Comments On Fertiliser Use In Rupandehi District

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It is important to Nepal to increase output of basic agricultural products. It is vital that the scarce capital available to the central government be used intelligently. Nepal can not afford to waste any money. The study on the reasons for the decrease in fertiliser use by Dr. K. K. Jha published in the November/December 1977 issue of the Economic Monthly gives us many very useful clues as to what are the impediments to increased fertilizer use and how to get around those obstacles.

Dr. Jha has collected data from two roughly similar villages in the Rupandehi District in western Nepal. While the villages are similar in occupation distribution, crops grown, family size and the size distribution of land holdings. (In facr, I calculated the Gini concentration coefficient to be 0.406 in Anandban and 0.388 in Bagauli; the variation on logged land holdings is 0.364 and 0.325 respectively. This indicates very little difference, and also exceptionally equal distribution of land.) However, in trying to explain why the gross value of per family output is approximately twice as much in Anandban as in Bagauli we are struck by the dissimilarities between the villages. Anandban villagers use much more fertilizer and they also possess more irrigated land. They are closer to the district capital and metalled roads. Further the Anandban

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villagers are more educated (45% as opposed to 22% of the farmers with post-primary education), and are able to farm the land much more intensively. Some of the similarities and differences are presumably correlated.

Since there are so many similarities and dissimilarities between the two villages aggregated data does not allow us to isolate which factor explains the differences in output. Is the key to the different value of output the irrigated lend ? the use of fertilizer ? the closeness of large markets ? The differences are important for policy reasons. If we feel that the prim: reason for differences in output is fertilizer use and we subsidize its consumption. but we find that irrigation is the true critical variable then we may have wasted scarce financial resources. In order to better locate the source of the barriers to increased output we might better use the 48 farmers surveyed as 48 observations and not treat them as two groups of 24 based on the village where they live. The breakdown into two groups by villages will only be important if some economic variable is very highly correlated with being in village A or B. If we treat the farmers as 48 data points then by use of factor analysis, correlation analysis or t or F-tests on grouped or ungrouped data we can more easily locate the critical variables. Specifically we could break the 48 farmers into two groups based on whether lands are irrigated or not and then check to see, by a t-test, whether there is a statistically significant difference in output. We could then do a correlation study between output and fertilizer use, keeping the irrigated quality constant. An incremental F-test would tell us whether irrigation or fertilizer use was a more statistically significant variable. We could get the same results by a multiple linear regression of output with the independent variables being fertilizer use and a dummy variable indicating irrigated or non-irrigated land. Other combinations could be attempted to find out which variables are indeed critical.

Two explanations that are postulated of two or more variable can be tested using the data presented. Specifically that major constraints on fertilizer use is (1) the low price of outputs and (2) the high cost of fertilizers. If we assume that fertilizer use and output are highly correlated (which Dr. Jha assumes in his opening paragraph) then we may be able to find whether the above independent variables significantly effect the quantity produced. The coefficient on the independent variable in a logged regression of fertilizer use and fertilizers prices will yield an estimate of the elasticity. We expect a negative sign since as price of fertilizer increases its use should decrease. We find the elasticity is -0. 36 in Anandban and -0. 23 in Bagauli (significant at 5% level in Anandban but not significiant in Bagauli). Thus while the farmers do respond to fertilizer price it is an inelastic

response and one which explains very little of the variance in fertilizer use in Bagauli. To change fertilizer use by changing fertilizer prices will entail a massive change in price, i. e. a 30% decrease in prices will increase use by about 10 %. While we may lament the increases in the price of fertilizers over the past few years in Nepal we must note that the increase is less than the increase in prices in fertilizers In India (as reported in Agricultural Marketing Information published by the Food and Agricultural Marketing Services Department of the Nepal Ministry of Food, Agriculture and Irrigation). The increase is less than the increase in potash prices and phosphate rock prices as noted in the IMF's International Financial Statisties. It appears that HMG has not increased its price of fertilizers as much as others have, or by as much as major suppliers of the raw matirials have increased their prices. It may be unrealistic to request a reduction in price unless we can show that the government is making an excessive profit on fertilizer sales or that there are some social benefits of increased fertilizer use that makes invalid the private cost/benefit calculation of the farmers based on the current prices. Most of the benefits of fortilizer use belong to the farmers. some reasons for disliking the unsubsidized result could be dissatisfaction with current income distribution, or a feeling that it is necessary to subsidize consumption until farmers become more fully aware of the benefits of fertilizer use, Dr. Jha's data does not Aupdotr either reason for Aubsidijing fertlzer price.

Since the relationship of fertilizer price and use is a very inelastic one it does not appear that a large enough subsidy is possible or worthwhile.

Another argument is that fertilizer use is restrained by the low price of crop outputs. Since farmers do not get a sufficient return on their crops they use too little fertitizer, i. e. the costs are high, but the return is kept too low to justify extensive fertilizer use. About one farmer in four in each village ventured this as his reason for not using more fertilizer. Again a logged regression yields elasticities of +0. 43 and +0. 64 respectively in Anandban and Bagauli While both are inelastic they are less inclastic than fertilizer prices, also both coeflicients are statistically significant and explain 92% and 55% of the variation in fertilizer use respectively. Pricc of outputs are kept low since the products produced are exceptionally importnat in the Nepali diet and low prices are a benefit to thc consumers. The low price also works as an implicit tax on producers and an income transfer from the producers to the consumers. Whether this is worthwhile is a separate point. However, we do note that international prices of paddy, maize. wheat and sugarcane have isea much more than domestic Nepali prices. (This

helps to keep Nepali inflation down). One consequence is that less fertilizer is used and thus there is less production and export of the products. There is a prima facie case to be made that output prices are too low and are acting to significantly discourage the use of more fertilizers.

(A multiple linear regression has that these two factors, explain 97.7% and 62.9% cf the variatien in fertilizer use by size of farm in Anandban and Bagauli respectively.)

Probably in no country are people pleased with the operation of banks, with the terms they offer for the use of money or their speed in decision making. The 14% interest rate charged does not appear to be a subsidized rate. If we want to argue for a subsidy then we would need to show that this use of scarce government capital is more worthwhile than the alternative, the place from which the government would get the money. In the study the farmers indicate that they feel 10% is fair and 14% is too high The difference is surprisingly small and probably means that very few farmers find high interest rates a barrier to using banks. More important are reasons connected with using bank Sat all-real and imagined fears. The argument that the banks are too slow does not appear strong since in the only example provided they approved the loan in seven days. If that is a bad example then the banks are probably approving loans quite quickly of course the performance could be improved. A very low percentage of farmers (table 4 page 30) indicated that credit arrived too late.

Dr. Jha shows very well that there are many distributional problems in acquiring fertilizer, as well as the problem of shortweighing the fertilizer. It is hoped that the proper actions to correct these problems can be taken by the government.

The research Dr. Jha has done is critically important to intelligent decision making. He has asked some exceptionally interesting and useful questions. His analysis should find its way into the proper government offices in order to assist those making the decisions to make intelligent use of scarce capital,