RETURN TO RICE RESEARCH INVESTMENTS AND POVERTY ALLEVIATION IN SRI LANKA: A WELFARE ANALYSIS 1959 - 1999

By

STEWAN KORALALAGE DON FRANK FELIX NIRANJAN

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ABSTRACT

Research intensity in Sri Lanka (Agricultural research investment as a proportion of the agricultural GDP), as in the other developing countries, has been low with hardly any increase over the past 25 years. The research intensity in the developed countries now approaches 5% compared to 0.6% in the developing countries, a gap of almost ten fold. The Sri Lankan annual recurrent agricultural research expenditure in the year 2000 was Rs. 905 million with a research intensity of 0.52%.

The main goal of agricultural research is to increase food supplies through yield enhancement and use of cost reducing technologies that would ultimately lead to lower food prices. However, researchers and policy makers have not stopped searching for answers only to reduce food prices, but very importantly need to search for solutions to reduce poverty. Developing linkages between agricultural research and poverty reduction is not that easy and it represents a recent focus in the research arena. Researchers have been able to show considerably high returns from agricultural research, but it has not been sufficient to eliminate rural poverty, a situation that can be even seen in countries with national food surpluses.

So far no study has been conducted to evaluate the impact of rice research investments on rice production and poverty alleviation in Sri Lanka. The aim of this study is to analyse the impact of research investments on rice production in the Sri Lankan rice sector from 1959 – 1999, that is, over the last 50 years. The objectives of the study are to: (a) estimate the impact of rice research investments on rice production, (b) simulate distributional returns to rice research and development investments and (c) examine the relationships between rice research and development investment on paddy production and poverty.

A supply function was estimated using time series data (1959 - 1999). Lagged research expenditure was included as one of the explanatory variables in the supply function. An attempt was made to apply cointegration approach to estimate the variables. Before testing for cointegration, the variables have been tested for unit roots using the Augmented Dickey-Fuller test. A partial-equilibrium dynamic-simulation model of a small open economy is used in the analysis to measure the returns to rice R & D investments under trade protection and free trade regimes. Two sensitivity analyses were carried out. First, an analysis was based on different cost streams (research, extension, irrigation, seed-paddy production and human resources development) associated with the paddy sector. The second was based on the acceptable specifications of the rice supply function with the minimum and the maximum elasticity values. A conceptual framework of the relationships between agricultural research and poverty alleviation was employed to examine the relationships between rice research and development investment on paddy production and poverty. This analysis was mainly based on a qualitative assessment. Secondary data were obtained from several sources for the period 1950 - 2000. Time series analysis was performed using TSP computer software.

Results revealed that rice research investments in Sri Lanka have taken 8 years to show any positive change in rice production. Production of rice increased gradually after the 8th year upto the 12th year and then decreased gradually. Supply elasticity with respect to rice research investment was 0.37. A one percent increase in rice research investment increased rice production by 0.37 percent. The returns to rice R & D investments were discussed under two different scenarios. In the base analysis (social discount rate of 6%), Net Research Benefit (NRB) simulated was Rs. mn. 61,189, total cost was Rs. mn. 18, Benefit Cost Ratio (BCR) was 2,311 and Internal Rate of Return (IRR) was 174 in the tariff protection regime. NRB and BCR were higher by 31 percent under a trade protection regime than under free trade. IRR was higher by 7% in the free trade regime than in the trade protection regime. The magnitude of the benefit gain due to tariff will be the cost resulting from government intervention policies to protect the rice farmers. The use of protectionist policies imposed due to political, social and economic reasons have increased the rate at which the gains from technological change have been passed on to rice producers by about 31 percent. The NRB is mainly distributed to the dry zone amounting to about Rs.mn. 26,504 and to about Rs. mn. 5,121 to the wet zone at 6% discount rate in the trade protection regime.

District-wise analysis was carried out to analyze the rice yields and poverty status in 1980 and 2000. Trends in rice consumption and updated poverty cut-off points were analysed. Further, net consumers and net sellers of rice were identified by paddy holding size, and poverty status by extent of paddy land was also examined. Research investment has a positive impact on rice production. However, the elasticity values indicate that the paddy supply elasticity with respect to price was almost double the supply elasticity with respect to research. Therefore, ambiguous impacts were observed on net paddy consumers and net sellers (net producers) depending on the economic policies (whether the economy is open or not). Technological improvements facilitate an increase of paddy production which should reduce farm-gate prices, even under a trade protection regime. Hence net return (income) of paddy producers decline. This change adversely affects net paddy producers (net sellers). On the other hand, with the technological improvements, net paddy producers benefit through increases in producers' surplus. Real wage increase may not have direct effect due to technological improvements (research investment). This may have close links with inflation and upward push due to wage rates in the non-farm sector. However, real wage rates increase may have negative impact on net paddy producers (sellers), own account workers, net consumers and unpaid family workers (majority of the paddy growers). Therefore, the impact on net paddy producer income is ambiguous. Although income decreases from paddy, the available rural non-farm activities help increase the total income of paddy producers, inferring a reduction of income poverty. However, that income increase has not been actively utilized to increase rice consumption, but perhaps used to increase the expenditures on non-food items and intake of protein foods. As a result, actual calorie intake has not increased, perhaps leading to an increase in food poverty or consumption poverty among paddy producers. Hence, the impact of increased paddy production on poverty is not clear.