Sugarcane

Rice (Paddy)

Wheat

Cotton

Mission Statement of API

To provide professional inputs to agriculture policy and recommendations relating to major and minor crops for meeting long-term objectives towards enhancing production.

Agriculture Policy Institute
Government of Pakistan
Islamabad

Table of Contents

FOOD PRICE STABILIZATION POLICIES
IN A GLOBALIZING WORLD

By

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Executive Summary

This case examines various aspects of food price instability. It focuses on (1) the sources of price instability, (2) various policy options and the conditions under which they are viable, and (3) experiences with both market-based and nonmarket- based policy responses to price instability. All sources of price instability—such as inadequate infrastructure, asymmetric information, and incomplete or missing institutions—qualify as market failure. One could therefore argue that an appropriate policy response would be to invest in the critical determinants of well-functioning markets and create enabling market conditions, which in turn improve price stability. But the proponents of direct government interventions have argued that it takes time to develop infrastructure, improve information flow, and build institutions, and hence direct intervention for price stabilization is a legitimate short-run policy response. This is the idea most developing countries adopted when they embarked on food price stabilization policies in the 1960s and 1970s.

Over the years, however, it became clear that such policies are expensive, may be dictated by special interests, and can distort agricultural incentives. These problems were particularly relevant for marketing board–led price controls in centrally planned economies. In Asian countries, most of which adopted dual pricing policies, interventions did produce beneficial results during the early years of the Green Revolution. But recent studies suggest that Asian food price stabilization is plagued by the very problems that the opponents had predicted with their theoretical models. These programs are becoming increasingly expensive, being captured by special interests, and hindering the process of diversification and commercialization. Furthermore, some countries in the region have demonstrated that reductions in public intervention can be beneficial. The Asian countries that adopted liberalization have been able to reduce food subsidy bills, strengthen markets, and allocate more resources to poverty alleviation programs—all without jeopardizing food price stability.

Given the policy vacuum created by liberalization and the increasing affordability of information and communication technologies, recent years have seen many initiatives in developing countries to set up market-based institutions, such as commodity exchanges, for managing price instability and risks. Some countries have also used international futures markets to protect their domestic market against global market volatility. In most cases, however, these initiatives have not produced the desired results, and addressing price instability continues to be a challenge for many developing countries. This case provides an overview of these challenges with the hope of stimulating critical thinking about policy solutions that can ensure an acceptable level of price stability, especially in low-income countries in Africa.

The assignment for the reader is to recommend a set of policies to Government of Pakistan that would ensure acceptable level of price stability for agricultural commodities. Keeping in view that Agriculture is a Provincial subject and Ministry of National Food Security and Research is working at Federal level for ensuring National Food Security.

1. Background

1.1 Agricultural households in developing countries face a variety of risks. The most visible manifestation of these risks is high food price instability, which, because of its inherent economic and political implications, has attracted the attention of almost all actors in food policy making over the past few decades. Politicians want food price stability irrespective of their ideology; public administrators have struggled to make food price policies work; and researchers have debated the ways and means of ensuring food price stability. All actors agree on one point—the dire consequence of price instability for consumers, producers, and overall economic growth. It is well documented that if the markets for credit and insurance are incomplete, commodity price instability can discourage investments and lead to inefficient resource allocation.[1] For poor consumers, the consequences of price instability can be severe. Because they spend a large share of their income on food, an unusual price increase forces them to cut down food intake, take their children out of school, or, in extreme cases, simply to starve.[2] A series of country studies have argued that price

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[1] For further details, see Newbery and Stiglitz (1981), Timmer (1988), Williams and Wright (1991), Fafchamps (1992), and Barrett (2002).

[2] Even if these shocks are temporary, they can have longterm economic impacts in terms of nutritional well-being, labor productivity, and survival chances (Hoddinott 2006).

instability may result in macroeconomic instability, social unrest, and overall reduction in economic growth.[3]

1.2   Thus, the issue is not finding policy justifications for ensuring price stability, but rather finding appropriate policy instruments and institutions to address it—a subject that was intensely debated in the 1970s and 1980s and has received renewed attention in recent years.[4] The traditional policy response has consisted of direct government interventions in food markets, through food marketing boards or parastatals, involving price controls and restrictions on both internal and external trade. Beginning in the 1980s, donors and other international agencies began promoting the reform of the food marketing boards and price policies as part of structural adjustment programs. This approach was motivated by the prevailing view at the time that direct marketing interventions in the food sector were too costly to continue. The reform experiences have been mixed, and whether the reforms provided positive price incentives is a subject of considerable debate (Barrett 1997; Jayne et al. 2002; Dorward et al. 2004).

1.3   In light of these mixed experiences with structural adjustment programs as well as other global trends, it is being increasingly recognized that food price instability and risk are important problems in many low-income countries, and finding appropriate policy responses for dealing with these problems has re-emerged as a contemporary policy issue (Byerlee et al. 2006; World Bank 2005). There are at least three reasons behind renewed interest in the subject. First, it is becoming evident that food market reforms have been partial, and in the wake of increased price volatility, many countries are reversing the policies they adopted under the structural adjustment programs.[5] Second, world grain stock is at historically low levels, and even a relatively small swing in exports or imports from large countries, such as China and India, can send major shock waves through world grain markets. This vulnerability has serious implications for developing countries, especially those that have food deficits and limited capacity to import owing to low foreign currency reserves. Finally, there is growing concern that

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[3] This has been a main theme of Peter Timmer's research for more than two decades. For Indonesia, he demonstrated that a stabilized rice price raised the country's growth rates by 16 percent during 1969–1974, by 14 percent during 1974–1979, and by 4 percent during 1989–1991 over what it would have been otherwise (Timmer 1997). For further discussion of the social and political justifications for price stabilization, see Timmer (1988, 1996).

[4] See Timmer (1988, 1996) and references therein on the debate and World Bank (2005) on recent issues.

[5] See Jayne et al. (2002) for Eastern and Southern African experiences.

global climate change is likely to expose poor countries to droughts, floods, and other extreme climatic events that can increase the risk of food price shocks.

1.4   Instability in agricultural prices results from a number of interrelated factors. It is important to note that such instability can often be triggered by one factor, like bad weather, and then be accelerated by other related factors, such as inadequate infrastructure and institutions. Broadly, one can divide these factors into four major groups: (1) agro climatic factors, (2) inadequate infrastructure and asymmetric information, (3) incomplete or missing institutions, and (4) high volatility in the world market.

2.   Agro Climatic Factors

2.1   The hostility of Mother Nature has historically been one of the main sources of peasant households' vulnerability. Droughts, floods, and endemic infestations of crops have always played roles in food insecurity and resultant human tragedies. The production from weather-dependent agriculture, as is the case in most developing countries, can be as unpredictable as the weather itself, as shown by the variability in production within and across years. It has been amply demonstrated that yield variability translates into price variability. The reasons are obvious when one observes how prices collapse following a bumper harvest and skyrocket after a crop failure.[6]

3.   Infrastructure and Information

3.1   The price of any given commodity is the final outcome of an exchange process we call the market, and the outcome is only as good as the process is able to deliver. Thus, the price of a commodity can be right only if the process of exchange is right. Three critical determinants of an efficient process of exchange (or market) are infrastructure, institutions, and information.[7] Two examples can help make the point clear. First, the results of the "getting-prices-right" campaign of the 1980s, which involved dismantling parastatals and allowing market forces to determine prices, varied widely across countries. Whereas liberalization led to higher price

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[6] The consequences of such shocks on the poor are also well documented. See Barrett (2002) for a review.

[7] Strictly speaking, these are not sources of price instability per se, but the lack or inadequacy of these elements amplifies the degree of instability.

variability and subsequent policy reversals in some African countries, it was remarkably successful in China and Vietnam— arguably because they had better infrastructure and institutions. Second, famines and acute food insecurity have historically been localized phenomena, and many of them are named after a specific region of a country, such as the Wello famine in Ethiopia and the Bengal and Madras famines in India. The classic example is the Bengal Famine of 1943, which tragically demonstrated how a small decline in food production can trigger massive food insecurity in the absence of infrastructure, information, and risk mitigating institutions. Food price stabilization policies have their roots in such tragic experiences.

4.   Incomplete Markets: Credit and Insurance

4.1   Life always involves risks, but over time the human race has learned how to manage or cope with them. The credit and insurance markets are the outcomes of such human learning. In developing countries, however, these institutions are largely incomplete or nonfunctional, and thus inadequate to address the credit and insurance needs of the vast majority of households. This failure indirectly contributes to agricultural risks and price instability. For instance, if the credit market functions well, households can borrow to maintain a certain level of consumption or to avoid distress sales in the face of negative income shocks. In many developing countries farmers must sell a portion of their crops immediately after the harvest to pay off loans, pay wages or school fees, or meet other social obligations. This is one of the reasons behind the stylized fact that prices decline after harvest in developing countries. Furthermore, a large body of literature argues that access to credit markets can reduce or delay the loss of productive assets through distress sales, which are detrimental to long-run productivity and growth.

4.2   The same argument applies to insurance markets. Farmers in developing countries have great difficulty dealing with weather-related income shocks owing to missing insurance markets. Crop failure due to drought, for example, can force households, otherwise above the poverty line, into poverty because they must sell their productive assets to meet consumption requirements and production costs. As the next section will show, the development of credit and insurance markets is also critical to ensure food price stability through market-based institutions.

5.   The Volatility of the World Food Market

5.1   The world staple food market has historically been thin, highly volatile, and heavily influenced by agricultural policies in developed

countries (Timmer 1996). This description was particularly true in the 1960s, when only about 6–7 million metric tons of rice, 46 million tons of wheat, and 23 million tons of maize were traded in the world market. The global market has increased in size over time (almost three times its size in the 1960s), but it remains volatile, with intrayear coefficients of variation reaching as high as 20.73 for rice, 16.9 for wheat, and 17.47 for maize over the past two decades.[8] Many studies have documented that high variability in world prices can be transmitted to domestic markets and worsen price instability. For net importing countries, the financial and balance of-payments implications can be severe. For example, a sudden increase in food imports may worsen the balance of trade, causing a devaluation of the currency and making imports more expensive in local currency (Hazell et al. 2005).

6. Other Factors Contributing to Price Instability

6.1   Two other factors can contribute to food price instability in developing countries. First, most developing countries have social safety net (SSN) programs to provide poor households with access to food. These programs are essential for all countries, irrespective of their level of development. If they are not managed properly, however, their operations can have destabilizing effects on markets, especially if the programs are large relative to the country's food economy. Although the direction of the price change may be different, both food transfers and cash transfers under SSN programs can affect the price. For instance, if beneficiaries receive food under SSN programs, it will lower their effective demand from the market, which in turn will lead to a decline in prices. If it is a cash transfer program, on the other hand, increased income will lead to an increase in demand and, for a given level of supply, an increase in prices. Thus, in either case, the market equilibrium will change, which in turn will change farmers' incentives and traders' arbitrage opportunities.

6.2   The other factor is food aid flow. Although the benefits of food aid supply during emergencies cannot be denied, excessive flows can depress market prices to the detriment of local producers, lowering levels of production and farmer incomes. This is particularly true for program food aid, which has historically been driven by the disposal of surpluses in donor countries rather than food security needs and incentives for domestic production in recipient countries. Consider the case of Ethiopia, one of the

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[8] Calculations are based on data from the U.S. Department of Agriculture Foreign agricultural Service.

largest recipients of food aid. According to a conservative estimate, total food aid accounted for 13 percent of cereal use in the country during 1999–2003. The share of food aid in total human consumption is at least twice as high, because in addition to human consumption, cereal use includes feed, seed, and post harvest losses (FAO 2004). Clearly, it is a large share and, depending on the mode of distribution, can produce disincentive effects for both producers and traders.

7.   Policy Options

7.1   From a theoretical standpoint, the central rationale for policy intervention to ensure price stability lies in the arguments of "market failure." In fact, three commonly cited rationales for public interventions in agricultural markets—(1) inadequate infrastructure, (2) incomplete risk-mitigating institutions like credit and insurance markets, and (3) lack of safeguards against external shocks—can all be argued as cases of market failure. The current stock of agricultural price stabilization policies includes both market-based and non-market-based options, with the former generally practiced in developed countries and the latter in developing countries.[9] A summary of available policy options is provided in Table 1, and each of the options is discussed here.

8.   Non-Market Based Options

8.1   In the age of liberalization and globalization, a discussion of non-market-based policies is likely to be labeled outdated and old-fashioned. There are at least three important reasons, however, for such policies to be considered. First, non-market-based intervention does not contradict the theories of market economics. Economic theory tells us that, in the absence of the provision of public goods and services, the invisible hand of the market is incapable of ensuring efficient allocation of resources. In such a situation government interventions can theoretically be justified.[10] Second, existing World Trade Organization (WTO) regulations allow developing countries to adopt non-market-based policies, including imposing variable levies within stipulated bands, maintaining strategic food reserves, and giving subsidies for market development. Finally, although they have come

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[9] In some countries, such as India and Kenya, market based and non-market-based policy options seem to coexist. Little is known, however, about how they affect each other.

[10] The problem historically, however, has been over-intervening in the market, often resulting from pressure from special interests and rent seeking—a common problem some Asian countries are confronting today.

under intense criticism in recent years, Asian countries had remarkable success with some of these policies during the early years of the Green Revolution. **Table-1** summarizes four such policy options, and three of them are discussed here.

8.2   *Government involvement in the sale and purchase of food.* Direct government interventions, through the sale and purchase of food, have been the main mechanism for stabilizing food prices in developing countries. The two most common forms of policy interventions are marketing board–led price stabilization in many African economies and dual pricing policies in many Asian countries. These methods of price stabilization came under intense criticism in the 1980s and 1990s, because they were found to be extraordinarily expensive and yet ineffective in generating benefits for the poor (Bates 1981; Newbery and Stiglitz 1981; Pinstrup-Andersen 1988).

8.3   The dual pricing policies are perhaps the most widely discussed and debated form of agricultural policy in the past four decades. Unlike marketing board–led policies, these policies provided a much needed boost to agricultural production and received recognition from policy makers, analysts, and academicians.[11] The policy essentially works as follows: ensure a floor price (often equal to the cost of production) and a ceiling price (set by adding certain margins to the cost of production) through public food procurement, stocking, and distribution. The public procurement ensured a floor price (for instance, in the case of a bumper harvest), stocking ensured the meeting of emergency food security needs, and distribution ensured a regular supply of food for social safety net programs for the poor.

8.4   Although it may sound simple, implementing dual pricing policies involves coordinating a complex set of policies, building related institutions, collecting highly disaggregated data, and monitoring both domestic and global prices. For instance, many Asian countries have agricultural price commissions that are responsible for collecting relevant data and setting up floor and ceiling prices; food logistics agencies that are responsible for procurement, stocking, and distribution; and a line ministry that designs safety net programs and identifies beneficiaries.

8.5   How are dual pricing policies different from marketing board–led price control in centrally planned economies? They differ in three important respects. First, unlike centrally planned economies, food logistics agencies in Asia did not eliminate private trading in the agricultural sector. For example,

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[11] See Timmer (1988) and Barrett (2002, section 3) for a review.

in the 1970s the food logistics agencies' shares in cereal production in India and Indonesia were only 10 percent and 3.54 percent, respectively (Rashid et al. 2005). The rest was traded by the private sector. Second, countries that practiced dual pricing policies never imposed production quotas on the farmers, a practice that was common in centrally planned economies. Finally, price stabilization policies in Asia went hand in hand with investments in infrastructure and market development. This approach is evident in the growth trends of road networks, irrigation facilities, and information and communication technologies. It is also supported by the recent studies of food market integration in Asia, almost all of which suggest that cereal markets have become well integrated in the past two decades, which is remarkably different from the earlier decades when the countries embarked on dual pricing policies.[12]

8.6   *Strategic Food Security Reserves.* The strategic food security reserve (SFSR) is a policy response to food security threats arising from weather-related disasters (such as droughts and floods) or human induced disasters (such as civil strife), both of which are prevalent in many developing countries in Africa and Asia. In Africa, maintaining SFSRs became a high-profile policy when the African heads of state and government passed a resolution establishing a regional food security reserve during the African Union summit held in Maputo, Mozambique, in July 2003. The rationales for maintaining SFSRs are similar to those for price stabilization, but they substantially differ from those for dual pricing policies. Although the focus of SFSR operation is mainly on emergency assistance and disaster management, dual pricing policies coordinate policy action across economic sectors. In particular, in addition to maintaining security reserves for emergencies (commonly called buffer stocks in Asia), dual pricing policies link farmers, through the minimum price guarantee, and consumers, through SSN, as part of the price stabilization mechanism.

8.7   Implementing this policy raises a number of challenges. It can be expensive and have disincentive effects on producers and private traders if stocks are not rotated and released in a timely and market-friendly manner. The direct costs of managing such reserves are easy to understand with a simple example. Suppose that a country maintains 450,000 metric tons of cereal reserves for emergency management and that policy makers know, based on historical evidence, that emergencies occur once every four years. Now, international evidence suggests that the average cost of storing one metric ton of cereal is US$30 per year. That is, the cost of maintaining food

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[12] A summary of these studies for six Asian countries is presented in Rashid et al. (2005).

9

security reserves is US$13.5 million per year or US$54.0 million (over four years) to address one emergency. These are conservative estimates, because they exclude other costs, such as storage losses, disincentives, or even potential corruption or misuse of the stocks.

8.8   Does this mean that one should abandon such policies? The answer, as in any policy debate, depends on country-specific realities. If a country is well integrated with the international market and has the capacity to import, such policies are irrelevant. If, however, a country is landlocked and weakly integrated with regional or world markets, maintaining food reserves may be necessary to save human lives, to which no one can objectively attach a financial value. Thus the objective in such a situation will probably be to find ways to minimize the adverse effects. Four commonly advocated options are (1) announcing the sale or release price before the main planting season, (2) setting the price around the expected import parity price, (3) rotating the stock through sales at import parity and tendering for commercial imports, and (4) strengthening the legal framework to minimize the scope for corruption, such as collusion between traders and officials to exploit the system.

8.9   *Variable tariffs.* International trade, especially involving the private sector, has long been recognized as an efficient means of stabilizing domestic food prices. Trade flows add to domestic supplies in times of shortage (or provide additional markets in times of surplus), with adjustments in tariffs providing a mechanism to influence both traded quantity and prices.[13] The key term in this statement is "adjustment of tariffs." From the perspective of trade theory, high tariffs on any commodity can create distortions in the respective sectors.

8.10   Nevertheless, given the weak agricultural base and high instability of world cereal markets, most developing countries cannot afford to leave their agricultural markets completely open. For instance, if a bumper harvest in a country coincides with low import parity prices, domestic prices can be further depressed and farmers may fail to recover their production costs. In a resource-poor, agriculture dependent country, such an outcome can be a big blow to the economy. This possibility is the underlying reason WTO regulations allow developing countries to apply tariffs within a band. The critical condition required to make this policy viable is a good market information system that can monitor both domestic and international prices,

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[13] See Minten and Dorosh (2006) for an analysis of rice price stabilization policy in Madagascar; Dorosh (2001) for an example of how private trade with India helped stabilize

rice prices in Bangladesh; and Jha and Srinivasan (1999) for an analysis of the welfare and efficiency implications of Indian grain price policies.

forecast domestic production, and allow for quick decisions on tariff adjustments.

9.   Market-Based Options

9.1   The market-based options and institutions used in most developed countries to mitigate price risk evolved in response to the conditions observable in many developing countries today. Writing on the history of futures markets in the United States, Kline (2001, 3) notes:

> … grains were typically sown in the spring and harvested in the fall. In the 1800s, this created extreme supply and demand imbalances throughout the year. During the fall, when supplies were plentiful, prices of grains were extremely depressed. Millers had an abundance. of new crops to choose from and would pay the lowest price they could. In fact, many farmers were left with cartloads of unsold grains that they were not willing to haul back to their farms. Sometimes the grains were left on the roadside to rot.

9.2   This story is similar to what Ethiopian farmers experienced during the harvesting season of 2002, when prices were so low that many farmers allegedly did not find it worthwhile to harvest and hence left their crops in the field to rot. History offers many examples of this sort, but they never translated into policy action to develop market based institutions in developing countries. The reasons were simple: developing countries did not have the technology and the institutions—such as credit, insurance, and contract enforcement—that are critical for the success of market-based mechanisms. In fact, it was not easy even for developed countries. For example, although the first forward contract was made on March 13, 1851, at the Chicago Board of Trade (CBOT), it was only in 1972 that the CBOT and the Chicago Mercantile Exchange (CME) developed contracts that were able to hedge against currency and interest rate volatility (Kline 2001).

9.3   Now, however, technologies that were beyond the reach of developing countries, such as information and communication technologies, are becoming more affordable; banking and financial sectors can be developed rapidly; and new markets are emerging in Brazil, China, and India. These factors are creating unprecedented opportunities for developing countries to set up market-based institutions. Yet developing countries continue to face difficulties in taking advantage of these opportunities.

11

9.4 *Warehouse receipt system.* The warehouse receipt system (WRS) is an institutional mechanism to mitigate some sources of price instability, namely credit constraints. As mentioned earlier, one of the main reasons for observed low prices after harvest is the fact that farmers, especially small farmers, are forced to sell a portion of their harvest to pay for laborers, pay off loans, and meet other social obligations. And when agriculture is dominated by smallholders, excess supply is created, which leads to depressed prices or even price collapse in certain years. If farmers were not credit constrained, they could store their harvest and wait for arbitrage opportunities over time. An efficient WRS can help farmers do exactly that. The idea is simple. After the harvest, farmers take their surplus to a designated warehouse and get a receipt indicating the value of the stock, which can then be deposited in a bank to get cash.

9.5 Providing farmers with warehousing facilities in developing countries offers an added advantage. In most developing countries, post-harvest losses are high—sometimes as high as 30 percent of gross production. Consider the case of Ethiopia, where estimates of post-harvest losses range from 20 to 30 percent of gross cereal production. Total gross production of cereal in the country is about 10 million metric tons. Assuming an average cereal price of US$200 per ton, this implies that the country loses about US$400 million worth of cereals in a given year. With appropriate harvesting, warehousing, and post harvest techniques, these losses could have been minimized, contributing to the well-being of both producers and consumers.

9.6 *Commodity exchanges and futures markets.* The futures market as it exists today is a contractual arrangement where farmers (sellers) and dealers (buyers) commit to future exchanges of grain for cash. For example, a farmer may agree with a dealer on a certain price to deliver a given quantity of wheat at the end of a pre-fixed time. If the bargain suits both parties, the farmer knows how much she will be paid for the wheat and the dealer knows his costs in advance. The two parties may exchange a written contract to this effect and possibly a small amount of money representing a "guarantee."

9.7 Such contracts have become common and are even used as collateral for bank loans. They can also change hands before the delivery date. If the dealer decides he does not want the wheat, he can sell the contract to someone who does. Similarly, if the farmer does not want to deliver her wheat, she can pass her obligation on to another farmer. The price fluctuates depending on what is happening in the wheat market, and the participants can use the price information to react accordingly. In simple terms, this is how commodity futures work, but successful implementation requires (1) a

system of grades and standards, (2) a large domestic market, (3) well-functioning credit and insurance markets, (4) a strong legal environment for contract enforcement, and (5) good information and communication infrastructure.

9.8   Given these stringent viability conditions, can such a system work in a developing country? If the current Western level of sophistication is taken as standard, the answer is probably "no." Going back in history, however, offers grounds for optimism about the prospect. For example, in the mid-1800s, when commodity exchanges evolved in the United States, all the viability conditions listed were either missing or at a low level of sophistication. Yet the institutions evolved and even flourished over the past century and a half.[14] Thus, if history is any indicator, commodity exchanges do have potential. The key challenges will be coping with small market size (most African countries have small markets) and creating an enabling legal and regulatory environment, which many countries lack.

9.9   *Crop insurance and weather-indexed insurance.* Crop insurance is an income stabilization mechanism, not a price stabilization scheme per se. Crop insurance comes in various forms—such as weather-indexed insurance, insurance against crop failure, and insurance against natural calamities and drought—and can be either a market-based or a non-market-based mechanism, depending on how a particular program operates. It can be termed market-based if it is self-sustaining with farmers buying the contract at a market-determined premium. On the other hand, it is a non-market based mechanism if premiums are subsidized or paid either by governments or by their development partners. Two questions are pertinent in this regard: Can crop insurance markets be feasible and self-sustaining in developing countries? And if they need to be subsidized, what justifies the subsidies? Hazell et al. (1986) deal with these questions extensively. Their answer to the first question was that, even in developed countries, crop insurance was not fully sustainable and involved large subsidies. Referring to developing countries, they wrote:

> ...the costs of multiple risk crop insurance tend to be particularly high in developing countries. Large numbers of small farmers and wide diversity of agricultural practices greatly adds to administration

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[14] The evolutionary path was not smooth though. The organization of commodity exchanges was held responsible for every inflationary and deflationary spiral, which led to two congressional investigations, in 1947 and 1948 (Baer and Saxon 1949).

13

and inspection costs. Poor data on actuarial risks and a lack of skilled personnel also hamper the writing and enforcement of contracts (Hazell et al. 1986, 295).

9.10.   Despite these bottlenecks, a general answer to the second question is that subsidizing such a scheme can be justified at an early stage of development based on the argument of market failures. In the early 1980s there was growing interest in crop insurance in developing countries in Asia and Latin America, as well as a push from international organizations like the Food and Agriculture Organization of the United Nations (FAO), the United Nations Commission on Trade and Development (UNCTAD), and the Inter-American Institute for Cooperation on Agriculture, but very few countries (only Brazil, Costa Rica, and Mexico until the late 1980s) experimented with the policy.

10.   Experiences with Various Policies

10.1   Food price stabilization programs in developing countries have been largely non-market-based— that is, they are implemented through direct government interventions. The most widely discussed and debated options are dual pricing policies, adopted by many Asian countries during the Green Revolution, and marketing board–led price controls in centrally planned economies. On the other hand, although they have been in existence for more than a century, market-based risk management instruments (such as warehouse receipts or commodity exchanges) have been introduced only recently in developing countries. For the sake of brevity, this section provides only brief reviews of experiences with dual pricing policies in Asia and recent initiatives instituting agricultural commodity exchanges.[15]

10.2   *Experiences with dual pricing policies.* Most Asian countries embarked on agricultural price stabilization programs in the 1960s. Although implementation approaches varied, the economic realities and the underlying policy justifications were similar across countries. All the sources of price instability described in the "Background" section were significant: agriculture was largely weather dependent, infrastructure was inadequate, risk management institutions were virtually nonexistent, and most countries were food deficient and hence food aid dependent. Therefore, policy thinking in all countries converged toward promoting agriculture to attain food self-sufficiency and improving agricultural markets. With the fortunate appearance   of Green Revolution technology, policy makers became

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[15] For a review of experiences with marketing boards in Africa, see Bates (1981).

convinced that the objectives were achievable with appropriate government interventions that could mitigate the risks and uncertainties of new technology.

10.3   Dual pricing policies (ensuring floor and ceiling prices) were an outcome of that thinking. The main goals were to increase production, scale up social safety net programs, and maintain buffer stocks to ensure national food security. Alongside these efforts, governments also made investments to improve input supply, credit facilities, and rural infrastructure. The initial successes of these policies were remarkable in terms of increasing production, strengthening social safety net programs, and fueling overall growth (Rashid et al. 2005; Cummings et al. 2006).

10.4   Experiences over the years have varied, however, as some countries continued with the policies despite changes in the rationales that justify such interventions. Based on findings from six Asian countries (Bangladesh, India, Indonesia, Pakistan, Philippines, and Vietnam), a recent study concludes that the broad rationales for public intervention in these countries have changed over the years, although some countries continue to implement price stabilization policies more or less the same way as they did in the 1960s.[16] The study shows that domestic markets are now well integrated, farmers have adopted new technologies, world cereal markets have matured, and all countries have adequate foreign currency reserves to participate in world markets at times of scarcity. The study further finds that although continued parastatal-led price policies have resulted in staggering increases in costs, liberalization has had beneficial impacts on the countries (Bangladesh and Vietnam) that pursued reforms.

10.5   Thus, the central message from the Asian experiences is that policy contexts are dynamic and policies need to be adjusted as contexts change. Many Asian countries failed to do so, which resulted in staggering amounts of subsidies and a distorted incentive structure for agriculture.

10.6   *Experiences with agricultural commodity exchanges.* The use of market-based instruments began only recently in developing countries. With the exception of pilot initiatives for weather index–based insurance and warehouse receipts, the focus has been mainly on setting up commodity exchanges. Although commodity exchanges have been in existence for more than a century, the recent interest in setting them up in developing countries is triggered by (1) the need for alternatives in the wake of market

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[16] See Rashid et al. (2005) for details.

15

liberalization and (2) the enhanced availability and affordability of information and communication technologies. In many countries, governments historically played key roles in providing market information, facilitating trade, and setting prices. With liberalization, there was a vacuum in these services, and many countries felt a need for price discovery and an efficient trading mechanism—needs that can ideally be met by commodity exchanges. As a result, commodity exchanges have grown rapidly across the developing world over the past decade.

10.7   A recent UNCTAD review, however, suggests that experiences have been mixed. The key message from this review is that although the Asia-Pacific region, led by China and India, has succeeded in promoting commodity exchanges, Africa fared less well. In particular, except for South Africa, commodity exchanges either failed or had limited success in other countries in the region. This outcome is clearly discouraging for African countries, where both yield variability and price variability are among the highest in the world. This finding has two important implications. First, the failure of market based instruments will give governments a reason to reverse policies and return to those that are detrimental to market development and agricultural growth. Second, since such instruments succeeded in countries with higher levels of development (Brazil, China, India, and South Africa) and failed in others, it may be that a majority of developing countries are not ready to rely on commodity exchanges, or other market-based instruments, for managing price instability.

10.8   This suggests that some form of non-market-based mechanism might be necessary before these countries can rely on market-based options for food price risk mitigation. The question is, how? Historically, public interventions have had problems related to excessive control, which induces inefficiencies, and the capture of policies by special interests over time. Now development practitioners have almost half a century of experience to help them refine policies and design government interventions in supportive and market-friendly ways. Two considerations are worth noting in this context: (1) leveling the playing field for both the private and public sectors and (2) stabilizing prices within a broad band, not at fixed levels.

10.9   Leveling the playing field essentially means not empowering government agencies with regulatory supports, such as monopoly control, movement restrictions, and preferential access to credit. On the other hand, stabilizing prices within a band implies moving away from fixed pan-territorial and pan-seasonal pricing, which most countries have practiced, toward seasonally adjusted pricing. The problem with fixed pricing is that it

can be dictated by special interests. For instance, in India the floor price is set at the full cost of production, which includes the opportunity costs of labor, land, and equipment. As a result, over the years floor prices have gone up so much that floor prices in some months are higher than market prices. This outcome clearly contradicts the very logic for the government's intervention, which is meant to protect farmers from extreme price swings, not to guarantee profits. If floor prices were set at the variable costs of production, the band would have been larger, selling to government would not have been so lucrative, and the private sector could have participated in the market.

11.   Assignment

11.1   The reader is expected to recommend a set of policies to the government of Pakistan that would ensure an acceptable level of price stability for agricultural commodities. For more than three decades the country announced administered prices on the recommendations of Agricultural Prices Commission for the benefit of the farming community and to boost up agricultural production at country level. With the international wave of liberalization of market and on the recommendation of multinationals the number of crops being covered under support price program were reduced to four major crops e.g. wheat, rice (paddy), seed cotton and sugarcane. Agricultural Prices Commission was restructured into Agriculture Policy Institute and its rules and functions redefined in 2006. Further more on the implementation of 18th constitutional amendment Ministry of Food and Agriculture has been devolved to provinces. Now agriculture is a provincial subject.

11.2   On the continuing need of Food Security of the inhabiting population of the country the government has created Ministry of National Food Security and Research. Agriculture Policy Institute has been placed under it. Country has harvested a couple of bumper crops of wheat. Federal and Provincial agencies has procured sizeable quantities of wheat at the time of harvest. The procurement agency take credit from the banking system for the wheat procurement operations which creates pressure on the commodity operation program of the financial institutions as the procuring agencies do not pay back the credit amount well in time because they have the problem of disposal of stocks due to successive bumper crops of wheat. The international prices of wheat are on the decline. Under this scenario to safeguard the interest of the farmer and keeping the food security of the country's population set of conducive policies to be implemented is a challenging task.

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Table-1:   **A Synopsis of Options for Food Price Stabilization**

Policy options	Implementation approach	Viability conditions and country experiences	Challenges / downsides
Non-market-based options			
Dual pricing	Enforce floor and ceiling price; maintain buffer stocks; support SSNs; open market sales in case of price spikes.	Requires highly disaggregated info system on prices (domestic and world) and costs of production; well designed SSNs; supplementary regulations. Worked well in the early years of Green Revolution in Asia.	It is expensive and likely to be dictated by special interests. If practiced for prolonged periods, it impedes growth of private sector.
Strategic food security reserves	Maintain food reserves to manage emergencies; no formal enforcement of floor and ceiling price.	Requires management and analytical capacity in the implementing agency; efficient stock management; timely and market-friendly distribution and procurement.	Difficult to manage; high costs of operation; can destabilize markets. If the size is large, it can crowd out private storage and limit arbitrage.
Variable levies	Adjust import tariffs / export tax depending on domestic production and market conditions.	Requires good market intelligence on both domestic and world markets; capacity of the relevant authority to make quick decision and enforcements.	Can potentially be dictated by special interests; if governance is weak, lobbyists can influence the tariff decisions; does not work if a country is poorly linked with world or regional markets.
Subsidizing private storage	Public-private partnership; private sector uses public storage at subsidized price.	Requires limited availability of private storage and existence of large private stock from either individual traders or farmers' organizations; rule-based management to prevent traders / officials from colluding.	There is significant rent=seeking potential if government officials and private agents collude; can be politically unacceptable.

Policy options	Implementation approach	Viability conditions and country experiences	Challenges / downsides
Market-based options			
Warehouse receipts	Farmers, traders, or processors take grain to a warehouse and get receipts, which are then used as collateral for borrowing from bank.	Requires grades and standards; strong legal environment for contract enforcement; well-functioning credit and insurance markets; volume of storage. Works well in combination with commodity exchanges.	Appropriate regulatory, legal, and business environment must be built; well-functioning credit and insurance markets needed. Potential for moral hazard, rent seeking.
Commodity exchange and futures Markets	Sellers and buyers commit to future exchanges of grain for cash. For example, a farmer can agree with a trader on a price to deliver to him 500 tons of maize at the end of a predefined time period. If the bargain suits both parties, the farmer knows the exact price and the trader knows his costs and benefits.	Requires an enabling legal and regulatory environment; strong financial sector; functioning credit and insurance markets; systems of grades and standards; sizable domestic markets.	The biggest challenges for most African countries are lack of an enabling environment and small market size (trade volume).
Weather-indexed insurance	It is not a price stabilization instrument per se but can mitigate the price spikes and weather-related income shocks. Insurance policies are sold (or subsidized by the government or donors) to farmers. If the index falls below certain level, farmers are paid for the crop loss.	Requires strong legal and financial institutions; disaggregated rainfall data to create weather index.	Requires strong analytical and forecasting capacity. Formulating payout amount can be complicated by agroclimatic conditions. Potential for moral hazard.
International futures market	Developing countries use international futures markets to manage risks.	Requires participation of large farmers, traders, or intermediaries (such as farmers' organizations); or direct participation of the government. Has proved successful in some countries, such as for cocoa in Ghana and coffee in Guatemala.	Requires significant training and capacity strengthening of participating groups, including the government officials in the executing agencies.

FORECASTING WHEAT DEMAND AND PRICE SHOCKS IN PAKISTAN A SURVEY

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Abstract

The current research investigates the forecasting wheat demand price shocks in Pakistan. Wheat growers and their economic implications are considered in terms of the existences and nature of production lags, and the choice between expected wheat and gross returns as the preferred explanatory of producer's response to changing economic condition. The analyses indicate that there are lags which are due primarily to the difficulties and cost of rapid adjustment rather than to the time required to revise expectations. The statistical results were similar for the alternative specification of gross margins and wheat as the economic decision available. However, the wheat elasticity's derived using the gross margins specification were about a third of those using the wheat specification. The gross margin specification yielded additional information in the form of yield and input cost elasticity's.

1. Introduction

1.1 Agriculture is significant sector of Pakistan's economy. The agriculture sector contributes around 19.8 percent in GDP, and engages half of the total employed labor force. It is largest source of foreign exchange earnings and meets raw material needs' of country's major industries such as textile and sugar production. (Economic Survey of Pakistan (2010-11). The growth in the agriculture sector has been 2.4 percent in 2010-11 primarily due to 4.8 percent growth in livestock sector. The sector of major crops minor crops, fishing and forestry grew at a slower pace. In 2011-12 wheat production may reach 25 million tonnes. Sugar production is expected to

23

exceed 5 million tonnes and cotton 15 million bales. The second report of SBP (Oct-Dec) forecasts growth of economy between 3 to 4 percent due to substantial achievement in the agriculture sector.

1.2   Growth in a agriculture sector is attributed to the government's agricultural policy reforms such as waiving of interest on loans, introduction of Khushali bank, support price of Wheat and introduction of micro credit facility. The growth is also attributed to timely measures to get cotton out of deep-seated crisis (at el S.M.Nasir).

1.3   The actual prices and their lag prices may be expressed in enumerative currency (Rao and Sharma et al, 1999) Thailand, India, Chad are the main competitors of Pakistan (*Shaikh et al*) The government of Pakistan is taking effective measures to increase the yield, production and quality of Wheat.   Research efforts are continuing on developing high yielding varieties of Wheat. Emphases are also being laid on agronomic research as well as on improved extension services, fertilizer use, direct seedling etc.   The flow of input and credits is also being substantially increased. The research was investigated with the objectives to determine the factors that affect the supply of wheat in Pakistan, and to estimate the short run wheat elasticity's of wheat in Pakistan.

1.4   Applied demand analysis is usually taken to refer to the micro economic analysis of consumer and producer behavior, especially the nature of input demand and consumer demand equations. According to Stigler's (1954) survey of earlier research applied demand analysis has a long history going back to the 1970s England with the budget studies of David Davies and Sir Frederic Morton Eden. Regarding the role of prices determining consumption.   Stigler(1954,p.103) argues that systematic and cumulative work began in the 1870s.The earliest empirical analysis known to Stigler's of the relationship between prices and quantities consumed was carried out in 1861 by Ernst Engel (1857)famous budget study led to what is now known as Engel's law the proportion of income devoted to food declines with increasing income. Engel's 1861 research dealt with harvest and prices of rye in russia for the period of 1846-61. The whole area of the applied demand analysis is not extensive a comprehensive survey would not be possible within the confines of the single paper. Fortunately number of books on the topic are now available, including Bewley (1986,Deaton, and Muelbeaur (1986), Gold Berger(1987) Philips(1974),Pollack and Wales (1992) Additionally recent major survey articles are Bludell (1988), Blundell et al (1993) and Deaton (1986) . The literature is often plagued with claims and counter claims regarding the benefits of one approach over the other. For

those who do not work in the field and have to rely on the literature for guidance, it is thus often difficult to assess these claims.

2.   Model Description

2.1   Let q1........qn be the quantities consumed of ή goods

Let p1...........pn be the corresponding price of Wheat

Then $M = \Sigma\ n/I = 1$ pi qi is the total expenditure, which we will refer to as income for short. The consumer chooses the quantity vector q= (qi) to Sogatmize the utility function u (q, subject to the utility Sogatmization U = p.q, where p= (Pi) is the vector of price. The solution to this problem leads to a Marshallian demand equation for good i:

We draw on Clements and Selvaathan (1994) and E.A. slevanuthan and Clements (1995).

$$q_i = q_i\ (M, P_t\ ....P_n\ )\ 2.1$$

To be more concrete. Suppose that (2.1) is logline:

$$\text{Log } q_i = \alpha_I + \eta_I \log M + \Sigma\eta_{ij} \log p_j \ (2.2) \ J=1$$

2.2   Where *ai* is intercept; n is the income elasticity: and nij is the (ij) the uncompensated price elasticity. The marshallian or money income constant demand equation can be transformed into its Slutsky or real income constant counterpart by using the Slutsky decomposition for the uncompensated price elasticity *nij = nij – wj nj*. Where nij is the (ij) the compensated price elasticity and *wj= piqj 1M* is the budget share of good j.the proportion of income spent on j. This yields, after a little algebra the Slutsky demand equation for good i: n

$$\text{Log } q_i = \alpha_I + \eta_I \log Q + \Sigma\eta_{ij} \log p_j \ (2.2) \quad J=1$$

2.3   Where log Q- log M- log P, with log P= $\Sigma\eta_{ij}$ log p_j the Division price index ,That is log Q is money income deflated by the price index . ora measure of the consumer's real income .Note that real income tend the compensated price elasticity's nij appear on the right-hand side of (2.3) while money income and the uncompensated elasticity's nij are in (2.2) .The consumer's Sogatmization problem implies three testable constraints on the

demand equations. The first is demand homogeneity which stated that an equi- proportional change in prices has no effect on the quantities demanded when real income is held constant .On the 13th of February, 2008 when decimal currency was introduced into Pakistan, all price and money income doubled overnight: demand homogeneity assure us that this change in the unit of account would have had no effect on consumption In the context of equation (2.3) for I= 1,,,,,,,,,, n good ,homogeneity is elasticity's for each good being zero.

$$\sum_{j=1}^{N} \eta_{ij} = 0 \qquad I\text{-}1, \ldots\ldots\ldots n$$

2.4 The second constraint is symmetry of the substitution effects or Slutsky symmery .This states that when real income is held constant the effect of a \$1 rise in the price of one K.G of Wheat, consumption is exactly equal to effect consumption on a \$1 rise in the price one K.G of a wheat to equation (2.3) , n ij is the corresponding slop Symmetry states that this slop is the same when we interchange the i and j subscripts, (qi1 pj) nij is the corresponding slope Symmetry states that this slope is the same when we interchange the I and j subscripts.(qi 1 pj) η ij =(aj1 pi) ηji

Or multiplying both sides by pi pj 1 M

Wi ηij = wj ηji $\qquad$ i.j= 1...n

2.5 Early tests of homogeneity and symmetry by Barten.Byron and other (see Barten, 1977, for references used F-test to test constraints (2.4) and (2.5) and variation thereof. As these hypotheses seemed to be plausible to most it came as a major surprise that many or the early tests led to rejection. What exactly was the problem should the theory of the utility Sogatmizing consumer really be abandoned as advocated by those who took the results literally such as Christenson et at (1975)? Or was the source of the problem the lack of dynamics or other variables excluded from the demand equations?

2.6 This and his students finally resolved this puzzle. Using Monte Carlo simulation experiments, they showed convincingly that the rejection were just and artefact of the tests employed .The test statistics have an asymptotic justification, but with sample sized (n, the number of commodities

distinguished typically used .the tests are seriously biased against the null.i.e… They over-reject. When appropriate adjustments are made to the test statistics, their finite-sample performance for homogeneity and symmetry is performance for homogeneity and symmetry is perfectly satisfactory .For details see Laitinen (1978), Mesiner (1979) the Theil (1987). The third constraint is the law of demand, Viz that demand curves slope down when real income remains constraint. This is sometime referred to as the negativity condition, as the n x n matrix of compensated price elasticity's [η ij] , although there are more sophisticated approaches (see ,e.g.. Barten and Geyskens, 1975).

2.7   A further set of constraints on the system of n demand equation is the adding up restrictions, which are implied by the budget constraint. In terms of (2.3), these take the form. n

$\sum w_i \eta\ i= 1,\ \eta\sum w_i\ \alpha I\ =0, j=1\ …n$

I = j   i=1

2.8   As the data used to estimate demand equations are constructed to satisfy the budget constraint, these restrictions are not testable.

3.   The Structure of Preferences

3.1   Consider demand equation (2.3) for I= 1 ……., n goods. In this system of n equation there are n intercepts, $\alpha1……\alpha n$ income elasticities $\eta1, \eta N$, and $\eta2$ price elasticities coefficients is n + n + n2 =n (2+ n) .For a moderate-sized system of $\eta=10$ goods, this total equals 120 which is an impossibly large number of coefficients is still of the order $\eta2$. One way of proceeding is to set to zero some of the cross-price elasticity's (ηij for I # j) in equation (2.3) ,perhaps on the basis of the intrinsic nature of the commodities involved or on the basic of prior evidence .a more systematic approach is to pattern the η x η elasticity matrix [ηij] by further structuring the nature of the consumer's utility function u ($q1,……qi$).Important early contributions in this area include Barten and Turnover sky (1968) .Leontief (1947) ,Pearce (1961), 1964), Soon (1961) and Struts (1957). Suppose the η goods are broad aggregates such as food, clothing, housing and so on. It is then not unreasonable to view the demand for each good as representing the TJ-83re for some characteristic (s) unique to each good: food provides nutrition and taste, clothing warmth and style and housing provides shelter.

3.2   These unique or basic characteristics represent fundamental TJ-83res which generate utility. Moreover for them to be truly basic characteristics, it should be the case that there is little or no interaction between them in the utility function, so that utility is generated by the consumption of food and clotting and housing, with the emphasis on the ends representing the notion of additively. Thesis ideas can be formalized by an additive utility function; whereby utility is the sum or n sub utility function, one for each good.

$$\mu (q1,.......qn) = \sum \mu i (qi)$$
$$I=1$$

3.3   Where ui (qi) is the sub-utility function for good I according to (3.1), each marginal utility is a function only of the good in question. and is independent of the consumption of all other good , According to (3.1) is also known as preference independence (P1) .An example of (3.1) is the Cobb-Douglas utility function, $II^n_{i=qj}$. As monotonic transformations of the utility function leave the demand equations unaffected, we can express the Cobb Douglas in logarithmic.

Which is now additive in log q1........ Log qi
To analyze the implication of PI, let o ij be the Kronecker delta

$$\eta Ij = \Phi \eta(\delta ij - wj \eta j),$$

Otherwise and Φ as the income flexibility .If preferences are of the form (3.1), the (I, j) The price elasticity then becomes (see, e.g ...Clements et al .., 1995):

Where ηI is itch income elasticity and wj is the budget share of j, as before .as

$$\eta j= (qi. 1\delta M) (M1q)$$

It follows that the term
Qi ηj on the right hand side of (3.2) equals
Φj answers the question, how much of a \$1-rise in income is spent on good j? The marginal share is to be contrasted with the budget share wj= pj, 1M, which related to Per-existing, or average, expenditure on jth ration of the marginal share to the corresponding budget share is the income elasticity, $\eta j= \theta j/wj$

If we use (3.2) in the demand equation (2.3) the substitution term then becomes

n

$$\sum_{j=1} \eta_{ij} \log P_j = \Phi \eta I (\log P_i - \log p')$$

n

Where $\log P = \sum_{I=1} \theta_i \log p$ is the Frisch price

3.4   Index .In contrast with the Division price index which uses marginal shares as weights .As luxuries [η>1] have marginal shares in excess of their budget shares it follows that these goods are more heavily weighted in the Frisch index than in the Division Index. Using (3.3) in (2.3), the itch demand equation under preference independence takes form This shows that PI implies that only the own –relative price appears in each demand equation and that the own price elastic so $\Phi \eta_i$) are proportional to the corresponding income elasticity (η_i), with the income flexibility (Φ) the marginal utility of income respectively .If C, F and U are the compensated, Frisch and uncompensated elasticity's then under PI the relationship between them is

$$C = F (1 - \theta_i) \quad U = C - \theta_i$$

3.5   Where θ_i is the marginal share of goodi. As all goods are normal under PI, θ_i>0 and it follows that IUI> ICI, It also follows that if the marginal share is small $C \approx F \approx U$. Similar considerations also apply to the cross price elasticity's.   The final feature FO preference independence to note is the reduction in the number of unknown parameters in the demand equation. As stated above in the underrated demand equation (2.3) for I= 1, n there is only one free parameter in the subsection loam, the income flexibility Φ.

3.6   The hypothesis of PI can be tested by comparing the fit of the restricted and unrestricted demand equations, equation (3.4) and (2.3) for I= 1...n or variants thereof. Most of the implication of PI rejected the rest ion see Barten 1977 for a survey in a highly influential paper. Deaion (1974) analyzed the impaction of PI indirectly by testing whether unrestricted own price elasticity's are proportion to the corresponding income elastic ties

Using PAKISTAN data for n= 37 and 89 commodities he finds no relationship between income and price elasticity's and concludes.

3.7   That the assumption of additive preferences is almost certain to be invalid in practice and the use for demand models based on such an assumption will lead to severe distortion of measurement.

3.8   The earlier tests of PI all had only an asymptotic justification, and in view of the difficulties with the asymptotic test of homogeneity and symmetry discussed above in Section II, there is reason to believe that these test also have reason to believe that these tests also have problems of over rejecion.S.Selvananthan (1987, 1993) develop a Monte Carlo test of PI which avoid possible problems associated with asymptotic and finds a good deal of support for the hypothesis with data from 18 OECD countries S.Selvanathan (1993) also estimates double-log demand equation for n= 10 goods in each or 18 OECD countries,. Theses equations have income and the own relative prices on the right hand side but the price elasticity's are otherwise unconstrained. **Table-1** (from Clements and S.Sellvanstrained 1994) and Figure 1 present the joint frequency distribution of the 10 x 18=180 elasticity's (this only the approximate number as there are minor differences in the number for goods in different countries.

Table-1:   Joint Frequency Distribution of income and Prices Elasticity's (Percentages)

Income elasticity		Absolute value of price elasticity	
	$\leq \frac{1}{2}$	$> \frac{1}{2}$	Total
≤ 1	34	21	55
> 1	15	30	45
Total	49	51	100

3.9   Luxuries are indeed more price elastic than necessities, which support the PI hypotheses. Accordingly, in light of this more recent evidence, Deaton (1974) may have been premature in rejecting preference independence.

3.10   A worker version of preference independence is block independence where by the consumer's utility function is additive in groups of goods,

rather than individual goods. written S1, SG such that each good belong to only one groups then preferences are of the block independence form when the utility function is the sum of G group utility function, each involving the quantities of only one group.

$$G$$

$$U (q1, qn)= \Sigma \, ug \, (qg), \qquad g=1$$

3.11   Where qg is the vector of the qi that fall under Sg Thus if alcohlic beverages make up one block independent group and all other goods another, the marginal utility of, say, Wheat would then be affected by the consumption of Wheat, but not by consumption of any good outside of type group .The demand equation for good.

Log qt = αi + η, log Q

$$\Sigma \, \eta Ij \, (\log Pj - \log P)$$

JsubSg

3.12   Equation (3.6) is to be compared with (3.4), the corresponding demand equation under preference independence .The assumption of PI implies that only the own price of goods in the dame group as the commodity in question play a role .If the Wheat and the Wheat Floor(Atta) if these form a block independent group then only the prices of the three beverages affect the consumption of each beverages affect the consumption of each beverage and the prices of together goods play no role .It can therefore be seen that there is an appealing unification between preferences an demand equations.

4.   Group Demand and Conditional Demand

4.1   Consider gain the demand for Wheat varieties .One way to analyze these beverages would be to postulate that they form a block independent group and then use demand equation .One disadvantage of this approach is that equation group the nose demand equation .One disadvantage of this approach is that equation involves real income and. through their influence on the Frisch price index log P, the price of other (i.e.. non-Wheat) goods. Conditional demand equations deal only with Wheat and thus avoid the problem. Accordingly a system with a large number of commodities can be transformed into a number of smaller. Independent sub systems, one for each group of goods. In this section, we set out detail of this approach Recall from

section II that the budget share WI is the proportion of toil expenditure devoted to good i, while the marginal share

θ Measures the increase in expenditure on I as a result of a one-dollar increase in income .The budget and marginal shares for the group Sg are

$$Wg = \sum_{JsubSg} WI \qquad \theta = \sum_{isubSg} \theta i$$

It then follows that w' = wiWg is the conditional budget share of iθi = θg is the corresponding conditional marginal share we return to 3.6 the demand equation.

The sum on the left-hand side of equation (4.1) si then just the Division volume index of the group log Qg .If we use the definition of θg and wiηj =θg /Wg.

We write the last term on the right hand side of (4.1) is the group income elasticity

ηG = θg/Wg We write the last term on the right hand side of (4.1) as

$$\frac{1}{W} \sum \sum Wi \, \eta ij \, (\log Pj - \log P)$$

We return to equation (3.6), the double-log demand equation for good me, viz, Sg if we now suppose that the n goods form only one block in the utility function, then preferences are unrestricted and this summation is over all n goods.

We take infinitesimal of all variables in this equation and then multiply both sides by WI to yield

$$Wi \, (\log qi) = \theta ifd \, (\log Q) + \overset{N}{\sum} vij \, [d \, (\log pj) \quad J=1-D \, (\log P')]$$

Where θ I=wiηI is the marginal share of good I and vij=w is the (I, j) th price coefficient .The above is the ith equation of the relative demand system .The variable on the left-hand side or (5.4) has the dual interpretation as the equation of the relative price version of Thiele's (1980a) deferential demand

system .The dual interpretation as the quantity component of the change in the budget share of good I and the contribution of I to the Division volume index d (log Q). Note that the confidents of (5.4), θ and vim are not necessarily constants.   N

We define the Slutky coefficient as well as (3.7) in the form.

$\sum=1$ vij $=\Phi$ θi, we then have

$$n$$

Wi d(log qi) = θ id (log Q) +$\sum$я ij d (log pj)
$$J=1$$

4.2   Which is the absolute price version of the differential demand equation for good j.the demand equations (5.4) and (5.5) are in terms of infinitesimal changes? The Rotterdam model, due to Barten (1964) and Theil (1965) is a finite-change version of those equations. We write Dxt=log xt – log xt-1 for the finite log change in a variable x from period t-1 to t and w_{it} for the arithmetic average of the budget share wit = (1/2) (wit + wit-1) the finite-change version of equation (5.3) si then

$$N$$
$$\overline{w_{it}} Dq_{it} = \theta DQt + \sum v_{ij} (Dp_{jt} - Dp't)$$
$$J=1$$

$$n$$
$$\overline{wit} Dqit = \theta DQt + \sum я ij (Dpjt - Dp't)$$
$$J=1$$

4.3   This is the *ith* demand equation of the absolute price version of the Rotterdam model. Recalling that the Frisch index DP involves the unknown marginal shares equation (5.6) is nonlinear in the parameters, whereas (5.7) is linear .For small values of n, the absolute price version is suitable for estimation but when n become large it is cumbersome. For large n it is better to use the relative price version and impose suitable restrictions on the vim according to notions of reparability. A weakness of the Rotterdam model is that both versions have constant marginal shares a defect which is shared with LES as discussed above. It has also been argued that another weakness is that the assumption of consistent coefficients implies that the model is consistent only with Cobb- Douglas utility. This criticism is originally due to

McFadden (1964) but as indicated in the next section more recent research has now established that the model holds under much weaker conditions.

4.4   The attraction of AIDS is that it gives an arbitrary first –order approximation to any demand system: satisfies the axioms of choice (almost exactly; aggregates perfectly without invoking the assumption of parallel linter Engle curves: and had a functional form which is consistent with that although many of the TJ-83rable properties of AIDS are possessed by one or other of the Rotterdam or Tran slog models, neither possess all the them simultaneously. The AIDS model in its general form is nonlinear. In practice, however by a suitable approximation to the price index, it is mad liner .As for the Rotterdam and Tran slog models, AIDS can also be used to test the restrictions of homogeneity and symmetry .As Barnett (1984,p 285) says The question therefore naturally arises as to just what has been gained by the wide spared adoption of flexible functional forms, at the expense of linearity, easy satiability, informative parameterization, and well-behaved error structure that has long been available from the older Rotterdam model .if flexibility is the answer, then only Monte Carlo studies could confirm the existence of that gain. However, it would be surprising if the Rotterdam model was to be found to be consistently less flexible than, say the currently fashionable translo model.

4.5   We do not believe that there is a single one-size-fits-all functional form that is ideal for all applicants. Instead, we believe that the characteristics that make a particular functional form suitable for one application my well make it inappropriate for another .For example household budget data typically present the investigator with wide variation in observed level of total less variation in expenditure and more variation in relative prices. Thus it is not surprising that the parametric forms best suited for analyzing household budget data differ from those best suited for analyzing per capita time series data.

5.   Aggregation over Consumers

5.1   The demand equation discussed in the previous section is of micro nature as they are based on the utility-Sogatmizing behavior of the individual consumer. As data in economics are usually available only in aggregate form (e.g... per capita or per adult), it is natural to ask or what extent FO the properties of the micro demand equation carry over to the aggregate (macro) of market demand functions? It can be easily shown that under certain conditions, the micro demand equations. LES given by (5.1), the Tran slog (5.2) and AIDS (5.3) can be aggregated into analogous macro forms; see

respectively, Theil (1975/76). Jorgensen et al (1982) and Dalton and Melbourne (1980b) .The aggregation of the differential demand equations (5.4) and (5.5) is more complex .The aggregation issues of the Rotterdam (differential) demand system were considered by Barnett (1979, 1981) R.A Selvanathan (1991b) and Tehil (1971, 1975/76) using the convergence approach .As this is not well understood by many analysis, in this section we briefly outline the convergence approach.

Let us write the micro demand equation

$q_{if} = q_{ic}(M_c, p)$ i=1,....,n

C=1,...,N (6.1)   N

$Q_i = 1$ Σ qic (Mc,p)

N   C=1

$= f_i(M_i, ..., M_N, p)$ I = 1 ,....,n (6.2)

$q_i = g_i(M, p)$,   I=1,....,n (6.3)

$q_{ic} = \alpha_{ic} + \text{ßic } M_c$.   I=1,...n (6.4)

c=1 ,...N

N $q_i = \alpha_i + \Sigma \text{ ßic } M_c M$

c=1

N

ΣM_c

c=1   (6.5)

5.2   As an approximate linear macro relaion, we apply the Theil's (1971, 1975/76)-convergence approach to aggregation in the following manner. Where we have used plum N=0p (1) =0. Thus for sufficiently large N (6.5) becomes equivalent to (6.6) even when incomes random. Using the above convergence approach, under fairly stung assumptions about the macro parameters and variables, Theil (1971, 1975/76) shows that (5.4) the micro versions of the differential demand equation in absolute prices, into the corresponding macro equation. E.A Selvanathan (1991b) extends Theil's work by deriving the macro form of the relative price version under the weaker assumptions of Barnett (1979, 1981).

6. Useful Empirical Regularities

6.1   Applied economist need demand elasticity's for trade practices issues, tax analysis, the construction of CGE models and so on .In this section we Present several topic that could be useful in providing guidance for the values of these elasticity's as well as some related issues.

7. Constructing Price Elastic ties from Income Elasticties

7.1   It is usually the case that income elasticites are more readily available that price elasticties income elasticties can some form cross-selection analysis of expender surveys, or from simple judgments about the luxuriousness of goods. Under the assumption of preference independence, as discussed in section III all own and cross price elasticity's can be derived from information regarding the budget share. Income elasticity's and the value of one parameter, the income flexibility .The expression for the (I, j) the price elasticity is given by equation 93.2) which we repeat here for convenience.

$$\eta' \, ij = \Phi \eta I \, (i.j - wj\eta j), \, (8.1)$$

7.2   If the income elasticity's and budget share are available, we are still facing with the problem FO what value of Φ of use in equation (8.1). Frisch (1959) speculated that Φ would increases in absolute clue) with real income, but the available; evidence does not indicate strong support from this income dependence. Clements and S.Selvanthan (1994) present a review of estimates of the income.

Table-2   Conditional Demand Elasticities for Different Wheat Varieties in Pakistan

(1) Elasticity's		Conditional income Elasticity (2)		(3)	Conditional Compensated Conditional Price elasticity's		tiding	(8)
	TJ-83	Sogat		Kiran	TJ-83 (4)	(Kiran) (5)	Sogat (6) (7)	
TJ-83	.45	-.17	.09	.08	.09	-.05	-.04	
Kiran	1.90	.41	-.28	-.13	-.22	.15	.07	
Sogat	1.72	.16	-.06	-.10	-.09	.03	.05	

8.   Wheat Demand

8.1   The demand for Wheat of interest to economists for several reasons. At the individual level, Wheat consumption is subject to great idiosyncratic behavior – some people like more, some simply take lot, while others abstain completely. There is thus the intellectual challenge to determine whether this sort of behavior is amenable to conventional economic analysis. Another reason for interest revolves around the public finance aspects of Wheat such as externalities (both positive and negative) and the appropriate levels of taxation. A recent example of this the controversy generated by the Scales Report (Scales et at. 1995) into Wheat taxation in Pakistan. Finally as in many cases data on Wheat consumption stem from taxation records the quality of the data is above average .It is for these reasons that the Wheat beverages group is perhaps the most studied of all commodity groups, especially in the last 10 years .It is also worth noting that based on our experience, the economics of Wheat consumption make lively teaching material .in this sub-section, we set out some key results on Wheat demand which emerge from a number of countries.

8.2   Under the assumption of block independence, the composite demand equation for the group Sg is given by equation (4.4). Using Pakistani Wheat data. Clemens and S.Selvanatghan (1991) estimate the group income elasticity in the eqution ηg to be close to unity .If we set $\eta g=1$ equation (4.4) can then be written as

$$\text{Log } Qg - \log Q = \alpha g + \Phi (\log P'g - \log P')$$

8.3   Where αg is an intercept and Φ are simultaneously the own priced elasticiy of demand for Sg and the income flexibiliy. E.A. Slevanathan and Clements (1988) use this equation in terns of change to plot the growth in consumption of Wheat as a whole relative to income .ΔLog p', after replacing the Frisch price indexes (which involve unknown marginal shares) with their Division counterparts (which involve know budget shares): see also clemtns and S.Selvanthan (1991) Figure 2 give gives the plots for Pakistan, the Pakistan and the USA .As can be seen, the three solid lines (the Ls regression lines) are more or less parallel with a slope of about $-1 / 2$. Result which is confirmed with more formal methods (see E.A kSelvantathan and Clemsnt 1988). We speculate elasticity of currently illegal durgs would also be for the order of $- 1 /2$.

8.4   E.A.Selvananthan (1991 a) estimates conditional demand equation born Wheat varieties in a number countries .One of his findings is that the three Wheat satisfy the homogeneity and symmetry restrictions, suggesting

that drinkers are rational in their beverage choice. Selvanathan's conditional income elasticities are given in Table 3. Although there is a good deal of dispersion across countries, it is still the CAS than that elasticity's show a distinct pattern: except for Japan in all counters the conditional income elasticity for Wheat is less than unity. Accordingly, Wheat is a necessity and sprits a luxury. On the other hand however, there seems to be no particular pattern among the Wheat income elasticity's; and the same is true for the price elasticity's (see E.A.Selvanathan 1991a) for details.

8.5   The final empirical regularity pertaining to Wheat consumption is the finding of some complementarily among beverages (see, e.g. Clements and S.Selvanathan 1991). This can be understood in terms of the formal-dinner model in which all three beverages are consumed sequentially, so that one beverage reinforces the utility of the other, rather than being competitive .The BBA model (which john Freebain Attribute to the Tasman Institute) also give rise to the same prediction to complementarily income grows geometrically. Note that the regression line accounts for 84 per cent for the variability for the budget shares, which is impressively high in view of the great difference among the 42 countries with other cross- sectional studies (see Chen 1993, and Theil et al 1989, for reviews a result which leads us to treat the value of this slope as something approaching a natural constant.

The model underlying figure 3 is Working's (1943).

$$w = a + \beta \log M, \qquad (8.2)$$

Table-3:   **Conditional income Elasticity's for Different varieties of Wheat**

Provinces	Sample period	TJ-83	Conditional Income elasticity's	
			Sogat	Kiran
1) Sindh	1995-08	.8	.7	1.9
2) Punjab	1995-08	.7	1.0	1.3
3) N.W.F.P	1995-08	.4	1.6	1.3
4) Balouchistan	1995-08	1.4	.3	.5

8.6   Thus a doubling of income leads to the food budget share declining by 10 percentage points. (Theil *et al* 1989) calls this the strong version of Engel's law. This law could be used a short cut in making real-income comparisons. If, for example, the food budget share for some country of

group of countries was 10 percentage points less than of another, we could then conclude that, prima-facie, and the former is twice as affluent as the latter. When the compensated own-price elasticity of demand for food is approximately constant a, corollary of the above law is that a doubling of income leads to the uncompensated own-price elasticity falling in absolute value by 10(Chen, 1993). This result could be useful when there is little information available about food elasticity's.

9.   Conclusion

9.1   Applied economist need demand elasticity's for trade practices issues, tax analysis, the construction of CGE models and so on .In this section we present several topic that could be useful in providing guidance for the values of these elasticity's as well as some related issues. Applied demand analysis is usually taken to refer to the micro economic analysis of consumer and producer behavior, especially the nature of input demand and consumer demand equations The demand for Wheat of interest to economists for several reasons. At the individual level, Wheat consumption is subject to great idiosyncratic behavior – some people like more, some simply takes lot, while others abstain completely. There is thus the intellectual challenge to determine whether this sort of behavior is amenable to conventional economic analysis. Another reason for interest revolves around the public finance aspects of Wheat such as externalities (both positive and negative) and the appropriate levels of taxation.

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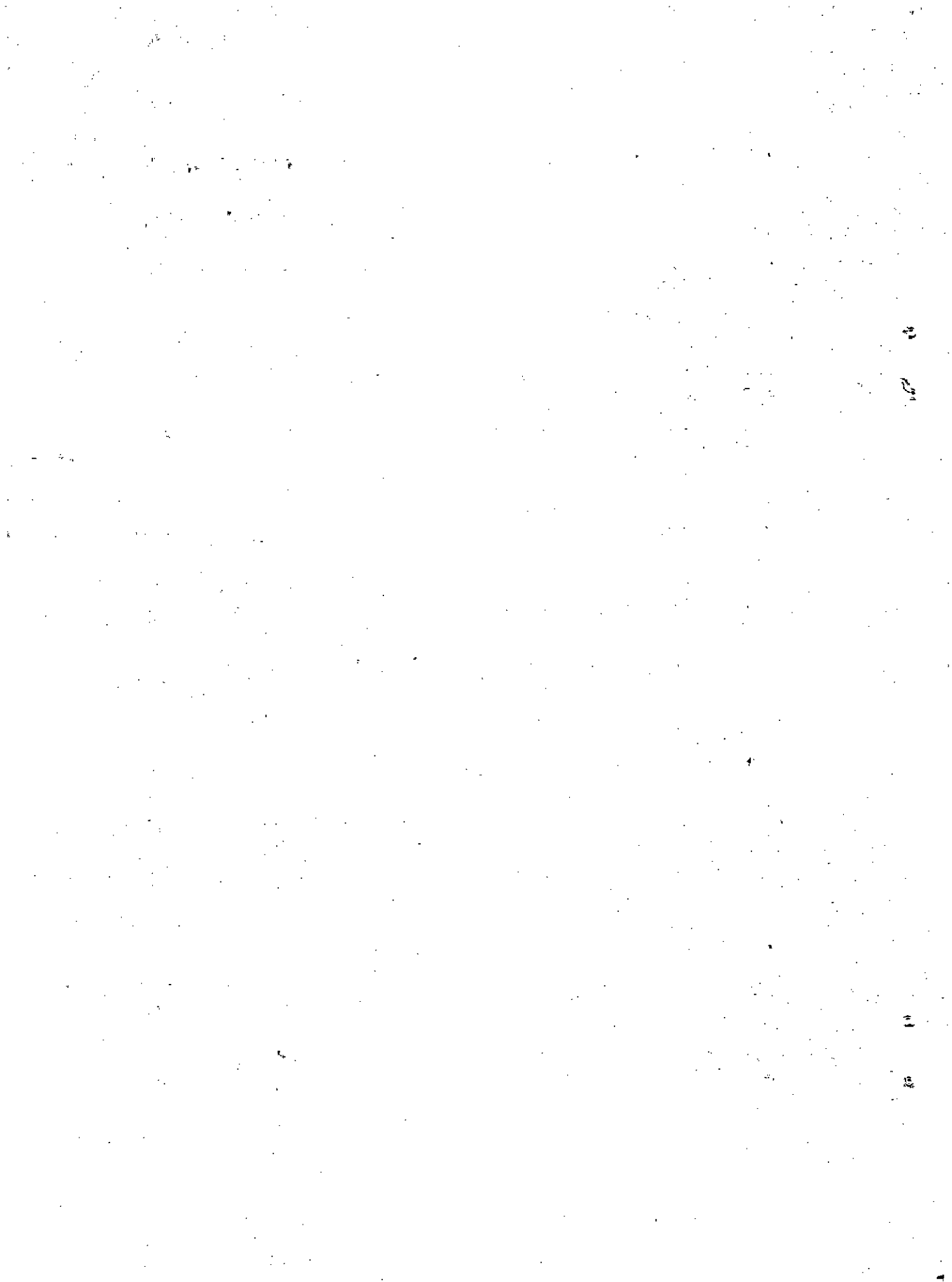
AGRICULTURAL MARKETING SYSTEM IN PAKISTAN

By

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1. Introduction

1.1 Agricultural marketing covers the services involved in moving farm products from the farm to the consumer. Several activities are involved in the process like planning, sowing, producing and harvesting, grading, packing, transport, storage, agro and food processing, distribution, advertising and sale. Such activities can not take place without the exchange of information and are often heavily dependent on the availability of suitable finance. Marketing has to be customer oriented and has to provide the farmer, transporter, trader, processor etc, with a profit. This requires those involved in marketing chains to understand buyer's requirements, both in terms of product and business conditions by using shorter channels with minimum marketing costs.

1.2 Agriculture is the major sector of our economy. It not only provides food security to the entire population but also supplements the foreign exchange resources through export of farm produce. It engages about 20% share to GDP. Despite that rural population constitutes about 60% of the total population yet it has no proper organization to represent their views and project interests.

1.3 Prime most interest of the farmer is to get a fair return of his produce in the market. At present the farmers who are spread all over the country make the sales of their surplus produce to the village shopkeepers. Some portion of the output is also sold direct to the market or through market agents. The farmers generally do not get a fair price of agricultural produce is one of the major problems of the farming community in Pakistan. For example the agricultural goods are generally perishable and cannot be stored for a longer period of time. There are great variations in the quality of produce. The farmer is therefore, generally handicapped and has to sell his produce at an unfavourable place on unfavourable terms.

42

2. Present Stage of Marketing

2.1   In Pakistan there are three systems of marketing the surplus agricultural produce:

2.1.1   Sale in Villages. Most of the farmers (especially small farmers) sell major share of the surplus produce to the traders and shopkeepers in their own village below the market price.

2.1.2   Sale in markets. The second method of selling the surplus produce is in the scattered markets near the villages.

2.1.3   Sale in mandis. Another method of selling agricultural produce is through mandis where commission agents and wholesalers buy the produce at competitive price.

2.2   However the crops which need milling before their ultimate use such as paddy etc. Their marketing channels are given in **Annex-I**. Indian channels of paddy marketing are not much different than that of Pakistan channels.

3. Problems in Marketing System

3.1   Major problems in marketing system of Pakistan are as under:

3.1.1   Low quality of produce. The production of agricultural goods is generally of low quality due to absence of grading, use of uncertified seed, low quality of pesticides/weedicides and deliberate adulteration etc. The agricultural produce like cotton, rice, do not enjoy good reputation in the foreign market due to lack of observance of SPS measures. As a result the cash returns to the producers are low. Our cotton is hand picked therefore it maintains quality at picking level but at the ginning stage mixing of trash deteriorate its quality which ultimately fetches less price in international market. The quality of rice is affected by presence of mixture of different varieties at various stages including its high broken percentage. It is grading which improves the quality of produce and adds value to the farm produce if strictly made.

3.1.2 Costly transport facilities. The transport system which consists of roads network, railways, air ports and shipping services is not only inadequate but also very costly for the transportation of bulky agricultural goods from one place to another. Marketing cost take a too high share of the final price. Lack of proper farm to market roads and inadequate transport facilities deprives farmer to get optimum price of the produce. Specially, vegetables reflect high transport cost. Being perishables their quality is also affected during transportation. The ideal transportation in Asia is referred as Jakarta in Indonesia where the farm to market roads are so developed that the farmers sell their produce the same day and go back. It is generally said that in Jakarta 20 million take lunch and 10 million take dinner.

3.1.3 Lack of market knowledge. The farmers mostly being illiterate do not have detailed market knowledge as to when, how and where the goods are to be sold. They therefore do not get a fair return of their produce. Marketing intelligence is the need of the time. It is the facility which helps farmer in getting better prices of his produce. Advance knowledge of the information which commodity is required in which market improves efficiency in supplies and prevents prices to fall at un-remunerative levels. Karachi agriculture commodity markets which also stimulates exports seems to be on modern lines as they direct supply of transportation of commodities when they fear price crash.

3.1.4 Chain of Middlemen/Commission Agents. There is a long chain of middlemen or marketing intermediaries who are engaged in handling of the farm produce from the grower onto the consumer. Each of these intermediaries take their own margin and tax the return of the grower. Different commodities has different marketing channels. Analysis of paddy returns to farmers from each channel incase of India is given in **Table-2**. Although middlemen are service providers but their unnecessary intervention mitigate farmers income.

3.1.5 Multiplicity of charges. There are a number of unjustified charges which the farmer has to pay in the market. These charges like commissions, payments to collie, masjid fund, flood fund etc. are a burden on the farmer/seller. The other charges like octroi duties and taxes are also paid by the farmer

44

while transporting goods to the market. There should be check and balance and farmer should not be unnecessarily charged with payment which are not related to marketing produce.

3.1.6 Lack of storage and warehousing facilities. There is no or inadequate storage facilities at the farm level or in the houses of the farmers to store the surplus produce. They therefore have to sell the produce immediately after the harvest and thus get low prices for their produce. The warehousing facilities in the markets are also insufficient and expensive. Village godowns may be established for the facilitation of farmers to protect him from distress sales

Table-1:   Average Paddy-Rice Marketing Costs and Margins Involved in Transactions in Sample Regulated Markets to Terminal Market (Agartala)

S. No.	Items	Regulated Markets of Agartala Average					Average
		Bishalgarh	Sonamura	Garjee	Nutan Bazar	Kulal	
1.	Processing charges (milling/boiling/cleaning etc.)	7.48	6.82	5.42	5.62	6.25	6.32
2.	Transport charges	1.72	2.04	1.87	3.12	2.50	2.25
3.	Loading, unloading and other labour charges	1.52	1.41	1.36	1.00	1.25	1.31
4.	Other marketing expenses (packing/commission/ tools/ stores etc.)	0.98	1.01	1.02	1.62	1.56	1.24
5.	Miller's or whole seller's margin	4.00	3.91	4.53	4.07	5.13	4.33
6.	Retailer's margin	3.75	3.75	3.75	3.75	3.75	3.75
7.	Cultivator's share	80.55	81.06	82.05	80.82	79.56	80.80
8.	Consumer's price	100	100	100	100	100	100
9.	Based on Number of Transactions	40.00	48.00	26.00	17.00	37.00	33.60

Source: Field Study.

*   Includes variety of paddy-rice and Jhum rice.

**   Includes holding cost and hence increased margins

***   During the period 1999-2000.

****   Consumer's price are taken at terminal market i.e. Agartala, consisting of seven municipal markets. Hence retailer's margin are same in all cases

3.1.7 **Weights and measures used by purchasers are not correct.** Under weightments of the farmers produce in the market deprives him from right payment. Cotton growers still complain that their produce in weighted in 40 kgs and payments are made on maund weight.

4. **Measures Taken by the Government of Pakistan for the Improvement of Agricultural Marketing.**

4.1 The Government of Pakistan has taken a number of measures for improving agricultural marketing in Pakistan.

4.1.1 **Farm to market roads.** The government of Pakistan is allocating huge amount of money each year in the annual budget for the construction of farm to market roads. The construction of roads not only reduces marketing costs but also makes it easy for the farmers to sell their surplus in the regularized markets. Different road network parameters available in Pakistan are mentioned. There are 7 km roads for 50 km area.

4.1.2 **Provision of information.** The Government is also providing through television, newspapers, radio information of current market prices of agricultural goods, crops prospects, factor influencing demand etc. The timely information provided by the Government helps the farmers in receiving fair return of their produce. Metrology Department also provides projected temperature and rain fall in agriculture region of the country to selected farmers through mobile phone network.

4.1.3 **Establishing standard and grades.** The Government through different medias and market organizations stresses on the farmers to maintain standards and grades of agricultural produce. The establishment of grades of their agricultural goods brings good returns on their investment, simulates export and helps the Government in earning foreign exchange. Grades provide value to the produce of the farmer. Properly graded produce fetches right price for the farmer.

4.1.4 **Regulation regarding weights.** The Government has set up marketing organization for implementing regulations regarding measuring weights, health and safety measures and checking unauthorized deductions by the purchasers.

4.1.5 Construction of warehouses and rural godowns. The government is also constructing warehouses and rural godowns through PASSCO. The construction of godowns makes it easy to store the goods and supply them when these are needed in the market. The storage facility helps in the stabilization of prices of agricultural goods.

4.1.6 Setting up market organizations. There are various agencies both at the Federal and Provincial levels which are entrusted with the grading of agricultural products, marketing research, survey etc. The Agriculture Policy Institute (API) consider a number of criteria including cost of production, domestic and world prices etc in recommending support/intervention prices. It also revises prices of important crops including wheat, cotton, sugarcane and rice paddy every year.

4.1.7 Establishment of PASSCO. The Government has also established Pakistan Agricultural Services and Storage Corporation (PASSCO) in 1973 PASSCO purchases wheat at the procurement price in the producing areas and releases the same to the flour mills at the sale prices fixed by the government i.e. issue price.

4.1.8 Regularized markets. There are a number of regularized markets mainly in the urban areas of the country. However, to safeguard the small growers the federal and provincial governments are presently encouraging the establishment of regularized markets in the rural areas too.

4.1.9 Future Challenges. Under the WTO regime, there is an urgent need to educate growers. They shall now have to concentrate on improving the quality of products by proper grading, standardization and storage. The Government both at the Federal and Provincial level shall have to develop efficient and strong marketing infrastructures for timely availability of the goods at the right place, at the right time, at the right price and in the suitable form needed in the domestic and international markets.

4.1.10 Recommendations

a. A number of new mandi towns should be constructed to provide an effective market outlet for agricultural produce within easy reach of all producers and to relieve the congestion in the old markets.

b. High priority should be given to construction of the farm to market roads

c. Private sector should be encouraged to construct and operate more storage facilities for agricultural produce especially for the perishables.

d. Functioning of the regulated produce markets should be improved especially to guarantee proper weighting of the produce.

e. Flow of market information through modern media should be improved.

f. More attention should be given to proper grading and packing of produce particularly when it is destined for export.

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Market channels of Paddy in India

Channels 1	Channels 2	Channels 3	Channels 4	Channels 5	Channels 6
Producer	Producer	Producer	Producer	Producer	Producer
Miller	Commission Agent	Wholesaler (Paddy)	Miller	Miller	Procuring Agency
Wholesaler	Miller	Miller	Retailer	Consumer	Miller
Retailer	Wholesaler	Wholesale (Rice)	Consumer		Distributing Agency
Consumer	Retailer	Retailer			Fair price
	Consumer	Consumer			Consumer
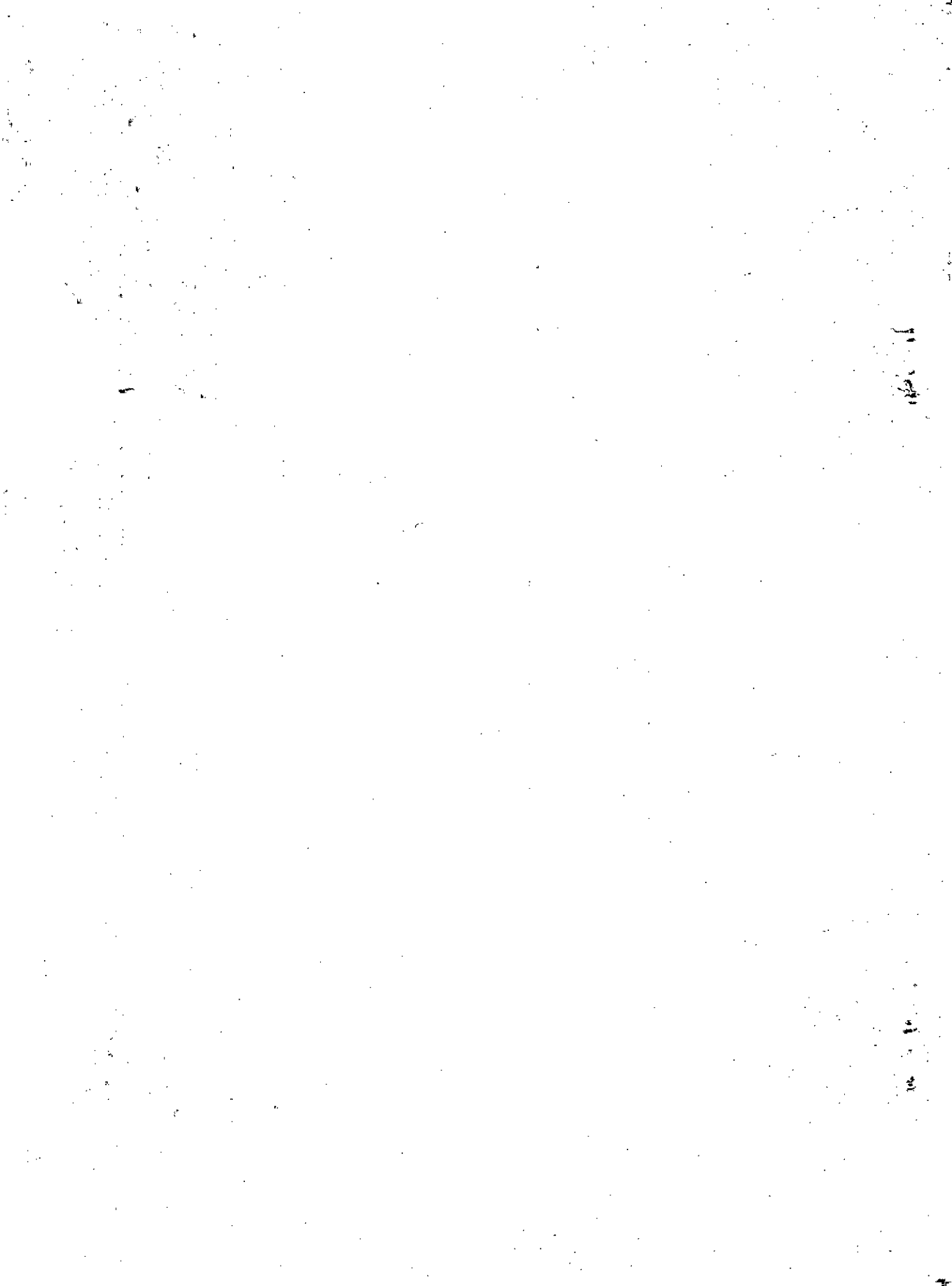
GENDER DIMENSIONS IN AGRICULTURE
ECONOMY OF PAKISTAN

By

Javeria Masood, NGO

1.   Introduction

1.1   Mankind originated from Adam and Eve. The history of agriculture dates back to existence of mankind on earth. The continuity and maintenance of life is dependent on agriculture. Agriculture provides food to human beings and feed to animals. Both man and woman play their due role for the sustenance of agriculture. Their nature of job is different and specific to maintain the supply chain in agriculture. Population is expanding at a faster pace and has crossed seven billion number. Agriculture is keeping pace with development in population. With the advent of new technologies the per hectare yield of crops has increased many fold. Actually overall growth in agriculture sector has outpaced the growth of population. This phenomenon has ensured food security and livelihood of mankind. The role of women in accelerating growth in agriculture is well recognized. Whether it is in cattle rearing, hen keeping, kitchen gardening, sowing of rice nurseries, cotton picking, grading of farm produce etc. Women are the second wheel of agricultural vehicle. Both the wheels work with optimum efficiency to keep the vehicle going. Modern agriculture is not confined to farm only. It is well integrated with market. Farmers produce for the market. It is the demand of the commodities which compels the farm sector to supply to the market according to the prevailing demand. Necessity is the mother of invention and women enterprises play their due role keeping pace with the changing scenarios in supply chain management.

1.2   Pakistan has the distinct advantage in cotton business as its cotton is hand picked. In the mechanized agriculture cotton is machine picked which is not clean and fetches less price. The credit of hand picked cotton goes to women as the entire lot of about 14 million bales produced all over the country is picked by them. Their specialization comes to fore as the cotton farmers from Balochistan province come to Punjab for contracting women pickers for the harvest of the cotton crop in the province. If special care is made at the ginning stage of cotton then our hand picked cotton can get premium price in the international market as the advantage gained at picking stage should not be lost at ginning stage. Another special task of women is in

chilli picking. Entire chilli crop of Sindh is picked by women. Kunri is the largest chilli market in Asia.

2. Gender Analysis

2.1 According to the Compendium of Gender Statistics in 2009 issued by Federal Bureau of Statistics total population of Pakistan as projected by NIPS for 2009 is 170.8 million. Females constitute 82.6 million or 48.3 percent of the total population. The sex ratio of population turns out to 107 percent. Meaning thereby that there are 107 males for every hundred females. The growth rate of population is estimated at 2.13 percent per annum. Sex specific growth rates indicate that females are growing @ 2.18 percent per annum and males are growing @ 2.13 percent per annum. Rural population as percent of total population stand at 61 percent. The working population aged 15-59 years is estimated at 57.5 percent of which 27.8 percent are females and 29.7 percent are males. Share of elderly persons aged 60 years and above are 5.9 percent out of which 2.8 percent are females and 3 percent are males. The overall dependency ratio (comprising population less than 15 years and 65 years and above) is 67.9 percent while the old age dependency ratio is 6.4 percent which is same for both sexes. According to Pakistan Demographic Survey the life expectancy at birth for female is 68 years and that of males is 63.35 years.

2.2 Pakistan Social and Living Standards Measurement Survey (PSLM) indicates that in Pakistan 9 percent house holds are headed by females. The rural-urban scenario at country level is that in rural area 9.1 percent house holds are headed by females and in urban areas it is 8.8 percent. In the Punjab female headship is 10.2 percent in both urban and rural areas. KPK has highest percentage of women headed house holds of 15.3 percent with 15.6 percent in rural areas and 15.3 percent in urban areas. The lowest percentage is recorded for Balochistan which 0.8 percent, urban house holds have 1.4 percent female heads and in rural Balochistan it is 0.6 percent only. In Sindh women headship is 4.2 percent. Urban headship of women exceeds in Sindh as compared to rural house hold headship which are 6.5 and 1.9 percent, respectively. **Table-1** provides labour force by gender in rural and urban areas of provinces.

Table-1: **Gender-wise Population in Labour Force (10 Years and Above)**

	Total	Male	Female
Punjab	**47.22**	**35.44**	**11.78**
Urban	40.81	34.8	6.01
Rural	50.46	35.76	14.7
Sindh	**45.81**	**28.13**	**7.69**
Urban	37.78	34.66	3.12
Rural	54.55	41.9	12.65
Khyber Pakhtunkhwa	**40.17**	**31.55**	**8.62**
Urban	36.49	31.37	5.11
Rural	40.95	31.59	9.36
Balochistan	**41.83**	**36.75**	**5.08**
Urban	36.13	32.81	3.32
Rural	43.75	38.07	5.68

Source: PSLM

2.3   Average household size in the country is 6.6 persons, in the urban areas it is 6.3 and rural areas it is 6.7. In the rural areas there are 3.4 females and in urban areas there are 3.1 females per household.

2.4   According to 1998 census literacy rate at country level is 43.9 percent, 54.8 percent for males and 32 percent for females. Literacy level captured by PSLM in 2007-08 is 56 percent, 69 percent for males and 44 percent for females. In the rural areas female literacy is 34 percent and in urban areas it is 63 percent.

2.5   Labour Force Survey 2007-08 indicates that total female labour force in Pakistan was 10.96 million out of which 10.03 million were employed. About 8.69 million were employed in rural areas and 1.34 million in urban areas. Female employment was the highest in agriculture, forestry, hunting and fishing which accounted for 75 percent. Other prominent sectors of the economy in case of female employment were manufacturing 11.8 percent, community social and personal services 10.6 percent and other 2.6 percent.

3.   Public Life

3.1   As far as women's role in public life is concerned total registered female voters in 2009 were 35.6 million out of total of 80.9 million voters.

3.2 In 2008 election female elected members in the National Assembly were 76 which contributed 22 percent of the total strength of 342 members. There were 17 female elected members in the Senate out of total strength of 100 in 2009.

3.3 Female elected members in the Provincial Assembly of Punjab in 2008 were 76 out of total strength of 371 members. In Balochistan, KPK and Sindh female elected members were 12, 22 and 29 in the total strength of 65, 124 and 168 members.

3.4 In the federal cabinet there are 2 female ministers. In all the four provincial Assemblies there are eight women ministers, six in Balochistan and one each in Punjab and KPK.

4. Participation of Women in Voluntary Associations / Groups

4.1 A number of NGOs and associations have been constituted and operated by women as a highly visible and vocal part of our civil society. Their main focus is advocacy of women rights, and representation. A lot are also engaged in substantive activities in the pursuits of women uplift. Some others are running crises centres and performing distress management. The prominent among them are given in Annex-I.

5. Gender Dimension

5.1 Urban

5.1.1 According to various estimates over 20 million women working in Pakistan are engaged in Home Based Work (HBW) in value addition sector like garments, bangle making, shoe stitching, embroidery, carpet weaving, dry fruit peeling, jewellery leather products stitching of mobile phone covers, prawn shelling.

5.1.2 Their working hours are 12 to 16 and they receive Rs 10 to Rs 50 in return. Prepared through efforts of some NGOs working with. HBW's the first draft of national policy on HBW's recognizes them as special category of workers, which includes every one working with the confines of home or any other premises of his or her choice but excluding the premises of the employees or contractors work place.

5.1.3 Political empowerment of women is possible if they are economically in dependent. Benazir Income Support Program and land entitlements in the name of women flood victims in Sindh are the government interventions in

this direction. The amount and land holding might be very small but crucial for sailing women headed house hold at times of sever economic crises.

6.   Agriculture Analysis

6.1   According to the agricultural statistics of Pakistan 2010-11, Pakistan has geographical area of 79.61 million hectare. Total reported area is about 57 million hectares out of which forest area is 4.21 million hectare, area not available for cultivation is 23.47 million hectares, cultureable waste is 8.1 million hectares and cultivated area is 21.28 million hectares. Out of which net area sown is 16.25 million hectares and 5.02 million hectare is current fallow. Area sown more than once is 7.42 million hectares. Total cropped area is estimated at 23.67 million hectares.

6.2   Area under food crops is 13.88 million hectares, cash crops 4.05 million hectares, pulses 1.47 million hectares, oilseeds 0.75million hectares, vegetables 0.4 million hectares, condiments 0.22 million hectares, fruits 0.86 million hectares and other crops 2.17 million hectares. Cropped area share in these crops is 58, 17, 6, 3, 2, 1, 4 and 9 per cent, respectively.

6.3   Major food crops are wheat, rice, jowar, maiz, bajra and barley. Cash crops include sugarcane, cotton, tobacco, sugar beet, jute and guarseed. Pulses account for gram, mung, mash, masoor, mattor and other kharif and rabi pulses. Oilseeds consists of rapeseed and mustard, seasamum, groundnut, linseed, castro seed. Sunflower, safflower and soyabean. Condiments constitute chillies, onion, garlic, coriander, turmeric and ginger. Vegetables are inclusive of potato, tomato and others. Fruits have citrus, mangoes, apples and others. All other crops not categorized above are included in others.

6.4   Among the total food grain production of 34 million tones, wheat, rice, bajra, jowar, maize and barley production is 25, 5, 0.3, 0.1, 3.3 and 0.1million tones respectively. Gram production is leading with 0.5 million tones in pulses. In cash crops sugarcane production is 55.3 million tones, cotton 14 million bales and tobacco 138 thousand tones. Sunflower is the leading oilseed with 4.20 thousand tones. Rapeseed and Mustard 168 thousand tones and sesamum 31 thousand tones. Potato is leading in vegetables with 3 million tones. Onion production is about 2 million tones in condiments. Citrus and mango have share of 2 million tones each in fruit production. Fodders share 54 million tones in other category.

7. Agriculture

7.1 Women's role in agriculture of the country is wide spread extending over to field crops, horticulture, floriculture etc.

Wheat

7.2 Wheat crop is sown around 9 million hectares through out the country. Women take part in different wheat growing operation including weeding. Wheat harvesting is the single largest operation in the country in which women take part side by side with men as far as manual harvesting is concerned.

Cotton

7.3 Cotton is the second largest crop of the country grown on about 3 million hectares women take part in sowing and weeding operation. Entire operation of cotton picking is done by women. Services of women pickers are obtained on contract basis by farm enterprises.

Rice

7.4 Rice is the third largest crop of the country planted a little less than 3 million hectares. The transplanting of rice nurseries is dominated by women. In the process of weeding and harvesting rice crop their role is well recognized.

Chilli

7.5 Chillies are generally grown is Sindh Kunri market is the largest chilli market in Asia, the picking of the chilli crop is also dominated by women.

Potato and Onion

7.6 Women and children play an important role in grading of the farm produce and bagging them for onward marketing.

Fruits

7.7 Grading and packing fruits for marketing to various destinations is performed by women folk.

8.   Conclusions

1.   Women constitute 48.3 percent in the population of Pakistan

2.   The working population of women (aged 5-59 years) is 27.8 percent in the total countries working population of 57.5 percent.

3.   Pakistan Demographic Survey estimates the life expectancy of women at birth is 68 years.

4.   9 percent households are headed by women

5.   According to PSLM female literacy rates is 44 percent in the country level literacy rate of 56 percent.

6.   Total female labour force in the country is 10.96 million out of which 10.03 million are employed.

7.   Rural employment of women stands at 8.69 million

8.   Women employment in agriculture sector stretches over sowing, weeding, harvesting, grading, sorting and marketing of crops.

9.   Recommendations

1.   In the agriculture sector women are under paid and payments should be at par with menfolk

2.   Women should be provided special care in case of picking cotton crop as the number of sprays made in the cotton crops may be harmful by pickers. They may be provided gloves and soap for washing hands so that the remains of pesticides may not affect them.

3.   Women may be provided their due shares in properties and agriculture holdings so that their rights are well established.

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2. *Agricultural Statistics of Pakistan 2009-10 Ministry of Food and Agriculture and Livestock, Islamabad.*

3. *Pakistan Economic Survey 2010-11, Government of Pakistan, Finance Division, Economic Wing, Islamabad.*

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5. *Policy Analysis Reports of Seed Cotton, API, Islamabad.*

6. *Policy Analysis Reports of Rice (Paddy), API, Islamabad.*

7. *Policy Analysis Reports of Sugarcane, API, Islamabad.*

8. *Reports of Kitchen Crop Project on Potatoes and Onions, API, Islamabad.*

9. *Gender Main Streaming in Agriculture can Ensure Food Security in Pakistan, Sohail Muhammad Khan and Javeria Masood, PJAE Vol.10.*

Participation of Women in Voluntary Associations / Groups

- Aik Hunar Aik Nagar (AHAN)
- Al-Ehsan Welfare Society (AEWS)
- All Pakistan Women Association (APWA).
- Anjuman Behboodi-e-Marizan (ABM)
- Association of Network for Community Empowerment (ANCE)
- Aurat Publication & Information Service Foundation.
- Awarness on Human Right, Social development and Action Society (AHSAS)
- Balochistan Environmental & Educational Journey (BEEJ)
- Children Health Improvement & Literacy Development (CHILD)
- Cooperation for Advancement Rehabilitation and Education (CARE)
- Development Action for Mobilization and Emancipation (DAMEN)
- Development Association of Youth (DAY)
- Family Planning Association of Pakistan.
- Gwadar Educational Welfare Society (GEWS)
- Idara-e-Taleem-o-Aagahi (ITA)
- Lahore University of Management Sciences (LUMS)
- Maternity & Child Welfare Association of Pakistan.
- National Management Foundation (NMF)
- Organization for Human Resource Development (OHRD)
- Pakistan Dairy Development Company (PDDC
- Pakistan Hemophilia Patients Welfare Society (PHPWS)
- Pakistan Labour Liberation Front (BLLP) etc.
- Participatory Integrated Development Society (PIDS)
- Patients Welfare Association (PWA)
- Punjab Industrial Estate Development and Management Company (PIE)
- Punjab Rural Support Programme (PRSP)
- Rabia Khuzdari Educational & Social Society (RESS)
- Sanjan Nagar Public Education Trust (SNPET)

- Social Mobilization, Advocacy, Research and Training (SMART)
- Society for Community Support for Primary Education in Balochistan (SCSPEB)
- Society for Empowerment Human Resources (SEHER)
- Society for Human Advancement and Disadvantaged Empowerment (SHADE)
- Society for Rehabilitation, Education and Community Health (REACH)
- Taraqee Foundation (TF)
- Waqf-e-Kuli Khan Society (WKK)
- Water, Environment and Sanitation Society (WESS)
- Women's Action Forum. Mother Trust.

ESTABLISHING AGRICULTURE POLICY INSTITUTE

By

Abdul Rauf Chaudhry, Chief, APD

1. Introduction

1.1 In order to tackle the pricing policy issues relating to Agriculture Commodities, the Government of Pakistan established Agricultural Prices Commission (APCom) in 1981 with the following mandate:

> Advise on price policy of wheat, rice, cotton, gram, sugarcane, oilseeds, potatoes, onions and such other commodities specified by the Government from time to time.

> Advise on non-price measures to improve agricultural productivity & remove deficiencies and inefficiencies of marketing, processing, storage etc.

> Advise on any problem relating to agricultural production and price.

1.2 On the evolving of WTO Regime and Regional Trade Agreements in place, the country needed to know/monitor the development of tradable commodities both domestically and internationally and suggest steps to position Pakistani agriculture in the emerging environment. To advise the Government on formulating agriculture policy and to make Pakistani agriculture profitable, competitive and sustainable, the Government of Pakistan extended/upgraded its role in Agriculture Sector and reconstituted the APCom as Agriculture Policy Institute (API) in August, 2006.

2. Mandate of Agriculture Policy Institute (API)

> Analyze emerging policy issues and its impact (input/output costs, farm credit, taxes, subsidies, monopolies and cartels, etc).

> Suggest measures for sectoral improvement under the prevailing scenario and recommend future strategies for enhancing production and productivity to make agriculture profitable, competitive, and sustainable.

61

➢ Study the terms of trade for agriculture vis-à-vis other sectors of the economy.

➢ Undertake farm economic analysis with a view to determining rational utilization of land, water and other farm resources.

➢ Publish Pakistan Journal of Agricultural Economics (PJAE).

➢ WTO related matters and all other issues impacting on the trade of farm outputs and inputs.

➢ Bilateral, regional and multilateral agricultural trade issues.

➢ Analysis of supply and demand of agriculture commodities and of value chain.

➢ Study the terms of trade of agriculture viz-a-viz other sectors of economy as well as foreign trade.

➢ Assess the comparative advantage and competitiveness of agricultural commodities in the world markets.

➢ Share information with stakeholders on need basis.

➢ Analyze micro economic issues relating to the crop and livestock production, processing and consumption.

➢ Examine the economics of different crops production and protection technologies.

➢ Identify barriers in attaining higher productivity in different farm enterprises and suggest remedial measures.

➢ Conduct studies on post-harvest crop losses, marketing margins, incidentals and product recovery.

➢ Create technical capacity to start trainings in IT field in the Institute.

➢ An IT Section would be created.

3.   Achievements

3.1   Regular Assignments

3.1.1   As per its terms of reference, API started work and completed numerous tasks since 2006 to date. Some major assignments are detailed below:

- o   Prepared Annual Policy Analysis Reports on Cotton, Sugarcane, Rice and Wheat crops;

- o   Conducted annual input-output field surveys in main producing areas of Cotton, Sugarcane, Rice, Wheat and Tobacco Crops;

- o   As a Consultative Mechanism, annual meetings of Standing Committee of all stakeholders before the formulation of price policy for Wheat, Cotton, Rice and Sugarcane Crops were conducted at the API premises;

- o   Comments on Revised WTO Drafts on Agriculture Modalities and Trade Policy of Pakistan-2008;

- o   Competitiveness of Agriculture Commodities viz wheat, rice, cotton, sugarcane, dates, ethanol and onions for workshop on WTO and MINFA Strategy for Commodity Development;

- o   A comprehensive presentation on the proposals for Food Assistance programme for targeted population to the Advisory Committee of Planning Commission;

- o   Prepared a brief paper on Trade and Climate Change and its impact on Agriculture and related issues;

- o   Updated the report of Food Supplies Committee of Defence Planning: 2010 and 2011;

- o   Analysis of Indian Subsidies in Agriculture Sector on Fertilizer, Electric power, Irrigation water and Food subsidy;

- o   Permanent Member in the Price and Grades Revision Committee of the Pakistan Tobacco Board, Peshawar;

o   A Member in the Special Committee on cost of production of Tobacco, Pakistan Tobacco Board, Peshawar;

o   Attended various sessions of the Senate and National Assembly for coverage of agriculture related items;

o   Prepared replies to National Assembly/Senate Questions regarding food crisis, energy crisis, hike in input prices and emerging policy issues;

o   Analysis of various issues relating to agriculture and bilateral agreements, Supply Chain, WTO and Trade related issues;

3.2   Publications/Research Work

o   Pakistan Journal of Agriculture Economics Vol. 6 2008, Agriculture Policy Institute, Islamabad;

o   Pakistan Journal of Agricultural Economics, Vol. 7, May 2011, Agriculture Policy Institute, Islamabad;

o   Pakistan Journal of Agricultural Economics, Vol. 8, October 2011, Agriculture Policy Institute, Islamabad;

o   Pakistan Journal of Agricultural Economics, Vol.9, January 2012, Agriculture Policy Institute, Islamabad;

o   Compendium of Crop Surveys and Meetings of the Stakeholders August 2011;

o   Drafted Agriculture Policy of Pakistan for the MINFA, 2009, Agriculture Policy Institute, Islamabad;

o   Internship programme for BS students from the University of Agriculture Faisalabad and University of Arid Agriculture, Rawalpindi;

o   Country Report on current situation of Karez Irrigation system in Pakistan;

o   Country Report on World Food Summit-Plan of Action for FAO Rome, 2008;

o   Economics of Wheat Flour Production by Flour mills in the Punjab and Sindh, 2009;

3.3   Special Assignments

o   Assistance to the MinFA/Ministry of NFS&R in analysis of emerging policy issues like Food Security, Food, Energy and Sugar Crisis in the Country;

o   Analysis for Purchase of wheat as Federal Strategic Reserve and current wheat situation;

o   Financial Implications of wheat procurement by the government and ways of its disposal;

o   Monitoring and evaluation of rice paddy procurement by PASSCO;

o   Economic viability of various options for disposal of surplus wheat in government stocks;

o   Analysis of Crop Damage Estimate by Flood 2010;

o   Preparation of summary on Assistance for Rabi Crops in the Flood Affected Areas for ECC of the Cabinet;

o   Presentation on Policy Analysis for Wheat, Rice, sugarcane and Cotton to the MINFA, Task Force on Agriculture, ECC, Cabinet Committee on Agriculture and Cabinet;

o   Drafted summary for the ECC of the Cabinet on availability and pricing position of pulses in the country;

o   Drafted summary for the ECC of the Cabinet on strategy for regular supply and rational support price policy for major and minor crops;

- o   Prepared draft material for the 10th five year Plan Target 2011-15 for the crop sector;

- o   Prepared technical input and comments on various studies/papers/letters etc.;

- o   Brief for the Secretary MINFA on Pakistan Economic Growth Strategy;

- o   Brief for the Secretary on European Union Food Facility Project to improve Food Security for Food Insecure and vulnerable Groups;

- o   Comments on various papers on MFN strategy, SAFTA, Sensitive List referred from the Ministry of Commerce, Islamabad;

- o   Presentation on Methodology of Agriculture Credit Requirements to the Committee comprising of the State Bank of Pakistan, MINFA, Planning Commission and Provinces;

- o   Worked as Member in the Sub-committee of Task Force on Food Security;

- o   Worked as Member of Committee on payment of sugarcane on the basis of sucrose recovery and installation of core sampler at sugarmills;

- o   Devised Methodology of Linking Support Price of Cane to its Sucrose Contents;

- o   A Brief on the study entitled "Technology-based Industrial Vision and Strategy for Socio-economic Development of Pakistan - A Joint Report of PIDE and HEC";

- o   Worked as Focal Point in behalf of MINFA on affects of climate change in Agriculture Sector in the Committee formulated by Ministry of Environment;

- o   Worked as member of Committee of FBS for Changing the base of National Accounts of Pakistan.

- o   Worked as Member of DDWP for examining the agriculture sector projects under Aaghaz-e-Haqooq Balochistan

- o   Working as Member of the Price Monitoring Committee of Finance Division

- o   Member of the Committee of the Ministry of Commerce in setting modalities of agriculture trade with India

- o   Prepared report on supply and demand of agriculture commodities.

4.   **List of Articles Published in Pakistan Journal of Agricultural Economics during 2011-12**

- Key Challenges Facing Pakistan Agriculture: How Best the Policy Makers Respond?

- Pricing Mechanism for Agricultural Commodities

- Prospects and Potential of Textile Industry in Pakistan

- Potential Uses of Cotton Gin Waste

- Impact of Imposition of Reformed General Sales Tax (RGST) on Cost of Production and Production of Crops: An Analysis

- Gur Production in Pakistan: An Analysis

- Economic Efficiency of Resource Use in Rice Production in Pakistan

- Farmers' Gains from Major Crops - An Analysis of Nominal and Real Prices of Wheat, Seed Cotton, Rice Paddy and Sugarcane

- Tobacco Farming in Pakistan

- Agricultural Development and Food Security

- Impact of Informal Economy with Specific Reference to Agriculture Policy Issues

- Impact of Agriculture Policies on Yield of Crops: Pak Punjab Vs Indian Punjab

- The Developmental Impact of Agricultural Subsidies?

- Transportation Cost Model

- Sugar Beet Cultivation in Khyber Pakhtunkhwa

- Comparative Economic Efficiency in Production of Major Crops in Pakistan

- Pakistan: Application of Remote Sensing and GIS Technology for Crop Area Estimation and Yield Forecasting

- Resource Mobilization through Agriculture Income Tax

- Gender Mainstreaming in Agriculture can Ensure Food Security in Pakistan?

- Agriculture Credit Review

- Tobacco Situation in Khyber Pakhtunkhwa

- Agricultural Pricing Policies and Input Subsidies in Pakistan: Some Historical Evidence