INTRODUCTION , OBJECTIVE METHODOLOGY

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INTRODUCTION :

The principles of scientific discoveries when applied to agriculture are termed as 'Technology' and the acceptance of such technical knowhow by the farmers is the technology adoption. Technology adoption is considered to be essential to bring development in agriculture.

The adoption of technology creates a radical change both in pattern and process in agricultural production. This implies a shift from the traditional agriculture, harnessed by the ecological conditions to the modern agriculture based on the scientific utilization of resources. As such technology adoption in agriculture is mainly expressed through the optimum utilization of resources in the form of inputs and through different production techniques.

The spatial variation of agricultural practices, as is well known, depends on the spatial variations of ecological conditions which have in their turn reflections on the behavioural pattern of the persons engaged in agriculture in a particular region. This is why fundamental differences in different regions have been marked in the agricultural sector. The regions where physiographic conditions are favourable, agricultural practices are observed to be much developed with a more civilized farming community than in the regions where the agro-ecological conditions are not favourable with backward agriculture. In those backward areas, farmers are poor and suffer from nutrition deficiencies.

The uneven distribution of development in agriculture implying differential adoption pattern of technologies, thus reveals a strong relationship between socio-cultural characteristics of the farmers and their innovativeness towards technology adoption. According to Prof. G. Myrdal the socio-cultural characteristics constitute the initial stage for technology development of any region, and the mode and magnitude of technology adoption are shaped by these characteristics.

In West Bengal the relation between the socio-cultural characteristics of the farmers and technology adoption by them has some interesting characteristics. In this State land is scarce and pressure of population on land is very high, with most its population engaged in agriculture. As a result there are innumerable size-classes. A large section of people are landless agricultural and marginal labourers. On this background the use of technologies demonstrates much diversities. It is generally low among the small farmers and high among the big farmers, but this trend varies depending on the degree of socio-cultural development of the adopters. The region with developed agriculture implying more adoption of technologies in the form of irrigation, high yielding variety crops, fertilizers etc. interestingly show a development in education, in mass-media contact and urban influences, which widen the acceptability of the farmers towards the new ideas. Obviously, this type of farmers enjoy greater ac ities with greater profit from agriculture and create a distinctive impact on the adoption behaviour. The droughtprone regions of West Bengal representing the districts of Purulia, Bankura, Birbhum etc. where agriculture is underdeveloped, education status, the

mass-media contact and the urban influence have been low with lower adoption of technologies while the favourable regions with developed agriculture show higher education status, higher mass-media and urban contact. This concordance strongly supports the contention of the hypothesis of the correlation between technology adoption in agriculture and the socio-cultural characteristics of the farmers in West Bengal.

Objective :

The over all objective of the study is to enquire into the pattern of adoption of technology in agriculture in selected regions of West Bengal and to investigate how technology adoption has been affected by certain basic socio-cultural characteristics of the farmers. The rationale of the study lies in the fact that, apart from purely physical and purely economic factors, certain socio-cultural variables are generally hypothesized to have affected the adoption behaviour of farmers, is an important measure particularly in agriculturally backward regions.

Methodology :

Data for the study have been collected mainly from primary sources through a field-based survey. Also, to supplement primary data, some secondary data have been collected from different official sources, journals and published statistics. The data collected from the village-level survey have been organised in such a way as to suit the empirical estimation in detail under two broad heads, namely, (a)technology adoption in agriculture in the villages and (b) relation of technology adoption in agriculture with the socio - cultural characteristics of the sample farmers.

Selection of the Sample Villages

The study has been mainly based on an investigation, mainly on an empirical survey. First of all, the State of West Bengal has been classified into five physico-climato-edaphic regions (after Sen's Report I. C. A. R) namely,

1. Hilly region
2. Terai region
3. Plains of Bengal
4. Plateau region
5. The coastal and deltaic plain.

The basis of the classification is physio-climatic and soil characteristics. For the study purpose, of these five regions the hill region which is uniquely represented by the Darjeeling district had to be excluded owing to political unrest and consequent difficulties of data collection during the period of field survey.

The empirical survey has been based on an investigation of a sample cultivating households during the agricultural year 1988-89 in fifteen villages, with three villages in a cluster selected from each district from each of the four regions. Accordingly Jalpaiguri district from Terai region; Burdwan and Nadia from the Bengal plains; Bankura district from plateau region and South 24-Parganas district from the coastal-deltaic plain have been taken into consideration.

The sample mouzas on a cluster basis in the five districts (as mentioned earlier) have been selected at random-the proportion being 2.5% of the total number of villages, as obtainable from the 1981 census.

Within the identified village clusters, keeping in view the use of agricultural technologies , a sample of 5% of large, medium, and small-farmers have been chosen on the basis of the population distribution (universe) of such holdings. By large farmer is meant those who owned land of 10 acres (4.04 hectares and above), by medium farmers those holding land between five and ten acres (2.02 and 4.04 hectares), and by small farmers those holding land less than five acres (2.02 hectares). The statistical method of the field survey has thus involved stratified proportional random sampling. The number of sample farmers selected in the blocks in the five districts is as follows :-

	Block/District	**Number of farmers**
1.	Jamalpur (Burdwan)	19
2.	Onda (Bankura)	21
3.	Chapra (Nadia)	11
4.	Sagar (South 24-Parganas)	36
5.	Maynaguri (Jalpaiguri)	31

Thus one representative block from each of the five districts, mentioned earlier, has been selected for detailed study.

The different components of improved agricultural technology are taken to be the following :

(a) the use of high-yielding variety seeds, particularly in rice, because rice is by far the major crop of all the districts of West Bengal;

(b) the use of chemical ferilizers under the three catagories (i) nitrogenous , (ii) phosphatic, and (iii) potassic;

(c) improved implements under the heads -
(i) tractors, (ii) Irrigation equipment, and
(iii) other implements ;

(d) plant protection involving the use of (i) pesticides, (ii) insecticides, and (iii) weedicides.

In analysing the degree of adoption of different components of improved technology, the number of farmers adopting a particular technology-component, expressed as per cent of the total number of farmers, has been taken as the adoption index for that particular technology component. We have also used a Composite Technology Adoption Index (CTAI) of the individual farmers in this connection. The CTAI has been calculated by ascribing various weights(points) to the different improved practices.

These weights are as follows :-

Use of high-yielding variety seeds	19 points
Use of nitrogenous fertilizers	20 points
Use of phosphatic fertilizers	12 points
Use of potassic fertilizers	8 points
Use of tractors	10 points
Use of irrigation equipment	14 points
Use of other implements	6 points
Use of plant protection	11 points
Total :	100 points

With the help of this, scores have been ascribed to the individual respondents and on the basis of the total scores ascribed, the respondents have been grouped into four categories of non-adopters (0 point), low adopters (1-50 points), medium adopters (51-75 points), and high adopters (76 points and above).

The indicators chosen to assess the social and cultural characteristics of farmers in relation to their technology adoption are

(a) education; (variable x_1)

(b) mass-media contact ; (variable x_2)

(c) urban contact ; (variable x_3)

(d) caste and ethmcity (variable x_4) and

(e) personality or psychological traits (variable x_5)

Here also, the status of the individual sample farmers in terms of these variables has been determined with the help of a scoring and ranking system which is explained in the relevant chapters.

Quantitative Techniques

Different techniques have been used for the quantitative analysis depending on their suitability. Thus with a view to understanding the nature of the agricultural profile of different region, several indexes, such as cropping-intensity index, productivity index, crop-diversification index, along with the technology adoption indices have been used. To consider the relation between technology adoption and socio-cultural characteristics of farmers, the Spearman's rank correlation technique (with suitable correction factors) has been applied, besides simple tabular analysis.

The entire study has been arranged into six chapters excluding the present one dealing with the conceptual frame work of the study. The first chapter deals with the physical layout of the State which obviously has a significant influence on technology adoption in agriculture, as well as on the socio-cultural characteristics of the farmers. In the second chapter, an analysis of the agricultural characteristics of the selected districts has been discussed. In the third, fourth and fifth chapters, the block-wise (representative) technology adoption pattern and socio-cultural characteristics of the farmers, along

with their statistical association have been dealt with. In the sixth chapter, an over-all or composite analysis based on the case studies of the selected five blocks has been attempted.

In the conclusion a short analysis of the emergent picture has been provided.