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NATURE AND ROLE OF THE RISK AND UNCERTAINTY IN AGRICULTURAL PRODUCTION IN BIHAR*

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Introduction

In India and especially in Bihar, agriculture constitutes the very base of the national economy. The magnitudes of the risks and uncertainties involved in this sector of the national economy are vast and perhaps may be insurmountable in an underdeveloped economy. The nature of the risks and uncertainties may be broadly classified into three categories, *viz.*, (i) flood and droughts due to inadequate and uneven distribution of the rainfall, (ii) occurrences of pests and diseases and (iii) economic and market factors such as instability of prices, marginal profits, parity prices amongst the competing crops, demand in the market, availability of storage and transport facilities, etc. It is difficult to have a measurable distinction between risks and uncertainties, the results of both being same. *A priori* knowledge about the events may be known in case of risks but these are unknown in cases of uncertainties which occur suddenly. More precisely, risks relate to a regular measurable behaviour being of the random nature whereas the uncertainties hardly obey any law of chance. However, no rigid definition exists demarcating clearly the two phenomena. Agricultural production in any year is dependent on two micro factors, *viz.*, acreage and production and both are liable to risks and uncertainties. The uncertainties involved due to natural calamities are difficult to control but the risks due to pests and diseases may be covered with the advancement of scientific knowledge.

Dependence of State Economy on Agriculture

Broadly speaking, the State of Bihar may be divided on the basis of rainfall, irrigation facilities and cropping pattern into three natural regions which are (i) North Bihar Plain, (ii)South Bihar Plain and (iii) Chotanagpur plateau. Roughly 74 per cent of the total area is cultivated in North Bihar while in the South Bihar plain and the plateau region 65 per cent and 36 per cent of the total area are cultivated respectively. The ratio of population to cultivated land in the State is almost the lowest and estimated to be nearly two per acre. A high ratio of population to cultivated area may not be a matter of concern in a diversified economy but Bihar's economy is overwhelmingly agricultural. The progress of industrialisation is not keeping pace with the growth of population with the result that the proportion of population dependent for its livelihood on agriculture alone has progressively increased. In 1901 only 73 per cent of the population was dependent on agriculture, which is now 86 per cent as against the all-India average of 70 per cent. In the rural areas more than 90 per cent of the population depend on agriculture. The ratio of the landless agricultural workers to the total population is a little more than 22 per cent in Bihar, being higher than any other State. It was revealed during the last Agricultural Labour Enquiry that in Bihar attached

*The views expressed by the author here are personal.

male workers got employment for only 155 days in the year and casual male workers got employment for only 94 days in the year. This merely shows the extent of the pressure of low utilisation in the agricultural sector and consequently the magnitude of dependence of the economy over the uncertain role of nature.

Uncertainties due to Floods and Droughts

Floods and droughts appear to be cyclical features in the agricultural history of the State. The extent of damages and the average annual loss incurred thereby due to floods and droughts have not properly been assessed but the relief work has to be carried more or less every year. The examination of the reports on the occurrences of floods and droughts in Bihar reveals that the floods or droughts of severe intensities occur almost once a decade. Detailed examination has shown that floods are more or less localised features in the districts of Shahabad, Saran, Champaran, Muzaffarpur, Darbhanga, Saharsa and Purnea. After the completion of the major irrigational projects of Kosi, Gandak and the remodelling of the Sone, it is expected that the frequency and the intensities of flood will be minimised. Drought appears to be a recurring phenomenon in the districts of Gaya, Champaran, Darbhanga, Muzaffarpur, Bhagalpur, Purnea, Palamau, Hazaribagh and Ranchi. It is noted that a drought pocket exists in parts of Chotanagpur plateau and stretches into the hilly parts of South Bihar plain. The areas affected by the flood mostly grow cereals like paddy and maize and cash crops like jute and sugarcane. The transplanted paddy being a longer duration crop is exposed to a greater risk of the natural hazards. Similarly, the districts affected by drought grow extensively transplanted rice. In areas more susceptible to drought, dry farming techniques and uses of drought resistant varieties with the appropriate farm planning will reduce the uncertainties of natural calamities. Experiments have shown that by application of organic manures, the moisture contents of soil are improved and this recommendation if practised extensively together with the dry farming techniques will be a great boon to the farm populations in the drought affected tracts.

Effect of Rainfall on the Cropping Practices

The distribution and the magnitude of rainfall in some of the months appear to affect the area under the crops while those in other months affect the yield per acre. The gross cropped area of the State fluctuates from year to year ranging from 52 per cent to 61 per cent of the total geographical area depending on weather and rainfall. The area under *kharif* crops fluctuated between 37 per cent to 42 per cent while the same under *rabi* crops fluctuated between 15 per cent to 21 per cent. In fact the percentage fluctuation of *kharif* crops is less than the *rabi* crops. The multiple cropping practices are dependent on the availability of adequate rainfall in the pre-*rabi* season. The yields per acre of *kharif* and *rabi* crops in the last decade have been found to vary between 5 to 10 maunds and 3 to 7 maunds respectively, depending on the conditions of the weather and rainfall.

Risks of Pests and Diseases

Pests and diseases are another important source of risks. A huge slice of the outcome of the efforts of the cultivators are nullified every year. It is roughly

estimated that nearly 10 per cent of the total harvests are damaged every year due to attack of the pests and diseases. Thus on this basis, a quantity of six lakh tons of foodgrains is expected to be not available for the consumers—which means a huge loss to the national economy. Roughly, the value of the loss incurred every year in the case of foodgrains alone may be estimated at Rs. 16 to Rs. 18 crores per annum in the State excluding the loss noted in the cash crops.

Risks due to Economic Factors

Risks and uncertainties in the agricultural sector arise not only due to factors external to the farm economy but also due to those factors inherent in the economy itself. Such factors like price fluctuations influence a great deal in bringing area under cultivation particularly of cash crops. Supply and demand in the market at a point of time determine the market prices irrespective of any consideration of the cost of cultivation. The parity between the harvest prices and the cost of cultivation is also the determining factor in extensive cultivation for any crop. Thus, in Bihar, paddy in jute growing area, maize or paddy followed by gram or *rabi* pulses in the sugarcane growing area are main competing crops. The parity prices between jute and paddy is now being maintained at the ratio of 2.5 to 1. Any fall in this ratio means a corresponding fall in the jute acreage in the next year. On the basis of 15 ozs. of cereals and 3 ozs. of pulses as the daily requirement for an adult unit, the estimated demand of foodgrains works out to 86 lakh tons in 1965-66, which leaves a marginal demand of 6 lakh tons to be procured from outside even after meeting the target of 80 lakh tons. The instability of prices and the damage to the agricultural crops due to natural calamities will only increase this marginal gap between production and demand and produce a strain on the economy as a whole.

UNCERTAINTIES IN AGRICULTURE AND DECISIONS OF THE CULTIVATORS REGARDING THE CROPS TO BE CULTIVATED

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In the present paper it is proposed to study the cropping pattern of a sample of cultivators with a view to finding out the relation between the crops cultivated and rainfall, prices of agricultural produce and certain factors peculiar to individual situations which influence the decisions of the farmers regarding the crops to be cultivated. The selected village,[1] Karkata from Latur Taluka, Osmanabad District, Maharashtra State, belonged to jowar-cotton-groundnut tract. The

1. The village was first surveyed in 1955-56 and resurveyed in 1962-63 in the scheme of continuous village surveys in the Agro-Economic Research Unit for Western Region located at the Gokhale Institute of Politics and Economics, Poona, by the Union Ministry of Food and Agriculture.