Chapter-VI

Findings, Suggestions and Conclusions
The basic thrust of the present work is centered around two important issues—population and agriculture. In a developing country like India with agriculture as the base of the economy, the coordination of these two issues is inseparable. But except a few areas of the western part of the country where green revolution is successful, the nexus between population and agriculture is not satisfactorily developed. Assam is no exception and for that matter, the district Jorhat is also in the same line. After a detailed examination of the population and agricultural relationship of the area, it has come to the notice that the quantitative and qualitative dimensions of the district’s population are yet to be utilized for the development of agriculture inspite of having its suitable agro-ecological conditions. The present study has revealed a number of interesting facts regarding the nexus between population and agriculture. These are given below;

1. The population of the district has been increasing at a rate 33.10 percent (1971-1991). Although low in comparison to other districts of Assam, yet the present rate is enough to lead for higher pressure of population on existing land resources (306 persons/km², higher than the state’s average of 286/km²). Unfortunately, the agricultural structure of the area remains traditional except a certain variations. This indicated by the low use of high yielding variety of seeds and fertilizer and lower productivity of crops. For instance, the average yield of all kinds of paddy in the area is only 1560 kg/ha compared to more than 2000kg/ha in other parts of the country. Thus, the area remains in poverty in the midst of plenty as far as the potentials for agricultural development are concerned.
2. While examined population and agricultural characteristics of the samples of four agro-ecological zones in the light of five determinants, viz., family size, population density, literacy rate, size of land holding and crop intensity, then a few interesting features have come in to the notice which are common for all ecological zones. These are:

a. With the increase in the size of family, the dependency ratio and the proportion of labour to the total population are found to be increasing. This has resulted more use of labour input per hectare of land than required. Among the agricultural attributes, the size of land holding is seen to be increasing with the increase of family size. The causes are apparent, i.e.; larger family size means more dependents and more labourers as the persons below 19 years of age are also the potential labourers for agricultural practices. Moreover, large families are the joint families and yet to divide their agricultural land among themselves and as such larger holding size is seen among these families;

b. With the increase in the density of population, the educational status (high school and above) and the supply of labour is becoming abundant. But land holding size and production per unit of labour declines significantly. Higher density means higher pressure of population on agricultural land and, therefore, labour intensity is more on agricultural land resulting lower per capita output;

c. With the increase in the share of literate persons (below lower primary level) in the households, family size is becoming larger. This is attributable to the fact that poor educational status has caused for a lack of awareness among the people relating the benefit of small family norm. Since the educational background is poor, labour productivity is also lower;
The effects of land holdings are seen over both land and labour productivities. Larger the size, higher is the volume of production and productivity. This signifies the fact that productivity is basically a function of the horizontal expansion of agriculture rather than the vertical expansion, indicating a traditional structure in the prevailing agriculture.

Changes in crop intensity is seen to be developing due to the pressure of population, but the changes are not perceptible and have no specific pattern to be identified.

Examining the relationship between population and agricultural attributes through correlation matrix, following facts have been derived,

a. Regardless of the type of agro-ecological conditions, the density of population (i.e., pressure) has emerged as the most influential factor in determining the intensity of labour structure. This suggests that whenever the pressure of population is more, the supply of labour to the agricultural practices is also more in a situation where agriculture is the main occupation and employment opportunities other than agricultural sectors is extremely limited.

b. As soon as supply of labour is more to the agricultural operation, the intensity of labour input per hectare of land is also more leading to a decline of per man production, i.e., labour productivity. This is what exactly happening in the study area.

c. The hypothesis proposed “under the conditions of abundant labour supply, land productivity moves up with the decline of labour productivity” is only partially valid. Because, with the increasing use of labour input per hectare of agricultural land in various agro-ecological zones, the land productivity is not moving up as expected in the hypothesis (although the relationship is positive, it is not significant
even at 95 percent confidence level), but labour productivity is declining significantly. Thus the second part of the hypothesis is valid in the study area.

d. Regarding the second hypothesis that the "intensity of cropping at a greater scale is emanating from the higher density of population" is also not strongly applicable. Although both density and crop intensity is positively related in all agro-ecological zones of the area, yet the relationship is not significant even at 95 percent level of confidence. It indicates that whatever the change in crop intensity is taking place, it is not due to the higher density of population alone but due to the other physical and non-physical factors.

4 Examining the role of population factors on the development of agriculture through multiple regression analysis, the following facts have been obtained;

a. The multiple effects of population factors on land productivity in the hilly zones (moderately steep to steep land and piedmont zones) are found stronger than that of the plain zones (built up and flood plain zones). More than 50 percent of variations in land productivity of the hilly zones are explained by population factors alone and only less than 50 percent of variations are explained by the other factors.

b. Similarly the multiple effects of population factors on labour productivity in the hilly zones are stronger than that of the plain zones already stated. More than 70 percent variations in labour productivity are explained by population factors in the hilly zones while in the plain zones, less than 40 percent variations in labour productivity are explained by population factors.

c. In determining crop intensity, population factors are again found to be playing significant role and more than 50 percent of variations in crop intensity in the hilly zones are being explained by population factors. In the plain zones, it is less than
40 percent and thus the role of other factors are seen to be more prominent (more than 60 percent).

5. The study has confirmed that the population and agricultural attributes are interrelated. But depending on the nature of agro-ecological conditions, the degree of relationship tends to vary as reflected by the four agro-ecological zones of the area. Similarly, the impact of population factors on agricultural development also depends on the type of agro-ecological conditions. More suitable ecological setting means lesser effort of man, as the environment is easier to utilize and opposite is the case when environment is comparatively difficult.

**Suggestions:**

The present work reflects not only the population-agriculture nexus under different agro-ecological settings, but also reveals some interesting areas of research that a geographer can pursue to enrich the theoretical basis of the subject. In this context, the following suggestions can be made for conducting research in due course of time.

First, the distance factor can be incorporated in examining both the population and agriculture characteristics and also the variations of their relationship according to the variations of the distance either from the nearest nodal centres or from the main road. Distance is an important aspect in geography and it forms the basic dimension of space with considerable influence on the operation of the spatial system (Knowles et al., 1998). It is also stated that for the development of inherent agricultural potentialities, road accessibility is a dire needs (Singh and Dhillon, 1994, p. 173) which is determined by the distance both in time and cost perspectives. The fact is that with the increase of distance, the land use pattern tends to vary. Sandhu (1977) studied the variations in the intensity of sugar cane cultivation in the light of accessibility in Haryana. With a view to classify areas in the context of accessibility, the Chief Engineers (1958) recommendation (known as
Nagpur Report) is seen to be relevant in Indian agricultural context. It says that areas lying within 4 km from a transport point are treated as “fairly accessible”, within 8 km as “simply accessible”, but beyond 8 km as “inaccessible” and beyond 16 km as “highly inaccessible”. The objectives of this classification is to see that in a highly developed agricultural area no village is more than 3 km away from a link road or more than 8 km away from a main road (Singh and Dhillon, 1994, p.173). In what ways the model is applicable in examining the agricultural structure of the state in general and Jorhat in particular is a vital question that the geographer of the region can answer for the betterment of the society.

Secondly, smaller and smaller areas can be taken up as a micro areal unit of investigation. The attributes of population and agriculture and their interconnection can be studied against the backdrop of the distance from the nearest urban centres located within the smaller regional unit. Thus a hierarchy in the regional system can be worked out which would be more meaningful in analyzing the spatial structure of agricultural activities in relation to the human population. In Jorhat, for instance, there are 223 villages in the Jorhat Thana itself over an area of 500 sq. km. Out of this total villages, 20 percent of villages lies within 8 km of distance, 50 percent lies within 8-16 km distance and 30 percent lies beyond 16 km distance from the Jorhat town (1991). How far these clusters of villages vary in terms of their population and agricultural characteristics and in what ways the distance factor contributing towards such variations, can be an interesting aspect for detail investigation. It will help in formulating models for planning and development of the area.

Thirdly, the study has also revealed that a large part of the population has been not properly utilized. This indicates that due to the abundant supply of labour to the agricultural practices, there exists under utilization of labour input and the contribution of
additional labourers to the production process is insignificant. Geographers have immense scope to formulate models that can give direction to the systematic use of the qualitative aspects of the population of the study area.

Conclusion:

Analyzing the present situation of population and agriculture of Jorhat, it can now be concluded that there is a need for micro level studies incorporating these vital issues. Reviewing the works on population-agriculture relationship, Kulkarni (1981, pp 355-356) commented that "it is essential to investigate whether agricultural change in a region is more a matter of a community's effort and of its attitudes to the adoption of new methods, and whether the human efforts and attitude are the result of the community's response to demographic pressure. At the same time, in those regions in which a notable agricultural development has taken place, it is essential to study the impact of this development has had on the demographic situation of that region". Although he is in favour of macro level studies, yet the basic issues relating population and agriculture and their interrelationship is highlighted as relevant in the developing countries like India. Agricultural development strategies should be formulated only after considering the population parameters because the latter is the basic input in agricultural development.

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References:


*Census of India (1971)*, *Primary Census Abstract, Sibsagar District*, Series-3, Assam.