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An Analysis of Export Competitiveness of Cotton in Tamil Nadu

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This paper combines policy analysis matrix techniques to model the analysis of profitability from cotton cultivation. Policy analysis matrices are computed for a sample of cotton growers located in the dry land of the Tamil Nadu under observed conventional and profit-efficient farming conditions. In this study cotton had been not competitive for most of the period under consideration. EPC estimates showed that it was more than unity like DRC in the most of the study period. However it could be seen that these had been a decreasing trend in the values of EPC and DRC from 2007-08.Since NPC value are less than unity it indicates that the state had not protected the crop at the farmers level. The estimates of DRC revealed that the state had comparative advantage in cotton export. The main conclusion is that the usefulness of the policy analysis matrix might be substantially enhanced by simulating profitability after efficiency-improving managerial decisions have been adopted.

Key words: Tamil Nadu cotton cultivators, Policy Analysis matrix, NPC, EPC, ERP, DRC, Indian agricultural policy, multifunctionality.

This paper evaluates the private and social profitability of farming systems by the use of the policy analysis matrix (PAM). Since the seminal work by Monke and Pearson (1989), the PAM has been widely employed to compute market-driven and social profits for a variety of farming systems under different technological and institutional scenarios. Here, it is shown that important additional insights might be obtained if the farmers' efficient behaviour is considered, in addition to their observed behaviour. This empirical application responds to the concern over whether or not those Tamil Nadu farming systems that can be deemed multifunctional, because of the important environmental functions performed, will be able to survive in the policy context of the post-2003 common agricultural policy (CAP).

For Indian authorities, the political problem of supporting farmers' incomes in an increasingly open economic environment has been further compounded by the need to take on board the impact of trade liberalization on the non-commodity outputs of Indian agriculture. There is a growing recognition that, beyond its primary function of supplying food and fibre, agriculture can provide environmental benefits and contribute to the sustainable management of renewable natural resources, as well as to the preservation of biodiversity, and the maintenance of the economic viability of less favored rural areas. These new concerns are frequently summarized under the heading of multifunctional agriculture and have become an integral part of the Indian model of agriculture (EC, 1999, 2000). The research concerning the multifunctional character of agriculture is no longer restricted to international trade policy.

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The impact of agricultural policies on farmers' income might be widely different under observed and efficient behaviors. Likewise, the assessment of private and social profitability for a particular farming system can change substantially after major input adjustment decisions have been adopted in response to the diffusion of best management procedures. Profits obtained after all those adjustments could provide a useful benchmark for current production practices, showing whether enough room exists for an improvement in farms' financial situation.

In this paper efficiency is used in connection with the PAM, refers to a social benchmark for the calculation of costs and revenues based on the adoption of international prices and the removal of the effects of subsidization and taxation.

Materials and Methods

Data and Sample

The study relied on secondary data pertaining to export of major agricultural commodities in Tamil Nadu. The secondary data included production of the groundnut in Tamil Nadu and India, export and import prices, domestic wholesale and world market prices for the periods between 2005-06 and 2014-15 at district and state level. These data were collected from various issues of Seasons and Crop Report of Tamil Nadu, Agro Stat published by different sources and web database of Food and Agriculture Organization and IndiaStat. Value of export of agricultural commodities through Chennai and Tuticorin ports was also collected from the custom houses (Sea Cargo) for the periods of ten years (2005-06 to 2014-15).

The price data are monthly quotations for nominal spot price (US $/metric ton) for groundnut were collected from UNCTAD website. The data span from January 2005 to December 2015 was collected. The dataset used in this paper corresponds to a sample of 337 single crop groundnut farms located in the Tamil Nadu districts. The data were collected from a comprehensive survey carried out by the authors with support from the Tamil Nadu Ministry of Agriculture and correspond to the year 2015. The dataset provides data for one output and seven inputs. Output is measured in kilograms of groundnut production. The only fixed input is cultivated land, measured in hectares. Variable inputs are: labour (working days), in addition to capital, fertilisers, seeds, herbicides and fungicides, all of which are measured in Indian rupees.

Measures of competitiveness

Nominal Protection Coefficient (NPC)

The Net Protection Coefficients were estimated for cotton lint under exportable hypothesis for the period from 2005-06 to 2014-15 in order to measure the extent to which domestic prices diverge from border equivalent prices. It was estimated as follows.

$NPC = P_d/P_b$

Where,

P_d = the domestic producer price; and

P_b = the border equivalent producer price computed as explained below.

Border equivalent prices or world prices adjusted for transport, marketing and processing costs, were estimated to serve as yardstick to indicate the extent to which domestic prices have been distorted by the various government interventions.

Algebraically,

$P_b = P_w - T_w - T_d - C_d + V_b$

Where,

Pb = Border Price

Pw = World Price

Tw = Ocean freight and insurance charges

Td = Handling, transport and marketing charges from port to domestic markets

Cd = Transport, processing and marketing charges farm gate to domestic market

V_b = The value of by-products.

An NPC greater than one would show that the domestic market price of the commodity exceeded the border price, which discouraged the export of that particular commodity.

Effective Protection Coefficient (EPC)

In the present study, Effective Protection Coefficient (EPC) was estimated as the ratio of value added in private prices to value added in social prices. The EPC indicates the combined effects of policies in the tradable cotton markets.

EPC = VPd / VPb

Where,

VP_d = the value added in domestic price (private price)

VP_b = the value added in border price (social price)

An EPC greater than one would indicate positive incentive effects of commodity policy (an export subsidy to producers), whereas an EPC less than 1 shows negative incentive effects (a tax on producers). Both the EPC and the NPC ignored the effects of transfers in the factor market and therefore do not reflect the full extent of incentives to farmers.

Domestic Resource Cost (DRC)

To measure the comparative advantage (or) efficiency of Indian cotton in the world market, domestic resource cost coefficient was estimated as given below.

$DRC = SP_d/VP_b$

Where,

SP_d = the shadow price of the cotton; and

VP_b = the value added measured at world prices.

DRCs greater than one would indicate that the value of domestic resources used to produce the commodity exceeded its value added in social prices. Production of the commodity, therefore, does not represent an efficient use of the country's resources. DRCs less than one would imply that a country has a comparative advantage in produce in the commodity. Values less than one would mean that the denominator (value added measured at world prices) exceeded the numerator (the cost of the domestic resources measured at their shadow prices).

Effective Rate of Protection (ERP)

To measure the structure of protection like tariffs, import bans, quantitative restrictions on Indian rice exports, Effective Rate of Protection coefficient was estimated, which measured the percentage increase above value added in world prices that was permitted by the structure of protection.

$EPC = VAD_p/VAB_p$

$ERP= (VAD_p - VAB_p)/VAB_p$

Where,

VAD_p = Value added at domestic price VAB_p = Value added at border price

ERP = EPC – 1 or EPC = ERP +1

Greater the ERP, higher would be the protection for that commodity to be traded in the world markets and vice versa.

In this paper, the PAM methodology is employed in order to learn about the possibilities of maintaining groundnut cultivation in the Tamil Nadu cotton cultivators.

Results and Discussion

Details of the Competing Countries

Details of competing countries and their average market share along with the growth rate for the cotton lint for the period from 2005-06 to 2014-15 are furnished in the Table 1. As mentioned elsewhere, the details were collected from the website of Food and Agricultural Organization and growth rate was worked out country wise.

Table 1. Competing countries and their average market share

Commodity	Major Exporting Countries	Quantity (tonnes)	Per cent to Total	CGR (per cent)
Cotton	USA	3215218	39.90	-0.5**
	Uzbekistan	830693	10.31	-2.7*
	India	756216	9.38	-3.6*
	Australia	435253	5.40	-1.3
	Brazil	395771	4.91	2.3*
	Greece	248303	3.08	-0.4
	World	8057933	100.00	-0.8*

*- Significant at ten per cent level;
**- Significant at five per cent level;
***- Significant at one per cent level

A enjoyed the prime place in the cotton export and it accounted for nearly 40 per cent of the world's cotton export. Next to USA, Uzbekistan had a share of 10.31 per cent of the world cotton export. However these two countries witnessed a negative growth rate during the period of consideration. India occupied third position in the cotton export and the export dwindled down at the rate of 3.6 per cent per annum of the selected countries only. Brazil exhibited a positive growth rate of 2.3 per cent per annum in cotton export though it shared only five per cent of the world total export of cotton. The growth rate of cotton export at world level showed a marginal decline (- 0.8 per cent per annum).

Export Competitiveness

Trade competitiveness of the crops was analyzed using the framework of Policy Analysis Matrix. As mentioned elsewhere, the PAM was constructed taking into consideration of free on board prices. Similarly, for domestic factors which are not internationally traded social cost was calculated using the value of marginal product approach using factor shares of various inputs alongwith the mean values of inputs, output and prices.

Nominal Protection Coefficient (NPC), Effective Protection Coefficient (EPC), Effective Rate of Protection (ERP) and Domestic Resource Cost (DRC) computed to reveal the trade competiveness. Trade competitiveness was estimated using the aforesaid measures for cotton for the period from 2005-06 to 2014-15.

Export Competitiveness of Cotton

The estimates of NPC, EPC, ERP and DRC for cotton lint are furnished in Table 2.

Table 2. Competitive measures for cotton

Year	NPC	EPC	ERP	DRC
2005-06	0.81	0.68	-0.32	0.67
2006-07	0.77	0.66	-0.34	0.64
2007-08	0.74	1.18	0.18	1.16
2008-09	0.73	1.22	0.22	1.20
2009-10	0.69	0.71	-0.29	0.69
2010-11	0.69	1.22	0.22	1.19
2011-12	0.70	0.95	-0.05	0.92
2012-13	0.66	1.23	0.23	1.20
2013-14	0.63	1.32	0.32	1.28
2014-15	0.66	1.40	0.40	1.36
Average	0.71	1.06	0.06	1.03

The average NPC was less than unity under exportable hypothesis. The average value of EPC was found to be 1.06, indicating in general that the state had not protected the crop. The DRC cotton revealed that Tamil Nadu had comparative disadvantage in cotton export and it can import at cheaper price. The cheaper availability of international cotton was due to the prevalence of subsidies provided by cotton producing countries especially USA and Brazil.

A relatively better performance of cotton crop in the pre WTO period might be due to expansion in area, availability of improved technologies of cotton production technology and its adoption, remunerative support prices and institutional support. But the production started declining after the establishment of WTO due to decrease in area under cultivation, which could be attributed to import of edible oils and relatively stagnant real prices of cotton.

From the foregoing discussion, it is evident that cotton was found to be disadvantage and efforts have to be taken to avert the situation. The measures will be taken by the Government are in the desired direction.

Conclusion

An efficient PAM has been built on the basis of this information, yielding new estimates of private and social profitability. Now, farms are made negative profits and the society also obtains a net welfare gain from the resources allocated to cotton production. It could be argued, with regard to the lack of social profitability of cotton farms with observed data, that social profitability is too narrowly defined in the PAM context, because it does not include a direct appraisal of the worth of the positive environmental externalities that stem from cotton cultivation. The PAM methodology could be extended by including the valuation of the public goods (landscape and biodiversity among them) jointly produced with the private or commercial output in the social row of the matrix. A trade-off could then arise between negative economic returns and the production of non-commercial, i.e. multifunctional, outputs. However, this line of thinking has not been pursued in this paper.

The lack of relevant empirical information that could be used for widening the scope of social efficiency prevents us from providing a sound justification of private and social losses grounded on society's quest for non-commodity outputs from agriculture. But differences between private and social profits per hectare can be used to establish a lower threshold for the valuation of the annual supply of public good services jointly produced with cotton output. Instead of pursuing a line of analysis that concentrates on the construction of an environmental PAM, the possibilities offered by computing a virtual PAM, assuming profit maximization on behalf of farmers, is explored. This helps to assess whether there is a way out of the current financial difficulties of cotton cultivators are experiencing that could allow the valuable non-commercial functions currently performed by this farming system to be maintained. The findings point to a negative outcome, both in terms of private and social profits, after farmers should be adopt the best practices of efficient farms.

Finally, it is worth highlighting a couple of the conclusions of this research. On the one hand, it vindicates the potential of the policy analysis matrix to yield fruitful information about particular cotton cultivation. Furthermore, the usefulness of this methodological approach may be substantially enhanced if the analyst can simulate the profitability of the system after all sorts of efficiency-improving changes have been adopted by farmers. On the other hand, the results of this research lead to a noteworthy conclusion in terms of economic policy. In order to preserve the nonmarketable function of the Tamil Nadu cotton system linked to the protection of biodiversity and the environment, local and regional authorities need to make a greater effort to spread the adoption of best practices among cotton cultivators, helping them to improve their profit efficiency and financial viability.

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