FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

GUIDELINES

FOR

AGRARIAN SYSTEMS DIAGNOSIS

Land Tenure Service
Rural Development Division
Sustainable Development Department
Food and Agriculture Organization

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FOREWORD

This publication on ***Agrarian Systems Diagnosis***[1] represents the result of an effort done by the Land Tenure Service (SDAA) of the Rural Development Division of FAO in cooperation with several institutions, and field projects.

It describes and summarizes SDAA's experiences in developing and applying a holistic approach to land tenure dynamics in rural areas. It also presents both the conceptual elements as well as practical methodological proposals for operationalizing agrarian systems diagnosis. The examples presented are drawn from concrete experiences in which the Service has been and still is presently involved.

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We are grateful to many colleagues from FAO as well as to institutes and individuals from outside FAO who have participated in the process of developing the philosophy that underlines this handbook. Special thanks go to Prof. Marcel Mazoyer and Prof. Marc Dufumier from the Institut National Agronomique Paris-Grignon, France [http://www.inapg.inra.fr/ens_rech/ses/index.htm] who have been developing the main theory on the evolution of, and difference between agrarian systems. Thanks to their work, future decisions for technical cooperation activities involving land tenure in developing countries will be better informed, more effective and more helpful to those making their living from food production.

[1] A short brief on ASD is presented in http://www.fao.org/WAICENT/FAOINFO/SUSTDEV/LTdirect/LTan0001.htm

WHAT THIS HANDBOOK IS FOR

This handbook is based on worldwide experience and uses knowledge obtained from both failures and successes. Its main objectives are:

1. To demonstrate the interest of a system approach for the formulation of land regularization policies.

2. To contribute towards the improvement of land tenure policies through

    - better understanding of rural dynamics which will allow us to anticipate any secondary effects and plan appropriate additional actions or policy changes
    - more effective regulation of tenure and land management policies

3. To help national experts involved in land tenure issues to define their own methodological guidelines.

This Handbook is *not* a comparative analysis of different systems methods, *nor is it* a theoretical investigation on agrarian system approaches. Many rapid appraisal methods share similar global objectives and principles, and different methodological frameworks can be used. The Handbook does not intend to provide you with an overall view of these methods.

Instead, the Handbook is first and foremost an educational instrument for readers looking for new, efficient and adapted methods and tools. It aims to obtain immediate results by offering a tried and tested methodology for immediate field use. The Handbook offers practical tools developed all over the world in FAO projects and used by other development agencies during the last 15 years. It should also contribute however to improved investigation and development skills amongst those carrying out field studies. This is even more important because it is also a self-training process for those carrying out the project.

The target audience includes development technicians working in national Institutions in charge of agrarian reform and land settlement, NGO field experts, and development managers. It also aims to help technicians and consultants who have been working on development issues, to carry out land tenure studies and propose policies to improve land tenure.

How to Use the Handbook

These guidelines are written as a handbook containing brief explanations on methods in everyday language. Technical words and concepts are used only where absolutely necessary. With boxes on specific topics, the handbook offers distinctive illustrations of those methods and tools, in concrete situations where land studies have been based on Agrarian Systems Diagnosis.

The handbook also serves as a reference work. A list of main publications related to the different schools of system approach is presented. This list provides complementary sources of information for each of the specific topic illustrated in the handbook.

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INTRODUCTION

Land reform programs are complex, and planned and carried out in very different social and cultural environments. They aim to change the ownership and management of land, rationalize farming, and establish a sound balance between agriculture and the rest of the economy. While a focus on farm management is important, it is too limited for the requirements of sustainable development. New approaches to land reform are instead increasingly multi-dimensional.

New approaches are needed, paying new attention to old words such as diversity, participation, and bottom-up approach. This implies a different style of development, which is endogenous and self-reliant, at the heart of each society and having full meaning only if rooted at local level in the praxis of each community (Hamrell and Nordberg in Development Dialogue).

This new vision of development is gaining ground, even within the UN System (see box 1). The President of the World Bank, James D. Wolfensohn also recently spoke of "the new direction the WB is taking in its support of participation, by recognizing that there is a diversity of stakeholders for every activity we undertake, and that those people affected by development interventions must be included in the decision making-process". He added: "I personally believe in the relevance of participatory approaches and partnerships in development and am committed to making them a way of doing business in the Bank" (Participation Sourcebook http://www.worldbank.int/).

> [...] The development that is needed must be qualitatively different [...]. Development will bring food security only if it is people-centered, if it is environmentally sound, if it is participatory, and if it builds local and national capacity for self-reliance. [...] At every turn, the lesson keeps hitting us in the face that involving rural people actively in the defining, designing and decision-making stages of agricultural development is not optional but essential. We see this missing requirement in many projects that failed because they adopted traditional top-down approaches, because they were based on narrow technical specializations. Sustainable agricultural development will not merely come from introducing better crops, new cattle breeds, more credit or rural cooperatives, as important as these may be. Rather, it is achieved by farmers working in very specific farm-household systems. It must be based on the tasks, needs and aspirations of the farmers themselves and on the dynamics and constraints they face, not only in their farming but also in their domestic and non-farm activities. It must take account of their whole rural life situation, including real-world factors beyond the control of the household - the ecology and natural resources of the zone, the social-cultural environment in the community, and the policies, prices, services and infrastructure that affect rural prospects".(J. Speth, UNDP)
> (http://www.undp.org/)

Unfortunately, recognizing the complexity of land reform is just the starting point. Answering the myriad of questions that follow on from this recognition is far more difficult. Systems analysis offers one way forward. FAO has made considerable progress in this respect, with the Farming Systems Development training kit (http://www.fao.org/waicent/faoinfo/agricult/ags/AGSP/DEFAULT.HTM), Land-Use Planning approach (http://www.fao.org/waicent/FaoInfo/agricult/AGL/AGLPUB.HTM#aglds and Community Forest Participation (http://www.fao.org/WAICENT/FAOINFO/FORESTRY/FTPP/default.htm).

The Sustainable Development Department has worked hard to integrate communication tools into participatory rapid appraisal methodologies, including visualized analysis. With this book, **Agrarian Systems Diagnosis,** FAO offers a further contribution from the Land Tenure viewpoint to the realization of genuine Sustainable Development.

I. THEORETICAL BACKGROUND

1. Land Tenure and Agricultural Production: A Functional Definition of Agriculture

Every traveler will notice that agricultural practices substantially vary from region to region, from state to state. Everybody knows that agricultural practices also change with the times, with the local, regional, international economic situation. These changes will not follow the same patterns from one place to another.

Agriculture is a human productive activity, but it is quite different from others, such as industry or services. ***It consists in the transformation of the environment in a determined social context.***

It is therefore highly unlikely that we will find the same agricultural activities within distinctive ecological situations. Environmental variables have to be taken into account as a key issue for understanding agricultural practices. Human societies have more or less deeply transformed the former natural environment. Each transformed and cultivated environment has its own production capacity, located within specific ecological limits. If some or all of these are surpassed, sustainability will be lost, crises will occur and societies will have to move to another place or to develop new practices for survival. The management of fertility is therefore of paramount importance in agriculture. Fertility is primarily a product of the ecological environment (soil, climate, natural vegetation, etc.), but effective and often intensive human management of the environment is also necessary if fertility is to be maintained or improved.

The agricultural use of natural resources is undertaken with human means (manpower, know-how) using implements tools; and with cultivated plants, fertilisers, and domesticated animals. Different kinds of social organizations, cultural patterns, economic relationships between the different actors enable varied and distinctive ways of exploiting the ecosystems.

We can therefore easily understand how important the access to natural resources is for rural people. In every society, land and other natural resources have value, and control over them can fundamentally determine the wellbeing of specific populations or sub-groups within populations. Access to land and other natural resources is an ***economic and social*** factor, not an agricultural one. It is only once the rules of access have been determined that people can begin cultivating, and sustaining their lives. There are probably as many versions of access rules as there are human societies, but basically these come down to ownership (either as individuals or some other collective group); or rental arrangements of one form or another.

How these rules are worked out and subsequently managed is perhaps as important for sustainable agriculture as the production techniques used. Indeed changes in these rules can render effective techniques inappropriate, and lead to the same type of crisis that might occur if inappropriate techniques had been used and ecological limits surpassed. This simple fact has been of great importance in agricultural development all over the world and through history.

It would therefore be impossible to carry out studies on agrarian issues without taking into consideration the relationships between distinctive actors when it comes to control over land access and use. By the same token, understanding these rules and how they operate – and how they might be changed or improved – requires an equally deep understanding of the development of agricultural societies. Here we refer not only to the technology used, the crops planted or animals raised, but also the way in which power relations have evolved, the way in which people gain access to land, and the systems that have evolved to manage land access and use. Once again, we are talking fundamentally about ***social processes***, which *underlie and enable the sustainable use of land and other resources for the greater (or lesser) social good*.

2. Historical and Geographical Differences in Land Access Systems

When population density is very low, and land is still abundant, access to labour rather than capital is the basic bottleneck. Strong private rights over specific areas will be weak or even non-existent. It would be mistake however to assume that no rights exist at all. Early European settlers in North America or Southern Africa saw huge tracts apparently 'unoccupied' and therefore 'free for the taking'. Land rights held or exercised by larger collective social entities could be identified upon closer scrutiny. In other words, it is important to understand the history of land occupation and the manner in which local people exploit their environment before deciding whether or not rights exist over an 'unoccupied' or 'empty' area.

These observations are important not only for understanding how land rights are established, but also for determining how land policy should be developed. One key area of policy in the modern world is how to manage access to land and natural resources by 'outsiders' who may or may not view land rights and land management in the same way as local people. Invaders or colonial settlers rarely carried out social and historical surveys before they occupied the land of others. They had a quite different agenda, and either ignored existing rights, or sincerely believed that land *was* free for taking. Such 'outsiders' naturally tended to use their own experience as a major reference point: overcrowded, privatised farm sectors where most land was already occupied and cultivated, or a farm sector from which they had been expelled, thus negating any misgivings they might have had about doing the same to others. These attitudes unfortunately *still* live on in the minds of many of those responsible for agricultural development, and critically influence policies for land and other natural resources.

Private rights to land do emerge gradually when population density increases. Yet the degree of privatisation is rarely a simple reflection of population density. And where stronger rights over land and other natural resources do emerge, they do not necessarily have to be 'freehold' or private property rights. Secure longer term rental agreements such as leasehold systems can offer an adequate basis for economic investment and the allocation of scarce land resources to those who really know how to use them.

'Abundant land' too is a relative concept. Not all land is equally fertile or close to water. Nor is all land close to markets. And most importantly, land is rarely equally divided up and shared out to all according to a simple arithmetic calculation. Private rights can emerge very suddenly and create land scarcity for the majority where only a short time ago there was plenty – when an outsider invades or a new plantation project expels the local population.

Population density in relation to *available land* then increases dramatically, pushing populations into crisis or forcing changes upon their own land access and use systems.

Many different situations have emerged over time. Where abundant land is exploited extensively in a well-worked out balance with nature, numerous systems have evolved which focus more on use than on ownership *per se*. In Africa today, many of these systems still exist under the label of 'traditional land rights', and are often mistakenly seen as some form of primitive communism where land and natural resources are collectively owned. Even here however, gaining access to, and the right to use, *specific resources*, has thrown up many complex rules and conventions between different socio-economic groups and sub-groups. These can either be quite separate ethnic groups who use different parts of the same landscape – Balanta rice growers and Manjaco upland cereals and palm oil producers in Guinea Bissau for example - or they can be sub-groups of the same society with unequal or controlled forms of access to the resources around them. Other ecological and historical contexts give rise to longstanding agreements over shared use – long distance cattle grazing through land belonging to neighbouring communities for example – or the communal use of specific resources such as lakes and forests.

In fact empirical evidence all over the world supports the view that there is hardly a landscape *anywhere* that is not covered by access or use rights of some sort. As power relations between distinct social groups have evolved, less visible social rights have been transformed into more private or exclusive forms of land access, conditioning the relative wealth and wellbeing of those on either side of the fence. Elites with new economic ambitions may exert their authority over land once used communally – the Enclosures in 17th Century England for example – transforming peasant or sharecropper agriculture into more extensive, commercially focused enterprises. Landlord estates may subsequently continue to have their entire area cultivated by other users – tenants – but under contracts with specific commercial terms. Note that tenants may not necessarily suffer in the process, provided that their contract with the landlord is legally enforceable and allows for some autonomy (for example, present day tenant farmers in England).

In contrast, Latin American "haciendas" parcel out land to workers who cultivate family plots for subsistence and provide paid or unpaid labor services to the owner. The relations governing access to land are highly exploitative and allow few opportunities to experiment with new crops or accumulate wealth. Large plantations also function on the basis of grossly exploitative conditions, such as slavery or later forms of forced or indentured labor. In India, particularly since the advent of the 'Green Revolution', many thousands of smallholders and sharecroppers have lost individual land rights granted by private landlords. Weak legal protection and a vastly inferior socio-economic position left them defenceless against landlords wanting to consolidate tiny production units into larger and more capital intensive commercial enterprises.

Even where strong private rights exist, it is possible to find several distinctive types of land access. In general, once private appropriation of land has been established as the norm, landless rural producers have still been able to get access to land through a range of contracts with land owners (including the State). These include share contracts or sharecropping (paying a certain percentage of production, or crop share, to the owner) and tenancy contracts (paying a fixed amount in cash or in kind or in labor). There are also innumerable formal or informal arrangements which involve some form of rent or the exchange of services and

goods. In addition, all contracts can cover either short or long periods, and can include restrictions on what is done (planting trees for example is often prohibited in Africa, where trees are seen as a sign of permanent occupation and *de facto* ownership).

Private holdings and other individualised land rights are not the end of the process however. Owner-operated family farms have become common across Western Europe and still predominate in France and most Mediterranean countries. Yet in England, the small family farm and farm tenancies are becoming less common, as large corporations buy up land and contract professional, salaried farm managers to run them. Private and communal forms of land use also still exist side by side, with areas of common land used for grazing and public leisure activities. Membership of service cooperatives – for processing and marketing farm goods – offers small farms some of the economies of scale enjoyed by larger units, while the remaining large landlord estates are farmed either directly by their owners, or by tenant farmers. There are also large public or State land holdings for a variety of purposes, National Parks, and other publicly-controlled land holding institutions which own and manage land assets in the name of conservation or some other 'public good' (the non-State National Trust is an excellent example).

In many countries where the population has apparently suffered through exploitative private land rights and grossly unequal access to land and other natural resources, the State has intervened through agrarian reform policies. New forms of land access have appeared: state farms, collective farms (cooperatives), specific agrarian reform titles for individual farmers. In many cases however, access to land through agrarian reform distribution has led to restricted property rights, even when individual land access has been allowed (e.g. the sale of land is prohibited for a long period after rights are attributed).

> National land reform programs, or the more general agrarian reform programs, are not matters to be undertaken lightly in any country. Such reforms are evoked only [...] by a profound poverty and by inequality of opportunity and power in rural societies. An emphasis upon land reform merely recognizes that man's relationship to land use and occupancy is not only fundamental for decent survival in an agrarian society, but that controls over his relationship to the use and occupancy of land provide leverage for the transformation of rural society and economy. If society is to be transformed, administrators must have ways to influence social practices at strategic places. Land policies and controls are strategic in the early stages of economic growth for they can be used to give direction to the transformation of less developed countries, which are handicapped by gross inequalities in wealth, power, and opportunities (Parson in FAO, 1984).

The state can also impose restrictions on use (for example, in conservation areas), or it can control or tax the inheritance process. Such measures are often advocated by politicians who believe that they are in the public interest: nationalising land and creating state farms will end exploitation and ensure that production meets national needs; taxing or controlling land inheritance will create a more egalitarian society; conservation will maintain biodiversity.

In this context land reform can be a double-edged sword, wielded to meet the ideological objectives of essentially urban thinkers concerned more with social engineering than with issues of rights and productivity. This was the case in Mozambique after Independence, when colonial plantations and other holdings were nationalised and reformed into large state-farms. Quite apart from the management and other technical problems subsequently encountered, it is now increasingly clear that local people felt dispossessed, at precisely the time they expected to have their pre-colonial land rights restored.

While different land access systems often coexist at the same time in the same area and are sometimes even complementary, the same can be said for *production* systems. Together, they meet a wide range of needs that one system alone could not satisfy. "Historically, the emergence of new farming methods in response to the need of growing populations for more food did not supplant existing systems of food production. Thus, the earliest hunter and shepherd stage survives in the desert nomads and modern range farmers of today. The succeeding planting stage, with tree-protected shifting cultivation, persists unchanged in many tropical rainfed areas; it has also developed into horticulture and market gardening in semiarid and temperate zones. The last stage, field crop farming, developed ultimately as highly specialized, uniform crop farming on large areas with powered machinery and chemical methods and has not displaced either of the earlier methods of production. Each stage came into existence to meet new demands. At the same time the older ones continued to develop. Agriculture is so diversified and so flexible by nature that abundant production can be secured from a variety of systems" (FAO, 1969).

This brief discussion raises important questions. Firstly, land rights are deeply rooted and evoke strong feelings. People who feel wronged can easily and, in their eyes justly, make a strong case for restoring land rights that existed many decades, even centuries ago. These rights may have been superseded or negated by some political or social process beyond their control., but are still as real to the present day claimants as they were to the original occupants. This question is at the root of many of the problems now being faced by African governments seeking to modernise so-called 'traditional' land access and land use systems. Mozambique is an excellent example, and one where serious efforts have been made in recent years to recognise historically acquired rights while still allowing space for 'outsiders' to come in and share land resources with local people.

The issue of 'empty land' is also still very much alive today. Where there are very low population densities and no evidence of intensive exploitation, it is easy for outsiders (who are not necessarily foreigners) to argue that they can occupy land freely without due regard to pre-existing or already acquired rights. They either maintain that such rights 'obviously' do not exist, or that there is so much free land that new areas can easily be found for the few who must leave to make way for their new schemes or projects. This modern face of the old European attitude is found across the world today, where powerful national elites seek to gain access to land resources that are under-used or not actively exploited by local people.

The European, 'developed country' case is also of great interest. In truth development never ends. The strength of corporate capital in England is transforming farming, and at the same time changing the cultural context of rural England. Today it is almost impossible for somebody without land – either inherited or in a secure long-term tenancy – to 'go into farming'. Land prices are too high, competition from large corporate units is too intense, and farmers are increasingly becoming outgrowers for supermarket chains that impose demanding and difficult to achieve cost and quality criteria. On the other side of the coin, in parts of Scotland descendants of 'crofters' (a traditional form of sharecropper or tenant farmer) expelled during the Enclosures are now reclaiming – and winning back – land rights lost by their expelled forefathers.

What emerges from this picture is that land access systems are varied, and dynamic. They change not only in line with climate and ecological change, but also in response to a wide range of human inspired or imposed conditions. New technologies come on line, more powerful groups appear on the scene with new ideas and resources, new governments introduce measures to tax producers, control the factors of production, and manage prices in favour or one group or another (the famous 'urban bias' scenario). And where there is change, there will always be groups or individuals who protest that their rights have been lost, or that they are suffering unduly through a maldistribution of resources, or that they can do better with the available land than those who presently use it. Thus the need for good land policy, policy which promotes equity and rights and also stimulates new investment and the best use of available land for the greater social good.

3. A Bottom-up Approach: Opting for Family Farming

Why should we favor agriculture, and in particular the family farm, as the focus for development efforts? Binswanger argues that small family farms have long been ignored for many reasons, but are in fact more productive than larger units and absorb far more labour. Not only can they be the motor of development in most countries where they are the norm, but their development as economic units will also bring real human development benefits to the majority of people in the countries concerned (see Box).

The greatest opportunity for the promotion of agricultural progress therefore lies in the involvement and leadership of producers themselves. Given that family farmers are still the most widespread type of farmer in the world, and that they can be just as efficient as much larger units if adequately supported and integrated into markets, they form the "natural" focus of our analysis. In the following pages we will examine the behavior of this complex group, and discuss ways to analyze it.

Binswanger (1994) of the World Bank makes a clear case for focusing resources on small family farms: "During the early days of "development economics"... rural poverty was often explained by the backwardness of traditional smallholder agriculture. The sector was considered to have almost no potential for development.[...] In addition, international commodity markets for agricultural goods were regarded as hostile, exposing countries, which relied on them for growth, to undue risks. Agriculture could be taxed with little adverse consequence for economic growth or poverty reduction. It is therefore not surprising that the solution to the reduction in rural poverty was almost universally seen as being associated with urban growth and rural-urban migration. [...] These views have been thoroughly discredited by research. Yet they also provided the ideological justification for patterns of agricultural policies and programs which have been highly detrimental to rural populations, especially the poor.[...] Both communist countries as well as many market economies have paid an enormous price for assuming - without much empirical evidence - that large farms are more efficient than small ones [...] their economic costs of production usually exceed that of smaller enterprises relying primarily on family labor, in developing as well as developed countries. Their production is capital intensive and they generate very little employment. Because small farms have less wealth and/or access to credit markets, they use an input mix which relies more on labor than capital, and thereby generates more employment and self-employment than their large counterparts".

4. A Systems Based Approach

All systems involve setting-up parts (components or sub-systems) that interact with each other according to some process. Following Schilizzi (CIRAD) "A system, being organized, is subject to an organizing factor. This is a set of rules governing the behavior of the system. In human societies, internal rules are rules that a system applies to itself through some inner process; external rules are those that the system appears to obey under theoretical analysis [...] The set of internal rules is what governs the system. Governance (regulation) is the activation of a set of rules and management of exogenous or endogenous perturbations affecting the system. As these are typically irregular in pattern, the creation of a new internal rule can be usefully viewed as dealing with uncertainty. The link between system governance and uncertainty is memory: identification, storage and comparisons of patterns of irregularities. Memory defines the scope or range of possible future events, which themselves define the uncertainties affecting the system at present. The set of future possibilities defines the system' s vision, which can deeply affect its behavior. Vision is rooted in past history".

The system approach aims to understand not only each component, but also interactions among components at different levels. These interactions produce special and often identifiable characteristics through which each system can be classified and analyzed. Not all components are of the same importance. When the degree of complexity increases significantly, new methods are needed to cope with systems as a whole, and for taking into account their internal and external dynamics.

Sustainable development is the management and conservation of the natural resource base, and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such sustainable development (in the agriculture, forestry and fisheries sectors) conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and social acceptable" (FAO-SARD) http://www.fao.org/sd

5. Different Levels of Analysis and Inter-Relationships: Corresponding Concepts

Some basic definitions are needed before we proceed further. Classical concepts and notions normally employed in agronomy, livestock production and agro-economics include:

- **Technical itinerary**
- **Cropping or livestock pattern**
- **Production system**
- **Agrarian system**

At a plot level the first concept we have to deal with is that of "**technical itinerary**". This concept is found principally in French agronomic thinking and has almost no equivalent in the Anglophone school of agronomy. It is normally defined as "the logical and ordinate sequence of cropping operations, applied to a vegetable or animal species" (Prof. M. Sebillotte). It encompasses the notion of "livestock management" which means the logical and ordinate sequence of livestock operations applied to a domestic species.

If we move to a higher degree of complexity, we reach the stage of the **cropping or livestock pattern**. One definition of cropping pattern proposed by Prof. M. Sebillotte is "a surface of land managed in a homogeneous way through different crops with their sequential order and the technical itineraries which have been applied to them". In the same farm there are normally many different cropping patterns, which together make up a **cropping system** (Prof Mazoyer**)**. The first level, or cropping pattern, in effect refers to a simplified system, although this almost never exists in the small farmer units characterised by the production of various crops, livestock and other forms of productive use of their surrounding resources.

The second level, or cropping system, does allow for such diversity and therefore can be effectively used in the analysis of family farm agriculture. We can make the same distinction between **livestock pattern** and **system** (see Box). The first term indicates animals of the same species shared out among defined proportions by age and sex and managed with the already identified technical itinerary. The second term means "a subset of the [production] systems, including cases in which livestock contribute more than 10 percent to total farm output in value terms or where intermediate contributions such as animal traction or manure represent more than 10 percent of the total value of purchased inputs" (FAO, 1996).

At this stage we are still working at the level of one or more plots and a possible combination with one or more animal species. The analysis has so far taken taken little account of the overall production unit. The combination of all cropping and livestock systems, and the other activities of a farm-household (such as collecting, hunting, fishing, craft industry, and off-farm incomes, etc.), set within its immediate ecological, social and economic environment, constitutes a higher order system, namely the **production system**.

A Classification of Livestock Production Systems

Solely Livestock Systems: more than 90% of dry matter fed to animals comes from rangelands, pastures, annual forages and purchased feeds and less than 10% of the total value of production comes from non-livestock farming activities

Landless Livestock Production Systems: A subset of the solely livestock systems in which less than 10% of the dry matter fed to animals is farm produced and in which annual average stocking rates are above ten livestock units (LU) per hectare of agricultural land.

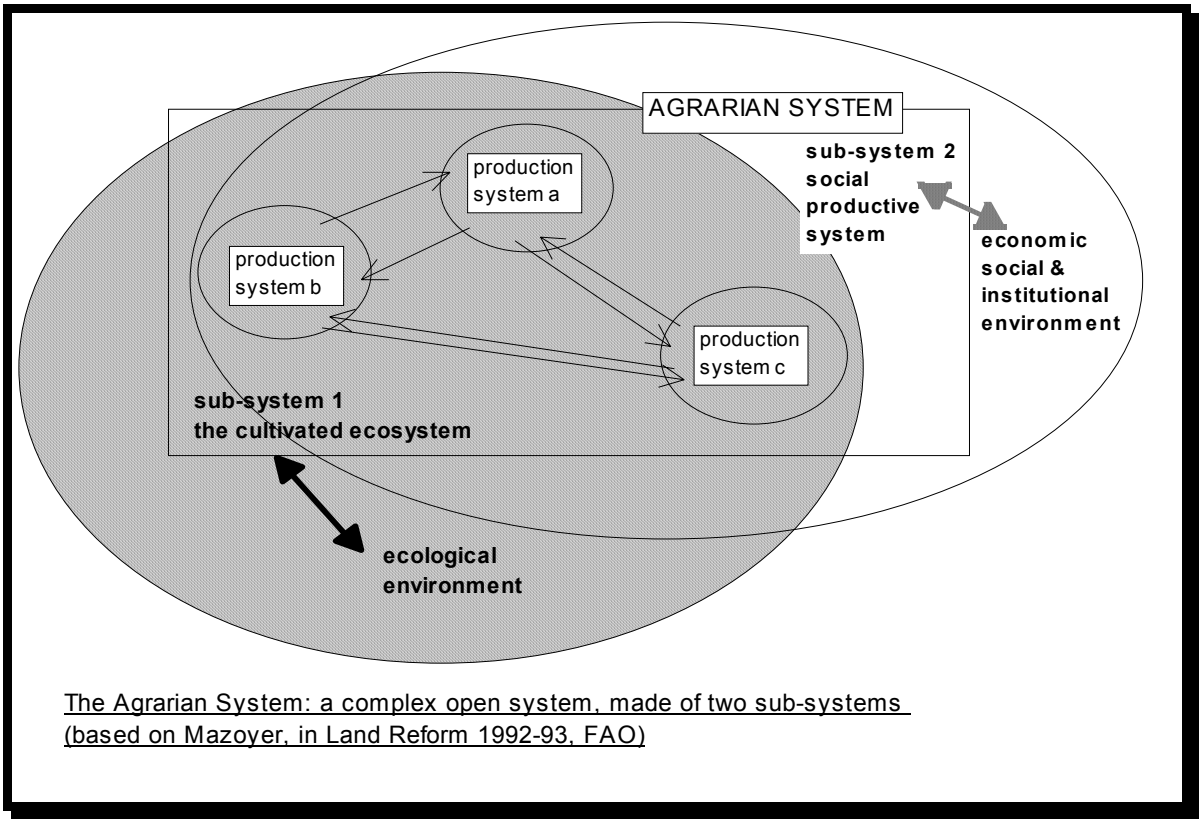
Grassland Based Systems: A subset of solely livestock systems in which more than 10% of the dry matter fed to animals is farm produced **and** in which annual average stocking rates are less than ten LU per hectare of agricultural land

Mixed Farming Systems: more than 10% of the dry matter fed to animals comes from crop by-products, stubble **or** more than 10% of the total value of production comes from non-livestock farming activitiers

Rainfed Mixed Farming Systems: A subset of mixed systems in which more than 90% of the value of non-livestock farm production comes from rainfed land use.

Irrigated Mixed Farming Systems: A subset of the mixed systems in which more than 10% of the value of non-livestock farm production comes from irrigated land use. (FAO-1996)

Several production systems together and the interactions between them in turn make up an **agrarian system** (see Figure 1). The agrarian system is the sum of relationships between the production systems and the general social and economic organization of the whole society.



The Agrarian System: a complex open system, made of two sub-systems (based on Mazoyer, in Land Reform 1992-93, FAO)

Figure 1

Prof. Mazoyer defines the agrarian system as: "**a mode of exploiting the environment historically created and sustainable, a system of production forces adapted to the bioclimatic conditions of a given space and responsive to the social conditions and needs of that moment**".

The internal coherence of the mode of exploitation of the environment raises questions about the overall technical, economic and social conditions of production. Mazoyer identifies the following essential variables which combine in an agrarian system in one form or another:

- *the cultivated ecosystem: original environment and its historical transformations*
- *the production elements: tools, machines and the biological material (cultivated plants, domestic animals), and the social manpower (physical and intellectual) to manage them.*
- *the mode of transforming the environment resulting from i) and ii): reproduction and exploitation of the cultivated ecosystem.*
- *the social division of labor between agriculture, craft industry and industry which allow a) the reproduction of work tools, and b) the production of agricultural surplus and c) the satisfaction of other social groups, beyond the needs of the farmers.*
- *the exchange relationships between these different but associated sectors of the economy, the relations of ownership and strength which determine the share of the production work, of the production and consumer goods.*
- *finally, the overall ideas and institutions, which allow the social reproduction: production and exchange relationships and the sharing of production.*

II. AGRARIAN SYSTEMS DIAGNOSIS

Building upon the discussion above, we propose to use **Agrarian Systems Diagnosis** as our basic methodology for analyzing family farm agriculture. This approach emphasizes interactions among system components at different levels. It moves from the general to the specific, using a holistic method, which respects a hierarchy of processes and determinants.

Agrarian Systems Diagnosis also gives a specific role to those systems which are "goal-orientated", such as the production system managed by a farmer according to his or her own purposes and taking into consideration his or her constraints and opportunities.

1. THE MAIN UNIT OF ANALYSIS: THE FARM HOUSEHOLD IN CONTEXT

The sheer diversity and complexity of land access and production systems – often in the same national or regional context – often demands that we identify patterns and simplify analytical approaches. Finding a suitable unit of analysis to facilitate technical studies and give meaning to subsequent policy recommendations is an essential step along this path.

Within such a unit of analysis, all those present should share a common understanding of social, technical and economic norms. As we progress upwards however, from cropping system through production systems to agrarian systems, it becomes more and more difficult to adhere to this basic principle. We have already seen that there are good reasons for focusing attention on family farms. Considering these also as a kind of micro-system may also offer the best way forward, with the family-farm-as-system being the building block of the higher level systems.

Simplifying Diversity: The Search for Workable Solutions

In Mozambique, FAO has been supporting the development of new land tenure policy and the drafting of new Land Legislation. With over 20 distinct ethnic groups, each with its own land access and land management systems, many people thought it would be impossible to integrate 'traditional' or customary land practices into the new legislation. It would simply be too difficult and expensive to codify all the various systems that exist, and the result would be too big and cumbersome to be useful.

Instead, FAO has helped the Government devise a new law which recognises the relevance of customary land access *as one of several channels through which State attributed land use rights are acquired.* In other words, the whole gamut of customary systems was reduced to one of several *patterns* of behaviour through which land issues are addressed.

This simple device, together with new concepts which encapsulate local communities and allow customary practices to continue within defined limits (both physical and constitutional), has facilitated the development of a concise new Land Law which nonetheless gives real recognition to the validity of rights acquired through customary channels, and the customary land access and use systems that manage these rights. The new law was approved in July 1997 and is now in force.

For better or worse, most technical literature is still strongly influenced by western modes of thought which seek to identify discrete and easily studied units of production. 'The household' is a classically western concept, approximating in the minds of many people to the nuclear family of two adults and their children. Thus 'the household' has emerged across the world as the universal unit of analysis. This unit lends itself to being analysed as a micro-level system in its own right, summed up in the present context by the concept of the 'farm-household'. This micro-system incorporates a range of production and social organisation variables.

These variables include production information (land area, crop and livestock itineraries and patterns, technology used), and indicators of labour availability, consumption, and overall social wellbeing. In the human development context, it is often the last of these (for example, young child nutrition within the unit) and not the more technical variables that are used as outcome indicators of the overall success or otherwise of the micro-system in its wider system context.

We shall see later that the farm-household concept is open to many interpretations reflecting the many human situations and cultures around the world. This can often create confusions between those who are 'thinking western' and want to see discrete units, and those who appreciate the subtleties and nested structure of households and extended families in other cultures (see the Box in the following section).

For the moment however, the concept of the farm-household as system is a useful starting point. UNDP provides a helpful definition: "The farm-household system provides a good *framework* for addressing human development concerns. It seeks to understand interactions between the different components of the overall environment as they affect the decisions and performance of each farm household. It also directly confronts the difficulty of reconciling governmental objectives with individual priorities. Thus it acknowledges that the outcome of governmental interventions in agriculture ultimately depends on the decisions of millions of men and women farmers".

It is important to remember however that no family or farm-household exists in a vacuum, even in western societies. Each unit is tied to others by a wide range of links. These begin with straightforward kinship relations and marriages that tie family farms into wider extended family groupings, and end in a web of commercial and trading relations that often mean that farmers in widely separate regions are often equally affected by the same phenomena. At local level this means simply that farmers live and work in communities. At the wider level, it means that they are embedded in social and political systems that are often beyond their control.

Moving from one level to the other - from the individual 'family farmer' to the community and on up to the society as a whole - involves important shifts of analysis. Behavioral patterns normally attributed to individual units or farmers as they deal with the larger forces around them are sometimes attributed to *groups* of farmers or communities *as if they were individual units.* When they do this, analysts often forget the heterogeneity of the communities or even the farm-households they are dealing with. Perhaps the most well known example are the still all-too-frequent assumptions that 'farmers' are always 'household heads' (ie the men of the household rather than women), and that income and goods are equally shared by all household members.

Nevertheless in the quest for quantifiable data and discrete units of analysis, the FHS model *is* useful. It must however be used correctly and due attention must be paid to ensuring that the correct definition of 'farm-household' is used in any given cultural or socio-economic setting. Bearing in mind these cautionary warnings, but aware of the systemic nature and analytical utility of the farm-household unit, we propose to adopt the so-called **Farm-Household-System (FHS)** as the main unit of analysis.

FAO has defined the FHS as *"...three basic sub-systems (Habitat, Production, Consumption), which are closely interlinked and interactive*". The sub-systems are:

- Habitat (those who live together): a decision-making unit; establishing general goals for the system
- Production (those who work together): other decision-making unit; establishing technical goals for the systems
- Consumption (those who eat together) other decision-making unit.

Thus the family farm becomes far more than just a series of cropping patterns or itineraries. It incorporates units of consumption, and is the mechanism through which the family is linked with others to form higher level production systems that deal with more complex forms of production than the family alone can handle.

Unfortunately, entrenched thinking based on the western household model can still result in inappropriate land and development policies being developed. The wrong land holding unit can be identified for cadastral registration for example, or the wrong people can be selected for credit and other technical assistance. In most African countries, nuclear families rarely form the basis of the household unit and FHS. Parents and children more often fit into wider extended family groups which sociological analysis can reveal as the most relevant FHS in a given cultural context (see Box discussion on Senegal, for example).

A household is defined as a group of individuals who live on the same farm, work together on at least one parcel (for adults) and recognize the authority of a single head of household in major decisions relating to the farm enterprise. [...] Farm production in the peanut basin of Senegal is organized at the compound level. The compound consists of one or more households. The nucleus of the compound is typically one man who has the "right of hatchet"and his household (wives, children, older parents, aunts, sisters, unmarried male relatives, etc.). Besides being the compound head, the male with right of hatchet is also the head of his household within the compound. Other households in the compound are headed by married brothers, sons, or cousins of the compound head. These secondary households are either dependent or independent, the difference being that the latter prepare their own meals and are responsible for meeting their own millet needs. A holding or farm is the aggregate of all parcels held by all family members within the household. (Bruce et Migot-Adholla) http://www.wisc.edu/ltc/staff.html

1.1 Defining the FHS

How one defines and thus identifies a household, and by extension the FHS, is then the most obvious question. Anthropologists have been debating this subject for years. From the layman's perspective it often appears that they agree only that it is impossible to define precisely what a household is – there are just too many cultural variations. The answer is that there is no simple definition. What *does* exist however is a common approach which, if used correctly and completely, will produce the most appropriate version of the FHS for a given cultural setting. This is the systems approach advocated here, in which various aspects of the household are studied together. Where there are points of contact, or where one result confirms another, we can begin to define the most appropriate unit for our purposes.

This process is called *triangulation*, and is a widely used technique in many areas of social and economic research. In this instance, we can start by considering each of the sub-systems listed above: Habitat, Consumption, and Production.

The Household as a Habitat Unit

If people live in the same dwelling, it is natural enough to assume that they all form one household. In most western economies this is a reasonable and correct assumption. Elsewhere in the world however it is far less certain. In some African societies for example, where men may have several wives, the husband lives in his own hut while each wife lives separately in her own space with her own children. Afro-Caribbean societies are known for the high incidence of female headed households, with several children from different fathers who may or may not participate in the daily lives of their respective 'household'.

Using co-habitation as a criterion for defining a FHS in these contexts is decidedly risky. Nevertheless, it is one of several tools that the investigator must have in his or her rucksack. Views of what a house or dwelling is must also be opened out so that they may embrace compounds with several distinct structures, or even several compounds which closer investigation reveals are linked together by marriage and farm and eat together.

The Household as a Consumption Unit

The last observation leads on to another important criterion for identifying a household, and by extension a FHS. The focus here is not the dwelling per se, but rather the cooking pot or hearth (cooking place). If people eat from the same pot or share the same cooking place, then they are a household.

A good example of this is found in Guinea Bissau, where the local term for a cooking place (*fogão*) defines a basic family unit which can approximate to a western nuclear family (although this is not always the case and can vary between different ethnic groups). Moving up from the *fogão* we find the *morança*. This expression refers to several cooking places within one extended family unit. A *morança* is often identified as a common unit of residence however, sometimes clearly encircled with a high fence, and is used as 'the household' in many studies. Even here however, where apparently clear local definitions exist, it is often difficult to establish precisely where the FHS begins and ends. Even Guinean researchers often disagree over the definitions, and argue at length over whether or not a *fogão* or a *morança* is the best unit of analysis in 'household surveys' and similar field studies.

The Household as a Unit of Production

At this point it is useful to introduce two more variables into the discussion: labour and land. In the Senegalese example above, Bruce and Migot-Adhollah emphasise the importance of identifying units within which 'a group of individuals…work together on at least one parcel…and recognise the authority of a single head of household in major decisions relating to the farm enterprise'.

Working together on the same land holding is obviously an important indicator of whether or not people belong to the same FHS. In many societies, units of production often include people from neighbouring dwellings, who share more difficult tasks such as land clearing and ploughing. Yet working together on the same parcel is not always a good way of identifying a FHS. This is particularly so in Africa, where youths who belong to traditional age-sets work together on land especially set aside for them. In socialist settings, where cooperatives are

established, people also work together but cannot all be lumped together within the same FHS. Some additional factor must be introduced to establish where the FHS begins and ends. Thus, if neighbouring dwellings can be shown to be related in some way using some of the other criteria discussed here, then it is likely that we are getting near to a definition of the FHS in a particular setting.

Land is the other factor of production that can bind people together in the same FHS. Looking again at Guinea Bissau, the *fogão* has been shown to be too low a level of analysis when dealing with land issues. The *morança* on the other hand does present a possible basic unit of land occupation that is managed and farmed collectively between members of the same extended family. Here, individual *fogãos* and even individuals within them have their own fields and plots, while their members also share labour with neighbouring *fogãos*. Add the fact that they all accept the overall authority of a *morança* head when it comes to overall land management decisions, and it becomes clear that the *morança* is the unit which most closely resembles a FHS.

The management structure is in fact an essential first step in identifying the *spatial* extension of the FHS. This structure in effect show us where the *social borders* of the FHS lie. Once these are known, it is a relatively easy task to include all land areas used or claimed by all those who accept the common authority of a particular individual or leader. It is also possible to look at this from the other direction, and determine at what level certain groups of people can make basic production decisions without reference to a higher management authority. At local level most farmers – even sharecroppers – have at least a minimal degree of control over the decisions they take. Thus the FHS can be equated to an area over which there is a certain autonomy over production and consumption decisions (including how to dispose of surpluses). Establishing how far this relative autonomy extends is another indicator of where the FHS lies.

To Sum Up

As far as family farm producers are concerned, the farm (or production unit) and the household (family reproduction unit) cannot be considered apart. Focusing our attention on the farm "per se" but not on the people managing it would prevent us from fully understanding how the farm works, where its boundaries lie, and what rights it has over other resources in both its immediate vicinity and further afield. Different versions of 'the family', 'households' and the FHS will have to be identified in different sociological and historical contexts. And the resulting unit of analysis will not be the same in Africa, in Europe, in Asia. What *is* important however is that those studying these diverse situations *use the same methods of analysis*, and keep an open mind until such time as they are sure they have identified the correct unit for the specific topic being addressed.

Where the FHS ends and higher-order systems begin is always going to be the focus of debate amongst investigators and field workers (not to mention amongst local people themselves). The answer is both vague yet indicative of the skills and sensitivity needed when beginning to assess land issues and identify our basic unit of analysis. *Each situation requires careful examination, building up a complete picture of the social and other variables that bind people together, underlie their decisions over production and consumption, and determine the way in which they occupy and use the land and other natural resources around them*. Only when such a picture has been built up, and the objectives of a particular exercise

are clearly defined, can we concretely identify what the FHS is in a specific geographical and cultural context.

By looking at each of the three sub-systems above in a given cultural context, we can identify the most appropriate grouping of individuals who together make up the FHS. The foundation stone of this process must be effective *sociological analysis*, producing a clear understanding of the kinship and power relationships between individuals and the various forms of residential and land occupation units encountered in a given setting. This approach will establish where the *social boundaries* of the FHS are (Bruce and Adhollah's 'group of individuals' defined in relation to habitat and a single authority figure). Once this is done, further analysis of the production system from a more technical perspective can tell us which land and other natural resources are used by the FHS. (This is done basically by asking all its members what they use, when they use it, and where it is.)

In this we arrive at a location and culture specific definition of a particular FHS, incorporating all the elements that make up the production system as defined above. These elements include the land other resources over which the FHS has occupation, ownership, extraction and other use rights, the individuals who make up the FHS, and the social and economic relationships that bind them to each other and to the land they use.

1.2 Gender issues and social categories

As an FAO-ILO document has recently pointed out: "Households often change the composition of their members through birth, death, marriage, migration, divorce or abandonment. Instability in household structure, which tends to increase under pressures of impoverishment and in periods of social and political turmoil, has created a relatively frequent phenomenon of women-headed households. [...] Household members use natural resources for production and consumption, which directly or indirectly has an impact on the natural resource base. [...] Although roles between and within cultures can vary, women and men are responsible for different although often complementary, productive activities, including those that depend on natural resources. There are many types of households with extensive variation from one place to another. Even one community, however, may include extended family households, households that are polygamous, female-headed, male-headed and that receive regular remissions from absent family members"(FAO-ILO).

Even when we consider the household as the most common interface between the individual and the community, it is already clear from the discussion above that this is quite imperfect. There is a need for the in-depth analysis of internal relationships between different members, focusing on gender as well as differences between young and old. Yet our main concern is not with the specific problems of each individual producer within the household or community: our unit of analysis is the FHS. Individual rural producers do fit into social categories within a community, the enhancement of which is the final purpose of our work. These social categories are the main building blocks of the agrarian system. They are not just mechanical components, as we would find in cybernetics. Some relationships between the different parts are technically determined, but others are socially predetermined. Some of the components are actors whose interests might be conflicting or contradictory.

Nevertheless an understanding of the behaviour of individual farmers, and the range of possible gender and other characteristics of the FHSs within our agrarian system, will help us to identify problems shared by groups of farmers within the FHS or production units. Once these problems are identified, and are seen to be widespread and not the result of a very particular situation in a give household, it is possible to devise improved agricultural and economic policies for the group as a whole. Other mechanisms – usually in the social domain or built in as components of the new programme – can then pick up individual problems and deal with them on a case-by-case basis.

As indicated above, the 'farm household' and the FHS are best seen as frameworks within which these social categories live and work together. Using the approach advocated here will allow an appropriate unit of analysis, or FHS, to emerge in each specific cultural and geographical situation. The systems approach is the glasses through which we commonly view the landscape - it is not necessary to change the glasses everytime a new landscape comes into view.

2. CHARACTERISTICS OF FAMILY FARMS

Moving on from the household as the basic unit, we now consider some other characteristics of family *farms*, or Farm Household Systems. These characteristics play an important role in farmer decisions, as well as being of fundamental importance for developing tenure and land use policies:

- **Risk management**
- **The invisibility of women**
- **The family reproduction cycle**
- **The relationship between nuclear families and the rural community**

2.1 Risks management at the farm level

Irregular yields are typical of agricultural production. Climate variations and recurring natural disasters, plague and insect infestations, and unexpected price increases and decreases, are amongst the many reasons why inter-annual yields fluctuate. The efficiency of family farming systems very often comes from their ability to adopt non-capitalistic behavior in order to cope with such difficult environmental conditions. Only one single year with bad results would lead them to collapse. Thus family farmers often try to reduce risks as much as possible. They prefer smaller yields and low-variability incomes over higher average yields and higher incomes that also imply high risks.

Risk limitation strategies frequently involve product diversification contingent upon access to a range of soil types in different agro-ecological areas. They also practice mixed cropping, non-intensive methods that preserve soil fertility, and the limited use of commercial inputs.

2.2 The Invisibility of Women

As discussed above, the focus on the household as the unit of analysis often obscures the fact that within this unit, social relations are anything but egalitarian or homogeneous. The role of women in the FHS is often overlooked, both in terms of what they actually do to keep the household going, and what they receive in return for their efforts.

There has long been an automatic assumption on the part of planners, technicians and even field workers that 'the farmer' is the 'household head'. The household head is the person who usually represents the household when dealing with the outside world. In other words it is essentially a socio-political role rather than an economic one. As such, it is nearly always occupied by a male household member, particularly in traditional societies where women are not encouraged to talk to outsiders or engage in social relations beyond the immediate family unit.

The result is that the male head of household is often assumed to be 'the farmer', and women in effect become invisible to the outside world (see Box below). It has long been recognised however that this perception is a fundamental error. In most developing countries, the bulk of farm work is carried out by women, who also make a large number of production decisions.

While certain tasks are done by men – for example clearing land or ploughing – many key agricultural tasks once the land is prepared are mainly carried out by women (see Figure 2 in the next page).

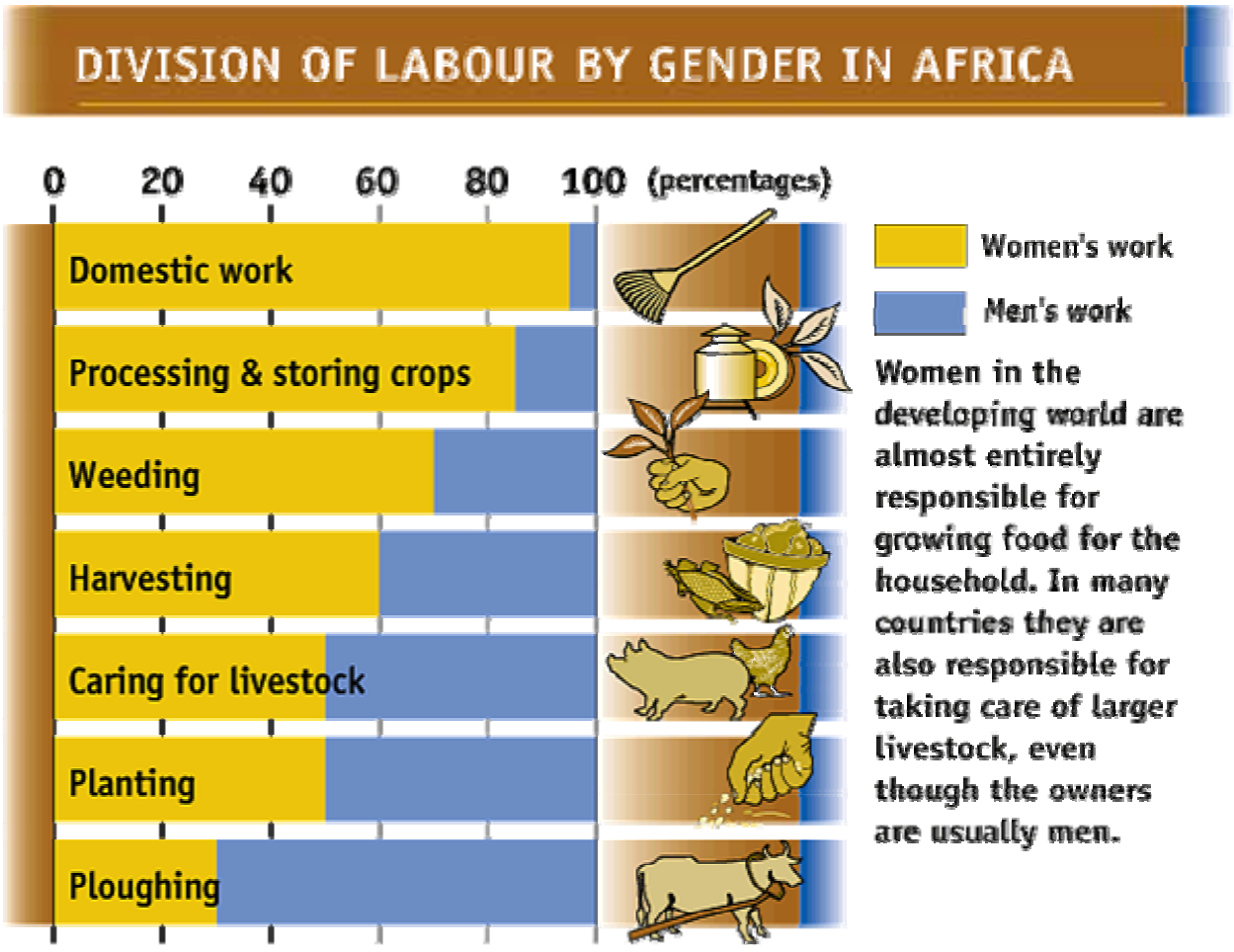
Apart from farm work, women are of course responsible for numerous other activities on the domestic front, ranging from the collection of firewood and water, to preparing and cooking food and caring for children (see Figure 3 in the next page). In short, they are the backbone of the FHS.

Moreover there is a growing body of empirical evidence that shows that women do *not* get a share of household resources which is in line with the work they carry out. Men usually eat first, and women will often give the best of what remains to their children. Income from cash crops is often controlled by the man, even if it is the women of the household who have done most of the work to produce them.

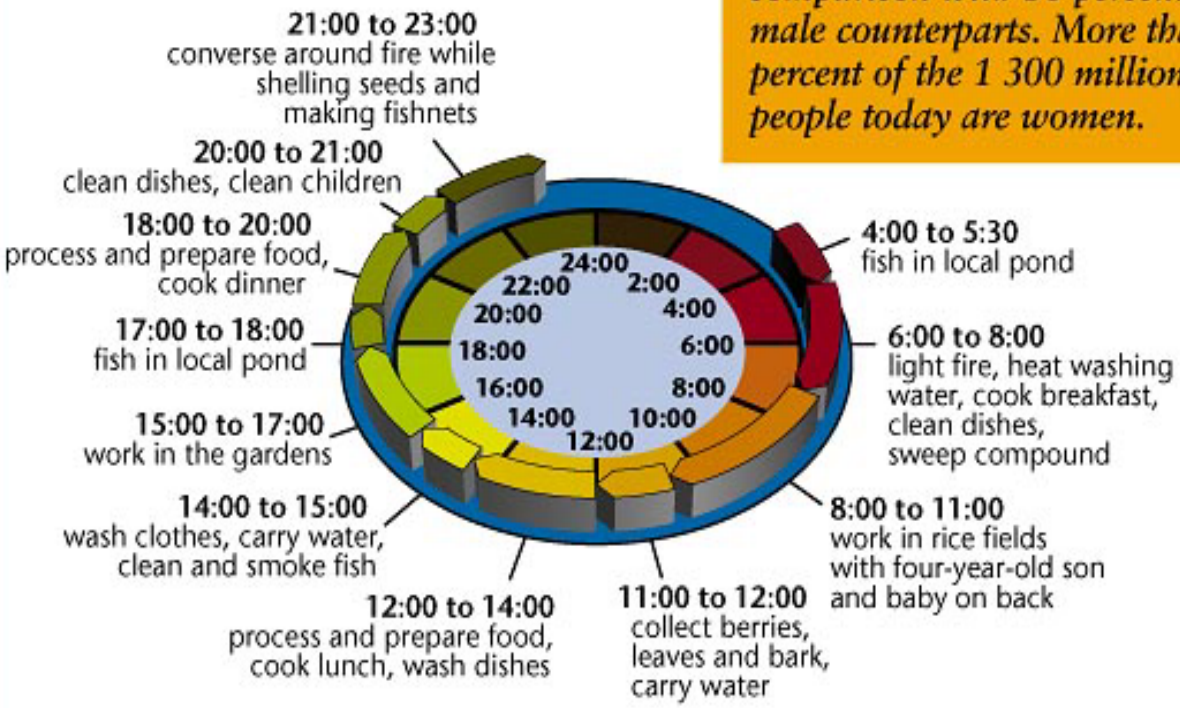
The Invisibility of Women

"Invisibility occurs at ... levels, in the first instance at the planning stage. Broad plans to improve agricultural performance do not usually include consideration of the actors involved, but focus rather on infrastructure, crop selection, technological innovations and administrative structures ... Women are also invisible at the later stage, when projects are implemented. There is a tendency to implicitly narrow the definition of target groups: the "rural poor'" too often gets translated into "adult male household head", resulting in the failure to recognize the economic role and contribution of women. Conventional economics view the household as one homogeneous unit, with a single decision-maker per unit: therefore policies, programs and projects address only the male head of household. But in fact, women and men producers within the same household may have conflicting interests or goals in regard to the cultivation of food crops. This conflict may be an obstacle to achieving high levels of productivity in given food crops. Part of the conflict is that in many cases women are expected to work as unremunerated family labor on cash crops, while still being responsible for the provision of family meals" (Weeks-Vagliani) http://www.oecd.org/

UNICEF has long advocated greater attention being paid to this phenomenon, and the impact it has on the key outcome indicators of child and maternal health. A crushing share of world poverty is in fact borne by women, who suffer economic and social discrimination within the FHS while being its most important productive asset.


DIVISION OF LABOUR BY GENDER IN AFRICA
0
20
40
60
80
100
(percentages)
Domestic work
Processing & storing crops
Weeding
Harvesting
Caring for livestock
Planting
Ploughing
Women's work
Men's work
Women in the developing world are almost entirely responsible for growing food for the household. In many countries they are also responsible for taking care of larger livestock, even though the owners are usually men.

One woman's day
in Sierra Leone



Since the 1970s, the number of women living below the poverty line has increased by 50 percent, in comparison with 30 percent for their male counterparts. More than 70 percent of the 1 300 million poor people today are women.

2.3 The Family Reproduction Cycle

Nuclear families do not always have the same configuration. The relationships between family workers and family consumers change as children are born, grow older and enter the FHS workforce, and eventually leave to make the own families.

Typically, household resources begin relatively small, increase over time, and eventually decline again, as parcels of land and other resources are allocated to children and the next generation of households is established (Figure 4). This process has a significant impact on the occupation and use of land resources, both during the lifetime of a particular household, and subsequently when the household head dies and land resources are redistributed (see Figur.

Distinctive inheritance patterns also influence the evolution of rural societies, and can impede progress towards capital accumulation and investment.

It is therefore essential to fully consider the dynamic of household reproduction, both to understand the behaviour of farmers in specific cultural contexts and the implications of the FHS lifecycle for land occupation and use over time.

This dynamic is also important for sampling when doing field surveys. A majority of households with limited resources may indicate an overall decline in resource availability. This could however be merely the result of a larger number of households being at an earlier stage in the developmental cycle. Where infant and maternal mortality rates are improving, it is a hard fact that earlier checks on population growth no longer exist. Demographic growth can thus threaten the balance between overall needs and the availability of land and other natural resources that was maintained through the life-and-death, growth-and-disintegration cycle of traditional households and land holdings.

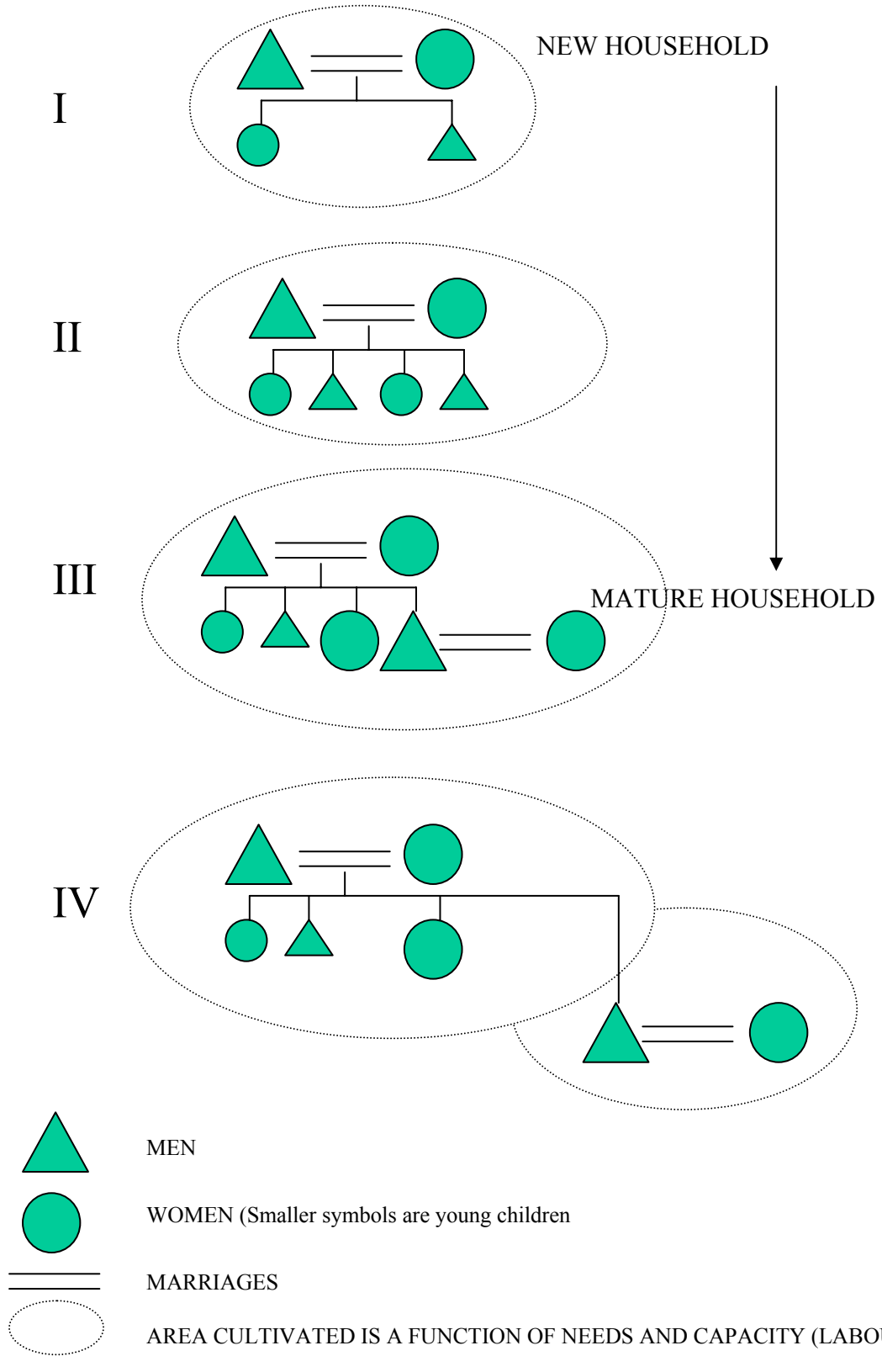
2.4 Relationships between individuals, farm-households, and the rural community

Part of our work when we study individual production systems is to see how community level and national institutions respond to incentives, strategies, and choices. Indigenous communities usually have more experience of local conditions than non-indigenous people when managing common resources such as forest and pasturelands, water, and wildlife. National institutions or technical agencies often have expertise and knowledge of the outside world (for example, commodity prices) that is unavailable to those at local level. Traditionally, the flow of information has been top-down, with 'experts' arriving to tell local people how to do things better. It is finally being accepted that in fact, local people often know more than outsiders do about the management and use of local resources.

> [...] The main condition for the development of communities is not the participation of the beneficiaries, although this is important, but rather it is the creation of local institutions that can ensure the continuation of that development. [...] Community institutions are therefore the result of an awareness of common problems, which are difficult to solve at the individual or family level, and which require an agreement or consensus among the different members of the community. (Sanchez in Community Development Journal)

FIGURE 4: THE FARM HOUSEHOLD DEVELOPMENT CYCLE

(Factors limiting land occupation: labour and technology)



Source: FAO 1999: Regional Training Courses in Community Land Delimitation. FAO/Land Commission, Maputo, February-March 1999

What communities really need is well targeted support designed with their full participation, and administered through community based institutions (see Box). Such support can make existing activities more productive, and ensure that new ones are workable in the context of the social, economic and ecological constraints identified by the local level end-users.

It is therefore essential to understand the different ways in which indigenous people or local communities administer their common resources. The allocation and management of land and other natural resources, as well as conflict-resolution mechanisms, are key elements of this process. In this context it is necessary to look again at the basic unit of analysis – the FHS – and consider whether it is indeed the right unit for all purposes. Targetting resources at the individual FHS level while the behind-the-scenes management role of a higher management or judicial authority has been overlooked, may simply result in a failed project.

Guinea Bissau is again a good example to illustrate these points, and the importance of understanding the relationships between the basic FHS unit (in this case the *morança*) and higher level orders of social and economic organisation (see Box below). FAO consultant Paul De Wit has shown that by introducing land management systems into the analysis (as opposed to land occupation and use), a higher level system is a more appropriate unit for developing a workable approach to land policy. This unit is the village, or *tabanca*, and has since become the main unit for delimiting community land rights within the new national Land Law (approved in January 1998).

It is debatable however whether even the *tabanca* is the end of the story. Higher levels of customary land management authority can also be identified in Guinea Bissau. These correspond to old chieftancies (*regulados*) that have survived from pre-colonial times. De Wit resolves this issue by analysing the relationships between the principal actors at local, village, and regional level. In this way, it becomes clear that while the *Regulo* is recognised as an overall authority on land matters and a repository of historical information, it is the leader of the village – *chefe da tabanca* – who is the main player in land management decisions.

This analysis then provides us with the appropriate mechanism for identifying and demarcating the land over which the tabanca as a whole has land rights. Within this area, individual FHSs have clearly recognised and relatively strong (virtually private) rights over specific areas of land, as well as shared rights over common resources such as forests for hunting and gathering honey and other forest products.

Key local resources such as the fertile flood plains that are dotted over the landscape are attribute to each FHS by the *chefe da tabanca* every year. Meanwhile, within each FHS, the head of this unit exercises his management role over the land and other resources within land held by the FHS for generations.

The distinction between land occupation and use, and land management, can also produce very different pictures of the area over which a FHS or a community claims land rights. A focus on occupation might produce a map with distinct, separate parcels of land used by a number of FHS on a more or less regular basis. A focus on management on the other hand could produce a much larger map which *incorporates all the FHS parcels, as well as areas in between them that are presently unused or unoccupied.*

The land management system also addresses the relations between individual land users. By analysing these together with the spatial occupation and use of natural resources, we can arrive at an assessment of *community land* rights as opposed to those exercised by individual FHS units.

It is also important to note that very few farm households rely solely upon agriculture for their livelihoods. This is particularly so for very small units, where available resources simply cannot provide for family subsistence. Off-farm employment, remittances from relations abroad, trading and other non-agricultural activities all contribute to household income. To quote Conway and Barbier (cited in Carley): "With surprisingly few exceptions, developing country farmers, particularly in resource-poor environments, do not rely exclusively on farming. Their aim is to secure a livelihood for themselves and their families and to achieve this they usually pursue a range of productive activities, only some of which involve crop or animal husbandry".

Farm-Households and Communities: Guinea Bissau

"The *tabanca* farm system represents an integrated strategy using land on three basic levels: *bolanha* flood plains and rivier valleys; river banks and drying out river bottom land; and upland rainfed areas. Access to forests, for hunting and other products such as honey…is also an important part of the year-round subsistence strategy. For many communities, fishing is a key activity, both for consumption and for sale. Livestock…are important for all ethnic groups [requiring good dry-season grazing]. […]The production system is intimately bound up with the social organisation of the *tabanca*. […] While individual *fogão* [nuclear family] members might make up separate production units in their own right, labour and food exchanges are common at all levels. Most [ethnic] groups also have some form of collective production, either on a communal rice field or on fields cultivated by members of age-sets or youth groups. […] The labour force comprises the older children and adults (especially women) of the immediate nuclear family unit; plus workers it can rely on from elsewhere in the *morança* at critical periods. […] Each *fogão* is subject to the authority of the *fogão* head, who allocates land of each type to his wives and unmarried sons, each of whom might have their own fields and a degree of control over at least part of what is produced. Behind the *fogão* head stands the wider land allocation system and social organisation of the *tabanca* and, in some [ethnic] groups, the noble clan and clan chief (*Regulo*). All land is allcoated downwards by the village elder (*Homen Grande* or *chefe da tabanca*), either through the *morança* or directly to each *fogão* head".
(Tanner 1991)

This observation means that a precise definition of the FHS is sometimes very hard to pin down. With entrepreneurial producers, it is relatively easy to distinguish between the economic production unit, the enterprise, and farm worker households. This is not the case with the most common agricultural system, the family farm. In reality, the production and consumption system of the farm-household – or in other words its *subsistence strategy* – often extends far beyond the immediate geographical area of the farm or village.

In this way the 'system' can even reach into industrial suburbs in developed countries where sons and brothers work to save money to send home, buy new land or invest in a truck or tractor, or simply to get married. Does the FHS of these households extend from, say, a Manjaco village in Guinea Bissau to incorporate a small flat in Marseilles? And what is the FHS of a household where the women and older children work on a nearby cotton plantation to earn extra cash income? Does it include the plantation itself, or is it confined to their farm plots and scrubland where they gather berries and firewood?

These observations underlie the fact that our basic unit of analysis, the FHS, is set within a complex structure of nested systems (see Figure 5), each one built upon or incorporating the others within it. The *tabanca* system in Guinea Bissau is an excellent example of such a 'nested' system, starting at the level of individuals within a particular FHS (for example women who get rights over certain plots attributed by their husband), moving up to the FHS as a unit, and ending in the *tabanca* 'production system'. Beyond this, there are many linkages to higher level systems – the agrarian system, the society as a whole, and eventually the international economy where terms of trade and other factors begin to exert their effect right down to local level.

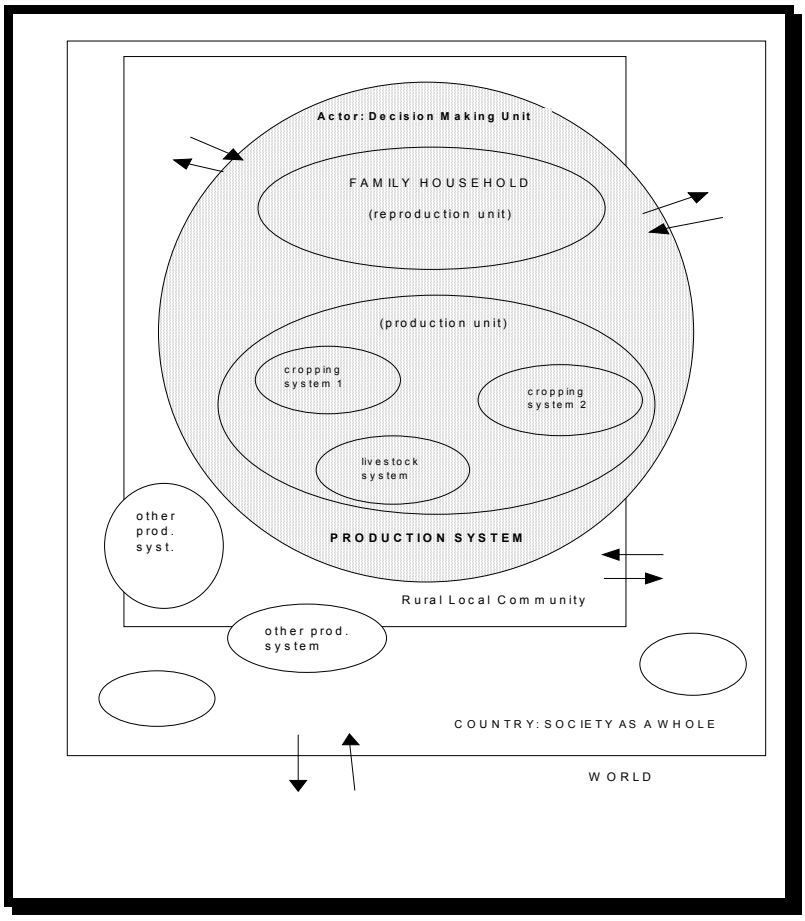


Figure 5: The Production System: An Open System

Few of the smaller systems close to the centre are sealed units without linkages of any kind with the higher order systems around them. It is at this point that we introduce the distinction between *open and closed* systems. Thus while we can identify a FHS using criteria such as 'working together on at least one parcel of land' or 'recognising the authority of a single head of household', we must not forget that the FHS also has essential links to the outside world. These links function through what is in effect an 'open border', and are often in integral part of the subsistence stratgegy of the FHS. The FHS then becomes an 'open system', identified as a distinct unit using the techniques above, but also with important two way exchanges going on (including trade for example) between it and the higher level systems.

3. A BASIC HYPOTHESIS: THE FARM-HOUSEHOLD RATIONALITY

The sustainability of production systems cannot be presented from a purely ecological or technical point of view. Deforestation, soil erosion, decrease in topsoil organic matter content in family farmers' production systems are often the result of much deeper causes which could be described as a lack of economic sustainability. Deficient access to resources, to secured land tenure, to markets, to production means, to labor, and to capital assets may force the poorest of smallholders to adopt survival strategies and non-sustainable production systems.

Less-favored farmers, however, are not the only ones implementing non-sustainable systems. Large profit making holdings may prefer to maximize their short-term benefits, and shift their plantation sites (e.g. bananas companies in Central America) or their concessions (e.g logging companies in many places) when natural resources are no longer available. Economic reasons cause these different actors to adopt such negative types of behavior.

During the last decades, the world economy has undergone rapid change, generating considerable transformations in agricultural production systems even in the remotest areas. Nowadays, no pertinent analysis of agricultural systems can be done at local level without taking into consideration socio-economic trends at local, national and even world level.

Depending upon their access to resources, and to the role they play in the production and exchange relationships in which they are involved, farmers adopt very different attitudes in order to maintain or to improve their livelihood as much as possible. The economic criteria they try to optimize vary according to many different factors: land access and tenure security, production means, family labor force, markets risks, off-farm income opportunities, etc.

However, farmers strive to use the scarcest resources as best they can. Farmer behavior may generally be explained by materialistic concerns. The way they work and live is not a product of low educational level, backward development, or only the expression of some specific cultural feature: the production systems depend on agro-ecological and also socio-economic potentialities and constraints, which have to be thoroughly identified. This is what we call "**family farming rationality**". It is not always easy for external observers to understand those different kinds of rationality, especially if they are technicians who are used to considering themselves better educated than the farmers they are working with.

There are sometimes exceptions and individual farmers may not act in a “logical” way. But we will never have historically significant social groups with irrational behavior. Nevertheless, this behavior does not necessarily mean the best option *per se*: it only reflects the best option available at a specific moment, and under specific ecological and socioeconomic conditions. **The so-called rationality has to be understood from the point of view of the FHS**, and does not always imply sustainability. In fact, as Parson mentioned "It is not enough to postulate that people make rational choices among alternatives; for if significant development is to be accomplished through choices, people must not only have the appropriate abilities to perform but there must be something from which to choose. Abilities are nourished by opportunities. The interrelations between abilities and opportunities are fundamental for national development".

Access to land is of course one of the core issues that will explain the behavior and the "strategy" of farmers. A detailed understanding of land constraints will be of paramount importance for rural development.

Promoting Diversity: two different types of diversity can be promoted [...]: diversity of production systems and diversity of economic activities [...] Diversified production systems in agriculture are based on growing several crops in association with several kinds of livestocks; in forestry, they are based on multi-species forests; in fisheries, they are based on exploiting many different species using different fishing methods and gear. Diversification can also involve integrating elements of agriculture, forestry and fisheries in a number of different combinations. Diversification reduces the risks introduced by variations in demand, changes in weather and climate, inter-seasonal variations in fish stocks, and the occurrence of pests and diseases. [...] At the same time, yields can be increased by agroforestry, multiple cropping, the confinement of farm animals and the production of some inputs on the farm, recycling, multiple use of land and adding value to outputs by on-farm processing. [...] The diversification of sources of income is an important part of any strategy for sustainable rural development.(FAO-SARD)

4. THE FRAMEWORK OF THE ECONOMIC ANALYSIS

Before looking at the survey process in detail, it is important at this stage to have a clear idea of the fundamentals of the economic analysis that is the last step in the process.

4.1 The theory of the ordinary farm

The concept of *ordinary farm* is the logical consequence of applying classic economic theory to the activity of valuation. The opinion that in valuation, priority attention should be given to ordinary incomes, was already being discussed in the XVIIIth century[2], and was refined and consolidated by Ricardo and Marshall in the following century.

The basic idea underlying this theory is that if a relatively homogeneous group of farmers, living and producing in the same area, is distributed so that the great majority do not present qualities very different from the average, these farmers will represent the ordinary producers who manage ordinary farms. The "**ordinary farm**" is also understood to be an enterprise which operates at zero level of profit, where the final value of production corresponds strictly to the costs of production.

The first direct consequence of utilizing this concept is the way in which a survey questionnaire is prepared. Instead of favoring hazardous data (mainly referring to techniques, yields and prices) attention focuses on the analysis of the most common practices, or **"ordinary practices".** This means, for example, that data presented for cropping yields do not necessarily refer to the last agricultural cycle, but more probably to an ordinary cycle, using ordinary prices expressed in constant terms.

4.2 Designing an economic model of a household

A comprehensive measure of farm-household income (Total Family Income) is a key indicator which considers all household activities. As we are interested in agricultural production systems, only that part concerning the farm is discussed below in details, while all non-farm income is aggregated together under the expression 'off-farm net incomes'.

[2]See, for example: C. Trinci. "Trattato delle stime dei beni stabili" in Nuovo trattato di agricoltura, Venezia, 1778; Girri: "L'agrimensore istruito", Venezia 1758; Pampani, "Breve metodo per stimare i terreni e fabbriche", Ferrara, 1780 and M. Gioia, "Nuovo prospetto delle Scienze Economiche", Milano, 1817

Thus:

Total Family Income = Off-farm Net Incomes + Agricultural Net Income

Agricultural Net Income

The Agricultural Net Income (or Aggregated Value) is obtained by subtracting all costs from the value of 'Farm Gross Production' (FGP), for the period under consideration (see Figure 6):

AV = Farm Gross Production (FGP) - Costs of production

where:

FGP = ∑ [(production x surface)] x unit price

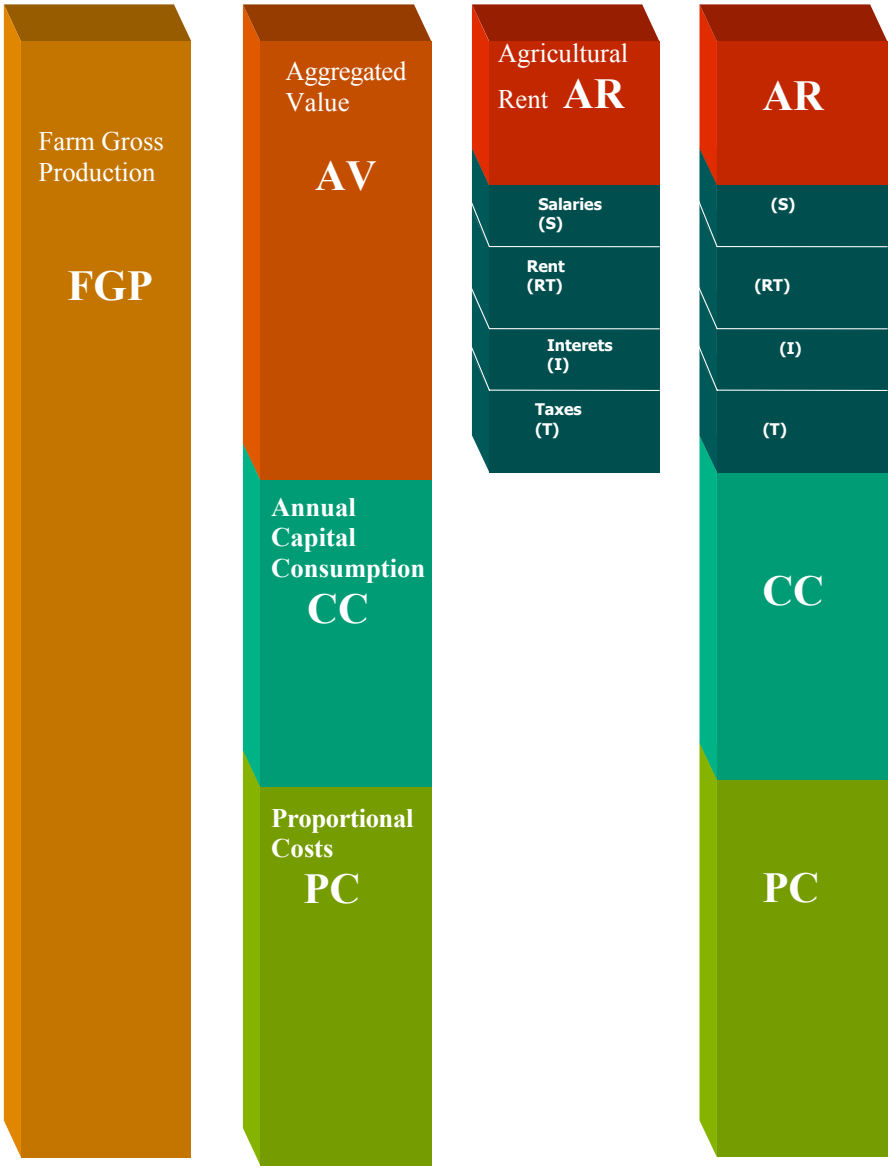


Figure 6

FGP represents *all* production, for sale or self-consumption. When farm production or some part of it is used as an input for some other production, it is considered in that way.

Calculating the Gross Farm Production presents some difficulties. For the sake of simplicity, prices for both marketed and self-consumed production are the same. Prices are also referenced to the same period of the year. If there is a high inflation rate, local prices are given in a stable currency (e.g. US dollar).

The other problem is how to represent variations in livestock and plantation values[3]. The variation in plantation values can be estimated by using the investment effectively made.

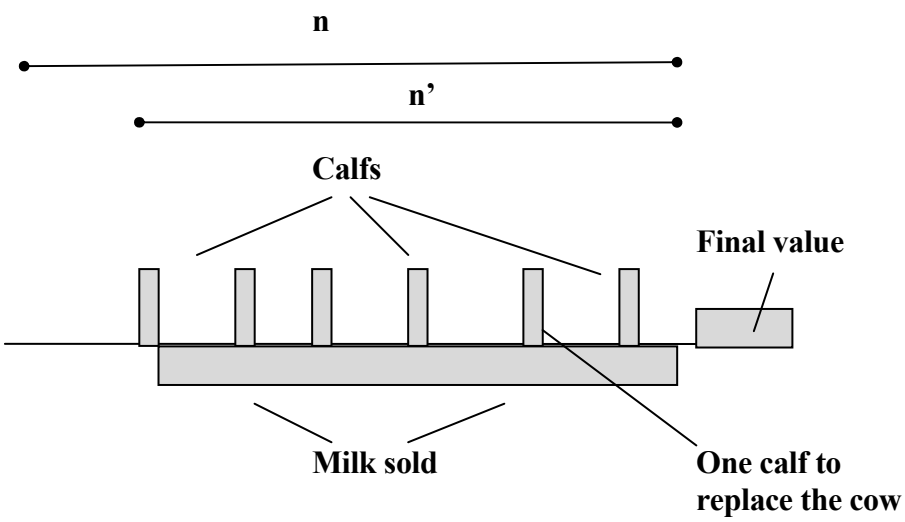
A practical way of calculating the livestock value is the equation (shown graphically below):

Livestock (year) production = {[(C-I) x unit price]+ [M x unit price] + Fv} / n

where:
n = "economic life" of a cow
n'= productive years (n'< n)
C = number of calves produced (whatever the sex) in n' years (total calf s less deaths)
M = quantity of milk produced and NOT used for calves (self-consumption + sold)
Fv = final (residual) value of the cow at the end of the "economic" life
I = one calf to be used for replacing the cow

None of these estimations will be perfect, but any rational estimation will be better than not taking into account these hidden aspects of production.

Graphic Representation of Estimating Livestock Values



Costs of Production

Among Costs of Production we can find proportional costs and fixed assets.

Proportional Costs (PC) are the sum of all costs incurred by producers for obtaining the final product (gasoline, seeds, fertiliser, chemical inputs, etc.), directly proportional to the amount of the production and which can be easily shared between different activities.

[3]In some cases, it would be worthwhile also taking into consideration variations in stores and supplies.

Fixed assets are the average annual consumption of capital, and are generally calculated on the basis of a linear depreciation, in the following way:

(Fv - Iv) / n

where:

Fv = final or residual value
Iv = initial value
n = economic life expressed in years

The Aggregated Value can also be presented in the following way:

AV = [(FGP/Ha - PC) x Ha] - Fixed assets

This represents the equation of a line **(y = mx + q)** with x defined between 0 and the maximum surface which can be managed by the unit of analysis in the present situation. In order to study the relationships existing between capital, manpower, land and the productivity of small farmer sector, we must start drawing a simple scheme of their relationships.

Such a scheme, following Mazoyer (1981) is shown in the diagram below (Figure 7), where:

Line 1 = Average gross product per equivalent worker
Line 2 = Average proportional costs
Line 3 = The proportional gross margin (1 - 2)
Line 4 = Average annual consumption of capital
Line 5 = Average productivity of agricultural labor
Line 6 = Maximum surface which can be managed within the existing technical system
Line 7 = Maximum labor productivity
Line 8 = Off-farm and non-agricultural income
Line 9 = Total Income
Line 10 = Present Reproduction Threshold

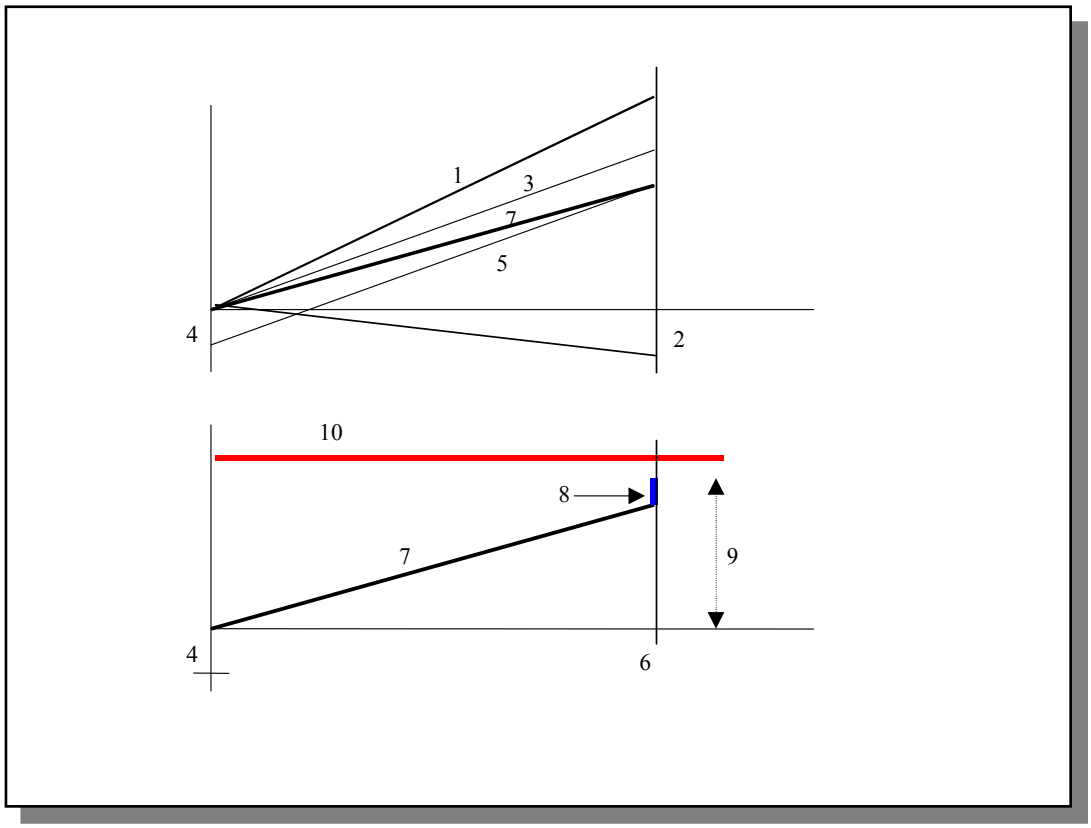


Figure 7

The Aggregated Value (line 7) corresponds to production factors that have been put into the production cycle: labor (physical and intellectual), land and capital (operating capital). Adding the different AV calculated for each activity will allow us to represent the ordinary production system as seen in the figure 8 below (drawn from the Cooperation Project with Incra, Brazil: http://www.incra.gov.br/fao).

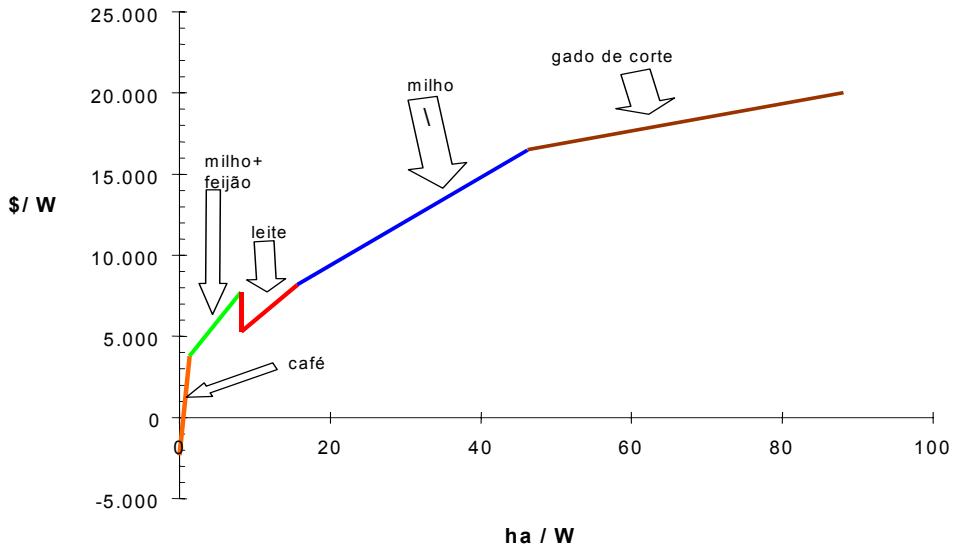
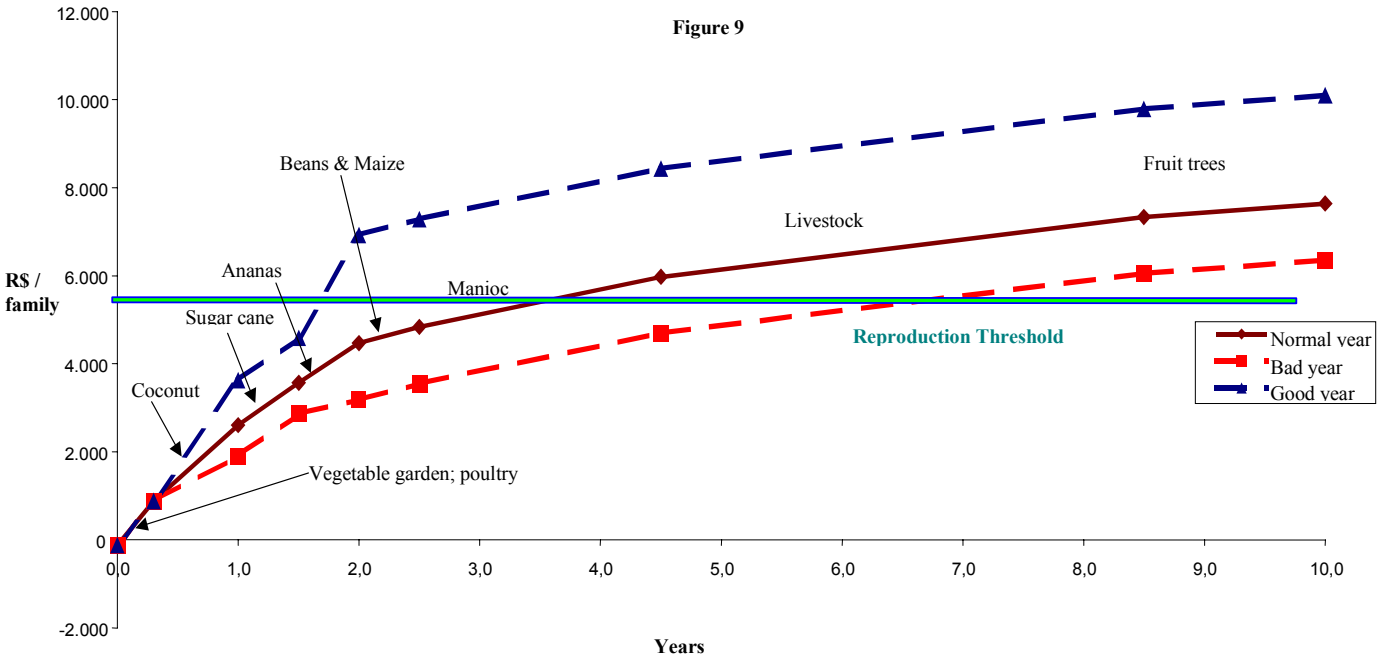


Figure 8

The next step is to show the aggregated values calculated using both the best as well as the worst results (physical and economic) for each activity. This is illustrated in the following figure (Figure 9) taken from a case study done in Itamaraju, Bahia State, Brazil.

Figure 9



4.3 Reproduction and accumulation thresholds

Under some economic thresholds, defined at household level, farmers will not have any choice other than to adopt unsustainable systems.

The Reproduction Threshold (RT) of a Production System refers to the reproduction of family manpower and the means of production. It covers:

- a) physiological needs (food) of the family members and all basic needs such as clothing, housing, health services, etc. According to FAO estimates, the lowest level of calories per capita needed to sustain life is about 2,000 kcal/person/day. This approximates to the "cost of living" in a specific place at a given time. This clearly dynamic concept can vary as a function of the household age profile, especially the number of growing children and pregnant women, and the type of labour (on farms, usually heavy manual) mostly engaged in. The Total Family Income (TFI) needed to meet needs is equally dynamic, and depends upon the opportunities available to rural people (both on-farm and off-farm or urban). Obviously farm-households which fail to cover basic needs are forced to join the rural exodus and/or suffer infant deaths and other signs of systemic failure.

- b) the renewal of implements and machines, farm buildings, animals, other capital, and also the fertility of the land.

In system analysis, the Reproduction Threshold is the expression of external factors which the producers have very little hope of influencing. The RT will be strongly affected by national economic policies, international terms of trade, and programmes like Structural Adjustment agreed with major lenders of capital. The impact of these external factors can be quite rapid. Thus macro-economic changes that have no immediate relationship with local farm production systems can completely modify sustainability thresholds and turn well-off producers into deprived ones. It is easier to understand such changes easier if we use the Reproduction Threshold concept.

An Example of Changes in Reproduction Thresholds

The more market-orientated the economic model, the more the Reproduction Threshold for that country will tend to be determined by factors beyond the boundaries of its agricultural sector. A study carried out by a FAO team in Chile looked at the evolution of the Simple Reproduction Threshold from the 1960s to the end of the 1980s. The study showed a major increase at the end of the 1970s and early 1980s. This increase was a direct result of a fully open market economic model chosen by the Government of Chile, in conjunction with major international financial organizations.

Explaining the reasons behind this policy and its subsequent impact is not of interest to us here. It is a good example however of the implications for rural producers. Effectively, with an increase of almost 100% in the cost of living, improvements in productivity amongst small farmers during the same period (more or less at the same level) was just sufficient to maintain the relative position they previously had. It was expected that rural poverty would be reduced in the long term., yet nothing like that happened. Any positive effects of the increased productivity were cancelled out by the parallel increase in the cost of living.(Groppo, 1991)

The RT is correlated with *measuring poverty*. The methods usually employed for measuring poverty vary from one major group to another, but there are basically two approaches:

a) The Poverty Line (PL) approach.
b) The Unsatisfied Basic Needs approach

The *Poverty Line Approach* consists of the following steps:

- define basic needs and its components;
- define a standard basket of what is essential for each household; c
- calculate the cost of this basket, which will represent the poverty, line;
- compare the poverty line with the household income
- classify each household falling below the poverty line as poor.

The Unsatisfied Basic Needs Approach is rather different. UNDP[4] gives the basic steps as follows:

- define basic needs and its components (as in the PL approach);
- select variables and indicators more appropriate for each component;
- define a minimum level for each indicator, below which the household will be considered as not meeting the basic needs,
- classify households lacking one or more basic needs as poor.

In both cases, all the members of a household not reaching the required standards will be considered as poor.

> From a policy or program perspective, the alternative ways of documenting human welfare have a distinct contribution to make. The measurements based on basic needs, such as the incidence and severity of nutritional deficiency, morbidity and mortality rates, water supply and sanitation facilities, housing conditions, and education and health facilities, are most useful in designing programs or policies specifically geared to those problems. They may also be useful in setting priorities, even though this may entail subjective comparisons of the welfare implications of, for example, a poor water supply and a lack of education facilities. On the other hand, the minimum income (poverty line) approach makes it possible to formulate policies and programs that influence employment generation, agricultural production, incomes, and prices. [...] As mentioned earlier, the income approach attempts to determine people's ability to meet some basic needs. Whether or not an individual actually does so can be influenced by a host of factors [...] Some individuals who are below the poverty line may have superior managerial skills, make more efficient use of resources, and achieve the desired basic needs [...] Nevertheless, the cutoff point is useful if it is based on "average" behavioral characteristics. (Kumar in Mellor and Desai)

In the Agrarian System Diagnosis whatever the method used, *calculations should include not only the income and other resources needed to meet basic needs, but also those needed to keep the farm-household above its Reproduction Threshold.* The overall situation is also placed in a development perspective to highlight recent trends within the ongoing evolution of the lives and circumstances of the economic actors.

[4] "Desarrollo sin pobreza", Conferencia Regional sobre la pobreza en América Latina y el Caribe, UNDP, Quito, Ecuador, 1990

4.4 Modeling: a proposal

Modeling means the construction of physical, conceptual or mathematical simulations of the real world. Models help to show relationships between processes (physical, economic or social) and may be used to predict the effects of changes in land tenure systems.

> Another Development would be need-oriented, endogenous, self-reliant, ecologically sound and based on the transformation of social structures. In delineating these characteristics, it [...] emphasized that, though human needs are both material and non-material, the basic needs of food, health, shelter and education should be satisfied on a priority basis. It was further emphasized that development, being endogenous and self-reliant, should stem from the heart of each society, and that it would acquire its full meaning only if rooted at the local level and in the praxis of each community. This, in turn, means that no development model can be universal and that the richness of development consists in the plurality of its patterns (Hamrell and Nordberg in Development Dialogue)

As we said in the Introduction, the type of development we are thinking of here is quite different from that which has been advocated in the past. The need to extrapolate from some models is used only as a way to go a step further in the methodological discussion. In fact, almost all the available guidelines for carrying out such a diagnosis stop at this level. We know that within the households different strategies may appear for the different members; at the same time we know that the poorer the household is, the more important will be other source of income, not necessarily coming from the farm. Therefore it is quite difficult (maybe unrealistic) to model such a situation. Our starting point must be that once we as technicians have decided that we have the right to intervene in a specific negative situation affecting a rural population, our basic objective is to try and make things worse. As Richards has pointed out, in too many cases farmers know their situation much better than the technicians who are supposed to improve their welfare.

> Recently I had the opportunity to contribute to a course [...] for a group of agriculture students in a West African university. Each student undertook a field project in a village [...]. The objectives of the project were to describe three "typical" farms, to provide, in scientific terms, an assessment of the way each farm was run, and after detailed discussion with the farmer, to propose technical solutions to his or her most pressing [...] problems. The work was well done, and the reports make fascinating reading. I think many of the students were genuinely surprised to find out how much farmers already knew about the ecological processes at work in their farms. [...]. Some [of the students] were sufficiently impressed by this knowledge to ask farmers' advice on problems they had come across in the course of experiments on the college farm. In the end, however, it became clear that the students had learnt more from the farmers than the farmers had learnt from the students. Few textbook solutions to agricultural development problems seemed relevant or feasible given the realities of the farms described. The problems that farmers themselves listed as priorities were ones on which the textbooks remained silent. The students came back from the field not with a list of recommendations offered but an agenda of research issues upon which they would have to start work from scratch. The project had demonstrated the width of the gap between what science has to offer and the needs of typical West African small-scale farmers. (Richards)

Our starting point is that we want to work on the existing production system (PS) and improve it where possible. This approach is certainly cheaper than introducing a new (external) one. In methodological terms, the logical consequence of this is the need to check if the present PS, once improved within the context of its own wider agrarian system will allow the FHS itself to enter what we call the Area of Possible Improvement (API). From this point on we will work with an archetypal FHS with average characteristics.

The methodological steps to follow are:

i) Identify the Basic Objective: Most FHSs are struggling in a market economy. We can assume that the basic objective would be **to reach a certain level of income and/or to reduce uncertainty**. Thus, if intervening in a given situation needs X years, and based upon an historical analysis of the RT, we should make an assessment of what the RT will be in X years. (see figure 10 below).

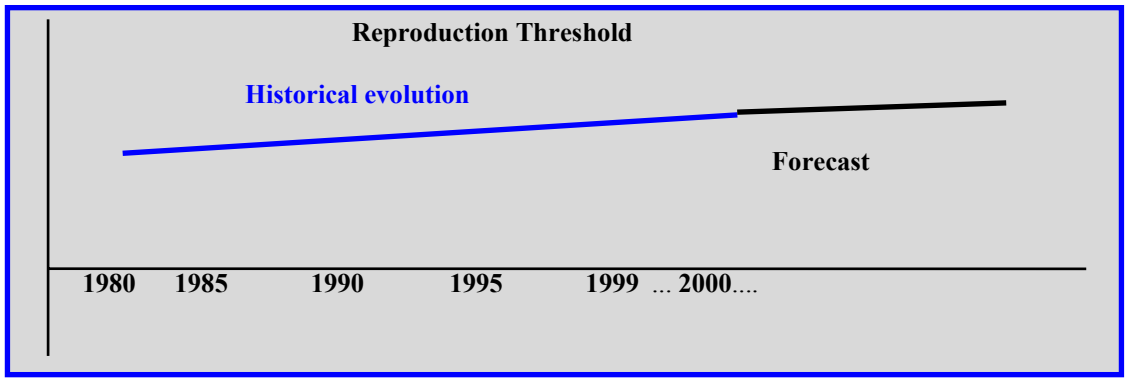


Figure 10

ii) Check the existence the **Area of Possible Improvement (API)**: This means checking to see if the present PS, allowed to reach its full limits, could ensure a level of income greater than the predicted RT. If the answer is positive, we proceed with the analysis; if not we should think of alternatives. We then ask FHS members what would be the maximum cultivable area given the present technical system (the upper line presented in the previous scheme) without changing it or introducing new tools or machinery. In the following figure (Figure 11) line **PH** represents that physical limit. Using the **Best Aggregated Value** of values that have really occurred in the past for crops in the same area, we then calculate the agro-economic limit (in the figure, line **SM** represents the best results for a given cropping system). Obviously a certain level of approximation is acceptable. The *projection of line SM onto line PH* will identify **point A** which, together with the *intersection of line PH with the reproduction threshold* (**point P**) and *the intersection of line AS with the reproduction threshold* (**point I**), will show the API area.

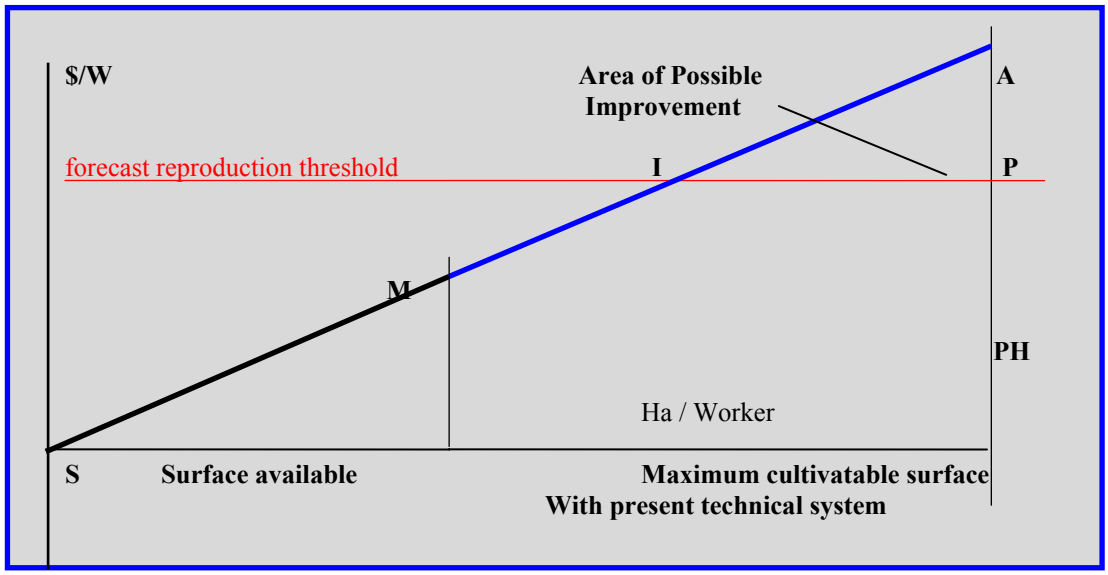


Figure 11

The identification of the API shows us how it might be possible to bring the existing PS to a level above the foreseen threshold in X years. Each of the many possibilities within the area represents a possible solution for obtaining that result. If that area had not been identified (point A below the threshold) the overall PS should have been changed.

iii) Identify the Risk Management Component: The fact that the projection of present PS has allowed us to identify the API does not mean that it should necessarily be the future PS of the FHS. Another key aspect to consider is the ***risk management*** component, which is often part of the overall strategy of a family farmer unit. This component is illustrated in the next diagram. Suppose we are working with a simple PS with two crops A and B, whose lines **a** and **b** represent their respective Aggregated Values. During the survey we have gathered data related to **good** and **bad** past yields (and prices); we have also asked the farmers if bad or good yields have occurred simultaneously for both crops.

In the Figure 12, **a'** represents the worst Aggregated Value for crop A and **a''** the best (**a** shows the *most probable (ordinary)* from the FHS viewpoint). If the interview confirmed that sometime in the past, poor production for B occurred at the same time as for A, then line **b'** (showing the worst Aggregated Value for crop B) is drawn starting from point a'. Similarly in the case of better yields, line **b''** will start at the end of a". The final points (called **M** and **R**) then indicate the *Surface of Maximum Risk (SMR)*, starting from the origin **S.**

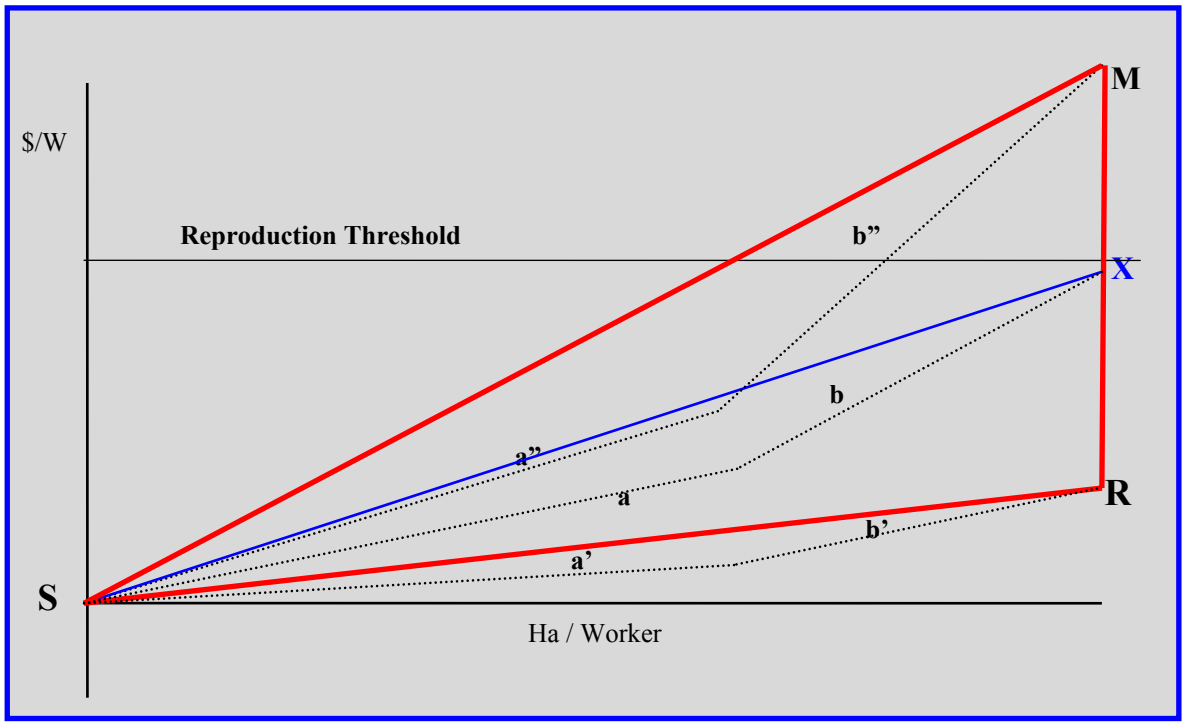


Figure 12

The two lines SR and the "ordinary" gross margin of the PS (line SX) are quite far from each other. It is therefore quite *probable* that the strategy of the FHS will not necessarily aim at maximizing Aggregated Value (reaching line SM), but will *probably* tend to reduce the SMR by trying to improve the bad results which would be terribly difficult to overcome.

A further methodological step, certainly useful but not easy to do, would be to indicate the ***frequency*** of ***the good, normal and bad yields***. In the figure 13 below we have illustrated two similar situations, equal in absolute terms (same good, normal and bad Aggregated Values), but quite different in terms of frequency. The first PS has the following frequencies: 20% for good, 70% for normal and 10% for bad. The second has: 20% for good, 50% for normal and 30% for bad. It is easy to see that the second FHS should have a more pronounced anti-risk strategy than the first one.

The figures do not therefore give us any easy solution. They are better seen as tools for visualizing other elements to be taken into account when trying to elaborate proposals. The effective answer will only come from the interaction between the technician, who should have a good knowledge of comparative agricultural systems, the FHS, the community to which it belongs, and the *Institution implementing the program*. Consequently there is a need for a ***validation and consensus*** meeting with all concerned parties before finalizing the proposals.

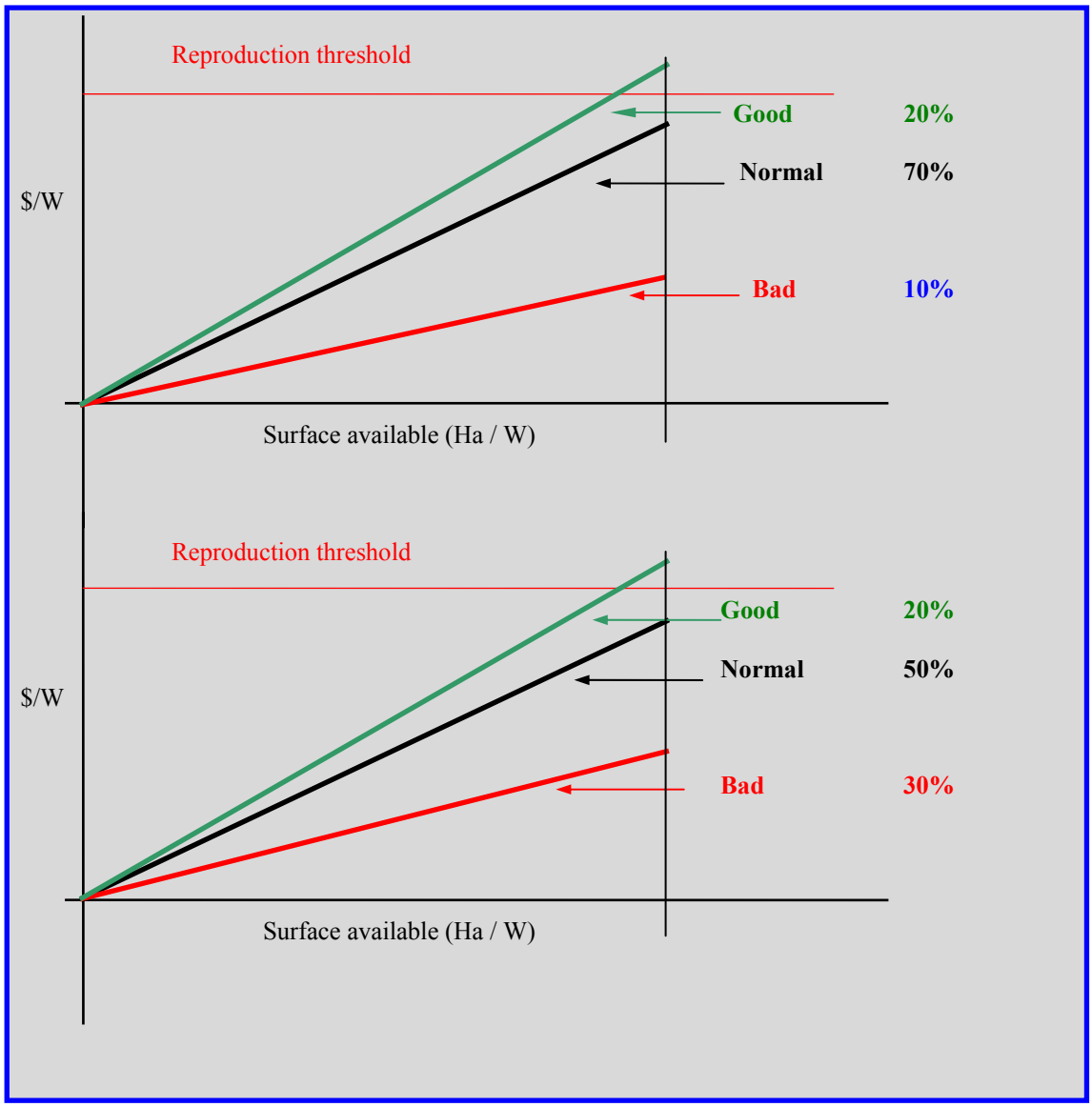


Figure 13

5. THE DIFFERENT STEPS OF THE PROPOSED METHOD AND ITS TOOLS

The method being presented here contains several distinct steps (Figure 14):

1. Zoning

2. Selecting the Sample

3. Carrying out an In-Depth Farm Household Survey

4. The Economic Analysis

The first two of these steps are largely preparatory exercises that are necessary before the main exercise begins. Once the survey is completed, the final phase of data analysis can begin, including feedback to the community to check the results and fully involve them in drafting the main conclusions and recommendations.

5.1 Zoning (Step 1)

Zoning means the division of an area into smaller units, which have similar characteristics. The objective of this activity is the identification and localization of agro-ecological and socio-economic constraints and potentialities **(***ager*, *saltus* and *silva*: individual productive areas, the common, the reserve), which interfere with the dynamics of the different systems.

Zoning becomes necessary both for practical reasons (it does not make sense to study all the FHS of the region) and for the identification of the Recommendation Domain. The RD is generally conceived as a group of FHS sharing similar problems. We can interpret the RD within each zone as the sub-unit for implementing possible solutions for overcoming any problems identified.

> One must constantly bear in mind that in predominantly agricultural communities; the form of tenure constitutes the social framework of production. The form of social structure and productivity are, therefore, in direct and close relationship with the forms of land tenure and the concepts of land, particularly as it exists in customary law. So, although it is not claimed that agricultural productivity depends exclusively on tenure arrangements, the tenure system has a major influence on productivity. It would be unrealistic to deny any connection between the tenure system and agricultural productivity. In fact, it would be reasonable to postulate that there is a correlation because agricultural production takes place within a framework of tenurial arrangements. The pattern of agricultural production also, in turn, could influence the tenurial system - thus establishing a cause-effect relationship between the two (FAO Pacific).

The zone referred to here is often a subdivision of agro-ecological zones produced by soil surveys and land use planners. It is *not* a representation of a crop or livestock system seen as a purely technical system. As indicated above, the overlaying of social and economic data on top of the technical aspects is central to producing a complete picture of the FHS and higher level systems within which it functions. *Sometimes* the FHS or the RD are synonymous with agro-ecological zones but this is by no means certain. Indeed while agro-ecological criteria are always important for the determining RD or system-based zones, the process of zoning itself must focus on the problem facing us. As shown above, it is very likely that the identification of *social boundaries* will be a more important first step than looking at agro-ecological aspects (see Box). This is particularly the case where farm households use various types of land

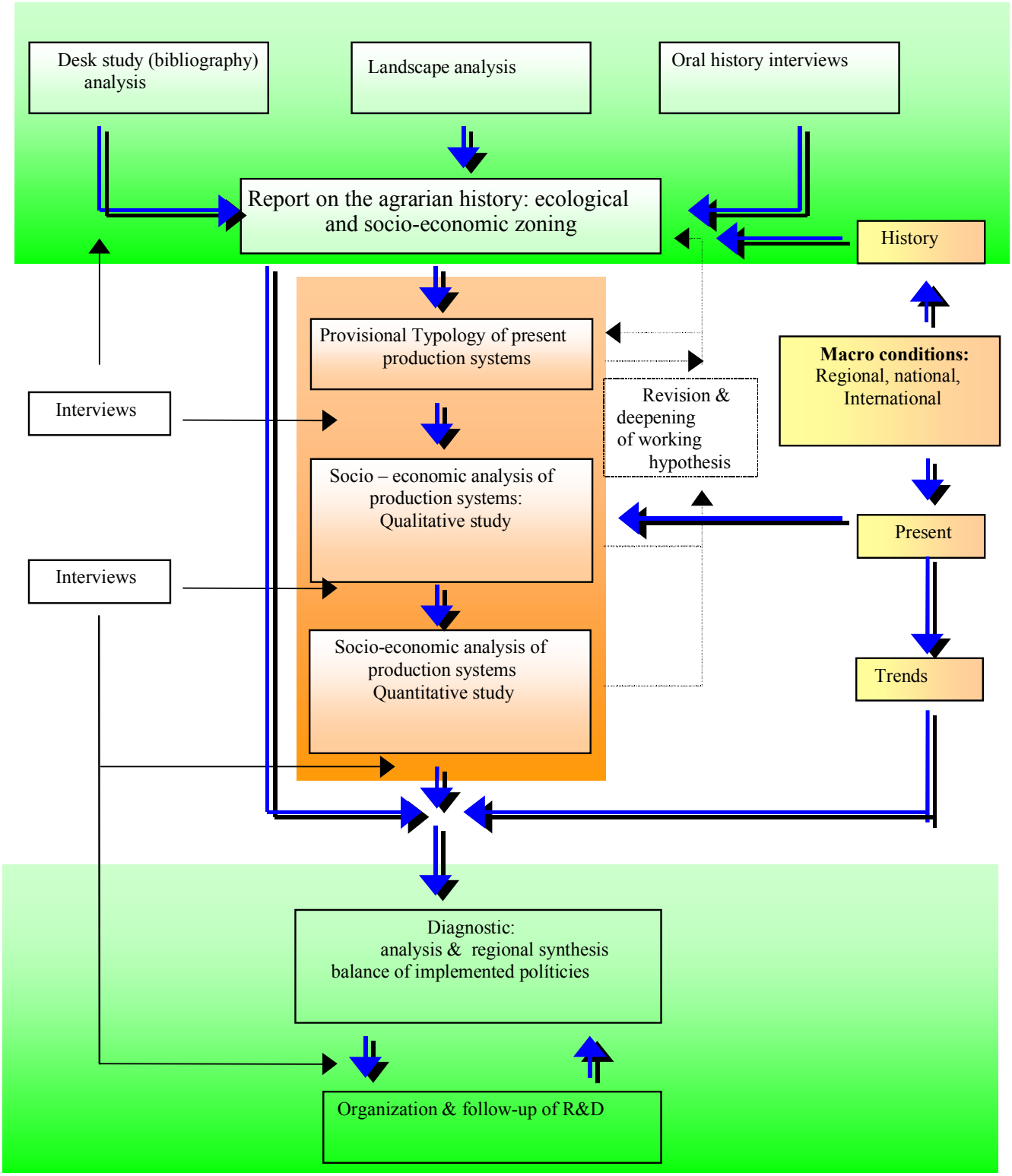

Desk study (bibliography) analysis
Landscape analysis
Oral history interviews
Report on the agrarian history: ecological and socio-economic zoning
History
Provisional Typology of present production systems
Macro conditions: Regional, national, International
Interviews
Revision & deepening of working hypothesis
Socio – economic analysis of production systems: Qualitative study
Present
Interviews
Socio-economic analysis of production systems Quantitative study
Trends
Diagnostic: analysis & regional synthesis balance of implemented politicies
Organization & follow-up of R&D
Agrarian System
Production System

Figure 14

within their overall production strategy, and depend upon long-distance grazing or access to other seasonal resources to maintain their subsistence strategy through the year. The same argument applies to policy and institutional criteria. In practice, depending upon the specific situation, we will choose the more useful criteria, noting that for practical reasons, the total number of zones cannot be so reduced as to avoid identification of differences and cannot be so high as to be a non-sense for regional development program.

Zoning relies heavily upon *secondary data* (topographic maps, statistical rainfall data, earlier surveys, etc), and the *knowledge of local people,* and is essentially an overlay of both kinds of knowledge. In this kind of study, zoning is principally used to save time and to improve the accuracy of further in-depth rural appraisal. Local empirical knowledge and secondary data complement one another. This kind of zoning is a real *participatory work* because it is based on a permanent *dialogue* between the local people and the technicians.

Secondary Data

Preparatory work by technicians is essential for them to be able to readily understand proposals made by local people. This involves collecting together all available information on the area in question. Types of information might include:

- topographic maps
- earlier surveys and data
- data from other sectoral work which may throw light on certain aspects (especially key non-agricultural factors such as social organisation and consumption)
- field workers with intimate knowledge of local conditions
- key local informants

The most important point is to then select and prioritise only a few key variables among all those available. Such choices will have to take into account historical data, and will depend on the specific knowledge of the surveyor with regard to local production systems. Obviously it would be absurd to ask local people to re-invent the wheel, for example by sketching a topographic map if this information is already available. When a map is used in discussion however, they may be able to interpret this existing information in a particular way, and indicate on the map precisely where certain problems occur and areas where more detailed investigation may be necessary.

Existing topographic maps are in fact one of the most important survey tools. These can be used to sketch thematic simplified maps. In the case of a discussion of water-shed areas and water management for example, they can be used to show just rivers, creeks, main irrigation canals, and mountain ridges and valleys. Others might show just some contour lines so that our understanding of erosion risk can be improved, or infrastructure to improve our understanding of transport and markets. Another important sketch map may show just administrative boundaries, a particularly important aspect in land access and management systems.

Topographic maps in fact nearly always exist. Even old ones can be very useful, particularly if the discussion is about existing or acquired land rights. Being able to show on an old map that a particular community has occupied a given area over a long period of time is sometimes the only real proof needed to establish this point. New maps can of course be made or other cartographic sources used, but this is a time-consuming and usually expensive process. In this context it is essential to assess the probable utility of a given resources in

relation to its cost and other constraints. As Bruce (Bruce, 1989) says: "Satellite imagery is available from several regional centers, but at current scales it is useful for orientation within a large area such as a river valley or ecological zone is to be covered. The imagery and the work with the imagery needed to make it useful in the field are expensive, especially if alternatives exist. Aerial photography of the area, if it exists on an appropriate scale, is usually preferable. This may be available through a government-mapping agency, a geography department in a local university, or through a donor or contractor who has previously planned or carried out project activities in the area. Photography on a 1:20,000 scale will show roads and buildings and can be used to map the basic type of tenure niche. [...] At 1:5,000 or lower one can map holdings in some farming systems quite comfortably. At 1:1,000 one has excellent resolution; one millimeter on the map represents one meter on the ground".

Other sources of secondary information may identify where local leaders live, where there are storage units and markets, and where the boundaries between administrative units lie. It might be helpful to come to a discussion with a community with important geographical reference points already researched and marked down on a simplified diagram (mountains, rivers, particularly large trees or forests, etc). It is likely that information will already exist on present land use, crop and livestock s systems. If land tenure is the key focus, existing cadastral and other records need to be checked before work begins. Data on infrastructure – existing, planned, and pre-existing – can be significant (for example when local people refer in discussion to a certain bridge which no longer exists or has been replaced, further upstream, by a new one, it is useful to know that 'the bridge' in question may not be the one you can see today.)

Historical information about the area will obviously be gained from local level discussions, but it is equally important to arrive there already with some idea of what has happened. In Mozambique for example, some idea of the impact of the civil war on local population movements and land occupation is important. When looking at spatial occupation, or discussing new land borders, it is very useful to know beforehand whether or not the area in question was the subject of villagisation programmes under the colonial and post-independence governments. In Guinea Bissau, discussing the long term decline of flood plains in certain areas, knowing that many fields were lost when dykes were bombed by the colonial power is crucial information to arrive with. Having some knowledge of the local area *already available to use in the discussion* also makes local people feel as if they are dealing with people who have taken some time to understand their situation, and whom they can subsequently trust.

Pre-pared maps and diagrams with all the information gathered can later be used to structure and focus interviews with local people, or simply to facilitate discussion: a map can often be a wonderful talking point which breaks the ice in many awkward situations. However, it is essential *not to arrive in an area with pre-ordained ideas about what it going on there.* This can be particularly important when discussing land borders delineating local communities for example, where any kind of pre-judgement by the technician (based for example on existing maps) can fundamentally distort the outcome of local discussions.

Local Level Discussion

Local level discussions are by definition where the real work is done (De Wit 1998a, Tanner et al 1998). No matter how thorough the preparatory process has been, no technician should arrive in the field with pre-conceived ideas. This is different from arriving with hypotheses. Indeed, *not* having some views on what is going on may in itself hinder discussion, and make any structuring of the interview process very difficult. Yet the product of the overall process of ASD *must* reflect the local reality, and be seen by local people as a product that has direct relevance for their lives. This will only happens if they are completely involved, if their views are respected, and if they are listened to.

Ensuring That All The Land Gets On the Map

In a recent field exercise in Southern Mozambique, the Swiss NGO Helvetas carried out interviews with local people to determine where their community land boundaries are. The first interview (with the women), revealed a complex pattern of plots and fields for different crops and uses, residential areas, and other areas of social and common interest. This map appeared to reflect all the land they felt was 'theirs', and could be clearly delineated and referenced on existing topographical maps. The women also indicated that fishing in the nearby river was an important activity.

A later discussion with men from the same community revealed however that they used the surrounding forest extensively, for hunting and extracting various forest products. Their perceptions of this land area were completely different, not seeing it as 'land' as such, but as a communal resource which they had always used and expected to go on using. The fact that it is an area of great interest to a neighbouring conservation area and Reserve, now undergoing a rehabalitation process under private management was source of anxiety. But in the initial discussion of what land is being used, the focus – as it always has been with technicians and development workers – was agricultural use and land that could be clearly identified as belonging to one family or another.

While the forest was not subdivided in the same way, it was clearly an essential resources for the overall subsistence strategy of the community and a guarantee of food security in poor harvest years. Including it in subsequent maps made a very large difference to the area over which acquired rights are being claimed, in the context of the new national Land Law.

Of course it may well be the case that local discussions will confirm the ideas of the technicians who arrive to conduct the local level investigation. The likelihood of this happening is probably close related to the thoroughness of their secondary information gathering, but it should not be overlooked that even good secondary data may reflect the particular social or political parameters of the era in which they were collected. The interest of the analyst in this context is to bring the data with him or her, and *to have it confirmed or to use it to provoke and open discussion of present day issues*.

In land matters, special attention will have to be paid to the way local people talk about particular questions. Units of measurement are one key factor which is easily overlooked. Again arriving well prepared is important: far better to have a table of hectare equivalents already prepared, than to try to work out this out at the time (although again it is always wise to check that they data you have is correct before relying on it completely – is this really the local term, is it really equal to 0.75 hectares, do local people have other terms, etc?). Moreover, the exact quantifiable unit *may not be important* – the concept of area and space is what is probably more relevant, and good borders may be drawn up using social and historical data that have no numerical value at all.

How local people classify things is often at odds with technical or official classifications. Local land classifications are especially important. Land tenure discussions in fact must cover a range of situations which do not necessarily always emerge when discussing 'land issues'.

These include the occupation and use of private or individually held land (with or without title, but usually land that has been used for several generations by the same family), and communal lands such as association and age-set plots grazing, forests, water resources, etc. Local people often do not include certain areas in discussions because they simply do not think that the interviewer is interested in them; or they themselves may not see these areas as land over which they have rights that need to be protected (see Box).

Other issues to bear in mind are changes in land management; and the legal situation and legal constraints. New titles may have been created that local people are unaware of , and old ones may still be legal but not presently being exercised (for example, many pre-Independence colonial titles in Mozambique are still in force, though the land is occupied by local people). New leasing contracts may exist that are informal or even illegal in a situation where land laws have long outlawed private transactions of any kind in land rights. Special reservations may have been created by national government without adequate consultation over respecting existing rights (to water, for example, or the continued and protected use of sacred sites within Parks). Different state institutions may also have accorded use rights over the same area (a common source of conflict in many countries), with these being interpreted as ownership rights by their holders (hunting and mining are two examles), while administrative boundaries are always subject to change.

With such additional information, the basic map will be improved on if necessary, and a first attempt at zoning can be carried out which sketches areas which share a set of development problems and that can be treated as a group of FHS for policy or programming purposes. It should be clearly emphasized throughout however that *these maps are real communication tools, to provide a floor for discussion of land tenure arrangements during the in-depth survey* (De Wit 1998a).

It is therefore also essential that *the local community are fully involved in preparing more fully worked out versions of these maps, and that they are subsequently in full agreement with what is contained in them.* This is the core of the ***participatory approach***. (FAO 1999)

Once a more complete map is available, it can be used to identify areas that require more detailed investigation. Obviously it is not possible or it may be too expensive to physically inspect or survey the whole area designated on a map in collaboration with the community. Local people can however indicate areas where they are uncertain of the exact boundary (for example where there is no physical reference point or line such as a river, outcrops of stone etc), or where they are having problems either with neighbouring communities or with 'outsiders' who have come in to occupy land. Once these points are identified, two processes are initiated: a) a review of the secondary data available with a focus on the precise area or problem indicated; and physical inspection with the community to the site.

Fieldwork can include a range of techniques to check the map and resolve problems. These may be **transect techniques,** a type of one-dimensional map of a line cut through a village or area requiring more detailed investigation. It depicts a cross-section of an area along which a number of issues are recorded. The purpose of a transect is to organize and refine spatial information and to summarize local conditions in the area. The information is gathered from direct observation while walking a straight line through the investigated area.

The other important technique, especially in cases of boundary conflicts or uncertainty, is discussion with neighbours or land users who actually live in the area in question. Once again, real information from real people is often of more use than more technical and quantifiable data gathered by technicians who do not take the time to go out and talk to those who occupy a given area. Confirmation of the land boundary, and of markers that show where it is, is a key element of the land delimitation process, and can *only* done by getting people together to argue out and resolve their differences. Only once this has been done can the topographers be brought in to record the border markers etc using GPS or other appropriate techniques.

5.2 Selecting the Sample (Step 2)

Two criteria determine the sample used for data collecting: the width of the survey and the mechanisms for selecting individual case-fonts. Methods differ between two limits: i) undertaking a large survey with more than one-hundred case-fonts for a micro-region, selected according to statistical criteria; and ii) a limited survey, with case-fonts selected according to a hypothesis of typologies originating in the study of secondary data.

The first method has the advantage of being more "systematic" and offering more quantifiable data. This approach is important if statistical relationships and calculations are important for the investigation. Its disadvantage however is that it uses a great deal of human and financial resources, and is repetitive. In fact, practice has shown that such statistical surveys have rarely resulted in viable development project or program designs. This is because "the questions asked reflect the expert's narrow perception of the problems facing various localities. Moreover, the time needed for collection and analysis often exceeds that available during this stage" (FAO, 1984).

Key informants when initiating data collection at field level; the first step consists of interviewing key informants, selected among people having a deep knowledge of the area where we are working. These interviews are clearly less structured and more open than the others are, but they have to cover the same fields because of their usefulness as "guidelines" for the preparation of the sample, which will be interviewed later on.

Key informants can be identified both from the eldest people living in the area and within the institutions working locally. Where possible it is more suitable to relate to ordinary people, preferably if they have been living for a long time in the area. A typical interview with a key informant will cover the following points: i) historical development of the region; ii) basic food crops and yields in the past, occurrence of famines in the past; iii) type of techniques normally employed and introduction, when and why, of new procedures, crops, etc.; iv) general problems, in the past and in the present as seen by them; v) identification of relevant "types" of households in the area.

Reliable information on the same subject can often be collected through alternative means at a lower cost. These include reconnaissance surveys and rapid rural appraisals (RRAs) that are much less structured and depend upon an open-ended process of questioning and observation. Such surveys are often based on a preliminary diagnosis using secondary and other data, in order to avoid possible underestimation of relevant land tenure and production systems. They are carried out by experienced rural development specialists who concentrate on a) key informants, and b) interviews with a range of different socio-economic categories within the community or area in question.

Through a process of 'triangulation', when data from different interviews are cross-referenced and checked, a complete picture of the real situation can be built up relatively quickly. It is apparent that which of these two methods is chosen is very much a function of the objectives of the survey. If statistical data are required, then clearly the first method would be the logical choice. If the objective is to establish where the land borders of a particular community might lie, and to understand the legal and other processes behind them, then the second is not only cheaper but is likely to produce a more complete and correct picture.

5.3 Carrying out an In-Depth Farm Household Survey (Step 3)

Agrarian System Diagnosis focuses on the farm-household system as a whole. It takes into consideration simultaneously ecological, sociological and economic conditions and constraints, which are beyond farm-household control. It is an approach which will enable us to understand the different ways the farmers make use of resources and to find out about the rational features of FHS' behavior. However, taking into account all production activities and all family life-related aspects is not an easy task. Classical survey questionnaires usually are not suitable for this type of undertaking. Too many questions would have to be asked; too many different cases would have to be considered. Each class of farmer would require special treatment.

Methodological Key Points

Since the early 1990s, FAO has been supporting the development of new land policy and legislation in Mozambique[5]. A new Land Law was approved in July 1997, and FAO is now working with the Government to develop a new methodology for identifying and delimiting land over which local communities claim use rights according to the provisions of the new (1997) Land Law. This process has huge significance as it will determine the areas over which communities have legally protected, customarily acquired land use rights. It will also identify areas over which communities have a type of management jurisdiction, including the right to participate in the official approval of requests for land by new, external investors.

This programme is an excellent example of the kind of participatory approach being advocated in this document. It shows very well the main methodological points of the ASD, which include:

- a systemic approach to agrarian systems research in support of specific objectives
- the use of participatory diagnosis as the main field methodology
- focusing participatory techniques onto a given issue (in this case, establishing land rights and land borders)
- combining these techniques with other technical inputs *when appropriate* to produce the final desired outcome (in this case, a legally approved and technically effective method for identifying and demarcating land at reasonable cost)

[5] FAO support to the Mozambique Government Land Commission began in 1993, with a TSS-1 project to establish guidelines for policy development. In 1995/96, an FAO Technical Cooperation Project implemented by the Land Tenure Service (SDAA) of the Sustainable Development Department and the Development Law Service (LEGN) supported the development of the new Land Law approved in July 1997. FAO is now continuing its support to the consolidation and implementation of the new National Land Programme, with Netherlands funded support to the Inter-ministerial Commission for the Revision of Land Legislation ('the Land Commission').

A System Approach

In system terms we are talking about community-based production systems enclosed by 'open borders' (i.e. *open systems*), through which linkages with the outside world and, notably, external capital, are permitted and even encouraged under current Government policy (see Box). These systems have already been shown to include many thousands of hectares of land and other natural resources such as forests and grazing land, as well as sites of cultural importance such as sacred forests and burial grounds. Much of this area is not actually being used by the communities, and is best seen instead as being part of their heritage or patrimony, handed down from previous generations and being safeguarded by present generations for future use.

This approach is a radical departure from earlier land policy in Mozambique with focused on *land use* as the main indicator of rights over a given area. Thus any area a family was actually cultivating or physically exploiting was protected by law, while the wider patrimony was left unprotected. Such 'free land' has become increasingly sought after by private investors, hence the need to reform the legislation and promote a more equitable form of land access and land use.

The former land use-based model focused much more on the 'crop and livestock itinerary' which is more closely related to the FHS level of analysis, while the newer approach embraces the wider definition of a production or even agrarian system incorporating several households within a single community. This model is the more appropriate in the African context, where land rights are often attached not to individual FHSs, but to lineage or higher level units of social organisation. It is obvious however that defining where the boundaries of such a system are involves much more than just locating fields and pasture land and drawing a line around them. As indicated above, the FHS and the wider production and agrarian systems are a combination of the technical production-based picture of land occupation, and the picture produced by grafting layers of social and economic relations over the top.

This understanding has enabled the FAO team in Mozambique to propose using systems analysis to resolve the problem of how to identify and delimit community land. Together with three key methodological tools – participatory diagnosis, 'triangulation', and participatory mapping – this approach has produced an effective and viable method for approaching a very complex problem, in culturally distinct and often very different contexts. (De Wit 1998a, FAO 1999, Tanner et al 1998).

The FAO approach divides the production system referred to above into a series of sub-systems, each one reflecting a specific aspect of local life. By comparing the results from an analysis of each of these sub-systems, it has been possible to arrive at the most appropriate definition of a 'local community' in any given setting. These sub-systems are:

- the history of a given community, with emphasis on how it came to live where it is and what historical evidence there is today of this longer-term occupation
- social organisation (leading to the 'social borders' discussed above)
- analysis of the production system as a dynamic and integrated concept
- analysis of subsistence strategies and the resources needed to maintain them
- analysis of land management structures within a given local context.

Each of these items is a kind of system in its own right. Together, data from each one can be pieced together to make up a complete picture about land use, historical and present rights, and how these are allocated and managed today. These data are secured using the participatory diagnosis approach advocated by FAO, which is the subject of the next section.

Open and Closed Borders Around Community Land Systems: the Case of Mozambique

Under the new Land Law, it is necessary to clearly define what a local community is in spatial terms. If the Law is correctly applied, the delimitation process will probably incorporate many thousands of hectares. This area can be loosely compared to a production system, using the concepts being discussed here. The critical question is not the size of the system, *but the nature of the border surrounding it:*

- Is it an exlusive area with a *closed* border (that is, one which does not allow external investors any access to the land and natural resources within it), or
- Is it a 'permeable'and *open'* border (that is, one which *does* allow investors to come in and in this way promote an interactive process of development where both parties gain in some way), and
- If it *is* permeable and open, what degree of control does the community have over the entry and exit of non-community members (that is, how can they protect themselves against unjust occupation of their land and how can they ensure that they are going to benefit from the incoming investment?).

These questions are at the heart of the system approach. The two alternatives – closed borders and open borders - are both equivalent to a system of production which includes diverse crop and livestock itineraries and complex social and economic relations between villages and households,. The system also includes large expanses of unused resources which nonetheless figure importantly in the overall (present and future) production system of local people.

In *closed border* option, communities enjoy strong protection inside a boundary that does not allow external investors access to community resources. Inside, smaller kinship-based groups (FHS) enjoy specific use rights secured through customary law and practice. These internal open borders around the FHS allow social and economic relations between FHSs that support the production/consumption system.

By contrast, the *open border* model allows external investors access to land and natural resources located inside the defined extensive limits. Inside, FHSs enjoy specific use rights attributed by customary law and practice, but because the wider border is 'open', these *internal* borders may need to be more clearly defined to protect the individual FHSs against external investors. In practice, however, they stay open *to other members of the community* and allow social and economic relations which underpin the local production and consumption system.

The second, *open border* model has been chosen by the Government for implementing the Land Law. The open nature of the borders protects the rights of those inside, while promoting the inflow of badly needed capital and encouraging a compromise over land and resource use between local people and external investors. The key question now is how to identify where the communities have acquired land rights, both active and 'passive' (ie unused) before proceeding to demarcate these on cadastral maps. FAO is now helping the Government with this task, following a systems-based approach using participatory diagnosis at local level as the basic methodology. (Tanner, De Wit and Madureira 1998)

Data from the first two establish the main 'social boundaries' of the system we are looking for. Subsequent analysis of the production and management systems allows us to determine which is the appropriate unit of organisation within the wider social boundaries to choose as the 'local community' in a specific area. Production and other land use data can then be fitted to this mainly socio-economic unit to show where its borders lie. These are then recorded on a cadastral map, at a stroke conferring legal protection of *all rights,* whether being used or not, within the delimited area.

Participatory Diagnosis

In Mozambique, the FAO team[6] first helped to develop the systems-based theoretical framework discussed above. A *field methodology* was subsequently developed, within which is embedded a central block of fieldwork, the *participatory diagnosis*. The outcome of the process is a series of maps recording local community land borders and other rights (rights of way, communal land or water resources shared by neighbouring communties, etc), with the final, tehnically cleared and fully geo-referenced map being recorded in official cadastral records.

Sequence of Activities

The FAO team proposed a *sequence of activities* for carrying out a community mapping exercise:

- Select the area to be investigated (using criteria such as incidence of land conflcits)
- Visit the area *before the survey to* carry out preliminary sensibilization
- Participatory diagnosis to identify land borders and land rights
- Restitution (first): take results back to the community
- Geo-reference physical markers that do not appear on topograhical maps using GPS
- Restitution (second): confirm results with the community and neighbouring communities
- Record agreed boundaries on official cadastral maps

This process has three essential elements. Firstly, the task of sensibilization which might take a considerable length of time but which is the foundation stone of a successful survey (see below, Phase B). Secondly, the particpatory diagnosis itself (discussed in detail below). And thirdly, the process of 'restitution', or going back to the community to discuss and confirm results.

Lastly, and most importantly, the community is given a copy of the results (in this case, the map of their land which *they produce, with support from but not directed by the technicians.* The ultimate outcome of the process is the initiation of new development activities, based upon a stronger local awareness of their resources and the rights they have over them.

Participatory Diagnosis

The essence of this technique is that the community itself produces the final outcome picture. The role of the external field team is to assist where needed, perhaps by focusing thoughts on specific issues or by bringing in comparative information from other areas, and by helping the community translate their results into a format appropriate for official or programme needs (in the case of land rights in Mozambqiue, transferrring community produced maps into officially approved mapping formats which can then be registered formally in cadastral recoreds).

[6] FAO International consultants Paul De Wit, Sevy Madureira and Christopher Tanner, FAO National Project Coordinator Jafar Mussá and Land Commission staff lead by Conceição Quadros.

The FAO and Land Commission team worked together to produce material on participatory diagnosis which has since been disseminated through training programmes to field technicians in Government departments and in the NGO sector. The particpatory approach developed has the following main elements:

- Use of particpatory techniques
- Follow the system-based analytical model outlined above
- Begin with an historical analysis leading into social organisation
- Be on the alert for unexpected information and cross-check data from different sources and from discussions on different topics (sub-systems)
- Use semi-structured interview techniques
- Use inter-disciplinary teams

Survey tools used include Venn Diagrams, Matrices of various sorts to cross-reference data, and a check-list that essential topics are covered:

- Meetings with local leaders and influential people
- The History of the Community
- Local social organisation
- Areas of jurisdiction/land management institutions
- Spatial occupation (habitation)
- Population dynamics
- Land use processes
- Perceptions of the future
- Incidence of conflicts and conflict resolution mechanisms

Participatory Mapping

This is a central part of the diagnosis. Local community leaders and other groups are asked to produce a map which corresponds to how each group sees the use and occupation of land and other natural resources. A similar approach could be used for other issues too, with each group giving views for example, on the causes of infant deaths in the community, or the main problems besetting local farming.

The essential feature here is that these maps *are produced by the communities, and not by the technicians*. The technical team subsequently help to transfer the data to official topographical maps collected during the preparatory phase of the survey. This process of cross-referencing or triangulation between different sources and sets of data is *continuous and two-directional*, between the technical team and the local people being interviewed. Thus in the case of the maps, the process identifies areas that are not already marked by some physical feature (such as a river), and where more detailed investigation and use of GPS equipment is needed. The approach therefore not only ensure local ownership and an accurate representation of local reality; it also promotes the efficient use of scarce technical resources by focusing them where needed *as a consequence of the participatory process itself*.

The Active Participation of Household Members

It is clear by now that carrying out a farm-household survey is not simply a data-collecting task. It requires the active participation of all the members of the household, and sometimes that of some of the relatives. Basically, it is a participatory activity and requires complete involvement by both the surveyor and the farmer. It is also meant to be a learning experience for all concerned.

In order for the survey to be successful, it is of paramount importance for the outset:

- To explain clearly to household members, both the aims and the different steps of the survey.
- To create the optimal conditions for communication and dialogue between the farmers and the technician (adapted tools and skills, but also proper technician attitude)
- To adopt a methodology which will enable the farmers and the technician to explain to each other the rational behavior of the farm-household. Final submission of the case studies at the end of the survey is not enough. The main findings must be elaborated in full collaboration and by mutual consent with all concerned people.

Methodological considerations when looking at FHS and wider production systems

To be successful in carrying out these surveys, the technicians must take into consideration the following points:

- ecological, socioeconomic constraints and potentials of the environment of the studied case (previous secondary data analysis is necessary so that the right questions will be asked)
- the life history of the parents and recent trends of the farm-household
- simultaneous system analysis of the farm and the household

The research will start with global issues. Details are only looked for as and when they are needed ("holistic" method). The survey will consider the reconstruction of an "**ordinary**" agricultural year and its economic assessment. This task will be carried out taking into account the farm-household past history and future perspectives. At this stage, a vocabulary in the local language covering the basic land tenure and production systems aspects should have been developed. Some terms which may have a clear meaning in the language spoken by the interviewers, may not have the same meaning for the farmers and vice-versa. It is quite difficult to clarify the use of technical terms in abstract discussion; if their meanings are tried out in the field during the first surveys this will certainly simplify the overall task. The same is true even for team members who speak the local language, but may not previously have been involved with agro-economic terminology.

Direct observation of activities, types of behavior, relationships, farming methods in the field are an important and complementary part of data gathering. Permanently making a parallel with other farmers' cases, as well as permanently correlating secondary data will be needed so that the carrying out of the survey will be constantly improved on.

Though flexibility may be necessary during the fieldwork, the survey requires the implementation of a logical sequence, which will include several key events.

From a general point of view, several visits to the FHS would be required to realize a comprehensive understanding of their viewpoints and strategies. In practice, in the concrete situations where we are requested to intervene, the opportunity to return for subsequent interviews rarely materializes. Therefore we should make the most of any visits made.

Effective and accurate fieldwork is also directly related to the knowledge, ability and experience of the technicians and interviewers, who must be able to integrate and interpret data and observations as and when they appear during the survey. The flow and volume of data increases with the number of studies carried out, but after or two surveys it will be easier to discern which information is essential and which is unnecessary. Carrying out two or three case studies at the same time can in fact make this process easier and enable us to ask more relevant questions.

The concern should be with quality and quantity. If a FHS seems uncommunicative, it is preferable to move on to another FHS given the time constraints on the work schedule. The main part of data gathering will be done in the field with the farmers. Another part of the interview will be conducted with different FHS members separately where possible. Several techniques may be used to gather data. Information can be obtained through meetings with individuals or groups of intended beneficiaries.

Group discussion can be used, for example, to identify constraints faced by producers or variations in production techniques. Individual discussions can identify many details of locality-specific production systems and concerns. Comparison of these beneficiary views with those of government and other supporting agencies allows confirmation of important design decisions - such as the priorities assigned to various components.

Using a **semi-structured interviewing** method with a checklist and a list of pre-prepared questions, partially closed and quantitative (for technical and economic aspects) and with a strong emphasis on dynamic aspects, is the best and most rapid way obtain a good understanding of the local agrarian situation. Obviously, it is possible that during the implementation of field visits, new facts previously unknown will come to light through analysis and interviewing, requiring additional collection of data. This **iterative process** must be considered as a central point and enough time and manpower should be reserved for this purpose.

The variables considered are referred to:

- Composition and evolution of the household unit
- Land tenure, land types and quality
- Capital assets
- Agricultural, forestry and livestock production
- Technical-managerial profile
- Off-farm agricultural activities and non-agricultural activities
- Use of labour for different activities and in different seasons
- Gender and youth relationships
- Problems and perspectives.

Obviously, the environment where *Agrarian System Diagnosis* is carried out will help determine the critical variables that must be taken into consideration. These variables include the program components and institutional arrangements that are needed for an agrarian reform/land settlement development program to be successful. These judgements must be made in the context of the existing levels of human, economic and social infrastructure development, and the social, cultural, economic, organizational, and political factors that will affect program implementation.

In all cases the survey questionnaire must be tested on a limited number of FHS and corrections made. A training workshop for the interviewers should also be held, including practice sessions.

Different Phases of a Detailed Farm Household Survey

Phase A: Preparation

The Farm Household Survey consists of 8 distinct phases (see Table One below). Before the fieldwork begins, the survey team will go through Steps One and Two above (zoning and sample selection). *These make up the Preparatory Phase of the survey process, designated as Phase A in Table One.* The team will review the secondary data and the results of the previous steps (participatory appraisal conclusions, if any, maps, climate data, principal constraints and potential,). They will then formulate hypotheses for each of the different selected cases, so that s/he will be able to ask the farmer and others in the FHS the relevant questions. Taking into account the main objectives of the study and the results of the preparatory steps described above (zoning, local history, pre-classification of farmers), the team will decide on the households to be selected and the number of cases to be surveyed in each "homogeneous zone".

Table One: The Different Phases of A Detailed Farm Household Survey

	Office work	Field Work
A	Preparation: Review secondary data and formulate hypothesis; select cases in light of study objectives (whole team)	
B	Informing the Community ('sensibilization')	Local meetings with whole community and its leaders, and with individual case families, to explain the activity and secure participation
C		First Farm Visit: Inventory of resources of farmer (both on farm & off farm). Life history. Schedule of the next visits
D	Initial consolidation and synthesis of data and information gathered from Phase C	
E		Second Farm Visit: on the farm and in different fields with the farmer to inquire about production, labour, and use of products
F	Secondary data consolidation, production system coherence assessment, and preliminary data analysis	
G		Final meeting: Validation and consensus gathering with the community. If necessary, recollection of complementary data, modification of assessment tables. Reconstruction of economic behavior. Discussion with the community on what can be done, on what kind of projects or interventions could be suggested at the farm level, at the municipality level, at global policy level.
H	Fine-tuning of the proposals based upon the assessment done by the Community as well as the Institutional counterparts	

Developing a Typology of Farm Households

The economic analysis will be assisted if surveyed households can be ordered according to a pre-survey typology. This can be done in the Preparation Phase, *but only if sufficient information is available in the review of seconday data to justify establishing a pre-survey typology.* If sufficient information is not available, putting households into presumed typologies could distort or prejudge results and produce a picture of the real situation that reflects the biases of the researchers and not the real situation on the ground. In this case, putting households into a typology must wait until Phase D at the earliest (initial consolidation of data).

Why is a typology necessary though, if the process of zoning (Step 1) has been effective? The answer responds to a common concern often raised by observers of this kind of research, who point out the big differences that exist between production/consumption units even within a limited geographical area. There is therefore a need to highlight and classify this diversity in order to produce specific programmes for each situation and type of problem.

Devising an appropriate typology begins with a declared operational interest: trying to simplify the heterogeneity of the surveyed FHSs through the identification of groups (types) presenting similar potential and experiencing similar problems.

The objective is to identify the different capacities, rhythms and levels of possible accumulation of the various production/consumption units. A number of methods exist for devising the typology. The proposal presented here foresees three steps:

1. According to the FHS annual income (per capita, per worker of for the whole unit), broadly separate the whole units into, say, three main groups: (a) units which are far above the Reproduction Threshold; (b) the units averaging the RT; and (c) the units below the RT.

2. Within each group, proceed to identify different production systems. Apart from main livestock and cropping systems, Production Systems will be classified by fixed assets and operating capital (for example, in a "dairy system", the farms featuring manual and automated milking are placed in different categories).

3. Combine each group of units already identified with the historical origins of the present types. This means for example taking into consideration the way they obtained their land, capital and manpower in the last decades, or their sociological background.

Combining 1,2, and 3 will then allow us to devise a reliable typology of units which represents the basic framework of the subsequent analysis.

Phase B: Informing the Farmers

The previous agreement of farmers is imperative before launching the case survey. The survey team must gain their full confidence in the exercise *before* starting the fieldwork. This is a process that can take many weeks in some cases, depending upon a range of factors. These include the level of contact the community has with the outside world, the reasons why

the survey is being undertaken, and the previous experience of local people with technical agents and other visitors to their area. If the survey is a response to local concerns – for example about land grabbing by outside investors – then receptivity to the presence of the team and a willingness to participate will be more or less assured. If the survey is in support of some externally driven project, this acceptance is far less certain and time will have to spent convincing the 'beneficiaries' of the good intentions of the survey team.

Before the fieldwork the survey team will therefore have to carry out several meetings at local level, if possible accompanied by someone who already has the trust of the community being surveyed (local priest, an NGO team already there, or maybe a team member who comes from the area). These meetings should include general meetings with all the community, to allay fears about why only certain people are being interviewed and to prevent gossip undermining the survey work later in the day. In certain circumstances it may also be necessary to make an appointment with each selected household to brief them on the purpose of the activity. Only then will the team proceed to the next phases of the survey.

Phase C: Life history and inventory of household members and resources

Each of these lines of enquiry can throw light on the others. For example, discussion of the life history of the farm household can help to identify its social boundaries and thus more accurately determine who should be included or not in household composition data. Similarly, inventory work can complement life history information history to fill in missing data (for example, finding out the first purchase date of some production equipment, parcels of land or new livestock).

Life history

Ask the farmer to relate the history of the family and the farm. Note all major events: starting out as a farmer, marriages, deaths, illnesses, land inheritance, purchase or sale, purchases of working animals, major changes to the production system, off-farm activities, and so on. If necessary, ask for additional information based upon your own knowledge of local history. The objective is to find out about major historical events (and possibly the reasons why they took place). These can help to place events which older or illiterate people cannot put a clear date to. In some field activities it is possible to use external references based on the life period of "important" families in the community. Cemetery data can be useful. Thus the technician can identify the period when someone of the X family died and subsequently ask ask a farmer about change he made in the past, saying "at that time, was Mr. X still alive or not? "

Household Members

List all residents of the FHS, with their ages and relationship to the FHS head(s). Ask about people who are part of the household but not present during the survey (working abroad or away for some other reason). Note what work each person does (on and off-farm tasks) including children, during the different seasons. Draft a table summarizing this information, highlighting the number of people who a) eat in the FHS and b) work, including field and household activities. Distinguish between the tasks of men and women.

Land

List all plots used by the family, their tenure status (ownership, tenant-contracts, share-contracts, public or communal lands, etc), and all other land owned by the family (with or without title). Asking the farmer to draw a blueprint of the different plots may be a good starting point.

Improve on this with the help of the farmer. Draft a table with each plot, its tenure status, present use, and agro-ecological constraints and capabilities. As Bruce says, "…particular members of a household will often have specific tenure rights in particular parcels and in fields within parcels. This is often particularly pronounced in situations where the production unit includes a number of households or in the case of polygamous households where wives are assigned separate individual fields…at any point in time certain parcels in the holding may be held under tenure acquired by contract, such as leasehold, while other parcels which belong to the household may be encumbered with such contractual obligations".

Livestock Production

List all animals owned by the family, including cattle, pigs, sheep, goats, poultry, fish production, etc., and include all types of draft animal. Try to get a preliminary idea of animal production.

Infrastructure, Tools and Implements

List all buildings, equipment, and main tools and implements (hand tools, draft equipment, mechanical tools, etc). Note if possible the purchase and present price of these items, and purchase dates for the most important ones.

The **Commons:** [...] how do we set about commons? Commons management has a community dimension, which cannot be captured through household interviewing alone. It must be approached initially through the small group and key informant interviews [...] As a household may have a multi-tenure holding consisting of several parcels, so a community may have more than one commons. It may have two pieces of commons with the same tenure regime, or it may have several commons under different uses and subject to different tenure rules. It may, for instance, have a communal forest; a common pasture on which trees grow; as well as uncultivated interstices between parcels and holdings. These commons areas must be identified and their various uses assessed. The managing group must be identified, its membership clearly understood, its institutional nature and potentials gauged, and its various mechanisms for control of member behavior evaluated [...] Tenure in trees or the commons must however also be examined from the viewpoint of the household. Households' tenure extends to the commons: households which are members of the group have rights to use the commons and may even have specific rights in certain trees on the commons under a system of tree nature. One must evaluate the extent to which those rights provide effective incentives for households and individuals to support and observe the rules, which control the use of the commons" (Bruce, 1989).

Phase D: Initial Consolidation of Data

After the first phase, an initial review of the data is carried out to check for missing information and confirm (or not) the hypotheses driving the study. This work is of paramount importance. It will avoid asking the same questions over and over again (which can annoy informants and have a negative impact for the rest of the survey). If the data indicate that we are on the wrong track, this process can indicate alternative hypotheses for testing in subsequent phases.

Phase E: Second Farm Visit and Visits to Different Fields

Crop and livestock surveys must be done on site. Information from farmers obtained while out in the fields is usually more accurate and can be immediately compared with visual observation. If data are collected elsewhere (the village), it can be difficult to see the difference between:

- the specific situation of each plot during the year studied, giving us relevant information to properly understand the problems of a particular farmer

- the ordinary requirements for production, which would be almost the same for all the farmers within a given locality.

Interviewers should ensure that farmers are not telling them what they want to hear (data reflecting perceived ideals of production and practices). It will be necessary to explain to farmers that only the specific data they themselves experimented with will help us in the understanding of their production system bottlenecks. The same method will be applied to livestock production.

In each plot or field location, the interview must:

- check land-use during (at least) the last three years (crop rotation)
- note all cultivation operations carried out in the plot as far as the studied period is concerned, with their respective date, inputs (volume and cost), labor force
- list all products and by-products obtained in the parcel of land
- note the intended use of the various products (home consumption, sale, and barter, stock) giving quantities, prices, and dates (animal feed by-products, non-timber products, firewood, etc, should not be forgotten)

Sketching plant locations in the plot and measuring inter-plant distances would be useful to assess yield component factors later on.

Care must be taken to distinguish family labor from hired labor, and any other forms of labor-sharing systems between households. If this is not done, it will not be possible to find out what the real return to family labour is within the farm production system. This is an essential indicator for further economic assessment.

A similar process will be required for animal production. Inquiries will have to be made on inputs and outputs, and the final use of each product. The interviewer will ask about all aspects of animal husbandry, including feeding, grazing, use of purchased inputs, and breeding. An assessment of variations in herd composition during the year may help to understand the production system rationale and to evaluate gross animal production. Main animal production indexes will have to be estimated, with appropriate questions, if livestock production is an important component of the production system being studied.

The interviewer(s) must also investigate other activities in the FHS. Even if the bulk of field production data is generally collected with the head (male or female) of the family, it is equally important to check this and get additional information by talking *to other members of the household.* Household consumption data and some production data will have to be collected from women. These data will not only cover basic needs, family food consumption,

medicine requirements, clothing etc, but will also cover important areas of economic activity such as vegetable gardening in backyard plots, trading activities, etc.

Phase F: Second Data Consolidation, Production System Coherence Assessment, and Preliminary Data Analysis

The survey team will already have gathered a lot of data by now that needs to organised and checked. Its overall coherence must also be checked before the final phase of the survey. These two tasks are done concurrently in the second phase of data consolidation.

Four core time-schedule tables will be used as balance sheets to check data consistency and to underline the principal constraints and opportunities:

- animal feeding balance sheet
- household staple food balance sheet
- labor requirements balance sheet (family, hired labor, ...)
- cash flow balance sheet

Each table will cover an "ordinary" agricultural cycle over a one-year period, and will give an overview of seasonal problems. Illustrating each balance sheet with a diagram will facilitate the dialogue with the farmer.

Animal feeding balance sheet

This balance sheet includes the year-round distribution of feeds for each type of animal, rotative grazing, complementary feeds, etc. Other data reflecting seasonal livestock production (calving period, milk production, etc) can be noted in the balance sheet to obtain a better idea of problems and bottlenecks. This balance sheet can also be used to support a dialogue with the farmer about animal husbandry problems.

Month	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Grazing plot 1 plot 2												
other feeds: on-farm produced purchased												
critical periods												

Labor requirements balance sheet

The balance sheet highlights critical periods for family labor. Some of these are only revealed by the presence of hired labor or use of non-family labor even if family labor availability seems to be higher than the normal labor requirement. Some agricultural tasks have to be completed in a very short time (for instance, plowing, planting, harvesting). A monthly partition is not an accurate indicator of all labor bottlenecks on the farm, but gives enough information for a global view of the FHS situation. Balance sheet interpretation requires thoughtfulness and a critical eye, and cannot be circumscribed as a mechanical exercise.

Month	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
FAMILY LABOR plot 1 plot 2/ herd 1 ... other activities ---------- off-farm-household labor agriculture other activities ---------- Sub Total ---------- Free labor exchanges Hired labor ---------- Total												

Household staple food balance sheet

This balance sheet assesses family food security. Harvesting dates, products kept for family consumption, products sold and purchased are registered in the table. A line beginning at the harvesting date shows the period during which each staple food is available for family consumption. Women are usually key informants as far as family food is concerned.

The balance sheet will show food shortages before the harvesting season and the different ways to resolve them. This can be established from the information on the production of each plot or from the most important clusters of plots. Gathering and hunting activities have to be included and seasonal variations in family composition must be allowed for when interpreting the table.

	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
For each plot/ cluster of plots Production → kept for family food → kept for sowing → sold → bartered → purchased family requirements hired labor requirements animal feeding requirements Total requirements												

Cash flow balance sheet

This reflects cash movements for both household and farm. The data in the table is therefore very varied. For instance, cash inflows, aggregate production sales, labor earnings, and also loan disbursements, and possibly an exceptional sale of some capital item.

	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Cash inflows Sales - crops - livestock - non farm products - capital items - labor in agricultural tasks - labor in non-agricultural tasks loan disbursements remittances …												
|Cash outflows - recurrent goods purchases (crops, livestock, general farm equipment) - hired labor - loan repayments - household consumption - investments - other												
Net Monthly Cash-flow												

Confusion will be avoided by not going into too much detail. The purpose of the exercise is to get an overall idea of the most important cash flows. *This is not to be mistaken for an accounting method. It is an analytical tool, and not an audit.*

The cash flow balance sheet is worthwhile so as to reveal any recurrent cash problems, which may have to be solved through adequate credit programs. Furthermore, it is a powerful tool for checking and completing information that has already been collected. Although the table seems complex at first sight, even illiterate farmers will find it easy to understand because it corresponds with well-known and concrete problems, which they themselves have to deal with.

Other analyses, diagrams and tables

These balance sheets could be complemented by other tables to suit each case. It might be useful for example to produce an abstract of the family life history highlighting the changes in the farm and main trends shown by the data. Other sheets could trace the evolution of family land use over the last 3-5 years, demonstrate a fertility-transfer scheme between the different plots, or sketch rainfall distribution for each distinctive agricultural system.

Preliminary calculation of economic indicators

Once the balance sheets and tables have been prepared, the survey team can start the provisional analysis of the data. Calculating the main economic indicators requires the use of some specific concepts. Farming accounts are analyzed from two different points of view:

- from the country point of view: indicators are used to compare the respective efficiency of different types of farmers, and to classify them according to their national interest. The most important indicator, the *value-added*, gives the amount of new created wealth

- from the FHS point of view: indicators and economic criteria will have to reflect family farm behavior as much as possible. Distinctive analysis indicators will have to be used for different kinds of farmers. For instance, it would be inaccurate to speak of any rate of profit for a land and resource-less farmer who struggles for survival on a day to day basis.

Annual farm-household income is one of the most commonly used indicators for family farm units. Calculating profit is done not by allocating an arbitrary value for each day worked by each FHS member of their family (deducting both the real and the estimated costs from the inclusive incomes), the efficiency of the FHS is calculated by estimating the real return to family labour. This is done by deducting only real costs from annual gross-incomes (cash and non-cash ones). During the farm survey, the results of this second approach will be the most important ones to be shared with the farmer. (see section, The Framework of the Economic Analysis)

Phases G and H: Validation and consensus with the community and fine-tuning of the proposals

Towards the end of the survey process, it is essential to go back to the community and present the preliminary results to the target households and proposed beneficiaries. This process of 'restitution' is the key moment of each diagnosis, for it underlines the participatory nature of the whole exercise and allows all those involved to really ensure that the data – and more importantly, its interpretation - is providing an accurate account of the situation.

This kind of meeting can take several hours. It has to be well planned in advance, to ensure that all concerned are present. It is also advisable to break the session up into discrete components, as it is unreasonable and also counterproductive to expect anyone to maintain their interest in the subject matter over too long a period. Most importantly, the survey team will have to be well prepared, and must go into the meeting with open minds ready to have their conclusions challenged and possible altered by their local informants.

All the information collected during the survey and subsequently analysed will be shared with the different households interviewed and other community members. They will be requested to correct wrong interpretations, complete the data, and give their own point of view.

At this level, participation is no longer merely a formal exercise. Both the technician and the farmers now have enough information about each other to be able to communicate. The surveyor will have to change any points that may have been misunderstood, and may have to improve on his calculations with the help of the farmers in order to obtain a consensus on all matters.

This last meeting will also be used to explore alternatives and to devise feasible projects at the farm level or at community level. New policy alternatives could also be discussed with the farmers. Any proposal which emerges with the objective of moving from the present status

to a more desirable future status should be thoroughly thought through by all side. The following questions need to be asked:

- **Is the proposal technically feasible?**
- **Is the proposal economically profitable?**
- **Will the proposal improve gender relations?**
- **Is the proposal ecologically viable?**
- **Is the proposal socially feasible?**
- **Will the proposal respect local habits?**
- **Will the proposal be politically feasible?**

Technical feasibility

Given that we want to base our work on existing capacities and resources, we should not propose technical changes that are far removed from local knowledge and expertise. This means that while the technician requires experience of comparative agro-ecological systems, the or she should also be able to match together the experiences of other FHS in the area.

If the technical proposal or something close to it has already been implemented by a farmer in the same situation (but *not a* Model Farmer), there is a good chance that others will accept it.

Economic feasibility

As Morrisson said, "... bringing together the necessary resources is not sufficient to ensure success, which depends not only on technical conditions but on economic ones as well. A farmer will not adopt a system of cultivation merely because it is more advanced from a technical point of view; it also has to be economically viable, in other words it has to provide the farmer with a net income per hectare which is satisfactory in relation to the work required".

This question is also very much about risk. If the proposed activities expose the farm household to high levels of risk, then they are unlikely to be adopted. When assessing this situation, the security and regularity of other, off-farm income is of paramount importance; other external inputs can also off-set risk during a start-up phase (for example, some kind of insurance scheme or food-aid support while new fruit trees mature for example, or to cover farm labour costs until returns to the investment come in).

Gender relations

The gender analysis carried out when doing the field surveys should not be considered as a compulsory appendix to be included in each Guideline. *It is an essential tool for understanding the dynamics of household reproduction and the distribution of labour and consumption linked to certain types of activity.* Male control of cash-crop incomes, even if the work is done by women, is one example. Where this is the case, and men have no social obligations to support the food budget of the household, there is no point in proposing new cash crop activities if the objective is to raise the income of women and by extension promote better household food security. The gender analysis must therefore enter right from the moment when proposals are first elaborated, to see if they are going to produce a positive, neutral or negative impact in the FHS.

Ecological viability

Given that natural resources are the main production factor for the FHS, any external intervention should not degrade these resources. Once again the technician should take account of local environmental knowledge, as well us using his or her experience of comparative agro-ecolgocial systems.

Social viability

The social viability of a proposal can be the most difficult aspect to consider. To let a PS reach the API, or to establish a new FHS based on the *technically* viable PS proposed, two types of action are normally needed: agro-economic improvement (moving toward line AE above); and increasing the physical surface or area cultivated/exploited (moving toward line PH). The latter action always means ensuring secure land access and longer-term rights over the resources needed, *not only over the land and other resources now being used, but also over the new resources needed to facilitate the proposed changes in PS and the rising Reproduction Threshold.* ASD may only give us an estimate of what is needed, but the social feasibility of such a program will essentially depend on the social relationships between FHSs, and between the local farm community and wider agrarian system and national society in which it is embedded.

The survey should also produce a clear picture of local management and authority structures, which may or not coincide with official or state institutions. Seeking the approval of these structures is often an essential pre-condition for any proposal to be successful, and is one that is surprisingly often over looked by technicians who fail to identify where the real authority lies in a given community. At FHS level, this same question arises in relation to the roles of the (male) head-of-household, who may not in fact be 'the farmer' and therefore should not be the one to talk to when agreeing what may or may not the best farm development strategy for the FHS.

Local habits

New proposals should respect local habits. This may seem obvious but again is often overlooked. For example, if for certain reasons a community does not work during a particular period of the year or undertakes physically demanding obligations (such as fasting during Ramadan), new proposals should not place demands on local people at precisely this time. This might rule out an excellent *technical* proposal which requires large amounts of labour over the period in question, but this simply has to be accepted.

A distinction must be made however between a practice which is generally shared by all concerned, and one which is imposed by one group over another. Thus for example, a proposal respecting a "traditional" habit of excluding women from the benefits of development assistance should not be considered as a positive action, whether or not it respects local "habits". Nonetheless, proposals that seek to by-pass such traditional practices and support the development of women have to be sensitive to the overall social milieu and tread carefully.

Although the target beneficiaries may want to adopt a new technique or try a new crop, technically or morally questionable constraints imposed by an elite or religious group may not be desirable, but they may also underpin other important aspects of the local subsistence strategy. A good example of this is kinship and godparent relationships between rich and poor households, and strategic marriages which allow access to new resources or employment. In Northeastern Brazil for example, this has been shown to be an essential factor which allows some poor families to get through difficult periods without suffering the loss of children through malnutrition (see Box). Such basic processes maybe exploitative or sustain an unequal system of chronic poverty, but they should not be put at immediate risk by radical new proposals.

Social Coping Mechanisms in the Face of Chronic Poverty and Malnutrition

Detailed field research amongst a small farmer community in Northeastern Brazil in the 1980s revealed that *all* households suffered the loss of at least one child through the combined impact of malnutrition and disease.

The key to understanding this information in the face of other data wich implied that such a disastrous FHS outcome indicator was limited a samllpercentage of the group of households being studied, was a detailed analysis of their developmental cycles (the lifecycle discussed earlier in this document). The same analysis did however show that some households were able to avoid or minimise this disastrous and inevitable process. These households managed to maintain or develop social links with better off households and elite families as they went through the 'developmental cycle'.

Thus, "Apart from affecting labour power and dependency ratios, developmental cycles also involve specific events which profoundly affect the individual income-gathering strategies of households and their ability to cope with malnutrition. Marriage and inheritance are particularly important, offering new or expected combinations of household labour, area farmed and tenure relations…access to more lucrative or secure off-farm work…is often determined by patron-cliet or kinship ties…" (Tanner 1987)

It is therefore of the utmost importance for the survey team to hear from informants exactly what *their* situation is, and whether going against social norms and habits established by or kept in place by 'higher' social group is really feasible or not. This observation links in to some extent with the question of political feasibility discussed below. What is important to recognise is that all FHS live and work in a real world structured by real social and political relationships, and that all proposals must be realistic in this context.

Political feasibility

Finally, proposal that have the support of certain politicians are more willing to be implemented than those that do not have this support. Unfortunately, the real situation we have to face is that of plenty of *technically* interesting proposals produced by a good ASD have never been implemented, while other *politically interesting* proposals that have no grounding whatever in any kind of ASD have often been imposed on 'beneficiary' communities.

It is therefore very important that local leaders and politico-administrative authorities are fully consulted during the Preparation Phases (A and B) of the survey, and at least feel that they have been taken note of. While their interests are not necessarily the same as those of the people they are supposed to represent, making them feel part of the participatory process is a good way of ensuring the resulting proposals have their support.

6. LIMITATIONS OF THE APPROACH

Several knowledgeable sources have backed the use of Agrarian Systems Diagnosis in a wide range of development programming and project planning situations. Nevertheless, although the ASD approach can provide powerful insights into the process of agricultural development at grassroots level, it does have a number of shortcomings. Opportunities and constraints tend to differ between farm households, and a comprehensive picture requires familiarity with several systems. Unless a suitably wide range of FHS is studied, programs may be developed on the basis of an atypical stereotype. Thus the situation from the viewpoint of the farmer needs to be supplemented by an analysis from the wider viewpoint of economic efficiency, in order to develop a complete overview. These opinions voiced by UNDP are counterbalanced by a strong statement in favour of ASD: "The basic information [produced by ASD] does, however, offer a more immediately comprehensible and intuitive picture of sector problems and opportunities. And it has the advantage that the conclusions and ideas developed have been endorsed by what should be a representative segment of the farm population." (UNDP)

Finally, Agrarian System Diagnosis does not offer a development strategy, but only a set of procedures aiming at the improvement of the standard of living of the target groups. Understanding farm household systems helps to organize knowledge and direct data collection, and can produce more effective interventions. On its own however, a holistic view of the problems faced by a FHS is not enough to solve the problems face by a given FHS situated within a given Agrarian System and wider politico-social context. Facing this challenge requires a clear political commitment by Governments in favor of family farmers and landless people. The link between technical anlaysis, strategic thinking, and policy development is, as always, the least certain of all the variables discussed here.

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