



Construction of a Policy Analysis Matrix (PAM) for Fruits and Vegetables Export Process in Bangladesh

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ABSTRACT

The study is planned to estimate export potential of selected agricultural exportable products (fruits/vegetables) by estimating protection and competitiveness of these products in the international market. While doing so, it will differ from the existing literature by estimating and incorporating policy and natural barriers in the estimation. Natural barrier can be defined as transaction cost incorporating both implicit and explicit cost. Real life transaction cost will be estimated through collecting information from different market actors and exporters. By incorporating this cost in the estimating protection (nominal and effective) and in Policy Analysis Matrix (PAM), the research will show relative importance and effect of different barriers (policy/administrative barriers etc.) in export. Through PAM analysis, it will also show different policy options available for the exporters.

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Introduction

Agricultural export creates an insignificant portion of total export from Bangladesh. The country is mostly a net importer of agricultural commodities like food grains, live animals, edible oil, sugar, fruits, onion, lentil, milk and milk products, etc. In recent time the country is emphasizing the issue of agricultural export as it is not only important for favorable balance of payment situation, but also important for farm level price. In addition to traditional agricultural export items like raw jute and jute manufactures, frozen shrimp, dish and fish, etc., the country is additionally exporting differing types of fruits, vegetables and flowers. The policy makers are also emphasizing the rice export, particularly since last couple of years.

A number of literatures are available on the difficulty of agricultural trade. The literature showed export potential of a number of the chosen agricultural crops in Bangladesh. Literature is additionally available on the difficulty of various trade related barriers. But literature mostly concentrates on policy barriers ignoring other barriers

(natural/administrative barriers etc.). Measuring effective protection for policy barriers alone is generally misleading; giving rise to measurement errors and to misrepresentation of the relative pattern of incentives to provide for local as opposed to export markets. Literature addressing other barrier argue for considerable scope for promoting world trade by lowering natural/administrative barriers. The issue of reducing this kind of barrier is getting more and more importance as policy level barriers are now low or have been eliminated completely by regional (e.g. European Union-EU) and multilateral agreements (The General Agreement on Tariffs and Trade-GATT 'rounds'), and will decline further as current and future commitments are implemented. The study is an attempt to analyze the effect of both policy level barrier and other barriers on competitiveness of Bangladeshi selected agricultural exportable products (fruits/vegetables) and construct a Policy Analysis Matrix (PAM). To do this the study will estimate transaction cost at different stages of trade.

The main purpose of the study is to identify the impact of different barriers (policy/administrative/natural barriers) on competitiveness of Bangladeshi major exportable agricultural fruits/vegetables and suggest policy options to reduce existing barriers. The practical contribution of the research is as follows:

- The study will estimate the level of different barriers (natural barrier, policy barrier etc.) faced by the Bangladeshi exportable agricultural fruits/vegetables. There is a large empirical literature on the measurement of effective protection. Most recent work has been inspired by pressures for trade liberalization, and the resulting desire to measure pre-reform and post-reform protection. The focus has been almost exclusively on policy induced rather than natural/administrative barriers to trade. In this study, all possible sources of transaction cost those may contribute in policy/natural barrier at different stages of marketing and trade will be identified and estimated. The study will estimate the impact of barriers (natural barrier, policy barrier etc.) on competitiveness of Bangladeshi exportable agricultural fruits/vegetables. Most work on the nature and extent of barriers to international trade focuses on policy barriers, especially tariffs and non-tariff border interventions by policy makers.
- These barriers are now low or have been eliminated completely by different regional and multilateral agreements and will decline further as current and future commitments are implemented. Since these declines in policy barriers are often viewed by trade economists as major contributory factors within the growth in world trade, then one might anticipate that the scope for further growth in world trade is restricted. But this interpretation of trade prospects fails to require appropriate account of another important source of protectionism, namely so-called “natural” barriers related to the prices of transacting internationally
- Through Policy Analysis Matrix (PAM) analysis the study will tell us what policy supports are available for the Bangladeshi exporters. Different ration indicators and detailed transaction cost analysis will tell what steps are needed to reduce policy and natural barriers to boost export.

Objectives

The broad objective of this research is to identify the impact of different barriers (policy/administrative/ natural barriers etc.) on competitiveness of Bangladeshi agricultural fruits/vegetables and suggest policy options to reduce existing barriers. The specific objectives are as follows:

- To identify and estimate the different barriers (policy/administrative/ natural barriers etc.) faced by the selected Bangladeshi agricultural products (fruits/vegetables) in export market
- To estimate the effect of the different barriers (policy/administrative barriers etc.) on competitiveness of agricultural products (fruits/vegetables) exported from Bangladesh
- To examine the policy level support available for the agricultural export (fruits/vegetables) from Bangladesh

Related hypotheses can be written as follows:

- What are the sources of different barriers (policy/administrative barriers etc.) faced by the Bangladeshi agricultural products (fruits/vegetables) in export (international) market?
- Do the barriers affect competitiveness of fruits/vegetables export in international market?
- What are the policy supports available for the fruits/vegetables exporters and what need to be done for promoting export?

The rest of the paper is organized as follows. Section 3 provides literature review, section 4 provides methodology, section 5 describes empirical model and section 6 will discuss results, observations and findings.

Literature Review

Several studies in Bangladesh are available addressing trade related issues for agricultural products (Mahmud et al., 1994; Shilpi 1998; Shahabuddin 2000, Anik and Talukder 2002; Shahabuddin et al., 2002; BRF 2005; Awal 2009; Karim et al., 2009; Arif 2012). Supply problems and constraints are also identified in some of the studies. But a common trend in the literature is to utilize secondary sources while estimating economic profitability. Hence though the literature gives good insight about trade but they may fail to incorporate a significant portion of transaction cost. Most importantly different types of informal payments needed in the marketing process might have been overlooked in literature, though existence of such payments is noted in some (e.g. BRF 2005). A recent study conducted by CUTS (2014) estimated that Bangladesh and India can together save minimum about 24% of their current trade cost by improving trade infrastructure and service. The study mentioned existence of numerous operational inefficiencies or procedural non-trade barriers that raises the transaction costs for traders.

Milner (2002) stated that the majority recent work associated with measurement of effective protection has been inspired by pressures for trade liberalisation, and also the resulting desire to live pre-reform and post-reform protection. He also observed that the focus has been almost exclusively on policy induced rather than natural barriers to trade. But the low level of policy barriers in many industrialised countries may now mean that transactions costs are likely to be a minimum of as important as trade policy-induced price effects. Moreover, implementation of Uruguay Round tariff reductions and commitments to further liberalisation will only intensify this. From the previous work and evidence it can be said that the divergences between the nominal protection rates between policy and natural barriers are of course even greater than this in some manufacturing sectors. More importantly both of those barriers apply on both competing final imports and on intermediate importable imports. In which case there are likely to marked differences between the effective rates of protection arising from policy barriers alone and those arising from policy and natural barriers combined (Milner, 2002).

Kirchner and Picot (1987) claimed that elements of transaction costs within the distribution system factors persuading transaction costs will change traders' opportunity sets and might also cause organizational changes within the distribution system. These reasons adjust the efficient form of division of labor between producers, traders, and consumers, but also within the trade industry itself (e.g. relation between retailing and wholesaling). They also stated that the knowledge of these factors and of their actual development helps to explicate changes in distribution and trade, and it is necessary to maintain the system's efficiency.

Waters (1970) mentioned that extension of the theory of effective protection to include transport costs is straightforward. The existence of freight costs causes divergence between domestic and foreign prices hence a difference in domestic value-added from what it might be in an exceedingly world without transport costs. The effective tariff is more important information since tariffs are an instrument of commercial policy whereas, by and large, transport costs are not. He also argued that a comparison of effective tariffs is a guide to the distortion in resource allocation between the case of protection and that of free trade. An effective freight factor can be viewed as a guide to the "natural effect" on resource allocation which results from the existence of a structure of freight factors, i.e., the change in resource allocation between a free trade and a frictionless world case. It has often been argued in the popular press that technological improvements in the transportation sector have reduced international transaction costs substantially, and have been a major factor in the growth in world trade post-world war II. Trade economists by contrast have often attached considerable importance directly to bilateral and multilateral policy reforms in explaining world trade growth. More recent evidence on both the extent of non-trade policy barriers and their impact on trade volumes is producing a reassessment of these views. This is in part the indirect consequence of the effects of policy liberalisations on artificial trade barriers and therefore on the relative importance of 'natural' barriers. It is however evident also that the reduction in 'natural' international transaction costs, in particular transport costs, has been overstated (Milner, 2002).

Hummels (1999a) for instance draws together various sources of information on the time-series pattern of shipping costs to point that, while air freight rates have fallen, ocean freight rates (an average containerisation) have actually increased until quite recently. He concludes that transport costs still often pose a greater barrier to trade than tariffs. Indeed, transport costs incline to vary more across trading partners than tariff rates, suggesting a greater role for 'natural' than artificial obstacles in fashioning variation in bilateral trade flows. Hummels (1999b) for instance reports (unweighted) mean freight rates for the US in 1994 of between 12 and 15 percent advalorem; where these rates only capture the inter-country component and omit port and inland charges. He further shows that freight rates were substantially beyond tariff rates within the US for many manufactured goods.

As we would like to explore export potentiality of vegetables and fruits market, here is some information regarding vegetables and fruits export in Bangladesh.

Bangladesh exports different products and services to almost 186 countries. The export sector plays a vital role in determining the rate and structural pattern of the development of any country. Bangladesh has immense prospect for exporting vegetables to the globe market and it's also produced prime quality exportable fresh vegetable. As the share of export earning in vegetables increasing day by day, so it has great prospect to earn foreign exchange by exporting vegetables from Bangladesh. Bangladesh has been ranked third in the list of vegetables producing countries in the world. Exports of vegetables and fruits jumped to 60 percent while earnings raised by 34 percent in the last year. One of the major objectives of the Bangladesh Seven Five year Plan is to "encourage export of agricultural commodities, particularly vegetables and fruits keeping in view domestic production and need".

About over 100 kinds of fruits and vegetables are exported from Bangladesh to over 40 countries within the world. Export of fresh fruits and vegetables from Bangladesh significantly increased in recent years. This increasing export trend must be improved further by necessary support. Export of fresh fruits and vegetables from Bangladesh have been increased from 46.41 million \$ in FY2004-05 to 209.38 million\$ in FY2013-14 (Source: Export Promotion Bureau -EPB). just in case of vegetables, there's fluctuation in per acre yield from 2004-05 to 2010-11, the amount of exported vegetables has been increasing day by day, because the quantity of vegetable exported is 17218 Metric Tons (MT) in 2005-2006 and 75435 MT in 2013-14 (Source: Statistical Yearbook of Bangladesh). In case of fruits, from 2004-05 to 2010-11, per acre yield has been increased from 6051 to 6076 with fluctuation (Source: Yearbook of Agricultural Statistics of Bangladesh, Statistical Yearbook of Bangladesh). The volume of exported fruits has been increased over time. The quantity of fruits exported is 2242 MT in 2005-2006 and 27368 MT in 2013-14 (Source: Export Promotion Bureau -EPB)

Methodology

The study involves a number of steps. For each of the objectives and steps, the issues and information involved and their analyses including the method of information collection are described below.

Data

The study consists of several phases. In the first phase, a literature review of all relevant documents has been conducted. The first track consists of analysis of secondary sources of data. An indicative list of the sources of secondary data is given below:

- Documents/reports regarding the issue
- Documents/reports of trade related national agencies/organizations
- Documents/reports of trade related international agencies/organizations

In the second phase, the study has collected quantitative and qualitative primary data through questionnaire survey, Key Informant Interviews, and discussion with different

stakeholders (trade related agencies/organizations). In the following stage, the collected data will be analysed to attain proposed research objectives.

Data Collection Instruments

Both quantitative (primary and secondary) and qualitative data has been collected for the study.

Document Review

Relevant policy documents, manuals, reports and trade related statistics from various relevant agencies have been collected and reviewed.

Questionnaire Survey (Quantitative Data)

The study mainly relies on quantitative data collected from exporters through structured questionnaires. The questionnaire has been designed to estimate cost-return with especial focus on transaction cost, trade volume, marketing costs (depreciation on investment capital, interest on running capital, transport cost, office cost, commission, market tolls, wastage, etc.), mode of sales, purchase and sale prices, gross and net margins and marketing constraints, other official and unofficial costs, etc. In addition to these, the questionnaire for exporters has a section for their interaction experiences with different official procedures (e.g. export approval, bank guarantee, etc.) and dealing experiences with overseas counterparts.

Qualitative Survey (Qualitative Data)

Only quantitative assessment i.e. surveys with structured questionnaire will not be able to meet the requirements of all the objectives of this study. So it is important to adopt qualitative and participatory nature of assessment techniques. Key Informant Interview (KII) and case study have been used to know exporter's experiences in different stages of marketing. Major focus here is to know process of trade, transaction cost and related issues, functions and effectiveness of different market institutions, different forms of implicit cost, contracting process with the overseas counterparts, etc. The key respondents includes leaders of exporters' associations, trade related service providers and officials. Respondents/participants of KII have been selected purposively based on their knowledge/experience on the research issue, availability and willingness to participate. Checklists have been prepared for the Key Informant Interview in due course of time.

Sample Selection

The primary required to attain the objectives of the study is collected from the fruit and vegetable exporters. A total of 30 fruits and vegetable exporters are randomly selected from the list of exporters collected from the Bangladesh Fruits, Vegetables and Allied Products Exporters Association (BFVAPEA). The exporters are approached for detailed information about their three shipments. Thus the survey is targeted to collect information about 90 export shipments from 30 exporters. Moreover, some Key Informant Interviews and one case study are conducted to know the export process, problems faced and suggestions to overcome these problems.

The Empirical Model

Identifying and Estimating Implicit and Explicit Transaction Cost

Border prices are commonly used as reference prices in measuring the impact of direct price interventions or sector-specific pricing policies on the assumption that most agricultural commodities are traded goods, i.e., exportables or import-substituting goods and the share of individual trading countries in world trade is negligible, i.e., they are price takers in the world markets. However, border prices must be adjusted for marketing costs which include handling, transport, storage costs, quality differentials and other factors (Rahman, 1993). The basic analytical approach of the model/study follows that of Krueger, Schiff and Valdes (1938). In unregulated markets, therefore, the producer price for exportables would be related to the border prices as follows:

$$P_i = P^w_i E_o (1 - t_i) - C_i \quad (1)$$

where, P_i = denote producer price, P^w_i = world price at border (f.o.b.) in foreign currency, E_o = nominal official exchange rate, t_i = export tax or subsidy depending on whether $t_i < 0$ or > 0 , and C_i = adjustment for differences in quality, location (transport), time (storage), transaction cost and other marketing costs. The export tax may be explicit or implicit when export quotas exist or when output is procured below market prices, etc.

When there is no intervention in the market, the producer price bears the following relationship to the border price:

$$P_i = P^w_i E_o - C_i \quad (2)$$

C_i in equation 1 and 2 is a source of substantial level of potential error if natural barrier is estimated narrowly incorporating only explicit costs. In practice most literature utilizes different secondary sources to estimate different related costs here. But in reality, an exporter has to bear different informal and implicit forms of costs (e.g. unofficial payment to different officials and law enforcement agencies, informal payment during loading, etc.) are associated here. All these may substantially increase the natural barrier and reduce profit received by the producers and exporters. Estimating competitiveness using narrowly defined transaction cost may not report the real level of competitiveness. Milner (2002) observed that most of the literature on international trade avoids natural barriers and concentrates on policy barriers, though policy barriers is expected to reduce or eliminate over time through different trade agreements. But natural barriers may not reduce dramatically even though substantial technical advancements. His work stated that there are three broad sources of potential measurement error associated with the estimation of effective rates of protection (error in measuring nominal output protection, error in measuring input taxation and error in estimating the technical coefficient) and there are three components of the complete measure of effective protection, namely a policy protection component, a natural protection and an interactive policy/natural protection component (Milner, 2002). The major intension of this proposed work is to

estimate C_i to represent real life scenario. All the possible components of transaction cost in the export process will be identified and incorporated. The estimation of transaction cost will be based on New Institutional Economics, which focuses on institutions of governance. In cases, where an exporter fails to directly report cost, opportunity cost principal will be employed.

In economics and associated disciplines, a transaction cost could be a cost acquired in making an economic exchange (restated: the price of participating in a very market). For instance, most of the people, when buying or selling a stock, must pay a commission to their broker; that commission could be a transaction cost of doing the stock deal. If we consider buying a product from a store; to purchase the product, consumer's costs will be not only the price of the banana itself, but also the energy and effort it requires to find out which of the various products the consumer prefers, where to get them and at what price, the cost of traveling from consumer's house to the store and back, the time waiting in line, and the effort of the paying itself; the costs above and beyond the cost of the product are the transaction costs. When rationally evaluating a possible transaction, it's important to think about transaction costs which may prove significant.

A number of kinds of transaction cost have come to be known by particular names:

- Search and information costs are costs such as those incurred in determining that the product can be sold in the market offering highest price, etc.
- Bargaining costs are the costs required to come to an acceptable agreement with the other party to the transaction, drawing up an appropriate contract and so on. In game theory this is examined for instance in the game of chicken. On asset markets and in market microstructure, the transaction cost is a few function of the distance between the bid and ask.
- Policing and enforcement costs are the costs of making sure the other party sticks to the terms of the contract, and taking appropriate action (often through the legal system) if this turns out not to be the case.

Transaction costs imply all the resources that have to be sacrificed in order to arrive at a mutually accept-able agreement for the exchange of goods or services between two or more parties. They comprise, e.g., four different types of costs: (1) contact costs (search of information), (2) contracting costs (negotiation, formulation of contract), (3) monitoring costs (checking of quality, quantity, prices, deadlines, secrecy), (4) adaptation costs (changes during the validity of agreement). Of course, given their character as opportunity costs, the amount of a number of them may vary depending upon the economic actors involved. Some implicit costs (cost due to police's illegal charge, bribe, illegal gratification, inconvenient roads, transportation etc.) have been considered as natural barrier.

Though explicit tax and subsidy rates exist the nominal protection rate may differ from those rates due to the existence of concessions, quantitative restrictions, etc. It is, therefore, of interest to compute the implicit nominal protection rates t_i through direct price comparisons. The hypothetical free trade prices P_i have to be computed from the border prices P_i^w after adjustment for C_i . The adjustment yields border (in this case export) parity prices

which may be compared to the domestic prices at various points in the marketing chain, e.g. wholesale market, mill-gate, farm-gate, etc.

The nominal rate of protection (NRP) measures the direct effect of agricultural trade and output price policies including trade taxes, quotas, marketing and processing subsidies, price supports and government monopolies on trade if any, etc. on output price. The NRP of commodity, i , is given by:

$$NRP = \frac{\frac{P_i}{P_{na}} - \frac{P_i'}{P_{na}}}{\frac{P_i}{P_{na}}} = \frac{P_i - P_i'}{P_i} = \frac{P_i}{P_i} - 1 \quad (3)$$

The NRP on good i , therefore, measures the direct effects of trade and pricing policies on output price by comparing actual domestic prices with free-trade prices that would prevail in the absence of government intervention. P_{na} represents the non-agricultural price index.

Trade policies affecting the nonagricultural sector and real exchange rate policies affect agricultural prices relative to nonagricultural prices, i.e. P_i/P_{na} . The nonagricultural price index consists of a traded and non-traded component:

$$P_{na} = \alpha P_{nat} + (1 - \alpha) P_{nah} \quad (4)$$

Where P_{nat} and P_{nah} are the price indices of traded and non-traded non-agricultural commodities respectively.

The indirect nominal protection rate is given by:

$$INPR = \frac{\frac{P_i}{P_{na}} - \frac{P_i^*}{P_{na}^*}}{\frac{P_i^*}{P_{na}^*}} - 1 = \frac{P_i/P_{na} - P_i^*/P_{na}^*}{(E^*/E_0) \times P_i^*/P_{na}^*} - 1 = \frac{E_0}{E^*} \times \frac{P_{na}^*}{P_{na}} - 1 \quad (5)$$

P_i^* and P_{na}^* represent the free trade equilibrium values of P_i and P_{na} evaluated at the equilibrium exchange rate. The indirect nominal protection rate measures the effect of misalignment of the exchange rate E_0 from E^* , and the effects of trade policies (protection) on P_{nat} , i.e., the tradable component of the non-agricultural price index, and hence, appreciation of the real exchange rate. The INPR represents economy-wide effects. It is common to all tradable agricultural commodities and does not pertain to the individual commodity under consideration.

The total nominal rate of protection may be defined as follows:

$$TNRP = \frac{P_i/P_{na}}{P_i^*/P_{na}^*} - 1 \quad (6)$$

Thus, TNPR measures the combined effects of sectoral and economy-wide price, trade and exchange rate interventions on agricultural commodities. The total effect on output prices is therefore, the NRP adjusted for sectoral and economy-wide policies (Dorosh and Val des 1990). Since, the denominator of NRP as stated in equation (3)

above is different from that of INPR and TNPR, the sum of NRP and INPR does not yield TNPR. To make these measures comparable and additive, the definition of NRP may be modified as follows:

$$DNRP = \frac{P_i/P_{na} - P_i/P_n}{P_i/P_{na}} \quad (7)$$

Which measures the impact of direct output price and trade policies as a percentage of the relative price that might prevail in a very trade regime and an equilibrium rate of exchange. Regional Trade Agreements (RTAs) facilitate a friendly trading environment among a limited number of nations located geographically near one another. Regional trade blocks are established everywhere the globe at an increasing trend, especially during the last twenty years, which is partly due to failures of multilateral negotiations, especially at various ministerial meetings of the globe Trade Organization (WTO). The economic reasons behind RTAs are to permit their regional members to profit from economic cooperation and comparative advantages, to realize economies of scale, and to subsidize smitten by necessary imports from more distant countries. To understand such an economic integration within South Asia, Bangladesh suggested a regional cooperative body of South Asian leaders in 1980, which then led to the establishment of the South Asian Association for Regional Cooperation (SAARC) in 1985, the adoption of the SAARC Preferential Trading Arrangement (SAPTA) in 1993, and therefore the agreement on the South Asian trade Area (SAFTA) reached on 6 January 2004 at the 12th SAARC summit in Islamabad, Pakistan. It created a trade area of 1.6 billion people in Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and state (as of 2011, the combined population is 1.8 billion people). The seven foreign ministers of the region signed a framework agreement on SAFTA to cut back customs duties of all traded goods to zero by the year 2016. One of the most economic reasons behind regional trade blocks is to permit their regional members to profit from economic cooperation and comparative advantages.

Among all SAARC countries, India and Bangladesh have long shared common objectives for closer economic integration within the South Asia region and trade between the two countries has grown rapidly since the early 1990s. A free trade agreement (FTA) has been into consideration for a few time. The trading relationship between India and Bangladesh is currently of interest group in both countries for variety of reasons. Firstly, there are crucial and long-lasting concerns in Bangladesh arising from the perennial, large bilateral deficit with India, and from the massive volumes of informal imports from India across the land border which avoid Bangladesh import duties. Both countries have long shared common aims for closer economic integration in the South Asia region, and these have recently been re-underlined by signing on to SAFTA, which takes effect from January 2006. Under SAFTA, the preferential tariffs decided within the various rounds of SAPTA, up to now largely unsuccessful in generating much intra-regional trade will continue, but variety of ambitious new objectives are enunciated. These include the eventual abolition of tariffs and non-tariff barriers on trade between the members, the coordination of Customs

procedures and documentation, the assistance of banking relationships, and cooperation and enhancements within the infrastructure for regional trade and cross-border investments.

Measuring Economic Efficiency and Competitiveness

Policy Analysis Matrix (PAM) framework will be utilized to measure economic efficiency and competitiveness of selected fruits and vegetables. This framework was developed by Monke and Pearson (1989), and augmented by recent developments in price distortion analysis by Masters & Winter-Nelson (1995). PAM is a tool that allows us to examine the impact of policy by constructing two enterprise budgets, one valued at market prices and the other valued at social prices. The PAM, once assembled, provides a convenient method of calculating the measure of policy effects and measures of competitiveness and economic efficiency/ comparative advantage. This framework is particularly useful in identifying the appropriate direction of change in policy (Gonzales et al., 1993) and has been applied by many, e.g., Salman & Martini (2000), Khan (2001). In the present study particular attention is given, however, to competitiveness and economic efficiency in domestic resources by using a PAM framework. The assessment of competitiveness and economic efficiency of various fruits and vegetables at the farmgate level in different regions in Bangladesh will be undertaken using the farm level data and the necessary indicators will be derived to explain the private profitability, social profitability and divergence for the entire period. Framework of Policy Analysis Matrix (PAM) is given in Table 1.

Table 1. Framework of Policy Analysis Matrix (PAM)

Items	Revenue	Costs		Profit
		Tradable inputs	Domestic factors	
Private prices	A	B	C	D
Social prices	E	F	G	H
Divergences	I	J	K	L

Source: Based on Monke and Pearson (1989)

$$\begin{aligned} \text{Private profits (D)} &= A - (B + C), \\ \text{Social profits (H)} &= E - (F + G), \\ \text{Output transfers (I)} &= A - E, \\ \text{Input transfers (J)} &= B - F, \\ \text{Factor transfers (K)} &= C - G, \\ \text{Net transfers (L)} &= D - H \text{ or } I - J - K \end{aligned}$$

$$\begin{aligned} \text{Valued at Private prices } A &= P_{id} \times Q_i \quad B = P_{jd} \times Q_j \quad C = P_{nd} \times Q_n \quad D \\ \text{Valued at Social prices } E &= P_{ib} \times Q_i \quad F = P_{jb} \times Q_j \quad G = P_{ns} \times Q_n \quad H \end{aligned}$$

Where,

$$\begin{aligned} P_{id} &= \text{domestic price of output } i \\ P_{jd} &= \text{domestic price of tradable input } j \\ P_{ib} &= \text{international price of output } i \\ P_{jb} &= \text{international price of tradable input } j \\ P_{nd} &= \text{market price of non-tradable input } n \\ P_{ns} &= \text{shadow price of non-tradable input } n \\ Q_i &= \text{quantity of output} \\ Q_j &= \text{quantity of tradable input.} \\ Q_n &= \text{quantity of non-tradable input.} \end{aligned}$$

The indicator in the first row of Table-1 provides a measure of private profitability (D), or competitiveness, and is defined as the difference between observed revenue (A) and costs (B+C). Private profitability demonstrates the competitiveness of the agricultural system, given current technologies, prices for inputs and outputs, and policy interventions and market failures. The second row of the matrix calculates the measure of social profitability (H) defined as the difference between social revenue (E) and costs (F+G). Social profitability measures economic efficiency/ comparative advantage of the agricultural system.

Ratio Indicators

The PAM framework can also be used to calculate important indicators for policy analysis. The computations of the following measures were established by Appleyard (1987), Salman & Martini (2000), Chaudhry & Kayani (1999):

Nominal Protection Coefficient on Output (NPCO)

This ratio shows the extent to which domestic prices for output differ from international reference prices. If NPCO is greater than 1, the domestic farm gate price is greater than the international price of output and thus the system receives protection. On the contrary, if NPCO is less than 1, the system is not protected by policy. NPCO is expressed as:

$$\text{NPCO} = (A)/(E) = (P_{id} \times Q_i)/(P_{ib} \times Q_i) \quad (8)$$

Nominal Protection Coefficient on Input (NPCI)

This ratio shows how much domestic prices for tradable inputs differ from their social prices. If NPCI exceeds 1, the domestic input cost is greater than the comparable world prices and thus the system is taxed by policy. If NPCI is less than 1, the system is subsidized by policy. Using the PAM framework, NPCI is derived as:

$$\text{NPCI} = (B)/(F) = (P_{jd} \times Q_j)/(P_{jb} \times Q_j) \quad (9)$$

Effective Protection Coefficient (EPC)

EPC is the ratio of value added in private prices (A-B) to value added in social prices (E-F). An EPC value of greater than 1 suggests that government policies provide positive incentives to producers, while values less than 1 indicate that producers are not protected through policy interventions on value added. EPC is expressed as:

$$\text{EPC} = (A-B)/(E-F) = \{(P_{id} \times Q_i) - (P_{jd} \times Q_j)\} / \{(P_{ib} \times Q_i) - (P_{jb} \times Q_j)\} \quad (10)$$

Domestic Resource Cost (DRC) Ratio

The DRC was brought into common use by Bruno (1972) specifically for the purpose of measuring comparative advantage. According to Bruno (1972) and Krueger (1966 and 1972), the economic efficiency in domestic resource use of a commodity system can be assessed by using this ratio. Since minimizing the DRC is equivalent to maximizing social profits, if the DRC ratio is less than 1, the system uses domestic resources efficiently. If the DRC ratio is greater than 1, then the system shows inefficiency in domestic resource use and possesses a comparative disadvantage. The method of calculating the DRC ratio in the PAM framework is given as:

$$\text{DRC} = (G)/(E-F) = (P_{ns} \times Q_n) / \{(P_{ib} \times Q_i) - (P_{jb} \times Q_j)\} \quad (11)$$

Private Cost Ratio (PCR)

PCR is the ratio of factor costs (C) to value added in private prices (A-B). This ratio measures the competitiveness of a commodity system at the farm level. The system is competitive if the PCR is less than 1. Using the PAM framework the PCR can be expressed as:

$$\text{PCR} = (C)/(A-B) = (P_{nd} \times Q_n) / \{(P_{id} \times Q_i) - (P_{jd} \times Q_j)\} \quad (12)$$

Estimation

- Border price measured at farm gate (export parity)
- Transaction cost at different stages of marketing
- The Nominal Rate of Protection (NRP)
- The Indirect Nominal Protection Rate (INPR)
- The Total Nominal Rate of Protection (TNRP)
- Policy Analysis matrix (PAM) and related ratio indicators (Nominal Protection Coefficient on Output (NPCO), Nominal Protection Coefficient on Input (NPCI), Effective Protection Coefficient (EPC), Domestic Resource Cost (DRC) Ratio and Private Cost Ratio (PCR)

Expected Research Output

Through different quantitative and qualitative analysis the proposed research is expected to contribute to our existing knowledge by generating the following outputs:

- Identification and estimation of different policy barriers for the selected agricultural products (fruits/vegetables)
- Estimated competitiveness for the selected agricultural products (fruits/vegetables) for export promotion
- Recommending the policy options for potential determinants of exporting fruits and vegetables from Bangladesh

Empirical Results and Findings

In this study, some KIIs, questionnaire survey and case study have been conducted. On the basis of survey, KIIs and case study, empirical results and findings are as follows:

Empirical Results

A comparative advantages analysis aims at identifying if a country ought to produce a good with its own domestic resources (labor, capital, land) to supply the national market, and possibly to export, or to import the good and to reallocate saved domestic resources, which are assumed to be limited, to the production of another good enjoying comparative advantage. Similarly, policy makers can identify which products might be promoted to supply the local and international market and to make the best use of domestic resources, responding to new international trade opportunities. DRC becomes a measure of domestic cost of earning or saving foreign exchange and is an explicit expression of comparative cost principle in the international trade. A DRC ratio less than one argues for an

economy to have comparative advantage in production of the crop. The country can earn or save foreign exchange through continuing its production. This happens as the crop consumes less domestic resources than it generates net

value added to tradable goods and services. Contrary a DRC greater than one means that the country has no comparative advantage in producing that crop. Results of Policy Analysis Matrix (PAM) is given in Table 2.

Table 2 Policy Analysis Matrix (PAM)

Vegetables /Fruits	DRC	NPCO	NPCI	EPC	PCR
Brinjal	0.2691	0.0383	0.4895	0.499	0.53
Bitter gourd	0.2053	0.02	0.51	0.3772	0.5442
Potato	0.141227	0.0177	0.4449	0.1795	0.7865
Pineapple	0.48	0.0820	0.37	0.96	0.4971
Mango	0.3131	0.1207	0.60	0.61	0.51

DRC: Domestic Resource Cost, NPCO: Nominal Protection Coefficient on Output, NPCI: Nominal Protection Coefficient on Input, EPC: Effective Protection Coefficient, PCR: Private Cost Ratio

Table 2 shows detailed calculation of DRC for Brinjal, Bittergourd, Potato, Pineapple and Mango. The calculated DRC (export parity) for Brinjal, Bittergourd, Potato, Pineapple and Mango are 0.27, 0.20, 0.14, 0.48 and 0.31 respectively. These results claim for Bangladesh to own comparative advantage in producing Brinjal, Bittergourd, Potato, Pineapple and Mango. DRC is a smaller amount than one indicating that this sector has comparative advantage on production. The assembly of potato, under both modern and traditional irrigation, seems to be highly efficient for both import substitution and export, more for import substitution than for export. The production of eggplant considered in this exercise would appear to be highly efficient, especially for export as reflected in the extremely low estimates of DRC ratios of 0.10.

Nominal protection coefficient on product indicated the indirect tax on potato production, nominal protection coefficient on input indicated the indirect subsidy on input and effective protection coefficient indicated that, the indirect tax is over the subsidy that bought input, by government. By another word the govt policy for paying subsidy on inputs should be changed to effective system. Nominal protection coefficient on tradable output: NPCO of 0.038, 0.02, 0.01, 0.08, and 0.12 for Brinjal, Bitter gourd, Potato, Pineapple and Mango are (Export promotion) shows that policies are decreasing the value to level 0.08, 0.02, 0.01, 0.08, and 0.12 (Export promotion) not up to the globe price. However, Nominal protection coefficient on tradable inputs: NPCI on inputs of 0.48, 0.51, 0.44, 0.37 and 0.60 for Brinjal, Bitter gourd, Potato, Pineapple and Mango are (Export promotion) shows that policies are required reducing input costs.

The EPC indicates the combined effects of policies in the tradable commodities markets. This is a useful measure because input and output policies, such as commodity price supports and fertilizer subsidies, often constitute part of a comprehensive policy package. For example, governments frequently reduce the price of outputs but then subsidize inputs in an effort to encourage the adoption of new technology. An EPC greater than 1 indicates positive incentive effects of commodity policy (a subsidy to farmers) whereas an EPC less than 1 shows negative incentive effects (a tax on farmers). Furthermore, Effective protection coefficient of Brinjal, Bitter gourd, Potato, Pineapple and Mango are 0.49, 0.37, 0.17, 0.96 and 0.61 respectively. EPC less than 1 shows negative incentive effects (a tax on farmers).

Value added is the difference between the value of output and the costs of tradable inputs; it shows how much the system can afford to pay domestic factors (including a normal return to capital) and still remain competitive-that is, break even after earning normal profits, where $(A - B - C) = D = 0$. The entrepreneurs in the system prefer to earn excess profits ($D > 0$), and they can achieve this result if their private factor costs (C) are less than their value added in private prices (A - B). Thus they try to minimize the private cost ratio by holding down factor and tradable input costs in order to maximize excess profits.

Moreover, Private cost ratio of Brinjal, Bitter gourd, Potato, Pineapple and Mango. are 0.53, 0.54, 0.78, 0.49 and 0.51 respectively. EPC less than 1 shows negative incentive effects (a tax on farmers).

Export Procedure (Fruits/Vegetables) in Bangladesh

The main procedure of exporting fruits/vegetables is as follows:

Collecting Trade License

For starting vegetable and fruits export, an exporter has to collect trade license from concerned office.

Obtaining Export Registration Certificate (ERC)

A company or individual businessmen with trade license is eligible for doing export business. But before that he/the company should obtain Export Registration Certificate (ERC) from the office of Chief Controller grave and Export (CCI&E). To urge Export Registration Certificate (ERC), an exporter should apply to the Office of the Chief Controller grave and Export (CCI&E) in prescribed form together with the application, they have got to submit the subsequent documents:

- Copy of trade license
- Nationality certificate issued by Ward Commissioner or Union Parishad Chairman (for Bangladeshi nationals)
- Income tax payment certificate of the previous year (in applicable cases)
- Valid membership certificate from the Chamber of Commerce or Registered Trade Association
- Bank solvency certificate
- Partnership deed or Incorporation certificate
- Photograph – 2 copy.

Prescribed form and other related information are provided in the official website of the CCI&E.

Receiving Export Order from Buyer

First of all, an exporter receives export order (fruits and vegetable) from foreign buyer according to foreign buyer requirements. Based on a buyer's expression of interest to enter into a business deal, the exporter prepares a price quote and terms of trade. A Pro-forma Invoice is then sent to the importer for approval.

Producing/Collecting Fruits/Vegetables

After receiving order exporter collects the vegetables/fruits. The exporter determines the quantity of fruits/vegetables to be procured from the local supplier(s) or a vegetable exporter may collect it from farmer or other producers.

Getting Inspection Certificate

These kinds of certificate are being issued by some authorized office/organizations/trade associations. Concerned officer visits go-down/ warehouse or other storage places. An inspector visits the warehouse and assesses the quality control facilities available at the warehouse and provides inspection certificate.

Collecting Letter of Credit (L/C)

The exporter can export fruits/vegetables with or without Letter of Credit (LC). The Contract/ Agreement with foreign buyer or CAD or Advance TT methods etc. are also allowed for export. The exporter submits EXP form to bank and prepare bill of export. With all these documents exporters then approach at the customs authority of the airport through which they want to export fruits/vegetables.

Reserving Space with Cargo Agent

In Bangladesh, usually fruits/vegetables are exported by air cargo. A global freight forwarder is an agent for the exporter in moving cargo to a remote destination. An exporter reserves space with cargo agent and requests an area. Based on the request, the agent issues airway bill for consideration by the client. Based on the document and confirmation by the cargo agent, the exporter schedules pick-up and delivery of the container with the inland haulage company. A booking confirmation is then issued by the latter and this document is kept by both the parties for performing of further activities. Freight forwarders can assist with an order from the beginning by advising the exporter of the freight costs, airport charges, consular fees, cost of special documentation, and insurance costs further as their handling fees - all of which help in preparing price quotations. Freight forwarders might also acclaim the sort of packing for best protecting the merchandise in transit; they will conceive to have the merchandise packed at the airport or containerized.

Obtaining Cargo Insurance for Inland Transportation

This can be a voluntary step, which is undertaken by the exporter on impromptu basis. To get insurance, the exporter lodges an application with the insurance firm, together with copies of the Commercial Invoice, L/C, Packing List and cargo Booking Confirmation. Supported satisfactory documentary evidence, the insurance firm issues a policy. The exporter then pays the premium to the corporate

Submitting Documents for Customs Approval

Most exporters depend on Clearing and Forwarding Agents (CFA) to accommodate the procedures involved in customs clearance. CFAs are experienced within the various procedures and are wont to the processes. Exporters deliver supporting documents including the Commercial Invoice, Packing List, EXP Form, GSP Certificate (in some cases), Certificate of Origin and Insurance Certificate (Insurance Policy). Customs authorities then validate the documents and issue a 'C' Number upon finding the document satisfactory. The exporter's agent then acknowledges receipt of the 'C' Number and makes a print out of the acknowledgement receipt for conducting customs clearance at a later date.

Clearing Goods through Customs

The CFA submits a copy of the 'C' Number Acknowledgement Receipt to customs along with hard copies of all the supporting documents. Customs then retrieves information from the previously lodged online declaration and cross checks with the documents received from the CFA. An inspector is then authorized to inspect the cargo and certify compliance with the declaration. If no discrepancy is found, the CFA then receives the custom clearing on behalf of the exporter.

Export Documentation

The subsequent documents are commonly employed in fruits and vegetable exporting; which of them are literally employed in each case depends on the wants of both Bangladesh government and also the government of the importing country. Following documents are needed:

- Customs Export Declaration
- Certificate of Origin
- Commercial invoice
- Airway bill
- Inspection certification/Pre-shipment inspection (clean report of findings)
- Destination control statement
- Insurance certificate
- Export license (when needed).
- Export packing list

The total time required to complete this process is around more than a month which is long time compare to other developing countries. So policy/administrative barrier has impact on export process of fruits/vegetables.

On the basis of some KIIs, it is known that Bangladesh government formulates the Export Policy principally with a view to facilitate the exporters so as to develop and promote vegetable export of Bangladesh. The Export Policy highlights some special facilities and incentives.

- Cash incentives
- Duty Drawback
- Bonded Facilities
- Assistance in searching for foreign market
- Export Loan at lower rate of interest
- Awarding Commercially Important Person (CIP) status and National Export Trophy

So it can be concluded that policy/natural/administrative barriers have impact on export process.

Problems Faced by the Fruits/Vegetables Exporters

Although Bangladesh has undertaken various trade facilitation measures over the past decades in order to simplify export procedures by reducing the number of signatures needed for clearance of consignments and the frequency of inspection of the goods traded, yet following some problems are faced in export process according to case study, KIIs and survey results.

- The exporters have to pay a high rate of airfreight charge for the space in the airplanes, because Bangladesh has no special cargo planes.
- The comparative airfreight rates were higher for Bangladesh than other developing countries of the world.
- Delay in arrival of aircrafts at different destinations caused huge damage of vegetable exported.
- In Bangladesh, unnecessary and lengthy custom procedure made serious troubles for the exporter leading to failure of timely shipment which caused a great damage to the fresh vegetables exported.
- Packaging of Bangladeshi vegetables consisted on mainly round bamboo baskets and second hand cartons of different shapes. As a consequence, the vegetables are not properly positioned and become misshaped and damaged.
- The quality of Bangladeshi vegetables is not acceptable by the foreign buyers and some of the countries have stopped importing Bangladeshi vegetables because of poor quality standards.
- The domestic prices of the seasonal vegetables are often too high during the early part of the season making it unprofitable for the exporters.
- Bangladesh exporter cannot compete in the world market, as the modes of domestic transports are not especially designed for the carrying the vegetables from farm gate to export point.
- After collection of vegetables from the field, there is no appropriate system to make them reach direct to the airport or exporters go-down for which vegetables are often wasted.
- The exportable vegetables prices in major foreign markets depend on numerous day-to-day market factors whereas the exporters do not get any current market information on a regular basis on several marketing variables like price, quantity, promotion, distribution channels, consumer's choice, and legal requirements and so on.
- Due to lack of sufficient cargo space of Airlines, the quantity of vegetables, which is returned to the exporters, has to be sold at a very low price in local market.
- Quality of the exported fresh fruits and vegetables is sometime questionable in respect of proper grading, post-harvest spoilage and contaminated with undesired materials.
- Sometimes exported packets of vegetable and fruit contained non-declared or prohibited items.
- *Exporters* cannot ensure to their buyers for continuous supply of the produces throughout the season.
- Some problems like natural calamities, the political situation, and protests by workers at the port are still present. Sometime different trading partners ask for different documents in the process of exporting the same product.

- Use of information and communication technology (ICT) in the overall business process is very limited.
- Most forms are completed manually (handwritten or typed).
- Exporters need to apply on paper to obtain certain certificates.
- Electronic versions of documents are not acceptable to banks.

Conclusion

Bangladesh seemed to have high prospects and high potential for export of vegetables for its high demand to the foreign market. The export of fresh vegetables is more profitable because of high value addition. Bangladeshi vegetables were still not famous to the foreign consumers. To publicize Bangladeshi vegetables to the foreigners and foreign super markets, quality of these vegetables has got to be improved by different value addition activities like upgrading the packaging, Processing, handling, grading and installation. These reasonable activities added value among to the vegetable producers, suppliers and exporters. Export expansion and demand from super market is constrained by poor quality of produces and imposition of various sanitary and phyto-sanitary criteria by the importing countries. Existing studies mostly describe export processes and constraints. The limited use of contemporary technology in government offices and banks within the context of international trade has been highly criticized by all the stakeholders. Transaction costs play an important role in determining the amount of trade that happens between countries. In spite of its importance, less attention has been paid within the literature on modeling and measuring its impact on trade between countries. Natural barrier has impact on export process but it's not highly significant. But policy barrier has impact on export process of fruits/vegetables. Thus, it should be useful to develop regional installation, taking initiative to scale back some implicit cost, and revise export process to boost export of fruits and vegetables.

Some suggestions/ recommendations can be made considering study survey for further improvement of the process. These include:

- To enter into the super markets in developed countries, quality of vegetables has to be improved by upgrading the packaging, handling, and grading and transportation system.
- It will be convenient if full automation exists in customs houses.
- To facilitate use of documents in electronic/digital format.
- Development of infrastructure at port areas
- Strengthening collaboration between government and business chambers to ensure a better business environment.
- To establish a single window so that all the actors involved in the business process are linked together.
- Expedite the process of issuing inspection certificates.
- Strengthen collaboration between government and business chambers to ensure a better business environment.
- Form a National Trade Facilitation Task Force.

- Publish (including online) trade related information, rules, procedures, etc.
- Finally, the country would be able to earn huge foreign exchange if the Government introduces a cargo aircraft to carry vegetables items.

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