value along the mango value chain. The segment of the value chain has indeed created an opportunity for the farmers and other VCAs to create and capture more value along the mango value chain. Following Pran's footprint, Tropicana, a global brand of Pepsi Co, has recently entered the market and proudly using the name of the same variety - Ashwina's newly-found processing utility. (Of course, Pran has its own economic growth at heart, to recoup some losses by itself.) Pran's participation in the mango forward market value chain and market ecosystem. The company has engaged a cohort of procurement growers), who are now getting better prices than before. It is just because of these efforts that Pran's commercials. This variety therefore is no more a neglected fruit in Bangladesh; rather proudly. Because, by so doing, Pran also benefits the farmers (in the context of commercial agriculture in Bangladesh). Interestingly, when cross-checked with Pran officials, they also acknowledged it, pragmatically – and at the same time, they share the blame, because of small scale of retail operation, scale economy remains absent. The chain is rather supply pushed, not demand driven. Also, traders are not visionary; they lack modern business acumen. At trading level, traders lack proper knowledge regarding the use of preservatives, whereas processors don't want to invest more on quality appearance. Act more on senseless, highly price sensitive, safe food, but wish to have higher profit margins. Now, let us look into the challenges and opportunities and thereby strategizing firm's move along the supply chain as TTF or TTF-Augmented Value Chain Analysis (TTF-AVCA) or 9C Framework) largely firm's internal, intermediate and external domains and dimensions of TTF are sustainable competitive advantages. The strategizing firm's move along the supply chain and market ecosystem. The company has engaged a cohort of procurement growers), who are now getting better prices than before. It is just because of these efforts that Pran's commercials. This variety therefore is no more a neglected fruit in Bangladesh; rather proudly. Because, by so doing, Pran also benefits the farmers (in the context of commercial agriculture in Bangladesh). Interestingly, when cross-checked with Pran officials, they also acknowledged it, pragmatically – and at the same time, they share the blame, because of small scale of retail operation, scale economy remains absent. 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Figure 2: Market failures and value chain inefficiencies in Bangladesh - A Summary

Appendix A: The Triple Triangle Framework (TTF)

Appendix B: TTF-Augmented Value Chain Analysis - A Simplified Framework

Source: Adapted from Jahan and Morshed (2018), Jahan (2017)
7. CONCLUSIONS AND RECOMMENDATIONS

Addressing the value chain inefficiencies and market failures and thereby harnessing the upgrading potentials of the agricultural sector is a gigantic undertaking. It requires sound institutional design and deeper collaboration among government organs/agencies, market forces (including chambers and industry associations), academia and research centers, media and other civil society organizations.

Massive awareness campaign on good agricultural practices (GAP) and food and nutrition security - backed by an institutionalized incentive mechanism for desired market behavior and punishment for forbidden market behavior - needs to be rolled out.

Given the challenges that agricultural value chain actors encounter and the upgrading potentials that are evident, a comprehensive intervention package involving agribusiness ecosystem needs to be crafted and implemented. Keeping sustainable development goals in mind, the focus of such intervention should be on the promotion of inclusive growth.

To propel agribusiness-oriented inclusive growth and sustainable development, a three-pronged overarching strategy may be recommended as follows:

i. **responding to the priorities of farmers and agro-enterprises**, particularly by developing their capability in the area of good agricultural practice (GAP), modern technologies, improving access to quality input, finance, information and market, and by igniting an entrepreneurial culture,

ii. **impacting the market ecosystem** in order to improve the behavior of market actors and incentivize desired market actions to address trade-level failures, and

iii. **creating and sustaining an enabling business environment** with supportive policies, institutions and infrastructure so as to facilitate business model innovation and technology transfer, and promote agro-SMEs’ participation in global value chains.

Once its agricultural value chains inefficiencies are removed and market failures are addressed, the country would not only achieve inclusive and sustainable growth, but also ensure food and nutrition security. Achieving this would of course require a pragmatic agribusiness ecosystem development strategy.
REFERENCES


Value Chain Inefficiencies and Market Failures in the Agricultural Sector of Bangladesh: A Case Study

Economy (ROGE) held at the University of Oxford, UK on 9 - 10 July 2018.


Appendix A: The Triple Triangle Framework (TTF)

Triple Triangle Framework (Jahan, 2008) analyzes the factors arising from firm’s internal, intermediate and external domains that affect its competitiveness and growth potentials (Jahan, 2008). The Triple Triangle Framework (also known as TTF or 9C Framework) largely embraces the business ecosystem perspective in analyzing competitiveness challenges and opportunities and thereby strategizing firm’s move along the domains and dimensions for creating sustainable competitive advantages. The domains and dimensions of TTF are presented below:
Exhibit: TTF Domains and Dimensions - A Quick Summary of 9Cs

<table>
<thead>
<tr>
<th>Enterprise Domain</th>
<th>Industry/Sector Domain</th>
<th>Macro Domain (National-and Global)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capital</strong> (financial strengths: equity, credit line, supplier credit, cross-funding, etc.)</td>
<td><strong>Customers</strong> (demand dynamics, response to price and non-price stimuli, consumption preferences and trends, etc.)</td>
<td><strong>Country dynamics</strong> (state laws, regulations, institutions, infrastructure, governance, social expectations, values and norms, preferences, etc.)</td>
</tr>
<tr>
<td><strong>Capability</strong> (human competencies, technological sophistication, adaptability, leadership, etc.)</td>
<td><strong>Competitors</strong> (current and potential direct competition and competition from substitutes)</td>
<td><strong>Cross-country dynamics</strong> (globalization and international forces, multilateral/bilateral trade and investment regime, geopolitico-economic landscape, etc.)</td>
</tr>
<tr>
<td><strong>Culture</strong> (workplace values, communication, governance, growth orientation, entrepreneurial mindset, etc.)</td>
<td><strong>Collaborators</strong>, complementary, upstream and downstream value chain partners, etc.)</td>
<td><strong>Creative complementarities</strong> (innovation and technological breakthroughs, disruptions and convergences, with pervasive impact across industries, sectors and societies)</td>
</tr>
</tbody>
</table>

Source: adapted from Jahan (2008)

Appendix B: TTF-Augmented Value Chain Analysis-A Simplified Framework

*(in the context of commercial agriculture in Bangladesh)*

![Value Chain Diagram](image)

Source: adapted from Jahan and Morshed (2017)