COMPARATIVE ADVANTAGE AND COMPETITIVENESS OF PEA CROP IN KHYBER PAKHTUNKHWA

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ABSTRACT

This study was conducted to analyze the comparative advantage and competitiveness of pea crop and its implications for resource allocation amongst the winter vegetable crops in Malakand valley. Policy distortion and agricultural protection was also determined by the study. The data was collected from respondents on cost of production and revenue generated of pea crop over the year 2008-09. Two important districts contributing towards pea production (Swat and Malakand) were selected as the sample area. The crop budgets were prepared initially in financial terms and economic prices were utilized to evaluate the comparative advantage and competitiveness of the potato crop. The Policy Analysis Matrix (PAM) was employed as the analytical framework. The policy distortions were measured through Nominal Protection Coefficient (NPC) and Effective Protection Coefficient (EPC). The comparative advantage was measured through Domestic Resource Cost ratio (DRC). Keeping in view the importance of pea in the food diet and rural economy, the analysis was conducted in import and export parity prices. The analysis results showed that at import parity price, Khyber Pakhtunkhwa has a comparative advantage in the production of pea only as an import substitution crop. At export parity price, Khyber Pakhtunkhwa is not competitive in the world pea market and has no comparative advantage in pea production. Furthermore, the analysis further confirmed the position of the crop as the second most efficient winter vegetable crop studied in Khyber Pakhtunkhwa province.

Keywords: PAM (Policy Analysis Matrix), DRC (Domestic Resource Cost) and NPC (Nominal Protection Coefficient).

Citation: Mulk. U. Sardar and Munir Khan. 2013. Comparative advantage and competitiveness of pea crop in Khyber Pakhtunkhwa. Sarhad J. Agric. 29(2): 299-306

INTRODUCTION

The pea crop is one of the major economic opportunities with an estimated global export market worth 1645985 (000 US$) in year, 2008-09. Pakistan has a local competitive edge in cultivating pea crop and was ranked eleven in the world valuing production worth Rs. 27548 (thousand $) in year, 2008-09 (FAO, 2008). The pea crop contributed a sum of Rs. 603 (million) in year, 1994-95 and Rs. 864 (million) in year, 2008-09 towards the gross value addition (at current factor cost) of minor crops in Pakistan. During the year, 2007-08, 757187 (kgs.) of fresh or chilled peas valuing Rs. 34155 were exported from Pakistan. The quantity of exports, however, increased to 771376 (kgs.) worth Rs. 29095 during the year, 2008-09 (GOP, 2008-09). However, Pakistan also imported fresh or chilled peas to the tune of 120237 (kgs.) worth Rs. 6018 during 2007-08 and 7063 (kgs.) valuing Rs. 1956 during 2008-09, respectively. Export figures demonstrate the export potential of pea crop for Pakistan. Import figures, however, demonstrate that the demand for vegetable crop has been on the increase in Pakistan. Similarly, pea gives higher nutritive yields and higher economic returns per unit area when compared to other food crops. (Joshi, 2004). This situation requires immediate attention of the policy makers towards filling the gap between the demand for the vegetable crop and it’s availability at affordable prices for the Pakistani consumers at sustainable level so as to exploit the scenario through exports. (GOP, 2008-09). The pea crop, being short duration crop can be grown even in small spaces and house gardens. With improved vegetable production of pea crop, the lower vegetable prices will allow the urbanites and the rural poor alike to have an easy access to Pakistani vegetables. Many varieties of pea crop are being grown on large scale in Pakistan and admired for their freshness, taste and nutritious value. Peas in fresh or chilled form weighing 757187 (kgs.) valuing Rs. 34155 was also exported abroad and valuable foreign exchange was earned by Pakistan. (FBS, 2008-09). The country, however, faces certain problems in exporting the vegetable produce due to its availability at affordable prices for the consumers at sustainable level so as to exploit the scenario through exports. (GOP, 2008-09). The pea crop, being short duration crop can be grown even in small spaces and house gardens. With improved vegetable production of pea crop, the lower vegetable prices will allow the urbanites and the rural poor alike to have an easy access to Pakistani vegetables. Many varieties of pea crop are being grown on large scale in Pakistan and admired for their freshness, taste and nutritious value. Peas in fresh or chilled form weighing 757187 (kgs.) valuing Rs. 34155 was also exported abroad and valuable foreign exchange was earned by Pakistan. (FBS, 2008-09). The country, however, faces certain problems in exporting the vegetable produce due to its availability at affordable prices for the consumers at sustainable level so as to exploit the scenario through exports. (GOP, 2008-09).

Pakistan pea (rabi) ranked 5th (area-wise) and 6th (production level-wise) during the years, 2004-05 to 2008-09 amongst the types of vegetables grown in Pakistan. However, Khyber Pakhtunkhwa with its most suited agro-ecological conditions for growth and development of vegetable crops in general and pea crop in particular along with the other selected crops under study, ranked pea crop at third place (area-wise) and sixth position (production-wise) amongst the Rabi vegetable crops during the same period. The persistent increase in area and production levels suggests important outcomes for policy makers towards filling the gap in not only meeting the desired dietary requirements; but, also improving the status of export level for consolidating the position of agriculture in Pakistan in general and Khyber Pakhtunkhwa in particular. It will have far reaching consequences.
in providing this important vegetable crop at a lower price affordable to consumers for domestic consumption and further, through value added could exploit international markets in favour of the country to a great extent. The data also figures that, fresh or chilled peas were also exported from Pakistan. In Khyber Pakhtunkhwa, the distribution of cultivated area for Rabi Pea crop was reported at 1811 (thousand ha), during the year, 2009-10. During the same year, the total Production quantity of pea crop in Khyber Pakhtunkhwa was reported at 14832 (thousand tonnes). The official data demonstrate that in Khyber Pakhtunkhwa, district Swat occupied the largest area at 1302 (ha) followed by district Swabi with 131 (ha), chitral with 54 (ha), Mardan with 39 (ha) and Malakand with 22 (hectares) (Govt. Pakhtunkhwa, 2009-10).

In the past 20 years, vegetable production in Khyber Pakhtunkhwa has recorded increase in the production of pea by 29 percent per hectare. Extension in area under the vegetable crop indicates the trend towards increased demand of the vegetable crop and hence a need for the availability of more and different varieties of pea crop. This increase, however, has been much less than the daily requirements for maintaining human health. This necessitates that pea crop production in the province must be improved rapidly in terms of variety and better yield to meet consumer's demand (Hussain, 2003).

Pakistan and Khyber Pakhtunkhwa has not declared horticulture as industry. The govts have neither shown priority nor tackled it’s ruptured traditional mechanism of production and trade. Resultantly, the sector has been kept in lurch with consequences of low production, low per capita consumption and low trade. Low outlays have been allocated to infrastructure development, which otherwise, requires large investment by the Govt. The private sector’s role has also been limited over the years in financing it to improve the existing outdated packing and grading systems. Export market of fresh pea produce depends upon quality produce and persistent supply. Quality standards and enforcements have not been maintained, throughout. At the local level, farm gate premium facility is required to be introduced to the farmers. Labeling needs to be subsidized in the short run. There has been limited pea production in Pakistan and Khyber Pakhtunkhwa as compared to global level.

Resultantly, the production has been lowered to local consumption mostly. Through public and private intervention in the pea crop production system, we can help improve the production levels in Pakistan and Khyber Pakhtunkhwa on sustainable basis. The development of fresh pea produce for export purposes will require an interaction amongst the stakeholders jointly. Research and development funds are also required to be allocated by the govt. for applied projects through concerned bodies especially, in establishing cold-chain amenities. The study of comparative advantage of the selected pea vegetable crop is of great importance for Khyber Pakhtunkhwa in particular to know the current and future potential of this vital vegetable crop in international trade under the present set of policies with the existing pattern of competitiveness.

Objectives of the Study

1. Determine the overall comparative advantage (national profitability) and competitiveness (private profitability) of pea vegetable crop in Malakand valley (Swat and Malakand districts) of Khyber Pakhtunkhwa province.

2. Compare the competitiveness with comparative advantage to gauge policy incentive effects for either favoring or in opposition to the selected pea vegetable crop Production in Khyber Pakhtunkhwa.

3. Determine whether Khyber Pakhtunkhwa qualify for export of the selected pea vegetable crop and or should produce the pea vegetable crop as import-substituting strategy to ensure food security

4. Draw policy implications of the research findings for long term investment incentives and research resources are directed to strengthen that pattern of comparative advantage in the global/regional agricultural context to attain influential position in agricultural/vegetable production and trade under the prevailing terms of trade.

MATERIAL AND METHODS

Sampling Technique and Sample Size

This study consists of two main districts, Swat and Malakand in Khyber Pakhtunkhwa. The data was collected from the historically known high pea vegetable producing valleys in the selected districts of Swat and Malakand. The known true potential yield of the selected pea vegetable crop in the selected areas has also been verified by the published governmental as well as private sources as depicted in the enclosed appendices (Appendix-D). From each district, 25 respondents were interviewed at random for pea crop enterprise. Keeping in view the nature of the study, purposive sampling technique (Cochran, 1977) was employed in selecting fifty farmers arbitrarily in the two selected districts (twenty five each) of Malakand valley. Similar studies have been conducted in similar conditions to get precise information for these types of studies. The number of sampled farmers selected arbitrarily from each village for the study area is given as under:
Table 1. Village-wise distribution of sample farmers in the study area.

<table>
<thead>
<tr>
<th>Crop</th>
<th>Village</th>
<th>Tehsil</th>
<th>District</th>
<th>No. of Farmers</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pea</td>
<td>Matkani</td>
<td>Bakhela</td>
<td>Malakand</td>
<td>180</td>
<td>25</td>
</tr>
<tr>
<td>-do-</td>
<td>Nigigram</td>
<td>Barikot</td>
<td>Swat</td>
<td>250</td>
<td>25</td>
</tr>
<tr>
<td>Total</td>
<td>-2-</td>
<td>-2-</td>
<td>-2-</td>
<td>430</td>
<td>50</td>
</tr>
</tbody>
</table>

Source: Survey Data, 2008-09

DATA ANALYSIS FRAMEWORK

The Policy Analysis Approach:

Best allocation of domestic resources is where an open trade and competitive environment exists. The PAM table consisted three columns by five rows with accounting values required (A to L) to calculate ratios necessary for investigating the comparative advantage (Table 4.).

Table 2. The Structure of Policy Analysis Matrix (PAM).

<table>
<thead>
<tr>
<th>Budget Items</th>
<th>Private Budget at Market Prices</th>
<th>National Budget at National Opportunity Costs</th>
<th>Effects of policy transfer (Divergences)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>A</td>
<td>F</td>
<td>K</td>
</tr>
<tr>
<td>Labor Costs</td>
<td>B</td>
<td>G</td>
<td>L</td>
</tr>
<tr>
<td>Capital Costs</td>
<td>C</td>
<td>H</td>
<td>M</td>
</tr>
<tr>
<td>Tradable Input Costs</td>
<td>D</td>
<td>I</td>
<td>N</td>
</tr>
<tr>
<td>Profits</td>
<td>E</td>
<td>J</td>
<td>O</td>
</tr>
</tbody>
</table>


Net Profitability, E= A-(B+C+D)
Net Social Profitability, J= F-(G+H+I)
Output Transfers, K = (A-F).
Labor Market Distortions, L = (B-G).
Capital Market Distortions, M = (C-H).
Other Inputs Transfers, N= (D-I).
Total Policy Effects O= (E-J) = (K-L-M-N) = (NPP-NSP) = PSE Total

Through the inside elements, the PAM encompassed all the data calculated the ratios: Domestic Resource Cost Ratio (DRC), Social Benefit Cost Ratio (SBC), Nominal Protection Coefficient (NPC), Effective Protection Coefficient (EPC), Producer Subsidy Equivalent (PSE) and Subsidy Ratio to Producers for the selected vegetable crops as per the following formulae:

Domestic Resource Costs ratio (DRC) = (G + H) / (F-I)
Social Benefit-Cost Ratio (SBC) = F / (G+ H +I).
Nominal Protection Coefficient (NPC) = A / F.
Effective Protection Coefficient (EPC) = (A – D)/ (F-I).
Producer Subsidy Equivalent (PSE) = O / A.
Subsidy Ratio to Producer (SRP) = O / F

Private Profitability is calculated (entered in column-2) by the divergence between practical revenue (A) and costs (B+C+D) cherished at market prices and represent competitiveness of agricultural production at present technologies, prices for inputs and outputs under policy transfers.

Social Profitability (J) valued at social opportunity costs, determines efficiency or comparative advantage of the agricultural systems (entered in column third of table 4). A positive value depict that the system uses scarce resources efficiently and contributes to national income. Four productive systems were measured for comparative advantage. The Policy Analysis Matrix (PAM) model was employed to investigate pea crop in two districts namely Swat and Malakand for determining self-sufficiency or export values during 2008-2009 from the primary data. Transfers represents public subdivides, either favorable or disenchant. Policy effects/divergences, the difference between the second and third column. Efficient policies rectify the divergence.

Indicators of Comparative Advantages

Include ratios measuring levels of comparative advantage and economic efficiency duly indicated next.

Ratio of Profitability and Economic Efficiency

It is the value of local factors at market price [FBC=C/ (A-B)] with more than one figure showing non-profitability of the system. The Domestic Cost Resources ratio is computed at social prices. It measures the level of comparative advantages achieved by the selected systems [DRC=G/(E-F)] with more than one value, there
exists no comparative advantages. Value less than one has got comparative advantage and economic efficiency. It is computed at social prices and explained as the DRC. (Master, 2003).

**Ratio of Price Distortions and Transfers**

The Nominal Protection Coefficient (NPC) measures the intensity of intervention for the tradable output by the ratio of the revenue at private price above the revenue at social price (NPC= A/E). Above one value represents that main output system is receiving advantage from a safeguard. Below one NPC value hints at undervalued output at private price.

The Effective Protection Coefficient ratio (EPC): The added value at private price is compared to added value at social price [EPC= (A-B) / (E-F)]. It gives a mutual indicator of the level of trade buckle on tradable inputs and outputs. It accurately measures the NPC value. EPC with greater than one value protected while an EPC below one means that it is explicitly or implicitly taxed.

The Equivalent Producer Subsidy (EPS) is ratio of the total net transfer (L) above revenue at private price [EPS= L/A]. It indicates the share of income gained (or lost) for the system due to distortions induced by the current policy or market distortions (Master, 2003).

The Subsidy Ratio to Producer (SRP) compares net transfer to the revenue at social price (L/E) and measures the magnitude of the transfer induced between the selected systems and the rest of the economy (Lancon, 2005).

The primary data of fifty farmers was analyzed on PAM model using CIF and FOB parity prices for pea crop in Swat and Malakand districts.

**RESULTS AND DISCUSSIONS**

**Policy Analysis Matrix (PAM) Results**

Empirical Estimates for Determining Competitiveness and Comparative Advantage of Pea Crop for Selected Districts in Malakand and Swat Protected Area during, 2008-09

The competitiveness and comparative advantage for Pea crop during 2008-09 was determined through net private profitability, net social profitability and evaluated for policy distortions under the current import substitution regime through CIF values for food self sufficiency and export parity prices (FOB values) for export purposes as under:

**Competitiveness or Net private profitability (NPP)**

Private Profitability is calculated by the divergence between practical revenue (A) and costs (B+C+D) cherished at market prices and represent competitiveness of agricultural production at present technologies, prices for inputs and outputs and policy transfers.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Malakand and Swat Peas</td>
<td>12494.14</td>
<td>12494.14</td>
</tr>
</tbody>
</table>

Table 3 depicts the net private profitability (NPP) or competitiveness of pea crop production in Swat and Malakand districts in Khyber Pakhtunkhwa during, 2008-2009. The net private profitability (per acre basis) in Swat and Malakand districts of Malakand valley was reported for pea crop with Rs. 12494.14/acre. The reasons for high private profitability of pea crop in both Swat and Malakand districts were lower input costs, easy accessibility of inputs, lower marketing and transportation costs and higher average wholesale market prices of Pea crop as compared to other crop enterprises/zones. The study showed that net private profitability (NPP) was the same for import substitution regime as well as for export promotion regime in the study area during the year, 2008-2009, as they were calculated at market prices, not at shadow prices.

**Net Social Profitability (Comparative Advantage) for Pea crop in selected Districts of Swat and Malakand**

Social profitability measures economic efficiency or comparative advantage. It is the difference between total benefits and total cost of tradable and non-tradable inputs valued at their shadow prices (Gittinger, 1982). In the PAM analysis, social profitability (J) is defined as the difference between revenue (F) and costs of domestic factors (G, H) and tradable inputs (I) priced at national opportunity cost values. When social profits are negative, a system cannot survive without assistance from the government. Such systems waste scarce resources by producing at social costs that exceed the costs of importing. A nation has a comparative advantage in producing a commodity if NSP is positive (NSP>0) and it uses its resources efficiently at their shadow prices. Conversely, if the NSP is negative (NSP < 0), the production of the commodity will not be socially profitable; hence, the country does not have a comparative advantage.
The Net Social Profitability value for import substitution in the cropping districts in 2008-2009 were found positive i.e. Rs. 51637.45 for Pea crop and higher than corresponding private profitability values. The net social profitability value of the pea crop was negative for export promotion regime i.e. Rs. (-14677.66). The analysis revealed that the crop could be grown in the study area for export promotion, given the current macroeconomic, agricultural conditions and policies. The reasons behind the comparative disadvantage of the crop in selected districts of Malakand valley were; high opportunity cost of land, high labour intensive crop, low yield and remoteness of the area from the main market which costs high marketing and transportation costs. The existing scenario could be improved by introducing high yielding varieties, improved crop management, light agricultural machinery to replace the human labor and development /improvement of infrastructure (communication) in the respective farming regions. The analysis showed, however, that the region while producing the lucrative crop of Pea in Swat and Malakand study area with high comparative advantage for import substitution/food self-sufficiency should be encouraged to grow in Khyber Pakhtunkhwa.

**Policy Effects: The Divergence between Private and National Profitability**

The PAM analysis, the transfers (divergences) are explained by policy interventions or market failure both in input and output market that change the incentives of the decision makers (farmers) and cause a divergence between private and national/social profitability. The PAM framework not only provides the overall policy effects but also facilitates the tracing of individual policy effects both in input and output markets. One of the objectives of this study was to compare and contrast private and social profitability of pea production for the pea farming crop in Khyber Pakhtunkhwa as to whether the policy incentives have favored or discriminated against the respective vegetable production enterprise.

Table 4 summarizes the results of PAM analysis especially the policy effects of the production in pea crop when grown as a strategy for import substitution by incorporating it’s import parity price. The transfers occur in the output and tradable input market, as well as in profitability. The transfers in the output market were from farmers to society was at Rs. 560 for pea crop; while, the import parity price was Rs. 898.488 for pea crop (PAM budget for import parity regime). As labor market is considered as free, therefore the transfers in labor market are zero. The market price and opportunity cost price of land in capital market were the same, therefore, the transfers occurred in the capital market was also zero. Negative transfers in tradable market indicated that farmers were paying over and above for tradable goods than it’s cost to society. The per acre transfers in tradable for pea crop was found out to be: Rs. (-676.54) during, 2008-2009. These transfers in the tradable market are from society to producers, indicating the government policy of subsidizing tradable goods. The aggregate policy effect shows that generally the production of pea crop was encouraged and supported by the policy incentives in the research area for import substitution during 2008-2009.

Table 4 highlights all the relevant data using export parity price of pea’s crop when their production was analyzed for export promotion in 2008-2009. The market value of the output, due to it’s low export parity price (PAM budget for export parity regime) was noted as Rs. 443.64 for pea crop. The value was much higher than it’s respective opportunity cost value, as compared to their respective average market price (Rs 40/ kg) which was Rs. 560 for pea crop. Transfers in the labor market and capital markets were also zero. Negative transfers in tradable markets for the agro-ecological zones indicate that farmers were paying less for tradable goods than their respective costs to society. The positive value of total policy effect in the last row of transfer’s column represent that the cropping production districts were encouraged and supported by policy incentives.

The NNP and NSP analysis showed that production of the vegetable crop was generally profitable for import substitution and having comparative disadvantage for export purposes. This implies that current macroeconomic and agricultural policies were inconsistent with the existing pattern of comparative advantage and had discriminated against production of the vegetable crop.

**The Measures of Comparative Advantage**

**Domestic Resource Cost (DRC) Analysis of pea crop in district Swat and Malakand during, 2008-09**

The DRC analysis measures comparative advantage. It plays the same substitute role for social profits as does the Private Cost Ratio (PCR). Minimizing the DRC is thus equivalent to maximizing social profits. The smaller the national cost incurred on transforming domestic resources to yield a unit of foreign exchange, the more efficiently the country uses its scarce resources. There exists an inverse relationship between DRC and comparative advantage. A country has a comparative advantage in an activity and contributes to national welfare (NSP > 0) if DRC ratio is less than unity. Conversely, a DRC ratio greater than unity suggests the inefficiency of a country in producing that particular commodity (NSP < 0).
Table 5. Table Domestic Resource Cost (DRC) for Pea crop during, 2008-09.

<table>
<thead>
<tr>
<th>Crop</th>
<th>Import Substitution Regime</th>
<th>Export Promotion Regime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malakand and Swat Peas</td>
<td>0.54</td>
<td>1.31</td>
</tr>
</tbody>
</table>

The DRC coefficient shown in Table 5 for the import substitution regime in case of Malakand and Swat cropping area was noted as; 0.54 for pea crop. It indicates that the crop in DRC value has comparative advantage towards it’s production in case of import substitution regime. However, in case of export substitution regime for pea crop with 1.31 value having greater value of DRC than unity confirms it’s comparative disadvantage position for export purposes in the study area during the year, 2008-2009.

Social Benefit Cost (SBC) Analysis

The Social Benefit Cost (SBC) ratio is the net social benefits to the social opportunity costs of resources incurred in the production process. It is expressed as $SBC = \frac{F}{G+H+I}$, where $F$ is the revenue (social value) and G, H, I are the costs of tradable and non-tradable inputs, all valued at social prices. There is direct relationship between SBC ratio and the measure of comparative advantage. An enterprise with higher SBC (greater than unity ) suggests that activity’s net social benefits are more than social costs and therefore, the enterprise enjoys comparative advantage, while lower SBC (positive but less than unity) implies that it does not have such advantage.


<table>
<thead>
<tr>
<th>Crop</th>
<th>Import Substitution Regime</th>
<th>Export Promotion Regime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malakand and Swat Peas</td>
<td>1.65</td>
<td>0.81</td>
</tr>
</tbody>
</table>

The result in table-6 show that the SBC ratio for import substitution regime in pea cropping zone was greater than unity which reflected that the respective areas had a comparative advantage in producing pea crop as import substitute crop. The SBC ratio for export promotion regime was 0.81 for pea crop during, 2008-2009. The value is less than unity which shows the comparative disadvantage of the crop.

The Indicators of Policy Effects

Nominal Protection Coefficient (NPC)

The NPC is simply defined as the ratio of domestic price of commodity to its border price. In the PAM context, $NPC = \frac{A}{F}$, where A and F are revenues per acre evaluated at domestic and border prices of the commodity respectively. As an indicator of policy effects, an NPC lower than one means that production of a particular commodity is taxed either because of market failure or government intervention. Conversely, an NPC greater than unity suggests inefficiency of a country in producing that particular commodity and that the price is heavily affected by government policies or other factors.

Table 7. Nominal Protection Coefficient (NPC) for pea crop in districts of Swat and Malakand during 2008-09.

<table>
<thead>
<tr>
<th>Crop</th>
<th>Import Substitution Regime</th>
<th>Export Promotion Regime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malakand and Swat Peas</td>
<td>0.70</td>
<td>1.41</td>
</tr>
</tbody>
</table>

Table 7 shows the NPC value of the crop production in the study area for import substitution regime and export promotion regime during the year, 2008-2009. This indicates that value of NPC for import substitution for the crop in the study area was: 0.70 for pea crop which was less than one; therefore, imply that farmers are receiving prices less than world reference price. While in case of export promotion regime, the NPC value for pea crop was 1.41. This indicates that during the year, 2008-2009, farmers were receiving more than the world reference price due to subsidy provided to the pea farmers by the government.

Effective Protection Coefficient (EPC)

The effective protection coefficient (EPC) is another indicator of incentives. This coefficient measures the degree of policy transfer from product market output and tradable input policies. The EPC can also be defined as the ratio of distorted tradable valued at market prices to its un-distorted valued at border prices. Using PAM elements, $EPC = \frac{(A-D)}{(F-I)}$. The EPC quickly became and still remains a dominant indicator of policy effects in empirical studies. As such, the EPC is the summary measure of the incentives or disincentives caused by government policies in both input and outputs markets. Using the border price as the reference price, an EPC greater than unity implies price protection and positive incentives to the domestic producer of that commodity while the opposite is true when the EPC is negative but less than unity.

Table 8. Effective Protection Coefficient (EPC) for pea crop during 2008-09.

<table>
<thead>
<tr>
<th>Crop</th>
<th>Import Substitution Regime</th>
<th>Export Promotion Regime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malakand and Swat Peas</td>
<td>0.65</td>
<td>1.58</td>
</tr>
</tbody>
</table>
The EPC value given in Table 8. indicate that for an import substitution regime in 2008-2009, the value was 0.65 for pea crop which was less than unity and show that input and output was taxed showing the disincentives caused by the government policies both at input and output markets. During the year, 2008-2009, the farmers of pea crop were taxed less relatively. In case of export promotion, the EPC value was 1.58 for pea crop; higher than unity which means that price was protected and positive incentive was given to the domestic producers of pea crop.

**Producer Subsidy Equivalent (PSE)**

Producer subsidy equivalent (PSE) is defined as the difference between private profitability and national profitability as a proportion of private revenue. It is the producer subsidy that would be necessary for removal of array of government farm policies employed in particular country in order to leave farm income unchanged. It is used to reduce state intervention in agriculture and liberalize commodity trade. In PAM notion it is expressed by PSE = O/A. The positive values of PSE imply that overall transfers have taken from society to producers; while negative values of PSE implies that overall transfers taken from producers to society and tax payers.

**Table 9. Producer Subsidy Equivalent (PSE) of Pea crop during the year, 2008-2009.**

<table>
<thead>
<tr>
<th>Crop</th>
<th>Import Substitution Regime</th>
<th>Export Promotion Regime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malakand and Swat Peas</td>
<td>-0.43</td>
<td>0.30</td>
</tr>
</tbody>
</table>

Table 9.Summaries the result of PSE for import substitution and export promotion regimes for the year, 2008-2009 in case of pea crop in Khyber Pakhtunkhwa farming region. In case of import substitution regime, the negative sign of PSE indicated overall transfers from pea producer to consumers and tax payers. The value of PSE analysis further shows the extent of taxation with 43 percent for pea crop. However, production of pea for export promotion needed government’s positive support to 30 percent during the year, 2008-2009.

**Subsidy Ratio to Producers (SRP)**

This is the final incentive indicator (SRP) which is the net policy transfer as a proportion of total social revenues or SRP = O/F. The SRP shows the proportion of revenues in world prices that would be required if a single subsidy or tax were substituted for the entire set of commodity and macroeconomic policies. The SRP permits comparisons of the extent to which all policy subsidizes agricultural systems. The SRP measure can also be disaggregated into component transfers to show separately the effects of output, input, and factor policies.

**Table 10. Subsidy Ratio to Producer (SRP) for Pea crop during year, 2008-2009.**

<table>
<thead>
<tr>
<th>Crop</th>
<th>Import Substitution Regime</th>
<th>Export Promotion Regime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malakand and Swat Peas</td>
<td>-0.30</td>
<td>0.42</td>
</tr>
</tbody>
</table>

Table 10. Shows the SRP value for pea crop in both import substitution regime as well as export promotion regime in the selected cropping zone of Khyber Pakhtunkhwa for the year, 2008-2009. In case of import substitution regime, the negative sign of SRP indicate overall transfer from pea producer to consumers and tax payers in 2008-2009. The SRP analysis further depict the extent of taxation of the crop with 30 percent for pea crop. However for production of the vegetable crop for export promotion, the extent of positive govt. support was 42 percent for pea crop in 2008-2009.

**CONCLUSIONS AND RECOMMENDATIONS**

The PAM results show that pea production was nationally profitable for import substitution but was not profitable for export promotion. It further explained that the cropping area could not produce pea crop for export purpose under the existing agro-climatic and topographic conditions in the area and policies. However, pea crop could be produced with comparative advantage for food self-sufficiency/ import substitution.

The policy analysis shows that for import substitution regime in the cropping area, the farmers were receiving less than the world prices and also taxed both in output and input markets. While, for export promotion, the farmers in pea crop were receiving more than world reference price and, thus subsidized both in output and input markets. The farmers were found competitive in the production of pea crop as import substitution. Since the farmers had comparative disadvantage in pea crop production as export promotion, the government should discourage the production of pea crop for export purposes so that the scarce resources may be re-allocated to the most efficient use in the research area.

The price of pea crop over the years has shown a cyclical trend. Continuous price changes in the market were due to mismanagement and lack of planning. To stabilize the prices in the market, especially during off seasons, it is imperative for the researchers, administrators and policy makers in Pakistan to think and reshape the ways and means to assess the country’s demand and promote production of the pea crop at least for food self-sufficiency/import substitution and food security purpose.
The most obvious policy implications are laid down as follow:

1. Since Pakistan has clear comparative advantage in producing Pea crop as import substitution; therefore, serious and sincere efforts are required on the part of agricultural scientists and policy makers to formulate agricultural and macroeconomic policies consistent with the existing comparative advantage to produce them as import substitution for food security and self-sufficiency.

2. Khyber Pakhtunkhwa has comparative disadvantage in the production of Pea crop for export purposes; therefore, the govt. should discourage the production of the crop for export purposes so that the scarce resources may be re-allocated to the most efficient alternative uses.

3. Yields in pea crop are far below relative to other pea growing countries of the world; and; therefore, it is recommended that agricultural scientists and policy makers in Pakistan should introduce new high yielding and disease resistant pea vegetable crop varieties in the area to bring at par the yield/acre of the crop in best interest of the farmers of the respective districts.

4. Price support improves the respective incomes of the growers of Pea crops in the short run. However, it also increases the cost of pea crop production in the long run due to the price support capitalization into the land value. This study suggest that world reference price must be ensured to the growers of the vegetable crop in Pakistan in general and Khyber Pakhtunkhwa in particular to increase and stabilize it’s income.

REFERENCES


