PART THREE
THE CONCLUSION
CHAPTER XIV
THE FINDINGS AND ASSESSMENT

Introduction

In Part I, the existing conditions of the agricultural system were presented in the light of the prevailing topographical, social, political and economic background of Arunachal Pradesh. The manpower and other available resources of the Territory were surveyed, the technological and ecological circumstances assessed, and the important agricultural practices were described. However, a number of facets of the various problems could not be studied in Part I due to the non-availability of certain data.

Part II dealt with the field inquiry which was largely aimed at filling-up some of these data gaps.

This part, namely Part III, is presented in three chapters for the purpose of assessment and assimilation of the information contained in Part I and Part II and for thereafter, arriving at meaningful conclusions regarding the problems of agricultural development in Arunachal Pradesh. In the last chapter of Part III 'a solution' is presented in its broad outlines.
Summary of Part II

The terrain of the territory of Arunachal Pradesh is hilly and extremely difficult. Practically all the flat lands are situated in the foot-hill areas only. The ranges of hill are intercepted by numerous rivers and streams that do not allow of navigation but which are potentially rich in hydro-electric power. Large stretches of valley land are few and far between; the climatic variations are pronounced at different altitudes. The mineral resources of the territory are yet to be fully investigated and assessed, but they are believed to be potentially rich. The territory is also rich in forest wealth although this valuable asset has not been fully surveyed or optimally utilized. All the reserved and proposed-to-be-reserved forests are confined to the foothills adjoining the plains of Assam, thereby locking-up considerable areas of good flat lands under forests. There are already indications that the tribes would like to settle in these flat stretches and prefer the forests to be develop in the higher hills. There is a traditional wisdom in such a desire supported by the scientific fact that preservation of forests in the higher altitudes not only prevents erosion of the land but also prevents drying up of the

hill streams so essential for creating gravitational irrigation systems.

The area of Arunachal Pradesh is large, but the density of population is low. Very high percentage of the population of the territory belong to the Scheduled Tribes, who mostly depend upon agriculture. The cultivators use simple tools and exploit the land extensively with practically nothing but labour as an input. The prevailing agricultural practices are primitive. Also, a good part of the requirements of the people are collected from the forests.

Arunachal Pradesh is almost entirely a rural area. This rural society has not yet shaken off the shackles of its evolutionary bondage. Two economic characteristics continue to dominate economic landscape. Firstly, the extensive character of agriculture, resulting from the thinness of application of labour and capital, to large stretches of land, (which is the most abundant and the cheapest factor of production) and the confining of the input practically to the application of labour that adds nothing to the formation of capital in the agricultural sector. And, secondly, 'self-sufficiency', implying by that term not complete isolation from commerce, but production, as a rule, for home

1. It has 4 towns with total 17 thousand of urban population,
consumption rather than for sale.\footnote{1}

The shifting type of cultivation, locally called 'Jhuming', continues to be the predominant method of cultivation recognised and sanctioned by the Jhum Land Regulation, 1947. The Government policy of encouraging people to take to sedentary cultivation by giving subsidies etc. is yet to yield good results.

Customs, religion and ceremonial are interwoven into the various aspects of agriculture. Livestock plays a very important role in the lives of the people. A semi-wild species locally known as 'Methon' (Bos frontalis) is much valued on both religious and economic grounds and acts almost as 'money' in the barter trade. The people have very little to trade with, as there is hardly any domestic surplus for disposal. As already indicated the very few existing trade surpluses are bartered. A money economy is yet to take firm root in the area. Transport costs are forbidding, as trade goods are usually carried as headloads. The road coverage is very meagre and such roads as exist remain even more meaningless to the common

\footnote{1. Compare: Bidwell, Percy W, and John I Falconer in History of Agriculture in the Northern United States 1620-1860 - page - 115.}
man due to the absence of a regular public transport system. Trade is also somewhat inhibited by the provisions of the Inner Line Regulation which restricts investment from the comparatively more advanced neighbouring areas.

The inputs provided through the Plan effort were too small to bring about an appreciable change in the economic structure of such a large territory beset by so many natural obstacles. A very high percentage of villages continue to be deficient in food. The Government expenditure on food import in the last 16 years had been much more than the total Plan outlays since 1950-73.

The amount spent by Government on the real development of the agricultural sector had been very low. The biggest component of this expenditure went into the creation of an infrastructure of buildings, staff and other such elements.

Summary of Part II:

Agriculture is the main occupation of the people of Subansiri District and Eastern Kameng. This fact is confirmed by the 1971 Census. The census exhibits high work participation rates. A very clear division of labour exists between the sex and age groups. The trade and commerce carried out by the people is marginal and confined to the vil-
village community, excepting in the few villages that adjoin the plains of Assam or which are elsewhere situated near the roadheads.

There are practically no roads to the villages. Even when there are roads, there is no public transport system, and this perpetuates the same immobility as would have existed without roads. The enquiry revealed that only one village (in the lower belt adjoining Assam), possessed one bullock cart.

Markets are yet to develop. The exchange of produce now takes place at homes or near homes in the open places. Amenities like medical cover, electricity and water supply can be said to be conspicuous by their absence in the Survey Villages. An unfiltered, untreated water supply facility was available only in one village, the remaining villages drew their water from streams/springs. The inquiry revealed an insignificant incidence of domestic indebtedness. This is because the people do not have a domestic surplus. While this probably indicates a valuable social asset in the context of the general economy of the villages, it also indicates the lack of resources for investment within the village. The economy is yet to become fully monetised and the use of money
remains at a low level. Consequently, the mobility of money is negligible, for hardly any locally available surplus changes hands in consideration of payment in cash. The amassing of money wealth as is assessed by local standards is concentrated in the hands of a few people who form a "nouveau riche" minority.

According to the inquiry, for their sustenance the people depend heavily upon collections from the jungle in addition to the crops grown in the field. Eatables and other requirements like building materials continue to be collected from the jungle, which also provides most of the trade items. There is no domestic surplus of field crops available for trading, excepting a negligible quantity of small grains (millet) grown in the villages situated near the plains of Assam. As there is no domestic surplus, the secondary sector has no inherent incentive to expand, and as a result of this, social development has also remained primitive.

The tribes remain busy on different stages of agricultural work during most of the year. The time gaps between the agricultural operations are usually filled in by traditional, social and religious functions and festivals that are conceived and sustained
for the success of the agricultural operations. In the Tirap District, for example, the Wancho tribe initiates a new-born baby boy to his land within the first fortnight of his birth; and takes the skull of a dead ancestor to the field, which belonged to him during his lifetime in order to offer the deceased his share of the harvest. These rituals indicate the depth of the attachment of an individual to the land. In many societies, community clearing of the jungle, sowing, and harvesting etc. are done after sacrificing livestock by the community as a whole. (The sacrifice represents no basic waste as the animals killed are then consumed ceremonially).

Thus, in Arunachal Pradesh agriculture and its associated functions take up all the available time of the people and their dependence on agriculture for a livelihood has been shown to be very high. The resulting lack of availability of manpower for any other tasks, is of great significance.

The literacy rate is extremely poor and is especially low amongst the females. The Census of India 1971 and the inquiry confirm this.

The inputs in agriculture are negligible. Fertilizers and manures are not at all used. According to the inquiry, the high-yielding variety of seeds are being
introduced by a few individuals who have little education on the subject and who have not yet taken in any measures for irrigation or for the use of fertilisers along with introduction of the high yielding varieties. In fact, in the area surveyed, the high-yielding variety of seeds were found to have been sown only in Jhum fields. The tools and implements used continue to be primitive - excepting one village, the farmers do not even use a traditional plough.

It is further revealed that whatever agricultural development has taken place, especially in sedentary cultivation, had been done in the bigger villages. The smaller villages do not have the economic means and the manpower to switch over from Jhuming to sedentary cultivation and it is not possible for the Arunachal Pradesh Administration or any other agency to provide the infrastructure necessary to convert the smaller villages into progressive economic units using agricultural practices based on modern technology. The smaller villages have to come together to form bigger villages to be viable for agricultural development based on such modern technology.

There is a significant finding arising out of the study that a definite relationship exists between the size of a village, its capacity and its initiative for permanent
sedentary cultivation, and the educational standard of its inhabitants. The very fact of a village being found at the time of intensification of developmental administration to be large and settled, may naturally have qualified it, at an early stage of planning, for the grant of a school and other developmental facilities. But, it is equally clear, that education itself, by opening up the mind, makes the whole village population more susceptible and receptive to new ideas of progress. A definite relationship was found to be existing between the incidence of sedentary cultivation and the existence of a school in a village.

Though the overall economy of Arunachal Pradesh can be said to be in a primitive stage of development, the primitiveness differs significantly even between different parts of Arunachal Pradesh. In the region selected for inquiry, such differences were observed in the upper, middle and lower belts called Belts I, II and III respectively. Regional disparities are evident in respect of both the wealth and the income of the people. In the visible wealth of the people, livestock forms an important component. There is a pronounced difference between the per capita holding of livestock between the
Baits. Since at least one specie of livestock called the 'methom' is used as a medium of exchange for acquiring all other types of wealth (traditionally considered valuable) it may be assumed that the disparity in the aggregate of traditional wealth therefore also exists between the Belts.

The consumption pattern, also indicates regional differences between the Belts. The consumption data, although collected at a single point of time only, generally supports the data on production of the field crops combined with the collection from the jungle. These facts and the observed differences in the production and jungle collection data between the Belts, goes to prove the existence of regional disparities which are likely to increase, because the productivity of the land, and consequently the ultimate wealth of the people, is likely to reduce due to the shortening Jhum cycle in the more backward regions where the availability of land suitable for Jhuming is limited and where conversion of Jhum fields into sedentary cultivation is more difficult than in other comparatively more prosperous areas.

The inquiry contradicts a general and widely held impression and shows that the present consumption standard of the tribes cannot be considered to be low compared to
the average Indian standard of consumption. In fact, the food items consumed in Arunachal Pradesh, both in quantity and quality and judged from their nutritional balance or the caloric value, can be said to be superior to what an average peasant consumes in other parts of India. However, they are low when compared to the daily intake recommended by nutritional experts. As the food is at present greatly supplemented from the forest collection, this source will dry up soon with increase in the population pressure.

A very major finding of the enquiry is the relative productivity of the Jhum. The productivity of the Jhum fields differs amongst the three Belts, and Belt I which is considered the most backward, reported the least productivity. The 'supporting area' has a close link with the observed Jhum fields under cultivation. In other words, the area of the rested or potential Jhum fields is as important for an economy based on Jhum cultivation as the area actually under Jhum cultivation. In this respect also the different regions vary, and the more backward areas tie up larger areas of rested or potential Jhum fields per unit of area under actual Jhum cultivation. Thus, it may be concluded that, because of low productivity, larger areas are required to be kept tied up for Jhum cultivation in the
regions that have less productive Jhum fields compared to other areas. Topographical factors point towards the relative unsuitability of the weaker area for Jhuming, because the high hills of this region contain rocky and steep cliffs which cannot be turned into Jhum fields, and probably because of these factors the productivity of Jhum fields is lower in this area.

The Jhum cycle has reduced to nearly 6 years as against the 20-25 year cycle believed to have existed in the late nineteen forties. The reduction in the length of Jhum cycle, makes the Jhum fields less productive, and hence, either more areas will have to come under the destructive process of Jhuming, or the people of the area will become more poorly fed. This will happen more rapidly in the regions that exhibit a lower productivity at present. The Jhuming process will thereby accentuate the regional disparities.

The general theme of all writers on Jhuming, supported by the views of the Arunachal Pradesh Administration itself, is that the practice of Jhuming is wasteful and needs to be replaced by permanent cultivation. Many hill tribes of the neighbouring areas, like those in Nagaland, have already taken to permanent cultivation with benefit. They have now a marginal surplus in food.
grains. The general view is, therefore: Why not abandon Jhums in favour of terraces, here and now? If the people need help to construct terraces, there is money in the form of subsidies, loans or even outright grants. And, when the terraces do not come up, or when they come up but Jhuming still continues, amazement is expressed and incredulity develops.

Thus, both the Government and private agencies had been denouncing Jhuming everywhere - in Asia, America and Africa - and have been goading the people to take to permanent cultivation but without the expected success. Since "Jhum cultivation is so harmful and inefficient, how is it that the system has not been replaced by a better and efficient method of cultivation one may ask?" Various reasons have been advanced to explain why WRC/TRC is to be preferred to Jhuming; but an important aspect relating to certain weaknesses in the development of WRC/TRC, which had not come to light so far, were unfolded by the inquiry.

This inquiry strongly indicated that under the existing conditions, THE PRODUCTIVITY OF WRC/TRC IS LOWER

1. Source: Miranjan Saha in the concluding chapter of his Thesis on "the Economics of Shifting Cultivation in Assam, page 193 (typed copy).
THAN THAT OF THE JHUM FIELDS. This is mainly because the existing permanent fields, without the essential inputs, are not more than extensions of the Jhum fields MINUS the ash (in a burnt Jhum field) that serves as a fertiliser, and an insect, fungi and weed killer.

This discovery of a higher yield from Jhum fields is possibly the major finding of the inquiry and needs very serious further investigation. However, it may be mentioned that instances are already observed where the people, after constructing WRC/TRC fields with the Government subsidy, leave these fields subsequently uncultivated. This may be related to the low productivity of newly-constructed WRC/TRC fields, especially of those constructed on high slopes by severely disturbing the (more fertile) top soil, as against the reclaimed valley bottom lands which the villagers continue to cultivate although they are usually situated far from the villages as compared to the high slope terraces. The villagers also complain that even after leaving a freshly constructed terrace for the period equivalent to a local Jhum cycle, its productivity remains low by local Jhum standards. This implies, apart from other things, that the cultivation of WRC/TRC is conceived and practised in the
same way as an extension of Jhum cultivation. "Terracing can only be practised where the nature of the country, the soil and the water supply permit and where the people are usually energetic and progressive." There are other difficulties in the way of putting through the WRC/TRC programme. Demonstration and supervision of the construction of terraces has not been very scientific: the top soil has been allowed to be wasted resulting in the exposure of the less fertile lower soil strata, which, in absence of fertilisers and other necessary inputs, gives very little yield; irrigation facilities have not been made available in time, while sometimes there is even a total lack of water potential in the areas where terraces have been cut. There has not been adequate education of the people in the methods of terrace cultivation and of its benefits in the long run; attempts to introduce the villagers to the benefits of fertilisers have not been sufficient or rewarding. In the Jhum fields, the farmer grows a mixed crop that gives him a continuous harvest of one crop after another. The present fertility level of the terraces without any modern inputs does not sustain such a practice. All these factors have often inhibited the people from terraced cultivation, even after terraces have been constructed with Government aid. The cost of building the

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1. Elwin Committee Report, page 49.
terraces and improving their fertility is higher than the amount of the subsidy given, and is beyond the personal means and resources of the great majority of the people. Besides this, it places a strain on the available meagre manpower, in the initial stage.

The problems which must be faced in a large scale programme for converting Jhum lands into terraces are: the shortage of manpower needed for a large scale terrace building programme; the related question of high wage rates and the consequent high cost of terrace building; and in the meanwhile the risk of seriously jeopardising the current year's output of foodgrains during the construction of the terraces.

More physical construction of WRC/TRC alone is therefore not enough, and the present concept of WRC/TRC fields as an extension of the methods of Jhum cultivation on to a flatter but less fertile piece of land, needs be reviewed in the light of the above findings.

In the adjacent hill areas where WRC/TRC is traditionally extensive (like in the Angami, Mao and Tangkal Naga areas of Nagaland & Manipur) a number of indigenous methods are used to improve the fertility of the freshly constructed WRC/TRC fields. For example, cattle are

tethered on a slope just above the newly cut terraces and the droppings of the cattle are allowed to improve the soil texture of the terraces. Terraces as a rule, are submerged in water for as long a period as possible, even before sowing and long after the harvest.

This continuously enriches them with top soil carried from elsewhere and simultaneously assists a process of decomposition that brings about a beneficial change in the soil structure. The submersion of the terraces for most part of the year seems to help build a particular level of micro-organism that in turn, brings insoluble plant nutrients into solution. But this is yet to be established by experiment. Further, at the time of the construction of the terraces on a high slope, the Naga tribes often keep the original top soil aside in a heap and spread it back on the terrace after levelling is completed. The Monpas of the Western Kameng District decompose oak leaves in compost stacks with night soil and rubbish for ultimately spreading on the fields.

It is significant that the same more advanced tribes of the mentioned Naga areas, who have adopted extensive permanently irrigated cultivation for centuries, have yet not abandoned Jhuming totally. They have

\[\text{Compare: 'Hunger Signs in Crops' by the American Society of Agronomy Page 11.}\]
sought to improve upon their permanent cultivations by burning of the undergrowth in a method which resembles, but which is not totally identifiable, with the process of Jhuming. The pattern in such areas, notably in the Angami Naga area, is that even where construction of permanent irrigated fields is not immediately possible, certain hill slopes are gradually developed into permanent rainfed fields by the devices of contour bunding, first with the logs yielded by the Jhum and sometime by supplementary rough dry-stone masonry. In such transitional fields certain trees, notably the Oak and Alder, are left standing as the fallen leaves act as compost. The yield of these leaves is increased deliberately for this purpose by the cutting of upper portions of the tree for firewood and by pruning the new shoots annually under the process known as "Pollarding".

It is perhaps not a coincidence that the areas of Arunachal Pradesh which showed the readiest response to the recently publicised Crash Programme\(^1\) for permanent terracing, are the ones where the Jhum cycle had already sunk so low as to physically and obviously reduce the fertility of the soil. However, even in these places where the obvious infertility of the Jhum fields (compared to

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\(^1\) An All-India Crash Scheme of Rural Employment.
earlier days) rendered the people more receptive to the building permanent terraces, especially after financial assistance was provided, there are already signs that the newly-out terrace may shortly languish or be abandoned unless other factors conducive to greater productivity are introduced with imagination and persistence.

It is, thus, clear that mere condemnation of Jhuming as the most primitive agricultural practice involving destructive processes and regression of vegetation, will not be adequate to persuade the people to abandon it.

A more thoughtful approach has been suggested by P. De Schlippe in his 'Shifting Cultivation in Africa- The Zande System of Agriculture' (1956). He first recognised the background. Agriculture, he pointed out is one of the main links between a human group and the landscape in which it lives and which man exploits. Through agriculture every environment has taught its inhabitants a certain way of life. This realisation impelled him towards a deeper study of the possibilities of reducing the ill-effects of shifting cultivation without necessarily

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1. It may be re-called that the inquiry showed that the 91% of the household continue to practice Jhuming, and only 5% of the households had plots of permanent cultivation.
abandoning it totally. He discovered that in parts of Africa the people had themselves evolved techniques of assisting regeneration, once the cycle of fallow natural regeneration became too small. They began planting seeds of specific tubers and fast growing vegetation before abandoning the Jhum. The widely experienced Assam Forest Officer, Mr. P. D. Stracy, has also advocated similar specific farm-forestry of quick growing species in North Eastern India to speed up the regeneration of Jhums before the time comes for their next cutting and burning.

In a shift from Jhum cultivation to permanent cultivation, the whole problem of land tenure and the rights transfer of land arise, leading to something almost like a social revolution in the village. An area which might be fit for permanent irrigated terracing, may well have originally constituted an area whose cultivation was sanctified by tradition by a particular clan, community or family in rotation over the years. If properly developed for permanent terraces, the trend towards individual ownership of the irrigated terraces becomes naturally irresistible. Some of the new class in each village will then become
more wealthy than others and a scramble may arise to buy such terraces even outside the traditional orbit of ownership. The new system of irrigated terraces may bring in its wake the problems of conflict between the operational and traditional ownership. A special responsibility will devolve on the Administration for preparing the community to face, to overcome and sometimes to live with the stresses and strains that such a transition will produce. The abandoning of Jhuming will change the present way of life with the values attached thereto. What will be the new way of life and the new values has to be ascertained and sociological changes must be ushered in along with change in the mode of earning a living. This indeed, is a vast responsibility. The central theme remains; Any other type of agriculture has to be economically more profitable than Jhuming, and socially more beneficial to make the people change over from Jhuming to that anticipated type of agriculture. It must not only be theoretically more profitable than Jhuming, but seen on the ground by the villagers to be more profitable after specific demonstration of all aspects of increased production including the economics of marketing.
The inquiry went into an assessment of the relative costs of cultivation. In terms of labour, the Jhum is less expensive than WRC/TRC as the labour input is about 22 percent less. For an acre, a Jhum field requires Rs. 1,701 as input of labour as against Rs. 1,951 for a WRC/TRC field. But one acre of Jhum under cultivation requires a stand-by of about 6 acres of rested or potential Jhum land. Assuming that Rs. 2,000 is required initially for conversion of an acre of Jhum fields into WRC/TRC, it may appear, prima facie, that under given circumstances the continuation of the Jhum practice will be in the interest of the hill people, and that the investment in construction of WRC/TRC fields is possibly unwarranted. But, taking into account the potential forest wealth of the six acres of resting or potential Jhum lands that are required to support each acre of land actually under Jhum cultivation, it may be shown that the overall cost of Jhuming in terms of destruction is far more than in the development of WRC/TRC. Even if the forest wealth per acre for 6 acres of rested and potential Jhums (supporting each acre of Jhum field under cultivation) is valued at the low rate of Rs. 2,000 per acre, it is estimated that for every acre of WRC/TRC
constructed, Rs.10,000 of forest wealth is saved directly within two decades. The ravages by floods in the plains as the result of Jhuming in the hills may be prevented by abandoning Jhums, but an estimation of this additional saving falls outside the purview of the present investigation.

In the above, the productivity in yields of a Jhum field and of a WRC/TRC field are assumed to be of the same, but it is a common experience that the productivity of the Jhum field decreases with the shortening of the Jhum cycle; whereas the productivity of the WRC/TRC increases with time and finally stabilizes at a much higher level of productivity especially with the application of modern technology. On the other hand, the application of modern technology is hardly possible in the shifting Jhum fields as this requires investment of permanent nature, whereby land is no longer merely exploited of its natural productivity, but is improved upon to yield more.

Inquiries into the actual availability of land suitable for conversion into WRC/TRC fields, revealed uniform optimism. An inspection of the contour maps of Arunachal Pradesh confirms this view by indicating the existence of

1. Rs.2,000 to be initially spent on WRC/TRC deducted.
suitable land for sedentary cultivation in many river valleys, and slopes of up to 30° inclination. The availability of land for sedentary cultivation in Subansiri District and Eastern Kameng is estimated at 0.4 million acres which may be considered quite adequate for resettling the local inhabitants and putting the higher slopes under horticulture or forests. Of course, a part of these lands will contain stony, sandy and other types of barren soils which are not suitable for cultivation.

By applying better technology and inputs it should be possible to resettle beneficially in these likely areas a denser population having a diversification of occupation. Further more, unlike the remaining parts of the District where the application of modern technology is considered unrewarding, these likely areas will be able to support a much higher standard of living and cultural attainments. "The essence of the creation of modern wealth is the application of mechanical (instead of animal and human) power to the land, sea and air and the production therefrom directly or indirectly of all the goods that modern cultivation needs."  


2. The underlined words are interposed by the author.
The application of better technology and mechanical aids is fundamental even to such a relatively backward area as Arunachal Pradesh, despite all constraints, and indeed because of the very constraints in regard to manpower availability and the tensions that would be created if large bodies of unskilled manpower were imported from elsewhere.

Nevertheless, in the conditions of Arunachal Pradesh selective thought needs to be applied to the exact level or usefulness of mechanical aids. Normal patterns of tractorisation or even the use of small agricultural bulldozers for land reclamation and terracing, will be practical in only a very few areas in Arunachal Pradesh, whereas these have proved successful on the gentler slopes and amongst more advanced populations of Meghalaya and Bhutan. It is essential in the first place, to study which mechanical aids, even on a small scale, can revolutionise the 'village economy'. Very small items such as wheel-barrows or hand-driven machines to remove the corn from the maize cobs fall in this category but are often overlooked. Unfortunately, the observed tendency is to experiment always with standard items of equipment in the nature of, say, power tillers which may be useful in other types of terrain.
On the other hand, when it comes to development of a compact area outside the confines of the aggregates of the 'village economics', much bigger and heavier machinery may be necessary to 'Open up' the area as against the standard equipments used by the Government agricultural departments, or by the usual road building agencies.

What is necessary is to have an open mind and the capacity to rise above the conventional concepts of mechanisation, in both mini and maxi directions, to introduce the necessary modifications demanded by the colossal problems of terrain and the lack of manpower, on the one hand, and the intricate problems related to the semi-invariability of training and experience of the farmers on the other hand.

The findings and assessment may best be concluded with the remark that a shift to sedentary cultivation from Jhuming needs to take place in the pockets that are conducive to 'area development' and must not be attempted simultaneously everywhere out of a mere theoretical desire for greater production at the expense of everything else. The investments for 'area development' must be commensurate with local needs, and a much higher outlay than at
present is required to be earmarked for the purpose.

The next chapter analyses the various fundamental constraints operating within the territory of Arunachal Pradesh. Only after an assessment in depth of these constraints, is made, can realistic suggestions be formulated for a solution to the present situation of semi-stagnation which is examined in the chapters that follow.
CHAPTER XV

THE MAJOR CONSTRAINTS

The terrain of Arunachal Pradesh presents one of the major constraints for the development of agriculture as indeed, for any other development. The terrain is hilly and affords very few flat areas or valleys for agricultural development. In its natural state the land can sustain very little population per Sq.Km.¹ The area itself consists of 'the most difficult terrain in the world'², which is not conducive to profitable permanent cultivation in its present state. The terrain also poses the problem of constructing expensive and unprofitable roads.³ The lack of roads, by itself, constitutes major constraint on agricultural development, as it restricts the mobility of other factors of production, and thus, by restricting the necessary inputs and sale of outputs, it breaks the 'economic circuit'⁴. The

1. Population density was 6 persons per Sq.Km. 1971 Census.
3. The road density of surfaced roads was 0.7 Km. per 100 Sq. Km. area of Arunachal Pradesh in 1971-72.
4. Shifting Cultivation in Africa, The Zande System of Agriculture by Pierre De Schlippe (1956) page XIV.
difficult terrain, coupled with lack of roads, earlier necessitated the population to disperse over a wide area in small habitations in search of their economic needs. The land was primarily expected to offer to the people good forests to be used extensively under the Jhum practice and for collection of food and other needs from the jungles. The environment denies any other opportunity of value except the doubtful negative merit of inaccessibility, created by the vastness of the terrain and the topographical difficulties, favouring security by isolation.

The fertility of the Jhum fields is on the decrease. The Jhum cycle has reduced from 20 to 25 years, as reported three decades ago, to average of 6 years. The yield of Jhum plots tends to become poorer with the shortening of the Jhum cycle.

Thus single factor of difficult and hilly terrain develops a number of interlinked constraints, unsurmountable by purely traditional means. The terrain, the availability of land suitable for cultivation and the pressure of population have greatly influenced the method of cultivation, the nature and size of villages, the pattern of land ownership and the very way of life.

1. Chapter IV Jhuming, Stonor O.R.read with Chapter II of the Thesis.
and culture. These combine to stand in the path of mobilisation of the inputs or outputs; bringing in of new technology; education; scientific knowledge and the associated benefits derived therefrom. The efforts of the Government to "open up" the area by giving the highest priority to construction of roads in all the four Five Year Plans and three annual plans, yielded few good roads. Also, in the absence of transport facilities these roads are not meaningful to the people in general and to the farmer in particular.

These primary factors restrain and concatenate a number of other problems. The literacy standards are still very low as the small villages cannot be provided with schools. Similarly, perennial irrigational facilities cannot be provided to the people living in small villages or hamlets because it becomes too expensive when related to the number of people who will directly benefit from them or the probable increase in production of grains. Thus, the major input required for better agricultural production, namely, irrigation, cannot be introduced because of the uneconomic circumstances. These, in turn, set

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1. Only 19% of all villages have schools.
in motion a vicious cycle of ignorance, isolation and poverty directly related to the small size of the villages.

Another powerful constraint on the development of the area had been its isolation or the innumerable barriers on movement, trade and exchange of new ideas over the centuries. Before the British period limited pockets had barter trade and intercourse with both Tibet and the plains of Assam.

Traffic on these trade routes was limited, however, to certain well defined tracks only while in other areas these tended to be blocked by an intermediate belt of warlike tribes who either impeded trade and intercourse or levied heavy traditional tolls upon it. Then followed the period of meagre extension of British administrative influence into the hills. A salient feature of this was the Regulation deriving from 1843 constituted the "Inner Line". The background and impact of this restrictive line on the population has already been related earlier. In actual practice it did not inhibit in any way traditional visits of such of the hill people, as were not cordoned-off by their intermediate belts of tribal trade blocks, from coming down to the plains for marketing and seasonal work. This peculiarity
rity of self-effacement widens further the social, cultural and economic gap between the inhabitants of the small and the big villages. However in the absence of any serious educational or developmental progress inside the hills, this meant that even the considerable number of seasonal tribal migrants to the plains restricted themselves to purely traditional trade or customary joining rituals there without any intelligent perception of the possibilities of modern development. Later, even after Independence, when a planned programme of rapid and organised developmental expansion was initiated for the interior of the hills, the approach was essentially selective. While much could be said at an earlier stage of development for such a selective approach to reduce the tensions which a sudden uncontrolled influx of persons from the rest of the country might have produced, it is equally important to recognise that the details of this selective approach and thought, thus became entirely decided by small groups of officials. However sincere or forward looking such groups might initially be, this naturally impeded the rapid keeping of pace with modern development elsewhere.

The small official executing agency itself tended to be cut-off from the mainstream of outside trends due
to extremely poor communications and postal services. At that stage the people themselves had neither the extent or breadth of education nor the political maturity or institutions to influence the trends of development and to ensure that at all times the selective approach was genuinely and practically related to the real requirements of the people. Added to this was the problem that even when vertical communications towards the District Headquarters line began to develop, there were hardly any lateral lines of communication or political or social institutions, to bring together among themselves, the people of Arunachal for free exchange of ideas. Thus the administrative policy of development through status quo could not alter the basic maladies of development, for these maladies were wedded to the 'status quo and their removal amounted to destruction of the 'status quo'. In other words it may be said that the philosophy of the Administration retained the constraints by upholding the isolation and non-permeability of economic factors from outside.

Finally the very rapidity of cadre formations and expansion in the years following Independence to meet the challenge of development, resulted in certain imbalances whereby recruitment tended to take place
Rapidly within a single age group, then young, which later grew older as a large in-service block without balanced infusion, until recently, of younger blood and ideas. The net result was that gradually thought tended to become stereotyped and execution of work somewhat routine. Some of these constraints already show signs of disappearance through natural developments such as the emergence of educated individuals and elected political leadership from among the people themselves. But even here the results of earlier selective planning or historical constraints have meant that while some areas have become relatively advanced in this respect, others have still not produced the leadership to remedy the constraints, while the gap between such advanced and backward pockets is still widening rather than decreasing.

Thus, although in the beginning during the base period of the First Plan, it was legitimate to assume that almost all of Arunachal Pradesh was equally backward and that there were obvious physical limitations on how much per capita could somehow be spent on the basic infrastructure of development, the changes that have come about during the Third and Fourth Five Year Plans, show the need for a realisation of two basic
essential factors.

The rest of the country doubled or trebled its investment in each Plan period, on top of some base, however inadequate, of earlier economic development lasting over centuries and also on a base of accompanying private sector capital investment. In Arunachal Pradesh there was no such private sector capital investment and it was indeed severely restricted and it is still restricted by the provisions of the Inner Line Regulation. Consideration of the future on these Inner Line restrictions is in itself a very complex problem, especially in view of the fears and specifically expressed wish of even the educated elements of the new society, that the restrictions should continue as a protective measure against monopolistic economic dominance from outside. However, the effect of continuance of such restrictions on outside private investment needs to be taken into consideration in planning governmental outlays and inputs especially at a time when communications are at last improving sufficiently to enable reasonable returns from much greater outlays and physical inputs than those available at present.

It follows that mere adherence in successive plains to the standard percentage formulae applied to the rest
of the country of doubling or trebling outlays in each plan will be inapplicable to Arunachal Pradesh considering the above factors of a virtual zero base in the First Plan and absence of any alternative private sector investment. It also follows from the discussion on constraints, that the time has come to concentrate on intensive area planning for each specific group of villages situated in certain types of belts, now that the phase of exploration and trials has continued long enough.

It finally follows that the problems of widely scattered small villages and their considerable population in aggregate will also have to be deeply studied. A headlong attack on this problem may involve very great financial and physical burdens which may not be easy to sustain or even worthwhile to try to remove. If the headlong approach thus has to be discarded sometimes device of circumvention will be necessary. One example would be to avoid the uneconomic approach of trying to link all isolated hamlets by costly roads and other facilities, and to try to bring such people together by incentives for coordinated development (which in the end will prove less costly) into what we may call 'compact areas'. Even
this policy, though not unexceptional in theory, has already been found in certain specific pilot projects to have failed due to the total unwillingness of the people to collect into such new areas. Some of their objections cannot be dismissed exonerably as mere conservative obstruction to innovation and progress. Some necessarily inhabit isolated hamlets at high altitudes because of the good grazing grounds. Others, when moved as in the case of "grouped" villages in Nagaland and Misoram (which apart from the security aspect of such grouping, were hoped, ultimately to develop into permanent examples of modern and prosperous villages development), found a variety of new economic constraints in land, cattle and water management at such centres. There can, therefore, be no hard and fast rule to circumvent the problem of isolated villages. In some cases the only practical solution may be to concentrate, again, through a separate selective "compact area" planning approach, on totally different forms of economic advancement, such as sheep up-grading and the improvement of dairy products in such isolated areas, as opposed to other types of development in large settled villages with sedentary cultivation.
However, the broad aim should clearly be to organise isolated communities into as large groups as are possible although only after deep study of the precise problems and needs of each such group. This again leads back to the conclusion that separate planning on an area basis is required in detail with wide differences of outlays and inputs as between various geographical and population areas which have already been shown to tend towards a division into three main belts.

In the light of the above Thesis, it is now necessary to consider a summary of specific issues.

Considering the level of development at the beginning of the Plan era, the overall plan investments had been too meagre for the size of the area, its problems and the people. On an average, nearly Rs. 200 per year have been spent for each Sq. Km. of the area since 1950 to 1975 and nearly Rs. 50 was spent per capita per annum under all the Plans for the same period. Much more money has been spent on importing food-grains into the area during the same period.

The major constraints can be classified into three types: the fixed point constraints like those
presented by the terrain and things connected with the terrain; the flexible constraints like the backwardness of the people which can be removed by factors like education, training and demonstration; and the imposed constraints like the Inner Line Regulation and inadequate outlay in agricultural planning.

The fixed point constraints are admittedly difficult to solve and these problems of terrain and dispersal of population have already been studied with the conclusion that even here ready made solutions applicable to the whole territory (such as grouping into large villages) will not always be possible and that a compact area development plan for each group concerned will be necessary after deep study of the wide variations in each problem area and its constraints.

The flexible constraints are rooted to the fixed point constraints but they can be separated from the latter and brought towards an independent solution without affecting the other constraints immediately. As for example, spread of education need not await, say, making of the terraces and consequent betterment of the people
and the release of the school going children from the shackles of their expected contribution to the practice of Jhuming. On the other hand, education may considerably affect construction of the terraces in the long run. But the flexible constraints will also be removed at a much faster rate if the fixed point constraints are circumvented with imagination and diligence. For example, if the people settle in a compact area, the spread of education will be more effective and less expensive.

The imposed constraints, largely originating from administrative requirements, can be removed easily without a very great social and economic price. But, to what extent their removal will lead to a political price is an open question that needs to be assessed objectively and individually for each of such constraints.

The classic example of imposed constraints is that of the Inner Line Regulation and the price in political unrest itself inhibiting future development which the abolition of this might cause. Again a selective specific approach to the needs of each area may have to be considered. One such solution would be to replace existing restriction of movement by realistically enforceable measures against land alienation to protect the tribal inhabitants, and similar rules about trade to protect
either the coming generation of tribal entrepreneur or any genuine system of partnership in capital investment which does not involve mere 'benami' transactions.

Another "imposed constraint" originating from administrative requirements, as has been described earlier, relates to the tendency towards administrative "in-breeding" and thought stagnation resulting from the initial constitution and subsequent expansion of local cadres. There is a serious danger of such a constraint involving even more complexities and tensions in the future if, under rapid plan expansions, manpower requirements are filled-up from purely similar sources with the result that, ultimately, future generations of trained tribal technological talent may find it difficult to accommodate and adapt themselves. Genuine expertise in manpower is indeed not likely to be available easily. It follows that manpower planning, recruitment and training, needs to be most carefully studied against the requirements of the sum-total of individual "compact area" plans. It would appear to be preferable that for these specialist subjects, really competent deputationists should be obtained for the time being. These deputationist specialists should be able to identify
suitable courses of training and specialist education for the upcoming tribal talent, who will, then, find at the end of each deputation tenure, the relevant posts still open to any such genuinely qualified local recruit with sufficient experience and training, instead of finding it blocked by confirmed personnel of a regular cadre who may continue for years together in such posts.

Such deputationists with experience of detailed problems of other similarly situated areas are also more likely to avoid by their practical experience, a variety of minor constraints which otherwise tend to build-up at a formative stage in the agricultural sector for want of such experience or careful fore-thought. For example, for the development of horticulture in an area, and horticultural marketing, proper packing facilities, cold storages, and marketing capital need be planned at the outset because without these there may be total initial failures which will discourage progress on an otherwise basically excellent scheme.

Having analysed the constraints which must be considered before propounding any solution to the problems posed by the earlier study and field investigations, it
is now necessary to come to a conclusion regarding the basic solution for these problems so as to enable agricultural developments in Arunachal Pradesh to progress more effectively than hitherto.
It should be recognised at the outset that what is presented in this chapter is 'an attempted solution' of the problems of agricultural development on the basis of findings, assessments and constraints mentioned in the previous chapters. It cannot constitute a 'solution' of all the constraints. Further, the solution can be dealt with only in its essentials and not in its details. By 'solution' is meant a release of greater productive processes in agricultural development by adoption of modern technology, and not achievement of agricultural surpluses in any aggre gative sense for the entire Union Territory.

The suggested solution is based upon a number of assumptions. Firstly, it is assumed that the broad existing political and administrative framework has to continue. Secondly, it is assumed that a socialist society has to emerge with this economic development. Thirdly, it is assumed that the emerging political leadership will be able to live with a new ecological equation and a new social status quo without affecting the cultural base and
attainments of the community. Fourthly, it is assumed that the relative prosperity of a small community compared to the society at large, at least during the first few years, will receive the necessary moral sanction of the society at large and the country as a whole. This assumption is justified because the main theme of the plan, as will be shortly seen, is but a modification of the Planning Commission's scheme of 'Colonisation of the Tribes', conceived during the Third Five Year Plan.

The solution envisages a basic concept of compact area planning. As a first step, the areas where large valley bottom lands are available in compact areas are to be located. These will mostly be in localities adjoining the plains of Assam or in the wide river valleys that are situated more or less in continuation of the Assam plains or at short distances therefrom. A few are, however, available deep in the interior and will be equally suitable for the plan. The second task will be to make terraces in such areas using mechanical devices and with the help of official 'Working Squads', as local manpower will be inadequate for the purpose because it is locked up in the existing field operations for most part of the year. Two
types of terraces need to be constructed. The terraces in the lower flat lands and the gentler slopes will be irrigated and used for production of grains and other crops requiring irrigation. The higher terraces need not have irrigation facilities and can be used for horticultural or cash crop development. The areas situated at an altitude higher than the horticultural terraces, will be contour banded and used for modernised forestry. The compact area thus prepared will be connected by roads and other facilities required for the building up of the infrastructure needed for rapid economic and social development suitable to that area. Once this is done, a large community of, say, 500 families could be settled or intensively aided there, each family cultivating 5 acres or more of wet land and 10 acres or more of horticultural plots. Each family could have about an acre of homestead land where they could have kitchen garden, poultry or piggery and keep livestock. Such a community will have roads, drinking water facilities, a school, hospital, maternity and childwelfare centre, Post and Telegraph facilities, a marketing centre, Police Out Post, field units of agriculture and other Government Departments; places of worship and
entertainment including a theatre, community hall and recreational centre. Marketing, public transport, the services of tractors or other modern equipment, credit facilities for seeds, fertilisers and other agricultural inputs will be provided centrally through Co-Operatives or other channels. Development of fodder and animal food may also be made centrally so that the people may gradually turn towards stall feeding of animals.

The road system, development of industries, distribution system of electricity, warehousing, horticultural nurseries and seed farms, treatment and storage of seeds, animal breeding farms, banking facilities etc, will have to be planned in such a way that a maximum number of compact areas as envisaged above may derive benefit from them.

Theoretically, the entire rural population of Arunachal Pradesh can be brought together in this manner into 200 compact areas, as against the present 2973 villages. But such a drastic step is not suggested. For reasons analysed during a study of the constraints, any such headlong approach will be unrealistic. The compact areas as suggested above may relatively easily be
developed in Belt III. But for Belt II and Belt I such a programme may meet two obstacles. In Belt II, the obstacle can be summarised as tribal pride and orthodoxy. It has already been stated that Belt II upholds what is traditionally considered good in the tribal culture in its best form—based, of course, upon the Jhum cultivation. Here, the change must come gradually and through persuasion. A master plan for this area must, nevertheless, to have the same base as the compact area programmes as conceived for Belt III. But the texture of the programme will have to be altered. Instead of going headlong to develop compact areas and settle people as suggested for Belt III, here the execution of the programme may await, for example, a consensus of about 10 villages to come together to form a compact area by fusing their village and individual rights. However, the development of the infrastructure needs be directed towards suitable focal points of compact area development even much before such a consensus is arrived at. This availability of the infrastructure itself will provide an additional incentive to arrive at the consensus.
The obstacles in Belt I, are conceived as the extreme poverty and some of the vested interests such as individuals' right over planted 'Tasse' (wild sago) and 'Rengbeng' groves that provide food for the people during the lean months. These groves cannot, for example, be transported to the compact areas - and if the groves are elsewhere why should the people settle in the compact areas? The people of this Belt possess huge areas as hunting grounds and as has been seen, the annual consumption of game by the individuals, clans and the villages, is of no mean proportion. Further, the terrain in this Belt will offer few areas where the compact area programme, as conceived for Belt III, can realistically be executed. It will, therefore, be necessary to alter the character of the programme to suit Belt I. For example, rearing of livestock, such as sheep that produce meat as well as wool and can be driven to the distant markets over difficult paths, may form the economic base for a compact area programme in Belt I instead of production of the grains as conceived for Belt III. Instead of service of tractors, in such areas, the services of veterinarians will be more necessary and appropriate, and provide the causa sine qua non for the people to come together and derive the social benefits of large villages while at the
same time exploiting the economic benefits provided under the scheme. Modern piggery, poultry, dairy, bee-keeping and other similar institutions may also be introduced simultaneously, and with great profit, through a well planned system of centres and sub-centres that should include development of pastures in the overall programme.

The different Administrative Circles throughout Belts I and Belt II vary widely in population content. For example, the average size of the villages of the Mirang Circle of Kaman District is 684 people whereas that in the Etalin Circle of Lohit District is only 23 people. The situation clearly indicates that, for a balanced regional development and for the purpose of removing the existing disparity in development, a suitable sliding scale will have to be devised to arrive at the criterion of providing the basic amenities and social services to all.

However, the problem of such "special aspects" of the solution by compact area planning in Belt I and Belt II, may not be very large. After all these special aspects are to be devised for the 'residual population' who will not like to be settled in the compact areas conceived for Belt III.
A point needs to be made at this stage. The resulting loss of area under the existing and the proposed Reserved Forests of Belt III, can be more than compensated by developing the forest wealth in the higher areas of Belt I and Belt II. Whereas in Belt II valuable timber may find favour with the silviculturists, the development of medicinal plants (the final produce is light in weight and therefore easier to transport) may attract their attention for Belt I together with growing of conifers along the larger rivers for the purpose of felling them and transporting them cheaply by water to the possible paper pulp industry, after hundred years or so. A more detailed study will however have to be carried out before a large scale programme of silviculture can be finalised.

An important pre-requisite for any such silviculture programme in Belts I and II will be the implementation of certain existing policy proposals to associate the people with a share of the Forest Revenue to be credited to their Anchal and District funds for development programmes. They are otherwise most unlikely to part with areas under their traditional ownership for such forestry programmes.
This leads to the last point in regard to any plan for the effective development of agriculture and allied programmes inside Arunachal Pradesh. Nowhere in the world and least of all in the tribal areas of Arunachal Pradesh, can any such programme, however well conceived, achieve success without the active and willing cooperation of the people. The mobilisation of this public opinion to accept and to associate the people actively with any such programme is the first necessity in planning. From this follows the postulate that the manpower selected to implement the schemes must be of the highest calibre not only in its academic and technical qualifications, but in its capacity to earn the respect of backward villagers by practical results in the field and by a willingness to demonstrate and prove the benefits of these. Thus, the manpower planning recruitment and orientation training of the developmental cadres, especially in the field of agriculture, assumes the highest importance and in its success lies the crux of any meaningful economic advance for the people of Arunachal Pradesh.

The detailed financial implications for the various suggested solutions to improve agricultural development in Arunachal Pradesh along with allied sectors such as
silviculture have not been attempted as this is not possible until the basic suggestion of widely differing area plans for the development of each compact area have been finalised and formulated. However, the proven relative backwardness of Arunachal Pradesh compared with any other area of the country, and the analysis showing how even within the aggregate budget of Arunachal Pradesh, comparatively little has been spent on actual agricultural inputs, clearly necessitate a very much greater investment during future plans in favour of the agricultural sectors and its allied programmes, if the imbalance between this backward area and the rest of the country is to be improved, or even prevented from widening still further.

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