Chapter IV

Empirical Findings
Economic structure of India in general, and that of the relatively less developed regional economies in particular dominated by the agricultural sector. Agriculture is, by and large, a rural industry and the rural India is real India. In 1981, 525 million out of 685 million Indians resided in 5.7 lakh villages, which constituted 77% of the total population. The largest proportion of the gross domestic product and the greatest share of the total employment are accounted by this sector. Out of these 525 million rural people, 253 million belong to the rural labour force, majority of whom are absorbed in agriculture. In fact, about 69% of the total work-force is employed in the rural sector of the Indian economy. In 1971, agriculture accounted for 49.2% of the total net domestic product, but the agriculture's share in net domestic product has tended to decline with the result that in 1985 its production has come down to 32.6% of the total. This decline notwithstanding agriculture still accounts for roughly one-third of the net national domestic product. Thus, agriculture happens to be the mainstay of almost the entire population in the rural segments of the national and regional economies. This predominant place of agriculture reflects the lopsided economic structure due to inadequate diversification of the rural economy. Besides, the disproportionately large population base of the rural economy paves the way for the absorption of the dominant proportion of the ever increasing
size of the labour force at extremely low wage rates in agriculture. Consequently, most of the poor and those living below the poverty line reside in the rural areas. In 1977-78, according to the Planning Commission estimates, 51.2% of the rural population lived below the poverty line. This percentage has, however, come down to 40% in 1984-85.

Agricultural development, like industrial development, needs technological upgradation of the production processes. It is the technological transformation which lies at the base of economic growth. The better and more efficient techniques make factor inputs capable of producing more output with a given quantity of inputs or the given output may be produced by a smaller quantity of the inputs. Such results normally reflect the changing levels of factor productivities or their reciprocals defined as input coefficients. In case of agriculture, land and labour are the most dominant factor inputs, whose productivities can also be raised by investment in new technology associated with the use of land augmenting inputs like water, fertilizers, pesticides, H.Y.V. seeds, diesel/electricity, and investment in general programmes of land improvements like bunding, fencing, terracing etc. The investment of this type in agriculture has already yielded remarkable results in the form of Green Revolution that has materialised in some of the regions of the country.
However, the tribal economies of North East India are afflicted by a rather different problem. Jhumming happens to be the most prevalent type of cultivation, and this is supposed to represent a backward and obsolete technology. Settled cultivation is assumed to be associated with the better technology than the one associated with the jhum. This has at least been the basic premise on which the programmes of the controlling and the gradual eliminating of the jhum have been based. This study seeks to test the empirical validity of such hypotheses.

In this study, we deal with the differences between employment, output/income from land and productivity of labour between the jhum and settled cultivation. This study has been designed mainly to examine two inter-related hypotheses:

1) Settled cultivation is more labour absorptive both in absolute terms as well as on per unit of land cultivated basis than the jhum.
2) Settled cultivation is capable of producing greater output, both in absolute terms and on per unit of cultivated land basis than the jhum.

Assumptions and Adjustment of Data:

Differential employment implications of the jhumming and settled cultivation cannot be examined with the raw-data. So we have standardised the data relating to employment in
order to avoid arriving at erroneous inferences. This is necessary due to the differences between family size, holding size, and the probable existence of disguised unemployment in the jhum cultivation which is based mainly on family labour. Disguised unemployment is postulated to be the dominant feature of the subsistence economies in general and subsistence agriculture in particular. Besides, it is mainly a trait of family labour. Jhum cultivation is generally carried on in those areas which are economically backward but whose factor endowments are generally dominated by the high land-man ratio. However, ever increasing population through time tends to alter this initially favourable resource endowment. Population pressures and the consequent decline in land-man ratio generally lead to a reduction in the jhum cycle. Due to lack of other employment avenues, larger and larger numbers have to be absorbed in cultivation even though they may fail to get full-time employment or even economically meaningful partial employment which leads to the disguised unemployment. Small holding size, non-commercialized and self-reliant cultivation almost merging on subsistence levels happen to be some of the characteristics of the jhum. Hence, the possibility of the presence of the disguised unemployment in jhum cannot be ruled out. For examining this possibility, data have been adjusted by the number of hours and the number of days worked by the given number of persons on the farm holdings.
Disguised Unemployment

From our questionnaire, we know the number of hours for which each member of the households works on the farm and the number of days of the week for which the farm workers of the households work on the holdings. Number of hours worked daily are first converted into the number of hours worked in a week, which are then converted into the number of hours worked in a month. This is multiplied by 12 to get the total man-hours worked in a year. Then, we assume that one-man day consists of eight hours and one week consists of six man-days. Practically all the farm households have reported that they work six days in a week though the daily number of hours worked vary from household to household. Each household keeps Sunday as an off-day. These norms are then used to obtain the standardised number of persons who get employment on the given holdings during the period of one year. The difference between the standardised number of persons employed and the number of persons who actually work on the individual farms then furnish us estimates of the disguised unemployment.

The results show that in all 61 persons in agriculture taken as a whole are disguisedly employed and the respective shares of jhum and settled cultivation in disguised unemployment are 33 and 28 respectively. Thus, the incidence of disguised unemployment appear to be higher in jhum than in settled
The holdings under the jhum are 2.5 times more than the holdings under the settled cultivation. Therefore, for a rigorous evaluation of the hypotheses these figures have been converted into the averages.

The disguised unemployment per acre in agriculture taken as a whole in the village is 1.22 men per annum, while the disguised unemployment in jhum is only 0.917 men per acre. In the settled cultivation the number of disguisedly unemployed persons per acre is as high as 2, which exceeds the disguised unemployment in jhum as well as the agriculture taken as a whole. Thus, the inference drawn from the comparison of absolute figures is reversed.

The difference of disguised unemployment between the jhum cultivation and agriculture as a whole is not significant, t-value being as low as 1.25. As against this, the difference of the disguised unemployment between the settled cultivation and agriculture as a whole is statistically significant, t-value being 2.013. Therefore, the average incidence of disguised unemployment on jhum and settled cultivation must also differ significantly which actually is the case. The t-value of the mean differences is as high as 5.33.

Thus, disguised unemployment affects the settled cultivation much more than the jhum cultivation.
These results highlight the inadequacy of the agricultural sector of the chosen village economy to absorb the labour force in economically meaningful sense. So the economy is in urgent need of the generation of more employment opportunities in the non-agricultural sectors of the economy. The fact that the settled cultivation bears the much greater incidence of disguised unemployment than the jhum, also suggests that the mere conversion of the jhum lands into the settled fields cannot solve the problem of generating economically viable employment opportunities.

**Employment Intensity**

Standardised employment in the settled cultivation is 34.51 men as against total employment of 190.19 persons in agriculture as a whole. The remaining 155.58 persons are employed in the jhumming. Thus, the settled cultivation accounts only for 14.08% of the total employment, though it accounts for as much as 28% of the total holdings in the village, while these settled holdings are spread over 67.5 acres out of the total 222 acres of cultivated area as a whole in the village. Thus, the settled holdings account for 30.41 percent of the total area cultivated in the village. The proportion of the total employment generated by the settled cultivation is only half of the proportion of the holdings while it is even less than half the proportion of the area that it accounts for in the
total area cultivated. As against this, the jhum absorbs 85.91% of the total agricultural workers in the village though it accounts only for 72% of the total holdings spread over 154.5 acres. The area under the jhum is 69.59 per cent of the total cultivated area. The differences of these proportions suggest that the jhum is the more labour intensive technique than the settled cultivation.

The inference is further tested by the t-value of the mean differences. Employment per acre in the jhum and in the settled cultivation is 1.01 and 0.51 persons per acre respectively. Thus, on an average the jhum generates 1.98 times more employment than the settled cultivation. This difference between the two means is highly significant, t-value being as high as 68.91.

The relative shares of the two types of cultivation both in open and disguised employment are significantly different. Thus, the jhum emerges as more labour absorptive than the settled cultivation, while the latter is much more prone to disguised unemployment than the jhum cultivation.

The differences between the absolute levels of employment in the two types of agriculture might have arisen from either the difference in the number of holdings or the total area cultivated. The first factor has been neutralised by the consideration of employment on per acre basis. Similarly, the
influence of the difference between the number of holdings in each type of cultivation will be eliminated if we consider employment on per holding basis.

In this case also, there is a significant difference in the labour absorption capacities of the holdings under the jhum and settled cultivation. The employment per holding in jhum cultivation is 4.44 persons, while that in settled cultivation it is 1.196 persons. The value of 't' of the difference between the employment per holding in the jhum and settled cultivation is 2.49 which is statistically significant at 5% probability level.

The difference between the employment per holding in the settled cultivation and agriculture as a whole is also significant, t-value being 2.13. However, the difference between the labour absorption per holding in the jhum and in overall agriculture is not significant, t-value being as low as 1.32.

These results imply that each holding under the jhum cultivation generates more employment than the holdings under the settled cultivation.

**Holding Size**

Both employment and output are generally related to the size of the holdings under cultivation. Besides, the holding size is also associated with certain socio-economic traits.
For example, most of the owners of small and marginal holdings cannot afford to engage hired labour. At times, they themselves may not be able to get full employment on their own holdings. This may force them to offer themselves as wage workers in order to supplement their family incomes. So, family labour and disguised unemployment are mainly associated with the marginal and small holdings. It may suggest that our results imply that the average holding size under the settled cultivation is less than the average size of the holdings under jhum, and that the marginal and small holdings may be more numerous among the settled than the shifting holdings. Similarly, weak economic base of these owners may not permit them to undertake the investment designed to improve lands and the yield - raising-technology. Hence, the per acre yield and the employment may also be relatively low. But the jhumias may also be deterred from undertaking such land improving and yield raising investment as their fields may shift from time to time. The investment in land that is to be abandoned in future is likely to be envisaged as the waste of individual resources. In order to evaluate the influence of such factors upon employment generation impact of the jhum and the settled cultivation, we have compared the average size of holdings under the two types of cultivation. Average size of holdings in agriculture as a whole in the village is 4.44 acres, while the average size of holdings in the jhum is 4.292 acres and that of the settled cultivation is 4.82 acres.
If for some socio-economic and other reasons, it is desired that the jhum should be replaced by the settled cultivation, then the implications of these findings would have to be kept in view, lest the policy should fail.

If the jhumias are persuaded to become the settled cultivators, then alternative employment opportunities will have to be provided to those who will be released from their jobs as a consequence of the conversion of jhum into settled cultivation which needs less labour than jhum. The additional job opportunities may be provided in agriculture itself as only a fraction of the holdings owned under jhum are cultivated each year; whereas the settled cultivation may facilitate the continuous cultivation of each plot of land which implies more intensive use of land. For optional use of the land resources, it is imperative that only the jhum lands are converted into the settled holdings but these holdings are bestowed with an adequate investment in land augmenting inputs like fertilizers, high yielding variety seeds, etc. So that the levels of employment, yield, output and hence incomes may be raised commensurately. But this will need substantial investment. The employment may even have to be supplemented by additional opportunities in the non-agricultural sectors of the economy. This, in any case, seems to offer a better solution as both the jhum and settled cultivation are characterised by the existence of disguised employment.
Labour Productivity

As seen from our results, jhum absorbs more labour. In absolute terms the shares of jhum and settled cultivation in disguised unemployment are 33 and 28 respectively. However, after converting these absolute figures to averages we see that disguised unemployment affects the settled cultivation much more than the jhum cultivation. But as jhum is more labour intensive than the settled cultivation, and as production of output in the jhum is less than the settled cultivation, it is obvious that the productivity of labour in jhum is lower than the settled cultivation, and this is actually the case because from our data we have computed that the average productivity of labour in agriculture as a whole is 843.109. In the jhum cultivation, it is 282.477 and in the settled cultivation the average productivity level of labour stands at 2284.73. The settled cultivation absorbs less labour than the jhum but it yields higher income to those who succeed in getting absorbed in this type of cultivation. Thus, the productivity of both the land and labour in the settled cultivation is higher than their corresponding levels in the jhumming. So the settled cultivation is capable of making much better and effective use of both the primary factors of agricultural production, viz. land and labour. As the North-Eastern economy is a labour scarce economy, jhum is an inappropriate technique of
cultivation. It accentuates the labour scarcity. Therefore, the conversion of jhum into settled cultivation will facilitate the loosening of the constraining influence of labour. Besides, the emerging scarcities of land will also be mitigated by the conversion.

We have already seen that overall output per acre in money terms is Rs. 1876.39. As against this, the output per acre in jhum is only Rs. 1618.04 while the settled cultivation yields an income of Rs. 2540.68. Thus, there is a significant difference between the output on per acre basis between jhum and settled cultivation, t-value being 10.38. Statistically significant differences also exist between the output levels of agriculture as a whole and jhumming; and agriculture as a whole and the settled cultivation, t-values being 5.49 and 8.812 respectively.

Income per holding for agriculture as a whole is Rs. 6350.4, whereas for the jhum and the settled cultivation corresponding income levels on per holding basis are Rs. 3883.2 and Rs. 22680 respectively. As expected from our earlier results, income from the jhum is much less than that from the settled cultivation. It is also less than the average income of the total agriculture. In fact, the income per settled holding exceeds the overall average by 257 per cent, while it is 484 per cent above the average of jhum whose income falls below the overall average by as much as 65
per cent. For purposes of evaluating the adequacy or inadequacy of income, family is the appropriate unit for consideration. It is obvious, thus, that the families of the settled cultivators are 484 times better off than the families of the jhumias. The value of $t$ of the differences of output per holding between jhum and settled cultivation is 8.26 which is statistically significant. The difference of income between jhum and overall agriculture is also significant, $t$ value being 3.85. The difference of income between settled cultivation and overall agriculture is also significant as the $t$ value is 7.66.

These results have important implications for the rural poverty alleviation programmes and policies. Our study area, in fact the whole of North-East India is a labour scarce economy. If the jhumias could be made to take up settled cultivation, then the constraining influence of labour may be reduced to a great extent. Adoption of the settled cultivation will raise the level of income of the cultivators. However, the investment costs involved in the conversion of the jhum holdings into the settled ones is also warranted by the differentials returns on investment in such programmes. To be precise, the investment will be justified on economic grounds as the net rate of return on investment derivable from the lifetime streams of the differential incomes relative to investment required for the conversion of the plots into settled holdings and the adoption
of the alternative mode of cultivation is substantially higher than zero. But we do not have any information about these investments and the durability of the converted holdings. So we cannot pass judgement about the time period needed to recover the invested capital.

Initial costs of the conversion may, however, be partially or wholly borne by the government. As the income differentials are to accrue to the cultivators, economic attractiveness of the conversion can easily be demonstrated to the intended beneficiaries.
Output

Agricultural income of a farm household depends upon two factors:

Amount of output and the price commanded by it in the market. Output itself is, however, a function of two factors - area and the yield. In order to neutralise the role of area, yield or output per acre may be considered. Yield in fact is an indicator of the productivity of land which, of course, depends largely upon the techniques of cultivation. Yield or the average productivity of land represents the capacity of the land inputs to produce output. A study of the factor productivity reveals if its capacity to produce output is increasing or decreasing through time, similarly, a comparison of the average productivities of a given factor input in two distinct activities at a given point of time reveals the degree of effectiveness with which the given factor is being used. It often reflects the differentials between the two techniques or methods of production. Therefore, a comparative study of overall output and yield per unit of cultivated land under jhum and the settled cultivation is likely to throw light on the efficiency with which land is used in the two modes of cultivation.

As a number of crops are raised on the holdings under both the settled and the jhum cultivation, it would be
desirable to compare crop wise yield rates of the two methods of cultivation. This is important from another viewpoint also. Different crops generally command different prices in the market. Therefore, the yield of high value crops in money terms, even if the productivity of land in terms of the physical output is relatively low, may be high.

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But we find it difficult to compare the cropwise yield in physical terms as the jhumias plant different crops in the same plot at the same time. This makes it difficult to determine the area under each crop even if the cropwise output is measurable separately. So we will examine the yield rates of all the crops taken together in money terms, though this does not preclude the possibility of the comparison of cropwise yields. But the estimates may be highly rough approximations. This is also possible only in case of the main crop of paddy.
The main crops grown in the village are rice, potatoes, millets, maize, chillies, ginger, cotton, pineapple, papaya, banana, sesamum, brooms, turmeric and vegetables like peas and brinjal.

Overall output per acre in money terms is Rs. 1876.39. As compared to this, the output per acre in jhum is Rs. 1618.04 and in the settled cultivation it is Rs. 2540.68. Thus, it is obvious that the income per acre derived from the jhum is the least as its average is lower than the overall average as well as the corresponding average income from the settled cultivation. Besides, the average income from settled cultivation is higher than the overall average as well. Thus, the income per acre from the settled holdings is 57 per cent more than the per acre income from the jhum, and the average income from the settled cultivation exceeds the average income level of the total agriculture by 35.4 per cent. The average income from jhum falls short of the overall average by as much as 15.97 per cent. Thus, the jhum cultivation emerges as the less productive of the two modes of production. The differences of Rs. 922.64 in absolute terms and 57.02 per cent in relative terms are quite high. At the margin, the differences are likely to be very substantial as well.
Marketed Surplus

Marketed surplus is that portion of the agricultural produce that is actually sold to the market. It is, therefore, that portion of the produce which is made available to the non-cultivators by the farmers. We should, however, distinguish between the concepts of "marketed surplus" and "marketable surplus. The former is that which we have explained above; but the latter term is marketable surplus represents total surplus which producers can potentially supply to the market. This is that portion of the produce which will be left in the hands of the farmers after meeting their own requirements of consumption, payment of wages in kind, feed, and seed requirements, etc.

In case of poor farmers, marketed surplus may be larger than the marketable surplus because they sell out of distress and have to repurchase later, in all probability, at higher prices in order to meet their consumption needs. Thus, in case of poor small and marginal farmers, marketed surplus may be larger than the marketable surplus whereas in case of rich farmers, marketable surplus may be greater than the marketed surplus. The case of rich farmers is different. They can often afford to keep a portion of their marketable surplus in the form of stocks, in order to realise the benefits of higher prices in lean seasons. Hence, for them marketable surplus may be greater than the marketed surplus. This will
hold true especially in the harvesting season.

Mathur and Ezekiel opine that the significance and appropriateness of the two terms (Marketed surplus and Marketable surplus) depends upon the nature of an economy. In developing countries, producers sell that amount of output which is sufficient to meet their necessary cash requirements, and it is consumption rather than the sales which is treated as the residual. As against this, in developed economies, producers treat their consumption requirements as essential, while the sales are treated as a residual.

Marketable surplus can be gross or net. Gross marketed surplus refers to the total quantities actually marketed and net marketed surplus is the gross marketed surplus minus repurchases from the market for own use.

Increase in agricultural productivity is no doubt necessary for economic development in general and rural development in particular, but the pace of development cannot be sustained by the growth of agricultural productivity alone. What is needed is a concomitant growth of marketed surplus along with the growth of output. Growth of productivity tends to raise total output and income of the farmers which in its turn leads to changes both in the levels and patterns of consumption. There is an upper limit to the consumption of food by a household. Engel's law also establishes that the
proportion of income spent on food declines with increases in income. Hence, increases in output resulting from the growth of productivity raises the marketable surplus. Then, the investible funds required for raising the productivity levels can be generated only by raising the level of the marketed surplus if the growth process is to be sustained on a long term basis. In the absence of consistent growth of the marketed surplus, bottlenecks and constraints may emerge that will obstruct and stallify rapid development. The growth of marketed surplus is desired because it provides necessary funds for capital formation, it may also increase foreign exchange earnings if extra supplies are exported increased output reduces or eliminated the need to import agricultural goods to fill up the gaps between domestic output and demand, and which eases the problem of balance of payments. Thus, the level of the marketed surpluses may be used as an indicator of the stage of agricultural development and the level of prosperity of the cultivators. Hence, we have examined the average levels of marketed surplus both in jhum and settled cultivation.

In the surveyed village, the marketed surplus per acre in money terms for agriculture as a whole is Rs. 750.104. But the marketed surplus per acre in jhum is less than this and is equal to Rs. 658.41. But the level of surplus generated by settled cultivation is much higher than this. It's value is Rs. 985.88. Thus, the average level of marketed
surplus generated by the settled cultivators is 1.3 times more than the overall average, while it is 1.5 times the level of surplus generated by the jhumias. It implies that the conversion of jhum into settled cultivation is likely to lead not only to the accelerated agricultural development but it will also introduce greater degree of commercialisation of agriculture which will strengthen the linkages between the rural and urban segments of the economy. These figures reveal that the farmers of that village do not engage in subsistence agriculture irrespective of the mode of cultivation as these averages are decided significantly different from zero.

So far as the settled cultivators are concerned, they have high surplus in rice, while most of the jhumias face the paucity of rice for self consumption. They have a high surplus in millets. It implies that most of the millets are produced for the market while the cultivation of rice cater to the needs of self-consumption of the jhumias.

NOTE (ref. page no. 38)

1 It may, however, be noted that the malady of disguised unemployment in the developing economies like the Indian one has percolated from agriculture to the tertiary sectors of the economy in general and the administrative services and public undertakings in particular. It is this which partly explains the development of the tertiary activities ahead of the secondary sectors. Public enterprises and administrative services abound in attempts to disguise open unemployment of the educated.