A STUDY OF SHIFTING CULTIVATION[1])

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In recent years, and especially after World War II, there has been a great deal of concern about the tremendous population increase in the world expected in the near future. By the close of this century the world is faced with the problem of feeding more than five billion human beings, or more than double the present population.

On the other hand there are justifiable expectations that next to a more effective regional distribution, also the production of food can be enormously increased so that the establishment of a reasonable balance between production and consumption at least could be foreseen. But to attain this object some serious obstacles have to be overcome, obstaccles in the technical as well as in the economic and social field.

Therefore it is evident that higher standards of production will require thorough study and careful planning. This is especially true in the tropics where the need of development is most urgent but where conditions and possibilities are least favorable and least known.

One of the widespread systems of agriculture in tropical areas involves the practice of shifting cultivation, a low producing mode of land use and one which is liable to degeneration.

Shifting cultivation may be described as an agricultural system characterised by extensive use of the land for a given period of years followed by a period during which time the land is allowed to rest. During this fallow period the soil is expected (partly) to regain its original fertility.

Of the factors determining shifting cultivation, viz. the natural environment, the demographic, the economic and the social conditions of the area, the demographic factor is most decisive.

To characterise these factors in a simplified and generalized form it may be stated that natural conditions in the wet tropics are poor, heavy rainfall results in the deterioration of the soil; humidity and high temperatures occasion abundant weed-growth and promote serious human, cattle and crop diseases; life is generally difficult, and production is low and risky.

In an area of shifting cultivation the economy is local, isolated and self dependent. In most cases the production of a surplus beyond the requirements of subsistence is useless, for such surplus can earn no income and no means outside the local community are available to improve production and raise the level of living.

The community's way of life, including its system of land tenure does not stimulate the initiative that would lead to higher production. The individual is subordinated to the community.

As long as there is an equilibrium between the total population and the

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production potential the system of shifting cultivation is more or less harmless and maintains itself on a low but stable level. Under this condition the system may be regarded as an acceptable form of land use.

However, under reasonable conditions of safety, order, health and governmental control people and cattle tend to multiply beyond the carrying capacity of the land. In other words at this point the period for a necessary rehabilitation of the land has to be shortened with the inevitable consequence of land deterioration and erosion. Production will decline until, finally, a state of total exhaustion is reached.

There appear to be three ways of restoring the imbalance between the land and the people: 1) to improve the system of shifting cultivation as such so that the use of the land is better suited to the potentiality of the soil under the conditions of a higher population density; 2) to reduce the economic isolation of the area so that products can be exported and means become available to increase agricultural production while at the same time preventing further depreciation of the land; 3) to open the isolated and closed community, free human forces, encourage initiative and make efficient forms of agricultural production more attractive.

This three-fold division is, of course, somewhat academic. In reality these three ways go together and interact with each other. Cover crops and commercial crops, fertilization, mulching, soil conservation, roads and markets, development of individual ownership, contacts with the outside world, social development – all these changes go together to bring about what could be expected and would be desired, that is a system of permanent agriculture. Such a development might be either gradual or rapid depending i.a. upon whether or not commercial crops are produced inside or outside the system. The production of commercial crops might occasion a rapid stride toward higher levels of production. On the other land, the cultivation of such crops may be dangerous if it upsets the balance in the shifting cultivation system and consequently leads to soil deterioration.

The improvement of the system of shifting cultivation in an area may be carried out in two stages: 1) that of control, and 2) that of development.

In the first stage, that of control, there is an effort to keep the system within bounds so that a minimum of damage is caused. To this end a classification of land is necessary in which lands are designated for different uses such as for forests, intensive cultivation (e.g. irrigation), and shifting cultivation blocs wherein the system can be controlled in space and in time. Laws can be enacted to insure compliance with the regulations. In the second stage, that of development, the objective is the improvement or even the transformation of the system as such by either technical or economic and social measures.

Each stage, however, should be preceded by a thorough survey of the actual situation in the area. Such a survey is the first step in the actual program for the improvement or transformation of the system of shifting cultivation. A carefully planned survey should establish not only clear-cut facts but facts that cover the whole field of human and social welfare. The survey should be systematic and coherent, and should consider all factors involved in the problem of shifting cultivation.

Following the survey should come research and experimentation to determine what can be done in relation to what is desirable to do and what can be expected from measures in the different fields of shifting cultivation improvements. The research should not be restricted to soil fertility and soil management problems but also should include experiment in regard to farm management and to the effects of economic and social measures such as market regulations, farm credit, cooperation, etc. The establishment of pilot schemes would be very useful if not necessary.

All this seems to be a rather ambitious program, complicated in its execution and requiring the guidance of capable men. It often is said that it is difficult to withdraw such men from other duties, that there is no time for extensive surveys and research, and that already we are adequately informed. It is further said that, with regard to demographic and political development in certain countries, some risks have to be taken and that there is urgent need for quick and impressive results.

The desire for quick and impressive results after the war led to the creation of large and spectacular and highly mechanized projects. Some of these were more or less succesful but many were doomed to failure for lack of proper survey, research and planning. As one of the FAO experts put it, the areas of many underdeveloped countries are littered with the remains of projects which have been very costly and moreover have been a cause of distrust with those for whose benefit these works were designed.

As a first step these projects have to be carefully formulated and prepared; as a second step they must be put into operation. This often means a quick and complete reorganization of the pattern of land use which often is not immediately acceptable to the people.

Moreover these projects often require much capital and expert guidance, which often is insufficiently available, they further are mostly exacting in regard to the suitability of lands for their establishment. For all these reasons the possibilities for their execution are restricted and their influence will therefore be limited to a relatively small number of population.

As a consequence, even though some large scale technical schemes have contributed to the economic development of the country it still is a question as to how in the wide expanses of tropical countries outside these project areas the development problems of the great masses of small crofters and shifting cultivators can be solved.

Concentrated action from the outside cannot bring solutions of these problems and there seems to be no better way than a regional approach and a development action from the inside. Such action is more likely to be succesful if it is closely linked up with the actual land use practices and existing social conditions. Therefore every attempt to improve the welfare situation in a region should be comprehensible and suitable for the masses of the farming population and should not exceed their capacity for assimilation.

What is said above is not new, and it certainly would be incorrect to say that all that is already done in the field of agricultural development in tropical areas is of little importance. On the contrary in some of these tropical countries development programs are far advanced. But often these programs,

no matter how intelligent nor how persevering they may be are too haphazerdly and incidentally carried out. What is needed is systematic, coherent, and coordinated action based upon a thorough and well-considered development program. And this indeed is the sense and the content of real land use planning.

Surveying, research, planning and preparation require time, but time well spent. The potentialities of the land are still large and the possibilities of low-level agricultural development are still great.

I think this is true in spite of the gloomy prospects for a teeming population in a rapidly deteriorating world. Certainly there is not much time to lose but that does not mean we should take hasty and ill-prepared action. It also is true that for this work we sorely need capable and dedicated men and that their number is not large and rapidly decreasing, but this does not mean we should be inactive and without determination.

There are many and large gaps in our knowledge of the system of shifting cultivation as it is practised in different areas of the tropical world. Therefore in an addendum to this article I have tried to set forth some points as a suggested guide for an appropriate survey.

This guide certainly is not complete nor consistent with all situations as they may exist in different areas of the tropical world. But at least there should be a survey. And at the basis of such a survey it seems quite probable that with a well devised program and with a restricted number of capable men familiar with the problem as well as with the area under investigation, a great deal of constructive work could be done in not too long a time.

ADDENDUM :

SURVEY PROGRAM ON SHIFTING CULTIVATION

I. Location of shifting cultivation in the country ; shifting cultivation regions ; area and extent.

II. Factors conditioning shifting cultivation concerning the various regions :

1. Natural aspects – altitude, topography, climate, soil, vegetation and ecological status, water supply, usable land unreclaimed and under different systems of land use, land reserves for shifting cultivation, forests, natural grazing lands.

2. Demographic aspects – density and distribution of population, settlement, increase or decrease of population.

3. Social aspects – tribes and communities in the region, structure of society and family, systems of inheritance, family groups, settled or unsettled population, local authority, religion, traditions and customs in relation to land use ; shifting cultivation as a group or individual undertaking (working units), division of labour within the unit ; languages spoken, educational level, nutrition, health.

4. Economic aspects – subsistence or (partly) commercial economy, crops, situation of the area in regard to inland or outland markets, transport facilities, prices, supplementary sources of income (forest products, cattle, home industry, labour income and so on), kind, quantity and value of production in the region, labour force, export, importation of goods from outside the area.

5. Legal aspects – rights on grazing, hunting and collecting in the area of the community, rights on clearing and farming of the groups or the individual under communal disposal ; relation between communities in regard to land rights ; usage rights and ownerships rights as concerned subsistence or commercial crops ; transfer of rights, leases, mortgages and sales under customary law ; jurisdiction and authorities.

6. Administrative aspects – communal rule and government administration and control, enforcement of law, provision for promoting rural welfare, functionaires, budget; responsibility for land- and water policy, esp. for the management of domain or community lands and for directing and financing migration, settlement and resettlement.

III. Types of shifting cultivation – forest rotation or grass rotation, system in regard to natural conditions ,occupation/fallow-ratio, factors determining duration of occupation and fallow (fertility depletion, weed control, rate of regeneration, labour input for clearing), activities furthering regeneration during fallow, crops planted (annual, perennial, subsistence, commercial), mixed or monoculture, crop rotation during the subsequent years of occupation, methods and timing of shifting cultivation activities: clearing, burning, tilling, cultivation, harvesting, measures for maintaining fertility (erosioncontrol, leguminous crops and trees, mulching, manuring); implements and tools; area cleared per group or household, production per ha and working unit (kind, quantity, nutritional- and money value); input and distribution of labour, costs, household budget.

IV. Shifting cultivation in relation to national economy and economic and social development of the country.

V. Effects of shifting cultivation in regard to forest reservation, loss of timber and fuel, soil fertility, erosion, runoff of rivers, nutrition, health, administration, settlement, educational development.

VI. Reasons why shifting cultivation is practised. Does shifting cultivation suit the local and present conditions of the land and the people or are (all or some) its effects detrimental. Are these effects in regard to present and future conditions acceptable or not. What factors influence development to permanent types of agriculture; favouring factors: increase of population, higher wants, cultivation of perennial and commercial crops, tendency for permanent settlement; hampering factors: traditional resistance, soil fertility, lack of capital, labour and know-how; cost/income ratio for shifting and permanent cultivation.

VII. Modification of the system of shifting cultivation during the last decades as a consequence of changing conditions. Remedial measures on shifting cultivation, reasons for success or failure:

1. In the technical field – soil conservation, fire protection, crop rotation, more intensive cultivation, improving humus conditions during occupation, accelerating regeneration during fallow, cover crops replacing forest fallow, rotation during occupation, mixed cultivation, mulching, fertilizing, disease control, research.
2. In the social field – improving organization of rural communities, strengthening local authority, stimulating wants for better living, community development, extension and education, demonstration, cooperation.
3. In the economic field – improving transportation, propagating commercial crops and productive grazing, price policy and market regulation, technical help and facilities, credit for economic betterment, creation of other possibilities for production (irrigation, industries).
4. In the administrative and legal field – allocation of shifting cultivation blocks and forest reserves, migration of population and resettlement, introducing appropriate land and water policy, creation financial reserves out of production for improving general welfare (marketing boards, development organization), timing and balancing of development, planning; regulation and legislation, enforcing legislation.
5. Regarding he country as a whole – improving general administration, establishing and maintaining law, order and safety, development of shifting cultivation in the framework of national development.

VIII. Proposed future action.