AREA SUPPLY RESPONSE TO OTHER FIELD CROPS WITH PRICE AND YIELD UNCERTAINTIES

By

ANTONETTE GEETHA MAYADUNNE

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ABSTRACT

This study addressed other field crop (OFC) area supply response at farm level, to examine the significance of yield rate and producer price uncertainties in the diversification of paddy based agriculture. The study was motivated by the observations made by researchers that, despite the higher income potential of OFCs compared to paddy at both national and farm levels, higher employment opportunities, a substantial potential demand, favorable technical possibilities and in the absence of regulatory constraints, why a greater extent of land has not been diverted to OFC cultivation. The slowness of diversification of paddy based agriculture has been attributed to, at national level, the government support to paddy aimed to maintain self sufficiency, low emphasis on OFC research, and at farm level, to the farmers bias towards paddy production because the farmers first priority would be to secure the staple food requirement of the household.

Productivity and product price uncertainties in OFCs have been suspected to be restraining diversification but remained to be established quantitatively. Literature notes that farmers are faced with high variations in OFC yield rates and producer prices and suggests the possibility that farmers may be averse to profit risks, thus impeding diversification. In the presence of the observed high variability in yield rate and producer prices it was considered important to establish the significance of profit risks in area supply to OFCs. Therefore the overall objective of the study was to estimate and analyze OFC area supply response of semi-subsistence farmers to examine whether productivity and product price uncertainties which manifest as uncertain profits are of significance in the diversification of paddy based agriculture.

The study focussed on the OFCs - chillie, big onion, greengram, cowpea and soya bean, recommended for diversification of paddy based agriculture. The area supply model employed in this study has been developed within a multi-crop framework, based on the behavioral postulate that farmers maximize the expected utility of wealth at the end of the season and household consumption of paddy. The model assumes that field crop area supply to a group of alternative crops are simultaneously determined and that each depends on the farmers expectations of profits, profit risks, anticipated income at the end of the season, level of household rice requirement, availability of high and low land and irrigation. The model explicitly accommodates farm household wealth and profit risk enabling analyzing the structure of risk aversions with respect to area supply. The model was estimated using Two Stage Least Squares estimation technique employing data collected from a cross section of 160 farm households spread across 16 villages in Hambantota, Matale, Kurunegala and Anuradhapura districts where agro-ecological and physical factors are conducive to OFC cultivation. The 95/96 maha season and the 1996 yala season were covered by the study.

The model estimates revealed that the supply response equations for greengram, cowpea and soya bean had low explanatory power and the signs of the coefficients conflicted with the theoretically expected signs; in some equations where some variables appeared statistically significant the variables made little sense in the absence of significance of the more important ones. The author observed that the farmers seemed unconcerned about the economic returns from these crops or the uncertainty of yields and prices in their area supply decisions. The indications were therefore that these crops needed to be analyzed separately from cash crops as the

factors governing area supply to these crops seem to be different from those of cash crops.

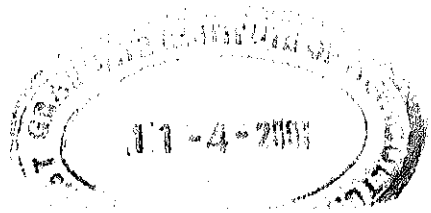
The results indicate that factors affecting area supply are different between the staple food crop and the cash crop and between seasons. In the maha season, access to lowland, irrigation and meeting household rice requirement seemed important in paddy area supply, while profit expectations and final wealth were important for chillie. This implies that in maha where farmers have a choice between paddy and OFCs farmers are willing to grow OFCs only if they get higher payoff in expected returns. For yala paddy in addition to irrigation, lowland and meeting household rice needs own profit risks appeared significant; for chillie own profit risk was the only significant factor. Therefore in yala own profit risk seemed the governing factor in area supply to chillie. These observations indicate that field crop farmers are likely to be risk averse in yala but not in maha. The tests for the structure of risk aversion showed that neither proportional changes in initial wealth or profits affected risk aversion, but an absolute increase in initial wealth could effect whatever risk aversion that may be present in maha chillie cultivation. This indicates that proportional wealth or profit taxes will have no effect on OFC area supply, but transfer payments to cash crop cultivators in maha could possibly effect an increase in area supply.

The effect of price support on area supply was examined by simulating the impact of a floor price program. The simulations demonstrated the profit mean increasing and risk reducing effect of floor prices, and the differential impact on the direction and magnitude of crop area dependent on the nature of interdependency between the crops and the price responsiveness of the crops. This observation

demonstrate the importance of considering cross commodity effects in the formulation of price support programs.

Given that other field crop cultivation is likely to be more intense in yala, the results of the study conclusively indicates that profit risk is a significant factor inhibiting diversification of paddy based agriculture. Hence policies need to be equipped to meet the risk attitudes of farmers if diversification is to be a success. Further the study indicates the importance of viewing the diversification issue in relation to the paddy base. Securing household rice requirement is a priority for farmers. Therefore the agricultural policy while concentrating on intensification of paddy production by increasing of productivity thus allowing farmers to meet household rice needs by concentrating on a lesser paddy area, should have yield and price risk reducing programs for OFCs if diversification is to take place. With increased productivity of rice, farmers relieved of the burden of cultivating paddy extensively, would supply more land to OFCs. However a counter argument is that, increasing paddy productivity will increase the profitability of paddy thus strengthening the farmers paddy bias and the focus on OFCs would be lessened. Therefore paddy productivity increases as well as the OFC yield and price support programmes should be such that these together should achieve diversification but not deviate away from this goal. These optimal levels of productivity and yield and price supports may be obtained via normative analytical techniques.

Decreasing absolute risk aversion has been a maintained hypothesis in economic literature, but refutation of the hypothesis in all except one case casts doubt on this general premise in the context of field crop cultivation in Sri Lanka. Further traditional tests for economic efficiency are miss-specified under conditions of



uncertainty; this study concludes that farmers are risk averse in yala and hence tests for allocative efficiency should take risk in to consideration. As for methodological implications , the study demonstrated the importance of considering area supply response in a multi-crop frame work and the modeling of area supply to alternative crops as a system of simultaneous equations.

The study focussed on OFC area supply response, but the major conclusions have been limited to a paddy-chillie crop system. In Sri Lanka paddy based diversification has in fact taken place mainly in terms of chillie and therefore the study could be viewed as a reasonable representation of OFC supply response without loss of generality of the study.