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Land and Water Development Division

**Globally Important Agricultural Heritage Systems:
Notes and guides in assessing
Natural Resources Management**

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Foreword

Natural resources management is a critical branch of sustainable rural development that requires thorough understanding of the *land, the people who nurtures the land and how they govern land*. They are historically, socially-ecologically constructed systems. While in today's generation, natural resources management is intertwined with the problems of poverty, food and livelihood security and land degradation. This fact is recognized and there is no single sectorial approach that can successfully address this complex problem. The solutions however, require multi-dimensional/multi-faceted strategies, involving efforts to strengthen institutions and local capacities for managing natural resources.

In 2002, FAO initiated a programme called "Conservation and Adaptive Management of Globally Important Agricultural Heritage Systems". Among others, the programme aims to safeguard and establish basis for global recognition, dynamic conservation and adaptive management of agricultural heritage systems and their agricultural biodiversity, knowledge systems, food and livelihood security and cultures throughout the world. Within this context and to facilitate understanding of the inherent characteristics of the traditional family farming communities and indigenous peoples' management of natural resources, the notes and guides is necessitated. Hence, this document was prepared in collaboration between the old units: Rural Development Division (SDA) and the Land and Water Division (AGL), both divisions are merged under the new name of Land and Water Division (NRL).

This notes and guides present the shared vision of the central role of the local people, the social processes and the institutions regulating use and management of natural resources. This could serve as guide to further assessment leading to methodological steps of conservation and adaptive management of GIAHS.

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Introduction

Globally Important Agricultural Heritage Systems (GIAHS)¹ ethno-agro-ecosystems are the outcome of a process of co-evolution of the rural communities and their environments. GIAHS communities or the so-called traditional family farming societies' natural resource base represents both their principal wealth and the outcome of a constant process of plant and animal domestication, technology development and natural resource management they have led in order to multiply the chances to survive in generally harsh environments.

The way traditional family farming societies manage Nature in their systems is founded on an appropriate knowledge of the mechanisms of action-reaction in the relation between humans and the ecosystem and on a social perception of nature that is embedded in their traditional beliefs, values, cosmology and ideology. These symbolic elements, in turn, are encoded in a set of norms and institutions that control natural resources access, use, management and distribution and assign rights and responsibilities to the various groups in society. These set of norms are the tenure systems that include all the relationships among individuals and groups that govern the appropriation or use of land and its attendant natural resources (water, trees, plants, pasture etc.).

Given the complexity of the linkages between GIAHS communities' livelihood strategies and access to natural (and also non-natural) resources, it is necessary to build a comprehensive framework which describes the relationships in a given territory between the social actors and the resources they use and among the social actors themselves. An analysis of such linkages, in traditional agricultural systems, allows identifying and assessing the principles that regulate access, use and management of resources to guarantee sustainable ecosystem management and social reproduction in GIAHS sites.

In this context, the GIAHS project represents a good opportunity to examine the multiple patterns of coherence between access, use and management of natural resources in traditional communities.

This document aims at characterising land tenure systems of traditional family farming societies. It contains key concepts and practical notes for examining the complexity of land and natural resource use, access and tenure arrangements in the GIAHS systems. The notes and some illustrations described could serve as a starting point in the endeavour of understanding and documenting GIAHS systems' diversity and complexity as well as their efficiency and adaptive capacity; it also helps assess how driving forces affect traditional farming societies, the reasons, patterns and direction of change, which can be useful in further development of local-specific initiatives for the guardians and managers of mother nature.

¹ FAO defines GIAHS as "Remarkable land use systems and landscapes which are rich in globally significant biological diversity evolving from the co-adaptation of a community with its environment and its needs and aspirations for sustainable development".

Exploitation vs. conservation of natural resources: a moving threshold

In order to make sure that conservation and utilization of natural resource are compatible, human activities for the use and management of resources must conform to the threshold set by the need to maximize the benefits derived from natural resources exploitation while guaranteeing its sustainability. This has been a key concern for the GIAHS communities that live in areas where natural constraints have historically been greater and human survival more difficult relative to other places. GIAHS systems are in fact characterised by significant geographic variables, climatic and land morphology (slopes, altitudes, etc.): that challenge communities' ingenuity. All these variables and the specific combinations they give rise to, have constituted both important limitations to human survival and the source of all inspirations and achievements that have allowed GIAHS communities to set up successful and responsive livelihood strategies. The ingenious traits of GIAHS communities are in fact shown in their capacity to manage agro-ecosystems interactions and systems underlying complexity in order to develop system's resources potential so as to face geographic variables and risk.

To diversify their survival strategies GIAHS communities have worked within the opportunity space provided by their ecosystems. This means that, at times when a change was recorded in one or more important variables in the system (e.g. demographic pressure, available labour force) new adjustments were found to maintain an overall equilibrium, without breaking the inherent stability of the human-environment system in the long term.

The GIAHS communities "have been engaged in a struggle to maintain a fragile balance between household demands and the short term carrying capacity of the resources and have been effective in managing resources in order to realize the two dimensions of sustainability: the sustainability of the natural resource itself, and the sustainability of the livelihoods of those households using the resource" (Chisholm, 2000)². This is the reason why these systems, although heavily threatened and often eroded, are still there.

GIAHS project key idea is that the Heritage of Mankind that we now receive should be dynamically conserved and allowed to evolve and passed on to future generations. This means that development processes should not result in an irreversible loss of territorial options and that sustainability is intrinsically related to the conservation of GIAHS systems' complexity and diversity. GIAHS dynamic conservation was possible thus far because GIAHS communities worked within and not beyond natural constraints and thus were able to generate, preserve and transmit to future generation a patrimony of extreme diversity in natural, social and cultural terms.

Why is access to and control of natural resources important for GIAHS communities?

There are many answers to this question. Some key arguments are provided below and illustrated by a number of examples to clarify and highlight the complexity of tenure systems.

² Cited by HOWARD P., SMITH E. (2005): *The Relationships between Tree and Plant Access and Livelihoods in the Southern Tigray Region of Ethiopia: a focus on Poor and Female Headed Households*. Research Project supported through a Letter of Agreement with the FAO Livelihoods Support Programme. Gender and Biocultural Diversity Studies, The Netherlands, February 2005: 8.

1. *The natural resource base comprises the principal wealth of GIAHS communities and at the same time it is the outcome of a continuous process of plants and animals' domestication and technology development in order to guarantee survival in harsh environments.*

Access to, use of the resource base and resource management are inseparable aspects. The security of access to the resources in their territories by the GIAHS communities must be granted in ways that permit the specific uses GIAHS communities make of their resource as well as their resource management practises.

2. *Land is much more than a physical support of human activities. It is the foundation of communities' identity, reciprocity and solidarity.*

Land and natural resource tenure regulate communities' membership and control of resources. "In lineage-based societies, a social norm commands that every household, by virtue of being a member of the community, be granted access to the amount of productive resources, land in particular, that can meet basic needs. Here is a 'general right' that is "an inseparable element of the status as member of the tribe. (...) Rights and obligations associated with land form a guarantee of relational existence, in the sense that land is the basis of social networks that enable people to access the whole series of material and non-material resources (Ng'weno 2001: 118)³" (Goetghebuer and Platteau, 2004: 2).

3. *Safeguarding traditional communities access to territorial resources means not only facilitating access to all the material and non material resources needed for survival but also allowing the traditional flexibility of arrangements needed to secure an adequate income and recognizing the institutions that mediate such arrangements.*

This flexibility is essential to keeping possibilities open for GIAHS communities to secure their livelihoods and also in order to face calamities, adverse trends and risks, adapt to changes and improve their well-being. The inherent flexibility of tenure systems is what has allowed GIAHS communities to adopt different livelihood strategies according to available resources. Resources are accessed through the multiple transactions of goods and services taking place among the population groups. These transactions build and strengthen social networks within and also amongst the different communities.

Within the Oases traditional tenure systems access and use rights are extremely mobile. Multiple transactions still take place in the oases among the community members to find equilibrium between the water, land and labour endowment in an attempt to maximize yields. The rebalancing of the various factors of production is often achieved through land transactions (in the form of mortgage), water transactions (mortgage or purchase of water), and the purchase of labour force (khamessat and wage-earners) (CNEARC, Laayoune, 2003)⁴.

³ Cited by GOETGHEBUER, T. and PLATTEAU, J-P (2004). *Community ties and land inheritance in the context of rising outside opportunities: evidence from the Peruvian Highlands*. Centre for Research on the Economics of Development (CRED), Faculty of Economics, Namur, Belgium: 2

⁴ CNEARC (2003) Etudes de quatre oasis de la région de Tata, Laayoune, CNEARC, Montpellier, France.

4. *GIAHS communities tenure institutions have ensured that the local knowledge and techniques be transferred generation after generation to guarantee a rational and sustainable use of the resources.*

GIAHS communities' knowledge systems are built on competence acquired on a trial-and-error basis, through continuous experimentation. The possibility to conserve the knowledge about resources (land management, biodiversity, botanic resources, etc.) and adapt such knowledge to the different conditions that arise depends upon users' permanent access to natural resources and direct management.

When assessing community knowledge systems, it must be kept in mind that the various groups in the community and the various members of the household have different roles and responsibilities to provide material goods and services. Therefore, the tasks of each group and individual in society should be taken into account as well as the necessary resources and technical knowledge they need to carry them out. In particular, access to resources and to the necessary knowledge to manage them is highly gendered. The role of women in using, managing and conserving botanical resources in many traditional systems in the world is well documented and is the source of the present bulk of knowledge about medicinal and nutritional properties of plants, their uses as colorants and their aesthetic value (Howard and Smith, 2005).

I. GIAHS systems as social constructions

To understand the rationale of the tenure institutions in the GIAHS, it is important to construct a coherent framework including the interpretation and perceptions of resources by the concerned communities. Among the key question analysts should ask themselves is: why do GIAHS systems function the way they do? How do GIAHS social and tenure institutions support systems functioning and coherence? Are GIAHS traditional institutions evolving? And if so, can different institutions serve the purpose of preserving the system's key principles?

In order to understand GIAHS system dynamic of change and resilience factors and as an introduction to the analysis of tenure systems, some notes about the evolution of territories are given in this paragraph. A proper analysis of tenure systems is the one that is framed within a broader territorial and system perspective able to take into account and explain the processes by which the actors concerned identify and create, use and manage a set of material and non material resources while constructing their territory (Turco, 1988)⁵.

Territories are social constructions and the result of a process of multiplication of survival options. GIAHS systems can be seen as "a mode of exploiting the environment historically created and sustainable, (...) adapted to the bioclimatic conditions of a given space and responsive to the social conditions and needs of the moment" (Mazoyer, 1998). The inherent coherence in the way territorial resources are utilized in the GIAHS systems can be assessed through analyzing the overall technical, economic, environmental, social and cultural conditions of societies' evolution.

The following elements are key to understanding the way GIAHS communities have constructed their territories and tract their historical evolution:

- **Communities' symbolic control** of the territory: it includes all the operations realized in order to intellectually own the environment around them. The symbolic control is established mainly through the conception of a set of designators defining points of reference in the space and transmitting practical and technical information about the resources themselves and their spiritual and value meaning;
- The **physical appropriation** of the space is established through the manipulation and transformation of the territorial resources, in the process of developing and performing community livelihood strategies (agriculture, stockbreeding, fishing, hunting, etc.). Also part of this process of physical appropriation of the territory are the related competence and skills that embrace the sphere of production, movement and dwelling;
- Communities' **beliefs, values, cosmology**, that guide the activities for the sustainable use of resources. These spiritual elements are inherent to the rationale of these systems, found communities' sound stewardship of nature, and are powerful motivators;
- The **local ecological knowledge systems**, specifically all the intellectual processes and resources utilized by a group to make use of and transform the natural potentialities of their environment. Knowledge systems refer to the performance of the various resources and transfer practical and technical information, as well as relevant symbolic information about them and about the appropriate practises of securitization;

⁵ TURCO A., (1988), *Verso una teoria geografica della complessità*, Unicopli, Milano.

- An **ideology** generating **norms and institutions** to regulate access, use, management and distribution of resources. Tenure norms and institutions allow the social reproduction (production and distribution of assets and exchange relationships) and the sustainable exploitation and reproduction of the managed ecosystem. Tenure systems can be seen as a sort of mediation between societies' hierarchical (in the spheres of land and resources tenure, politics and religion) and horizontal/egalitarian (e.g. age-groups) institutions.

An analysis of GIAHS systems should therefore be oriented towards the reconstruction of the practises of the main actors (farmers, herders, hunters, fishermen, etc.) that produce territory. These practises inform about the specific criteria on which, for example, communities of farmers base their decisions and activities related to the establishment of agricultural fields; the definition of the agricultural calendar; the management of the soil, water and vegetation cover; the choice of agricultural techniques, selection of local cultivars, tools and instruments and the selection of the different cultivation methods; the selections of the village's location, the identification of the better areas for hunting and fishing, etc. These criteria reflect communities' competences with regard to plants, soils, hydrography and climate and their distinctive interpretation of resources. Furthermore, all of these elements are mirrored in the functioning of the community land tenure system which encompasses community's principles for the management of the communitarian spaces, and the political and social organization established to regulate access to the natural resources by community members.

The multidimensionality of territories

From what highlighted above it follows that the space where the actions of territorial appropriation and domestication take place is not given and fixed but resources are opened to a plurality of interpretations in the sense that they are perceived and interpreted in various ways by the people that live of them. This is a key factor that must be taken into account when analyzing the resource tenure system and the forces at play in shaping and transforming the GIAHS systems, including conflicts.

In many traditional societies, territories are perceived more as spaces with variable geometries and discontinuities than real borders. An analysis based on the visions of the actors concerned might in fact reveal territories that are neither polygonal nor composed of neighbouring blocks of homogenous zones, but are defined by poles and pathways. These territories can be represented in the form of a network, i.e. in terms of exchange flows and migrations, and are often marked more by "geo-symbols" than by borders⁶. An example is provided by a study of nomadic populations in Kerala province (India): by following the life rhythm of these populations and by listening to them on such matters as marriage, work, politics, religious practices, legends and dreams, three main phenomena were identified that defined the territorial borders as perceived by the community: the animal corridors, the construction of drums and two festivals. Based on these three elements it was found that there are sites inhabited by different emotions, and that the region is not considered as one single space but as the sum of these sites, with a third dimension linked to the social or cultural networks (FAO, 2005)⁷.

⁶ CAMBREZY, BONNEMAISON J., QUINTY-BOURGEOIS. (1999)

⁷ FAO (2005), Participatory and Negotiated Territorial Development (PNTD). FAO, Rome http://www.fao.org/sd/dim_pe2/docs/pe2_050402d1_en.pdf.

In the case of the pre-Hispanic Andean agrarian system, authors refer to a form of territorial discontinuity in land occupation. The traditional system of dispersed *chacras* extended both on the vertical and latitude axes and responded to the logic of an autarchic economy and at the same time to the need to ensure harvests or at least part of them. Referring to the Southern Andean system John Murra (1975)⁸ formulated the hypothesis that the principle of spatial organization was based on verticality that is “on the vertical control of a maximum of *pisos ecológicos*” (Camino, 1980)⁹. Since then many authors have researched more into this model of territorial discontinuity pointing to its diverse manifestations within the traditional Andean system. It was then highlighted that the communities living in the highlands of the Peruvian *sierra* had also access to enclaves on the coast and in the *selva*. This spatial organization also served productive organizational purposes. In 1549, in the town of Canta (Lima Region) there were 8 permanent settlements (*aldeas*) and 16 temporary villages. The latter were left empty for most of the year once the members of the *ayllu* (the traditional Andean lineage) had carried out the specific activities that were supposed to take place there (handicrafts, sowing of communal land, planting of specific plants needed by the group). Some *aldeas* migrated temporarily to accomplish agricultural collective works (*faenas*). This spatial discontinuity was also the effect of the projection of the sacred sphere on the territory. Each god (*huaca*) no matter how small it was, “possessed” a piece of land where corn was cultivated to prepare the traditional drink for the rituals and celebrations in their name. These possessions have been termed as “religious enclaves”. Also pilgrimages drew human paths on lands that were left deserted during the rest of the year. Many more dimensions of this territorial discontinuity might be found through further research in this subject.

What should be stressed here is, on the one hand, that the Andean characteristic of discontinuous land possessions responded then (as well as today) at the need to moderate the risk in agricultural production deriving from adverse natural phenomena such as frost, hail, drought or excessive rain and pests; on the other hand, that beyond the productive organization also the spiritual sphere is a key force in shaping the territory and communities social organization (Rostworowski, 2002).

Different groups in a society can coordinate and cooperate to use and manage resources in a sustainable way although they have different perceptions of the territory.

Several examples can be brought up of groups and actors that cooperate and establish alliances to use and manage territorial resources (e.g. cultivators and stockbreeders) through negotiations over its appropriation, its utilization and transformation. These can either be quite separate ethnic groups who use different parts of the 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.

Systems resilience and Change of territorial systems

Each society thus creates its own geography coherent with a territorial rationale stemming from a specific social rationale. The rationale of a system can be defined as the set of

⁸ Cited by ROSTWOROSKI, M. (2002) *Algunos aspectos de la tenencia de la tierra en los Andes pre-hispanicos*. In: “El hombre y los Andes: homenaje a Franklin Pease G.Y.”/ Javier Flores Espinoza; Rafael Varón Gabai, fondo Ed de la PUCP, Lima.

⁹ Cited by ROSTWOROSKI, 2002.

mechanisms, core values and norms that represent the foundation of social cohesion and guarantee the normative, material, technical and symbolic resources that societies need to exist and reproduce. A system is the outcome of specific historical events, territorial processes, normative systems, knowledge systems and beliefs and mirrors the inseparable nexus between human beings and their competence over the space they inhabit. The system is embedded in the traditional social and territorial structures and in the channels for the circulation of power.

Territories, even the more isolated and remote ones are open systems where natural resources are subject to multiple uses and various actors play. Rural societies and also GIAHS communities have undergone deep transformations both territorial and social, new actors and new institutions have appeared throughout history whose actions are not founded on traditional local rational. As a result, territories have become stages where a plurality of social-territorial rationales interact shaping the space in different, often conflicting ways.

This rationale can derive from a logic which is internal to the community and the territory, but also – and increasingly in times of global markets and market induced needs - external. The different territorial rational can be seen as negotiating or conflicting, nonetheless they are inextricably blended by social actors in everyday existence. As a result, the “basic geography” (Turco, 1988) of most territories in the world has been dismantled and transformed.

One of the main repercussions of this transformation of territories can be clearly seen at the level of the traditional tenure systems that regulate access to land and the resources on it and their exploitation. The customary systems, based on universally recognized traditions, have been pressured and challenged by the introduction of a modern state organization. Through colonization a normative framework based on universal and abstract principles proceeding from a higher authority such as the State was imposed that governed people’s activities according to an interpretation of resources and Nature based on an external value system.

These transformations have caused a fundamental change in communities’ survival strategies and practises that guarantee their social and physical reproduction. Furthermore, as a result of these territorial processes, various conflicts have arisen in most places between the two spheres of legitimacy and legality. Local populations are often in a state of uncertainty about their rights to the land (Laban, 1995: 346) and its resources and legal conflict management schemes do not succeed in solving divergences among the different claimants.

The legal pluralism within the tenure systems

In the perspective of a progressive integration of the traditional legitimate systems within the legal system, an analysis of tenures should focus on the existing or potential interactions between actions and decisions pertaining to the two normative spheres.

The concept of legal pluralism provides useful insights into the evolution of normative systems for access to resources. Legal pluralism occurs when a plurality of tenure regimes each with its rational and normative framework, have authority over the assignment of rights and are legitimized to resolve disputes. In the case of land, these can be the legal and customary land tenure systems. This plurality can give rise to opportunities for innovation, or simply insecurity arising from contradictions, ambiguities, lack of information or forum

shopping but only by those who have the means to do so (e.g. education and financial resources).

Legal and customary systems themselves should not be seen as fixed and unambiguous set of rules and actions. Customary systems have their own gap between norms and behaviour. Rules which are disregarded with some regularity may be stated as eternal verities by local customary law specialists. This is why to avoid important lines of inquiries to be foreclosed by formal statements of customary rules in an analysis of local tenure systems, it is better to go from behaviour to rules rather than vice-versa. (Bruce, 1989).

In general, it can be said that the *de jure* tenure systems, whether legal, customary, exist alongside another category of *de facto* norms and behaviours that can be considered as lying in a grey area between the realms of regulated systems. Where neither legal nor customary legal frameworks are effective or appropriate to local conditions, informal tenure systems may be created *ad hoc* by disaffected or frustrated social actors. Such new behaviours may be positively or negatively sanctioned by the formal institutions, eventually causing a transformation in the tenure systems and their evolution.

Furthermore, when studying the evolution of the normative systems for access to resources, it must be kept in mind that norms regulating access and use of resources in harsh contexts are generally more sophisticated when resources are scarce than in times of abundance. The more eroded or claimed by a growing number of people the resource base, the more strictly regulated the access system. Nevertheless, resources scarcity can also be a market driven effect. Private rights can suddenly emerge and create land scarcity for the majority where it used to be not a problem before – when an outsider invades or a new plantation project expels the local population.

In the Maghreb region, emergent land and water scarcity became a problem due to increased regulation of the access. While, in the oases traditional tenure system, water had always been subject to strict regulations, for land, scarcity appeared later. As a result a progressive move was observed from a relatively unrestricted access by community members towards a more regulated admission and an individualization of rights. The move towards individualization of property rights in the oases started in the beginning of the 20th century, parallel with the massive sedentarization and relevant population growth taking place in the area, but it was also decisively encouraged by the establishment of a modern state organization. In fact, the centralized states in the Maghreb region have been slicing and delimitating the tribal space in an irreversible way despite the fact that territorial borders in the oases and the desert have never existed as fixed delimitations. The oases territories were subject to a continuous redefinition, expanding and concentrating according to the populations' needs. On the contrary, today, the obligation set by the colonial administration to divide and delimitate collective lands, the resulting mandatory posed limits of the regional and national borders as well as of the cultivated areas and irrigated perimeters, have made territorial borders rigid and impossible to circumvent (Abaab, Ali et al., 1995).

Because of these imposed delimitations, it resulted to a difficult process of reorganization of the oases lands, and the weakening of the traditional tribal political organizations. In this situation conflicts are far more difficult to manage. Traditional conflict management institutions are generally no longer able to use their customary flexible regulations to make decisions and thus manage disorder by alleviating it (Jardak, 1997). All of this has had a clear negative impact on the sustainability of resource use and management in the oases (Toutail, Dollé, Ferry, 1990).

In a similar way, “in some Sub-Saharan African countries where land is held under dualistic tenure systems (indigenous/communal tenure and individual ownership), post-colonial law has tried to marginalise the influences of the institutions of indigenous tenures, in favour of state control or individual ownership (Cheater, 1990). This change upset centuries-old traditional land and resource control institutions (Murphree and Cumming, 1991; Scoones and Matose, 1993)”¹⁰ (Kundhlande and Luckert, 1998).

Alongside the individualization of rights, other processes such as changes in the level of decision-making, wealth differentiation, commercial market linkages, and demographic pressure have severely undermined traditional tenure systems. Difference in local interests, heterogeneity of communities and growing external pressure on land and natural resources, nowadays increase the tensions around property and usufruct rights. Furthermore, the uniformization of agricultural practises to adhere to a business or economic logic of profits, returns to heavy investments, and economic/technical efficiency has led to a loss both of biodiversity and of associated cultures, which are the basic elements that guarantee that the system is able to adapt to changing conditions and human needs.

What is to be underlined, given the plurality of property regimes that form part of the local tenure systems, is the key role played by policy reforms and action by the government agencies in defining and determining the actual relationships between various tenure regimes at the local level (e.g. private, common property, open-access, or state property). How this competition among property regimes and players is worked out and subsequently managed is perhaps as important for sustainable agriculture as the production techniques used, determining possible patterns of ecological or social crisis. Government’s actions can also support or discourage the institutional changes that are necessary for local systems to cope with such various changing conditions as demographic growth, increased commercialisation or pressure by external actors over the use of local resources etc. One key policy area in the modern world is in fact how to manage access to land and other natural resources by ‘outsiders’ who may or may not view land rights and land management in the same way as local people (FAO, 1999).

What makes GIAHS more resilient than other systems?

For the GIAHS communities the concept of land property differs from most Western ideas. In Peru, they have beliefs similar to many African populations (e.g. the Bariba in Benin), the land is a gift from the gods. Its fertility is assured by a mystical and foundational alliance between the users of the land and the spirits of the area. Such a gift is not made to one single person but to all the members of the lineage or the clan whose ancestors were the first to occupy the area. The single rings of the chain of the succeeding generations are only the provisional managers of land and the resources on it. Land is not their own, they can only occupy and use it (usufruct rights is all they hold).

GIAHS communities’ have responded to changing needs and circumstances (economic, ecological and demographic conditions) through a continuous adaptation of resource tenure

¹⁰ Authors cited by KUNDHLANDE, G., LUCKERT, M.K. (1998): Towards an analytical framework for assessing property rights to natural resources: a case study in the Communal Areas of Zimbabwe. Staff Paper 98-05, Dept. of Rural Economy, University of Alberta, Edmonton, Canada: 5.

systems and livelihood strategies. The central role of traditional institutions and the enduring competence of communities over resources securitization are key resilience factors in the GIAHS systems.

Therefore, GIAHS systems continue to exist not because they are closed systems situated in remote areas. As already underlined, no territorial system is ever impermeable to external forces. On the contrary, the resilience of the GIAHS systems is based on the fact that their traditional institutions for the sustainable management of community resources have continued to exist alongside the establishment of new legal institutions and next to them. The latter are adopted as an interface with the State, the public institutions, private actors and development projects to negotiate about funds or benefits. Yet, it is still the former that command social and ecological matters.

Yet, during the last few decades, multiple and mounting pressures on increasingly fragile socio-economic and ecological environments have put at serious risk the ability of GIAHS systems to guarantee food security and quality of life requirements for their population. Demographic pressure and the changing preference of the new generations are among the key factors that lead to resource individualization and abandonment of old practises in the Andean farms to adhere to logic of profit, disregarding previous concerns for risk minimization through diversification. In the community of Acco Acco in the area of Sicuani, on the Peruvian Highlands, at 4000 metres asl, a number of land transactions have recently taken place within the community in order for single households to turn into one extended plot the numerous scattered family parcels, dispersed in the various ecological niches along the mountain side. This process of land “concentration” clearly breaks the key customary Andean principle that commands that parcels should be scattered to avoid that heavy rain or frost and in general adverse climate phenomena, might affect all the cultivations in the same undesirable way. This strategy against climate risk is the same used by the *allyus* (Peruvian traditional lineages) in the pre-Hispanic period, which held and cultivated land in the territory of other *allyus* in what was at that time an extremely complex and intertwined tenure system. Nowadays the customary risk minimizing strategy is still the approach that allow Andean farmers to not to be too affected by present phenomena of climate change (although opinions on the degree of impact of climate change on the Andean agriculture diverge).

Land and natural resource tenure

Tenure rules are among the principal mechanisms that communities use, first to define their territorial space and then to manage the resources within that territory (FAO, 1993).

GIAHS communities base their livelihood strategies on the access to a wide range of areas and to the resources located there. Each set of resources in the GIAHS systems, should not be thought of in isolation but should be considered and understood as part of a coherent system. What matters in the analysis of traditional communities’ resource base is how the single resources and the various activities carried out complement each other in the fulfilment of societies’ established goals. This is why the analysis of the GIAHS land tenure is broadened in this document to also try to encompass all the resources found in the system that GIAHS communities need, use and manage in their everyday existence.

What is a tenure?

A tenure has been defined as a “bundle of rights” (e.g. Alchian and Demsetz 1973) or as “the rights and patterns of control over land” (Norton and Alwang 1993¹¹). A “tenure system” is the set of tenures in a given society. Indigenous tenure systems, although there are “family resemblances” among some of them, have evolved to meet specific needs of particular peoples, in specific environments and using certain technologies. They are so diverse as to make generalization difficult. Furthermore, there are usually several different tenures in a tenure system, for different land and natural resources uses or types of users, but they should constitute a coherent system, complementing one another (Bruce, 1989).

A closer look to the way natural resources are accessed and managed in traditional tenure systems reveals a key feature of these systems: instead of one person having all the rights to a given plot of land and the resources on it, the “bundle of rights” is divided up:

- a) It may be divided according to the *resource*. For example the land is owned by one person, the trees by another, the water by a third.
- b) Or according to *the way the resource is exploited*: one person may be considered the owner of a tree and have exclusive rights to chop it down or collect the firewood, but many other people may have rights to collect fruits or leaves.
- c) Or, *the rights to the resource may change over time*: one person may hold land for cultivation purposes during the rainy season while the same land is turned to pasture with much less restrictive rules of access during the dry season (FAO, 1993: chapter 1)¹².

Gender roles, knowledge and skills: women responsibilities for food security and biodiversity conservation

GIAHS “systems of rights and duties are in the first place universally differentiated according to sex (...). The simplest explanation for this is that there is a gender division of labour, which means that rights are associated with men’s and women’s material needs and their distinct obligations to provide material good and services, as well as with their knowledge and abilities (human capital) that are required to carry out distinct tasks”¹³.

Gender roles are learned behaviours in a given society, based on social conditioning about which activities are considered appropriate for males and which are appropriate for females. Gender roles and social responsibilities are learned and may change with time and vary widely within and between cultures. In gender analysis, the key questions are: WHO does WHAT? And WHEN (IBPGR, 1991)¹⁴.

Women play an essential role in agricultural production thanks to their knowledge and technical skills; second, they are the one to transfer such knowledge to new generations securing the preservation of culture. In rural areas, in particular, “the conservation and use of plant genetic resources begins with women (...). As smallholder farmers, women are involved in all areas of the crop cycle from seed selection to planting, harvest, storage and processing. (...) Within the household, women are responsible for food needs and welfare,

¹¹ Authors cited by KUNDHLANDE and LUCKERT, 1998: 3.

¹² FAO (1993): Tree and land tenure rapid appraisal tools. FAO Rome Prepared by Karen Schoonmaker Freudenberger. http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/t1700e/t1700e04.htm

¹³ *Ibidem*, page 11

¹⁴ cited by TAPIA and DE LA TORRE, 1998

including the gathering and utilization of food, fodder, fuel, medicinal plants and fibre. In these roles, women often determine which plant resources to conserve and use, which seed to select, which crop varieties to grow, which food products to keep for home consumption and which to sell at the local market. (...) rural women have a special interest in the diverse and multiple uses of plants and other biological resources, given their varied and complex responsibilities in rural households. (...) The knowledge acquired as managers of these resources for livelihood, health and food security constitute a knowledge system that both ensure subsistence and community needs, and contributes to the conservation and use of local varieties”¹⁵.

A good example is the traditional peasant communities of southern Peru, where women are in charge of selection and administration of the harvested products i.e. for food necessities, market and for seed stocking (De la Torre and Cuzco 1989)¹⁶. While in the case of the Aymara people of the southern Andes, men show more interest than woman toward the introduction of new commercial varieties (Tapia, and De La Torre, 1998).

Women’s knowledge about seeds and genetic resources management systems in the Andes

In the Andean tradition, the division of work roles is well defined and everything referring to the conservation and care of the seeds belongs to women. In the traditional peasant communities of southern Peru seed selection and storage belong to them. It has nothing to do with property: it is a women responsibility within the traditional division of labour and the local cosmology.

“As long as seeds remain in the family plot, men are responsible for cropping, harvesting and transportation. The woman’s responsibility starts when the products enter the home (...). In the Andean thinking, the man deposits the seeds and the woman receives them, either in her womb or in the attic of her home, to keep and to nurse them. They are her responsibility until they leave her dominion and go out, back to the world or to the family plot.

Men gather the seeds in the family plot and bring them home, so the women can sort and arrange them as they wish...”

“They belong to us, to us the women”

“To whom else can they belong, than to us women”

“It’s women’s work”

With the arrival of the Europeans in the Andes, the women became the stronghold of traditional practises. Men’s affairs were more exposed and therefore more easily attacked. The Andean women continued to carry out their activities in silence: their arts and skills, such as the production of textiles, and especially the selection and conservation of seeds. At the same time they made sure that these skills and knowledge were passed on to the new generations.

During the traditional weekly agricultural fairs in the Andes, where farmers from the surrounding areas offer and exchange their surplus products, and buy basic goods, women are in charge of the trading. Since they are the one to manage the surplus, they also play an important role in selecting the products that are traded and the varieties to be sold. One reason of their interest is the need to have the local ingredients to cook the traditional food for their family’s daily nutrition. Given their role in the fairs some women or their families are especially known to be particularly active as “conservationists” and to conserve this genetic material with great dedication. If a family happens to lose genetic material for climatic or social reasons (theft), diseases or mischance, they will turn to the conservationists to recover some seeds. Older women still know how to propagate potato from botanical seeds, as a way of

¹⁵ Pablo Eyzaguirre, in the introduction to *Women Farmers and Andean Seeds* by Tapia and De La Torre, 1998: 6.

¹⁶ Cited by Tapia and De La Torre, 1998.

increasing diversity and selecting new varieties.

Source: TAPIA, M. E., and DE LA TORRE, A. (1998) *Women Farmers and Andean Seeds*, FAO-IPGRI, Rome: 10, 18, 25, 26).

II. The tenure study: objectives and methodological principles and concepts

This part will provide some methodological clarification about the various themes and variables that should be researched on when an appraisal on tenure and natural resource management is conducted. The analysis of resource tenure systems is a very complex exercise that should involve a multidisciplinary team of social scientists, agronomists and environmentalists. Designing a research framework that would fit various sites is impossible given the great diversity observed in reality. Generalizations are generally defective. Yet, an initial framework will be provided in this document as a basis for discussion and as a preliminary step toward the design of a more complete methodology that could be developed as a follow up to this work.

Objectives of a tenure appraisal

A tenure analysis is conducted with the following objectives¹⁷:

1. The identification of the territory (ies) of the community and, by micro-ecological zone/tenure niche, of the principal natural resources found there.
2. The identification of the various uses that are made of such resources, when they occur and for what purpose.
3. The identification of the users of the natural resources with particular attention to social categories such as: gender, age groups, socio-economic status (e.g. caste and class), residents and outsiders, livelihood activities (herders, cultivators, etc.).
4. The identification of the institutions and rules governing the management of natural resources both the customary and legal institutions, whether internal to the community or external. By institution here is meant organizations.
5. The identification of who holds the knowledge about resource use and management and how it is transmitted.
6. The identification of the key tenure and natural resource management issues in the area.
 - Bottlenecks to wellbeing and/or sustainable management of the ecosystem
 - Abandonment of traditional technologies and management practises and adoption of new practises and/technologies
 - Changes in the social sphere and in the patterns of access to resources
 - Effects of changes in the technology and social sphere on the management of community natural and non natural resources.
 - Status of land and natural resources
 - Cause of conflict or situation
 - Consequences and future perspectives

¹⁷ Adapted from FAO (1993): chapter 2.

With regards to the above cited situational analysis and in order to trace the evolution of tenure systems in each GIAHS site and to find answers to a set of important questions that are crucial to defining possible intervention strategies for the GIAHS sites. Some of these questions are outlined below:

What elements have guaranteed GIAHS system's resilience? What are the principles that command the sustainable functioning of these systems? Why are specific technologies adopted? What constraints (drought, slopes, climate, etc.) do they overcome and how? Can new technology be adopted that guarantee that system's complexity and multi-functionality is preserved? What would likely be the impact of the adoption of new technologies on the social organization?

How do GIAHS customary institutions guarantee both the social and ecological sustainability of the system? Are local tenure institutions changing? If so, how is such change affecting the way natural resources are managed? Can transformed or different institutions serve the purpose of guaranteeing the social and ecological sustainability of the system? What preliminary hypothesis can be made about the way new institutions should be regulated and about their functioning?

What are the driving forces that impinge on the system? What are the likely scenarios with regard to resource use and management and people's livelihoods and wellbeing?

How will GIAHS project impact on the area? And in the wider ethno-agro-ecosystem? What issues can the project intervene on? How will GIAHS projects affect gender relations or the relationships between different groups in the pilot communities? How will the project affect the relationships of the community with neighbouring communities?

Some methodological warnings

The aim of this tenure appraisal is not to identify each single component of the tenure system *per se*, but to recognize the interactions among components and their interdependences at different levels. According to the principles of a system analysis, these interactions, more than the single elements alone, produce identifiable characteristics, through which each system can be analyzed.

Coherence is the key methodological principle of such analysis guaranteeing that the results are reliable and that the study is carried out as efficiently and effectively as possible given available resources (financial resources and time). In this context, precision does not mean to pursue in-depth observations and exact data *per se*, but to pay attention not to neglect anything important for understanding the causes of problems and the current trends in the GIAHS systems.

The process of the analysis should be **iterative** and **progressive**. The research team should be able to come back to a question and draw up new hypotheses, adding new pieces to the puzzle little by little, and leaving enough room for discussion of the results with the people in the community and the key informants. Open questions start with: who, how, why, when and where. They help people to speak and express themselves and allow having in-depth discussions.

Simplicity and **practicality** are required in order for the process to be easily understood and social actors to be involved in each phase. This is also a good way to make sure that the resulting plans and projects are feasible and sustainable.

The research process should be **transparent**, based on a wide access to and an open sharing of information. A transparent process is more likely conducive to an assumption of responsibility by the actors and is also a key indicator of the quality of the process.

Finally, a tenure appraisal should **not be only outcome oriented**. Special consideration should be given to the process of **establishing a social dialogue** around key territorial issues such as the status of natural resources, the role of local knowledge and management practises in guaranteeing ecological sustainability, the role of local institutions, the advantages of collective management schemes and the role of solidarity bonds, the values and expectations of the new generations, etc. The opening of such dialogue is an essential precondition towards the design of a strategic plan for the GIAHS pilot sites that effectively take into consideration and involves all the actors concerned (FAO, 2005).

The Historical Analysis

An historical analysis of the territorial system - defined as a “modality of social organization based on its relationship with the environment” - looks at how various factors have changed over time and is pivotal for a coherent understanding of actors’ perspectives and livelihood strategies. The historical investigation allows a dynamic analysis of GIAHS resource management and use practises.

In an historical analysis of the GIAHS systems, it is necessary to study the development of local ethno-agro-ecosystems, their social organization, the modalities of land and resource use, the evolution of the ecosystems and the landscapes and the changes in the degree of anthropization, the evolution of the production means and forces taking into account the indigenous know-how, available tools, work productivity, etc.

The study of the evolution of the social relations is pivotal to understanding territorial dynamics such as exchange flows, networks, role of the social groups, adaptation/modification of local practises and modalities of territorial administration, etc. This analysis also helps assess how local livelihood strategies (cultivation, stockbreeding, fishing, work in town, etc.) have evolved in response to changing conditions (Mazoyer, 1998).

Likewise, an inventory should be made through discussions with key informants or group discussions, of local and external events that have had a connection with or an impact on the territory and the issues being addressed. This will help identify events (such as mechanization, sedentarization processes, conflicts) which may have caused significant changes in resource endowment (fallow land, cultivated land, number of cattle, number or density of trees, etc) or use. Furthermore, a retrospective analysis will help identify what survival strategies have been adopted in time of crisis (eat wild fruits, sell animals, emigrate, etc.), which in turn helps spot key resource such as locally important wild plants or famine foods.

Key research areas for a historical and system analysis (Adapted from Mazoyer, 1998)

To sum up, among the key areas that a historical and system analysis of agro-ecosystems should focus on are the following:

- i) the managed ecosystem: original environment and its historical transformations;
- ii) the production elements: tools, machines and the biological material (cultivated plants, domestic animals), and the human and social resources (physical and intellectual) to manage them;
- iii) the mode of transforming the environment resulting from i) and ii): sustainable exploitation and reproduction of the managed ecosystem;
- iv) the social division of labour between agriculture and other livelihood activities which allow a) the reproduction of work tools, and b) the production of surplus and c) the satisfaction of other social groups, beyond the needs of the direct producers;
- v) the exchange relationships between these different but associated sectors of society, the relations of ownership and power which determine access to and resources distribution, the share of the production work and of the production and consumer goods;
- vi) finally, the overall ideas and institutions, which allow the social reproduction (production and exchange relationships and the sharing of production) and the sustainable management of the territory.

Site/s selection

Coming back more specifically to the tenure appraisal, with regard to the site selection, several communities in different areas of the country or different micro-ecological zones might be selected in order to get a sense of the diversity or similarity of tenure and other conditions. The more the variation in the area being studied, the more sites will probably need to be selected in order to understand the range of situations (FAO, 1993).

Aside from communities with traditional agriculture and tenure rules and collectively managed lands, it is important to know what the tenure situation is in other less traditional areas and in the areas in transition (e.g. territories around cities or towns). If there are some important differences in the area, a stratified sample may be necessary. This means that the major factors that may cause villages to manage their resources differently are identified in advance (e.g. good marketing opportunities, plenty of land available, etc.). Such a stratified analysis of communities differently exposed to or affected by processes such as agriculture modernization, international trade or individualization of land rights, will help pinpoint actual and potential drivers of change and make hypothesis about the way they may affect - in a more or less distant future - traditional GIAHS communities.

Secondary bibliographic materials

Secondary material relevant to a tenure study can come from many sources. A few key sources that should be reviewed at the start of the research are mentioned below (FAO, 1993; Bruce, 1989):

- Maps of the area as well as any aerial photographs/satellite images;
- Relevant ethnographic material and other studies;
- Project design or evaluation reports from prior projects in the study area;

- Academic research and government reports relative to the study area on topics such as social structure and livelihoods, agrarian systems, evolution of tenure systems, agrarian reforms; gender roles in resource management;
- National laws or local edicts that relate to resource management (e.g. real property law and forest code);
- Documents about local court cases concerning conflicts on tenure and resources.

The role of the key informants

The use of key informants is an efficient method to collect information and in-depth points of view over current issues. The help of the key informants is especially crucial during the initial phases of the tenure analysis to get an overview about the area under study, and their analysis of territorial potentials and constraints and current trends. In addition, all along the analytical process they actively collaborate in the investigation by helping in the design of questionnaires or by pointing to other information sources and suggesting new lines of research. Finally, the key informants can be asked to confirm the researcher's perceptions and conclusions. Their contribution is essential for ensuring the open character of the research, which is an iterative process based on an action-research strategy.

It is, however, necessary to diversify the choice of key informants according to their status within the community and attitudes with regard to tradition and change, in order to avoid ending up with biased information and results and also that they may influence the type of data that are collected. In general, they should be selected among those persons who are long term residents in the area or possess sufficient historical knowledge about the territory and the local communities.

A few examples of key informants (adapted from FAO, 2005)

A very vast bibliography on the subject, but a few examples of key informants (individuals as well as groups) and area covered are given below.

- *Local government agents*: local government structure, strategies and policies (e.g. about trade, patents, environment and natural resources), general situation of farms;
- *Community elders*: history, traditions and customs;
- *Religious leaders*: traditional knowledge systems and practises, taboos, religious obligations;
- *Women and women farmers*: women's role in the community and as producers in agriculture, husbandry, etc., women's role in biodiversity conservation and knowledge about plants collection, use and management, home economics, nutrition, child and youth education and health, migration;
- *Local tradesmen*: marketing channels, production lines, conditions for credit, prices;
- *"Progressive" farmers*: successful ideas and opportunities, old vs. new technologies, pre-requisites for the adoption of new technologies and potential positive or negative impacts.

In the following box a number of questions are listed that can serve as a guide for an interview with key informants who are knowledgeable persons about the area and the community. A wide range of information can be gathered during such interviews - that will likely occur in several instances throughout the research - about the history of the community, trends in the evolution of the territory, the nature of the community's livelihood

and production systems, important actors in the use and management of resources within and outside the community, and some more or less technical information about the use of resources, traditional technologies and management practises in the area.

Draft questionnaire for interviews with key informants

A) Development of the area in the history (warming up questions...)

- What about agriculture in this area and employment?
- Has this place always been this way?
- Can you divide the area in sub-zones and describe their relevant features?

B) Evolution of the territory

- Which local and/or external events occurred in the past that have had a relevant impact on the area in your opinion?
- How have natural resources evolved? (Available land, land fertility, water...etc).
- How has the population evolved? (Number of families, total fertility rate, migration rate – both domestic and international migrations – reasons for migration).
- How has land use evolved?
- Have famines occurred in the past? What happened? How did people overcome the crisis?
- Have other crisis occurred?
- What institutions and organizations (Government, NGOs, extensions, cooperatives, etc.) have played an important role in the evolution of the area and when?
- What are the constraints/opportunities of the system?
- And so on...

C) Livelihood and production systems

- Are the people here principally farmers? Herders?
- Do they engage in many diverse economic activities or are they focused on only a few? What activities?
- Which is the political, geographical and economic context in which the community operates.
- Is it remote from markets or well integrated?
- What are the constraints to production?
- Which is at present the basic agricultural output (crops) in the area? (Major crops planted, share of production kept for consumption and sold in the market)
- What technologies are normally employed (use of native varieties, trends in biodiversity conservation)? Present and past prevalence.
- Do farmers use commercial seeds and inputs? Present and past prevalence.
- Are there cooperatives in this area? What services do cooperatives provide? Are farmers in the area members of agricultural cooperatives? Actual and past prevalence.
- Is there any agricultural extension office in the area? What services do they provide? What about five years ago?
- Do farmers have access to credit? Where do they get it? (A bank/a private person/a cooperative/relative and friends/landowner/NGO/Other).
- Do people here have savings?
- Do people here have financial resources? From what sources? How quickly can they mobilize them?
- What about employment? Do people in the community use hired labour? Do people in the community sell their labour to other farmers? Are there people in the community who temporarily leave during certain time of the year to look for work elsewhere? If yes, where do they go? For how long? What type of work? Are there people who temporarily come to

this area to look from work? From where? What work? For how long?

- How many households have at least one member who emigrated? Are they receiving the remittances? How are remittances invested?

D) Community resource use and management

- Are there areas managed as commons by the community?
- Where are the commons? Where are the holdings? And the reserves?
- Is there any rotation of cultures? How does it work? How long is the fallow period? How long was it in the past? Why has it changes or not changed?
- What are the traditions and rules about community work? Are people still participating to the collective woks or are they having more individualistic behaviours?
- What customary institutions exist in the area? What formal institutions exist in the area? Are the two sets of rules consistent? Are they contradictory? If yes, how does this affect the functioning of the system and the sustainable use of resources?
- Is community social organization relatively egalitarian or hierarchical? Are there especially influent families, groups or actors in resource use and management?

E) Land tenure

- How have the rules of access to land evolved? What about the Agrarian reform in the area?
- Is community land titled? If yes, when did it receive the title? Is the title registered? Are there conflicts with other communities about boundaries or land use?
- Do farmers have usufruct rights on the land they till? Do they own the land?
- Are there leaseholders and/or sharecroppers in the area; farmers in this area who recently bought or sold land or utilization rights? Actual and past prevalence.
- Are there registered individual land rights in the area? If, yes why do people want private titles on their lands? What do they cultivate on their lands before and after privatization? Does privatization of lands create any tension in the community? If yes, what kind of tensions? How are these tensions managed? Are there conflicts about land? Actual and past prevalence.
- Are there conflicts over the use of natural resources? Actual and past prevalence.
- And so on...

E) Future scenarios

- Which are the general problems of the area at present?
- What are the opportunities?
- How do you see them?
- What are the likely scenarios with regard to resource use and management and people's livelihoods and wellbeing?
- And so on...

Identification of the relevant units of analysis

Among the relevant units of analysis which need to be defined at the start of the tenure study are the territory of the community, the community membership, the household and the groups and individuals that hold specific roles in resource use and management.

On the one hand, it is necessary to arrive at a definition of the territory, its borders, key areas and important resources as close as possible to the way local communities see it. On the other hand, the relevant decision making units are identified to examine who takes decision about what in the community, with regard to resource use and management and

who are the actors that are especially affected by changes in the access to resources and, more in general, in the tenure systems.

The territory of the community

The community's "territory" can be described as a land area which is habitually used by members of a community for their livelihoods, with boundaries that are recognized by members of the spatial unit and by those residing outside the territory (Painter, 1991)¹⁸. Yet, as highlighted in chapter I (The multidimensionality of territories, p10), beyond the delimitation of the community's area of residence, cultivation and pasture, the identification of their territory may be very complex given the many factors that come into play when trying to delimit territories. Beside the perceptions of their land and resources by territorial actors, the location of religious and ancestral sites, the traditional networks and power relations among the different communities in the area, also other historical, administrative and geographical factors can come into play that make this a complicated exercise.

Community membership and access to collective resources

Achieving a clear definition of the community which can use and control use of resources is the essential first step toward understanding the management of commons. Key questions are: who can lay what claim against community resources? And who decides about resource access and management? It must be kept in mind that the limits placed by the definition of membership, if they can be enforced, regulate pressure on the resources and that community level attempts to control resources are likely to reflect community struggles and cleavages (Bruce, 1989). Nevertheless, the identification of the community and community membership might prove more difficult than expected.

Community control of resources is mostly associated with geographically-bounded communities where ties of kinship reinforce territorial ties. Yet, in these times of high population mobility and extensive economic interdependence, community and community membership have become harder to define and enforce effectively (Bruce, 1989). Even if we take community to mean a geographically specific place, community membership could be defined by present or previous residence, by property ownership, by kinship ties, or by some combination of these factors (Cernea, 1985)¹⁹.

The social organization of work

To draw the context where the tenure rules operate, it is important to assess who does what in agricultural labour and collect some more detailed information about the community and households' livelihood and production system.

The social organization of work is a complex and broad issue to research on (some of the key questions are listed below). Yet, this analysis provides necessary insights into the roles the different social groups play within the community and the various household's members hold within the family; it also helps identify the solidarity bonds and interdependences existing within the community. By assessing how community level livelihood activities are

¹⁸ PAINTER, T. 1991. *Approaches to Improving the Use of Natural Resources for Agriculture in Sahelian West Africa*. CARE International, New Cork, cited by FAO, 1993

¹⁹ Cited by Bruce (1989)

accomplished it will also be possible to identify what practises of reciprocity and mutual collaboration exist which allow families to share heavy tasks and tie people together in a nest of rights and obligations. In fact, this information is key for understanding the rules of access and management of resources.

Finally, it is important to research into how the social organization has evolved and how the roles of the various actors in the community (e.g. women) have changed, as a consequence of processes such as an agrarian reform, individual land titling or migration, etc.

Some questions to ask about the social organization of work

Community level

- What activities are carried out together by all the households in the community?
- What activities are carried out by specific groups? (e.g. guarantee of the peace and order situation, performing rituals)
- How is the work in communal fields organized?
- Is there any rotational system? Who decides when to plant?
- How are people appointed to fulfil specific roles (e.g. the guardian of the *chacras* in the Andean agrarian system)?
- Does every family in the community participate to the work in the fields during the collective works?
- What if a family cannot provide labour for the collective works (e.g. because male members have emigrated)?
- Are community households as involved in collective work as in the past? If not, how many and why?
- Do people prefer to hire labour instead of participating to community reciprocity schemes?
- Is there any practise of reciprocity or collaboration among the families?
- What conditions are set on families to benefit from the help of other families?
- Is reciprocity compulsory? In every case?

Household level

- Who does what in agricultural labour?
- Does everyone in the family participate to the work in the field?
- What task does each member have?
- What are men's tasks?
- What are women's tasks?
- What do male children do?
- What do female children do?
- Who takes care of the livestock?
- How do the children acquire the needed knowledge for the farm work and other livelihood and traditional activities? What do they learn from their mother and when? What do they learn from their father and when?
- Does the family use hired labour?
- Have the tasks accomplished by women in the farm work increased in the last 10 years? If yes how? And in the last 30 years?

III. The information gathering

Participatory research tools and techniques

A wide variety of tools and techniques have been adopted to gather information about land and resource use patterns and management practises. Among the many participatory appraisal techniques used are mapping exercises, diagrams, calendars, ranking activities and semi-structured interviews with small groups and key informants. Less and less use is made of pre-established questionnaires since they do not allow the flexibility needed to identify new lines of inquiry while gathering information and follow them. Instead, a growing consideration is given to methods that allow capturing the perception of the concerned actors with regard to natural resources, the cultural meanings they attach to them and resources relative importance at present as well as in the past.

A) Identification of the territory and the types of resources that exist and are accessed by the community

This section of the tenure appraisal will provide some methodological insights into the identification of the various micro-ecological zones/tenure niches in the community's territory and the various types of resources that exist in the area. This can be done through several methods among which are the following:

- The participatory mapping of the community and its territory;
- The participatory mapping of the micro-ecological zones/tenure niches in the community's territory;
- The transect walk to explore various dimension of the tenure system while walking through the place;
- A household sketch map to assess the various tenure of the family holdings.

The community and its territory

The participatory mapping of the community and its territory is a valuable method to assess local perceptions of boundaries, resource availability and spatial distribution, etc. The participatory mapping exercise can be carried out in small or bigger groups²⁰. Also different groups - by age or gender - can draw different maps of their vision – present and future – of the community's territory and the resources in it. Finally, historical maps can help explore changes over time in resource availability and status, territorial boundaries, etc.

The main micro-ecological zones/tenure niches

Different micro-ecological zones often have different uses and may be characterized by different tenure arrangements. A first round of analysis may focus on identifying the three main tenure niches defined by Bruce (1989): the holdings (characterized by individual or

²⁰ for more details see: DRAFT Methodological guidelines for Participatory Land Delimitation: an innovative method for securing rights acquired through customary and other forms of occupation Land Tenure and Management Unit (NRLA) FAO (2008)

household farming operations), the commons (managed by a group), and the reserves (protected by the government)²¹.

The commons

With regard to the commons in fact, the community might have more than one commons under the same use or different uses and different tenure rules may exist for each of the areas or resources in the commons (land, water, trees, etc.). It may, for instance, have a communal forest; a common pasture on which trees grow; as well as uncultivated interstices between parcels and holdings. All “these commons areas must be identified and their various uses assessed. For each of the commons, the managing group must be identified, its membership clearly understood, its institutional nature and potentials gauged, and its various mechanisms for control of member behaviours evaluated” (Bruce, 1989 chapter 6).

In many local tenure systems the rules governing access to resources change seasonally and depending on the activities carried out in the different areas of the community’s territory. Open access for grazing is interdicted in the community commons in the Andean system (e.g. the agricultural sectors in Peru) when these are under cultivation (up to three or four years) but it is allowed after harvest and during the fallow period (from four to eleven years depending on the community).

To gather information about the community in relation to the commons - a participatory mapping exercise is a useful method because it allows a great deal of topics to be touched upon while discussing about access, use and management of resources. It can be conducted with groups from the community or key informants. Also an historical map of the commons can help assess how the community resources have changed over time.

Another good method to get an idea of the diverse micro-ecological zones found in a territory is the transect walk that permits a direct observation of the area by cutting the territory across, accompanied by key informants and members of the community. It also allows exploring the many dimensions of the territory such as variations in the landscape (forested areas, lowlands, upland fields, grasslands, etc.) and the different land uses. Finally, while doing a transect walk (or drive or biking) it is possible to directly observe the status of resources and make inquiries about them, to spot uncultivated parcels and abandoned lands, and identify areas that seem subject to a more intense use of resources, etc.,

The Household multi-tenure holding

A household may have a multi-tenure holding consisting of several parcels. A household sketch map can be used to assess the different parcels farmed by the family, included the leased or borrowed areas, the areas they use for pastures or for gathering wild plants, etc. Households' tenure extends to the commons: households which are members of the group have rights to use collective resources (e.g. water, trees, pastures, fields, forest products).

Once the different parcels and also the various activities that take place in each of them, have been identified, it is possible to derive more specific information about the range of tenure niches of the family holdings: what access rules exist for each niche and what niches are used and managed by women and what by men. The household's landholding in most

²¹ See Bruce (1989)

African societies, even if "owned" by a male, may consist of several plots, each managed rather independently by a wife. The wife makes the management decisions and provides the labour, while the security of tenure is a role played by the husband.

Some questions to ask while doing a household sketch map (adapted from FAO, 1993)

- Who is the "holder" of the land?
- Who actually uses it? What is the relationship between the two?
- How many parcels does the household possess?
- Is each parcel owned? If owned under what title?
- Are some or all parcels under usufruct rights?
- What activities take place on the different parcels? Does this change by season or year fallows, etc.?
- Are the parcels characterized by different tenure relations?
- Does the informant borrow or lend land? What rules characterize these arrangements?
- What resources on the holding are used exclusively by members of his/her family and which ones are also exploited by others?
- How are men's and women's rights to the holding different?
- How easy is it to increase the size of the holding?

B) Gathering information about the use and users of resources

How are natural and other resources used in the community?

To identify how natural resources are used and by whom in the community a set of questions should be asked about:

1. What kind of resources are used (or not used)?
2. Who are the users?
3. When, how and for what purposes are they used?

This information are first of all important to assess how individual and groups in the community use the various material and non material resources, what different roles they play in the livelihood and socio-cultural activities of the households and the community and whether knowledge about uses of resources is diffused or gendered or held by specialized groups or individuals.

Also, the information about the use of resources is important for understanding whether there are constraints in such use and to start addressing equity issues: who has greater access to resources and who has limited use or is excluded altogether? It is important to be particularly sensitive to characteristics such as gender, ethnic group, social or economic standing and other factors that affect peoples' access to resources in the community in question. When use patterns are being studied, it is particularly important to pay attention to the more "marginal" or invisible users of resources. "These are people who, because of their poverty or marginal social status, tend to be under-represented in discussions. Their use patterns may not be reported by others. Often, however, these same people are highly vulnerable and depend disproportionately on natural resource-based livelihood strategies. For example, they may engage heavily in the collection of wild tree products that requires less cash investment than many other income generating activities" (FAO, 1993: chapter 3).

Who uses the various resources found in the community and when?

An important area of research is the identification of what constitutes a key resource for different groups in the community. That is: where do they get the major source of revenues? (By selling animals, tree products, crops, seeds, or exchanging goods and services, etc) and how do they spend it? (Buying food, seeds, paying school fees, buying clothes, paying health costs, etc.).

It is useful to compare difference in resource use between different groups of actors in the community and how such uses have changed over time (e.g. men and women, rich or poor people, people living in the community vs. people from neighbouring communities or people who are complete strangers). The analysis of such differences will help identify the key resources for each group and whether resources tend to be overexploited or underexploited or conflicts arise about them.

It must be taken into account that women particularly depend upon the commons (Rocheleau 1987), for example, the women's role in gathering firewood and other forest products in community forests. Similarly, the poor and landless have a special dependence upon the commons.

Roles, rights, responsibilities and revenues

To explore both community and inter-household dynamics a distinction should be made between authority to manage, responsibility to provide labour and right to dispose of the product. Men and women in a household often have very different rights and responsibilities with regard to land and the resources on it. In many contexts it may be women's main responsibility to manage home gardens but they also have the right to sell part of the production in order to acquire the cash they need for their personal and their children's expenses.

The 3 R approach is an analytical tool that can be used to clarify the roles of the actors involved in using and managing natural resources in terms of their rights, responsibilities, revenues/returns.

A simplified version of the 3R matrix, elaborated to analyse actual natural resource management in the Mandena region (Southern Madagascar), is shown below.

Table 1: 3 R matrix of actual forest management.

3R Actors	Rights	Responsibilities	Revenues/returns
CRD (Regional committee for development)	Information on the state of natural resources	Diagnosing problems and proposing solutions	Regional development plan
CIREF (Forestry Service)	Land ownership Ownership of forest resources	Sustainable management of forest resources	Taxes on products A lack of budgetary resources, making it difficult to function
Village communities	Uses granted by the forest code Customary use	Traditional	Subsistence needs
Village wood cutters and other (independent) user groups	Uses granted by the forest code Customary uses	None	Subsistence needs Sales of forest products

	Right to sell		
Fort- Dauphin wood cutters (independent)	Access to forest resources Right to sell	None	Sales of forest products (charcoal)
QMM (Québec Iron & Titanium Inc.) Madagascar Minerals S.A.	Access and use for research purposes as defined by the convention of establishment	To limit usage to research and experimental purposes	Research results

The same matrix can be built to research areas such as actual resource use and management by different groups in the community, by members of the community and other actors (other communities, government, private companies), or within the household, by the different members.

Access and management of plant and animal diversity

In the case of GIAHS communities, the changes occurred throughout history in the access to and management of plant and animal diversity should be subject to a specific analysis. Given the speed by which knowledge about the GIAHS system's diversity and complexity is eroding, this assessment is certainly urgent and old people and specialists should be directly involved in it.

Knowledge about the use of natural resources is often highly gendered. So is the transmission of knowledge. In the Andean agrarian system in Peru women are the one to transfer to their children the knowledge about plant and genetic resources, while the man teaches them everything they need to know about the work on the fields (the *chacras*). This tasks and skills of women should be carefully spelled out since their very important roles with regard to plant genetic resources and animal breeding as well as their contribution to the household economy is often underestimated.

An important area of analysis in the field of plant diversity is how farmers restore their stock of seeds when it is eroded (e.g. because unsuitable commercial varieties have replaced locally domesticated ones). An assessment of community's strategies in this field is key to explain GIAHS resilience factors interpreted as their capacity to go back to traditional practises when the adopted technologies prove inefficient or damaging (e.g. the importance of the fairs in the Andes for exchanging seeds).

Some questions to ask about plant and animal diversity

- How does farmer acquire seeds?
- Are there people who are specialists in seed selection in the community?
- Can seeds be brought from or exchanged with other communities? When and where does it occur? How far are these communities?
- How has access to and management of plant and animal diversity changed through history?
- Have local native plant varieties disappeared? How many have disappeared during the last 10 years? Which one? And during the last 30 years?
- Could these lost varieties be obtained from anyone or anywhere now?
- Is native livestock production still common? If not. Why is it disappearing?
- How does animal selection and breeding take place?
- Where do communities buy or exchange the animals for breeding?

Traditional technologies and knowledge systems

The analysis of traditional technologies and knowledge systems, especially those related to natural resources securitization (e.g. techniques used to manage land and conserve biodiversity), is clearly a central and technical area of research. Yet, such analysis should be conducted with due attention to the social processes that underlie the more technical aspects, in order to get a sense of the rationales behind such technologies and to identify the systems by which knowledge related to resource securitization is developed and transferred to future generations.

Furthermore, a focus on the principles that guarantee the success of the traditional technologies provides valuable inputs that can help overcome constraints in resource management and livelihoods in more or less similar systems.

Some questions to ask about knowledge systems and technologies

- What technologies exist for land management, plant and animal domestication, biodiversity conservation and enhancement, seed selection and conservation, etc.?
- What knowledge and skills do they require?
- Who is in charge of the different activities? Man? Women? Specialized groups?
- What principles are such technologies based on?
- What local constraints (drought, slopes, climate) do they overcome and how?
- How is knowledge transferred about such technologies?
- How is natural resource securitization guaranteed?
- How is knowledge transferred about resources securitization?

Access and use of financial resources and remittances

A relevant part of the transactions that take place among GIAHS community members are often still in kind i.e. exchange of seeds, or the traditional arrangements with regard to the exchange of labour. Nevertheless, financial resources are increasingly important in economies, such as the GIAHS systems and in general the rural areas, that are more and more connected to the markets and subject to the influence of the urban areas and large cities, and where national and international migration play a growing role.

Given the restricted access to credit and the limited savings of the rural households, migrants' remittances often represent a major part of household's income. An assessment of how remittances are invested provides important information about the household's needs and preferences and also about future sustainable or unsustainable scenarios with regard to resource use and management. In the oasis of the Maghreb, farm capital is often totally dependent on the remittances of the national and international migrants. In many instances money is used to build a house where those who are working abroad can return one day while less and less this income is spent on appropriate land development.

Some questions to ask about access and use of financial resources

- Do households or producers groups have access to credit? How? (Through the bank? selling livestock?)
- What proportion of the population owns cattle or sheep and goats?
- Are migrants' remittances a relevant source of income for the people in the community?
- How many households have at least one member of the family who emigrated?
- What is/are the main reasons for emigrating?
- Are these households receiving regular remittances?
- Are migrants returning more or less regularly to their native locale to participate in collective activities? To manifest their interest in community affairs? If not directly, do they do that in a vicarious manner?
- How are remittances invested? What impact do these investments have on local natural resources use and management? Do they result in unsustainable practices? What practices? Why?
- What happens with the land of those who emigrated?
- How have land inheritance pattern changed due to migration?
- Is inheritance shared between man and women equally? (ask specific question for livestock and land) If not, who gets the bigger share?
- Have inheritance pattern changed during the last 30 years? If yes, how? Due to what factors?
- Is there a difference in inheritance patterns between rich and poor families or depending on land endowment?

Borrowing, lending, mortgaging and selling of land

Exchanging, borrowing and lending of land or other resources (such as water, or tree products) are traditional strategies that rural households adopt to face an imbalance between, for example, the land per management unit and the available labour force or irrigation water (in the Oasis). Households may resort to such practises increasingly often as a consequence of a significant out-migration or an increased demand for land from outsiders. Quantification technique can be used to find out how common specific arrangements are (for more details about quantification techniques see FAO, 1993, Howard and Smith, 2005).

Land titling is a relatively new fact in many GIAHS systems and a key area of analysis for a tenure appraisal in these systems. The individual titling of land is still not a rampant practise in traditional communities where land privatization is not functional to peoples' needs there or it is too costly given the characteristics of the system (e.g. think of the advantages of collective work and the dispersed parcels of land in the Andes highlands). Yet, some communities, in the Peruvian high plateau, around the Titicaca Lake for example, are seeing cases of community members getting private titles on what used to be communally managed land, who later have mortgaged their lands to access credit from the bank and lost it. Another area of interest for a tenure analysis is how land is managed after privatization, and whether, once the land is privatized, a significant departure from traditional practises and crops take place.

Some questions to ask about land transactions and privatization

- Is land privately owned by the families in the community? Who takes decision about what to plant and where? The community or the households? Which parcels are privately owned and which are under usufruct right?
- Can people in the community sell they lands? If yes, can they sell to anyone inside the community? And outside the community?
- How are restrictions enforced?
- Are there cases of land being sold, borrowed and lent in the community among its members? How are such arrangements regulated?
- Are there people outside the community who borrow land in the community?
- Are there people in the community who borrow land outside? Why?
- Are there people in the community who lend land to outsiders? Are the borrowers or lenders men or women?
- Are there cases of other natural resources (water, products, etc.) being sold, borrowed and lent among the community members? And to people outside the community? And by community members from people outside?
- Why people privatize their lands? (Security of tenure? Autonomy of management decision? Access to credit?)
- What do people plant in their land once it has been privatized? The same crops than before privatization? Other crops? Do people use the land for other purposes than cultivation after privatization? What purposes?
- Are there people in the community who mortgage land to the bank for credit? Have anyone lost their lands? What happens then? Does the community interfere in the process? Can the community buy the land from the bank before anyone else?

C) Gathering information about the management of resources

When researching about the tenure norms and institutions related to land and other natural resources the analysis should be able to answer the following questions:

- Who makes decisions about resource use?
- What rules apply?
- Who plays a role in negotiating any disputes that may arise?

Decision making levels and roles

There are many different mechanism and levels of decision making. Formal mechanisms include government's rules or the decisions made by committees or powerful individuals with clearly designated roles in the community.

Yet, many important decisions concerning resource use are made entirely informally by individuals in the households: by the household head or by other members who have a particular influence or role.

The analysis of the decision making levels and roles should identify the individuals and bodies with an influence on decision making with regard to resource use and management within the community; outside *loci* of decision making; and finally, the relations between community's institutions and outside forces, such as government services or development

agencies active in natural resource affairs. The Venn diagram is a useful tool that can be used to focus on these issues (see FAO, 1993 for more details about the use of the Venn diagram).

Some questions to ask while researching about decision making processes in resource management and influential actors (adapted from FAO, 1993)

- Which people or groups have power to make rules concerning resource management?
- Who makes decisions about the management of commons? And about the holdings?
- Who acts to enforce the rules?
- What happens when there is a conflict (give example)?
- Is the community autonomous in deciding about natural resource management or does it work in conjunction with other communities?
- Does the community have important reciprocal arrangements with other communities for using resources? Is there any common decision-making body for the two communities with regard to the use and management of common resources? With regard to other activities?
- What is women's role in decision-making? What is their role in decisions on resource management?
- Is the community receiving any support from outside concerning resource management? What kind of support?
- Is the community subject to any sanction (e.g. from public authorities) coming from outside the community concerning resource management? What institutions have taken the action?
- Are any of the institutions noted gaining or losing power as time passes? Why?

The role of women, in particular, is often noted in natural resource management even when they are largely absent from more formal decision-making mechanisms. As a result of such exclusion women may not abide to formal rules when using resource. Instead, women may adopt practices that are not codified but are very important for resource management.

Questions about Women's role in decision-making (from FAO, 1993: Conflict matrix)

- Who are the women in the community who have particular influence when decisions are made in the community?
- How did these women become influential?
- What role do they play when decisions are made?
- Have there been any examples indicating when women have had a particular impact on how trees (or land, or pastures, etc.) are managed in the community?
- At the level of the household, what role do women play in decisions about land use (or other resource issues)? (Questions can be asked about her own fields, if she has them, as well as the family fields.)
- Who makes decisions about where women plant? About what will be planted and how?
- Who manages the harvest of women's fields?

Assessing rules about management

Once the different tenure regimes found in the various micro-ecological zones and related resource use patterns have been identified both at community and household level, it will be possible to examine, what different rules (both informal and formal), apply in each case concerning (FAO, 1993):

- management practices (uses and destinations);

- who has rights to use resources; and
- who has rights to exclude others from using them.

As has been elaborated under legal pluralism - the land and natural resource tenure spheres, reality often differs from what is supposed to exist according to both the legal and customary rules and what actually happens may be very different from what is declared as local rules and formal legislation. This is why it is more practical to go from practices to rules than vice-versa (Bruce, 1989).

Questions about tenure rules

- What rules apply in each tenure niche (commons, holdings, reserves) for different uses and users (man, women, children), destination (home consumption, selling on the market), periods of the year, etc..?
- What rules apply with regard to water?
- What are the rules regarding tree rights? (e.g. exclusive tree shaking rights or restricted use to the naturally fallen pods)? Can the tree resources be used for commercial sale or only for home consumption? Can trees on the commons be cut down, and in what circumstances
- What are the rights of individuals versus groups on the commons?
- How many different kinds of rules have an effect on the community?
- Are there government rules that apply in theory? (Written sources should also be consulted or government authorities interviewed to find out what official rules exist).
- Do these rules have an influence in practice (refer to specific cases)?
- With regard to the specific case/s: are there also local rules that come into play?
- How do these two sets of rules interact?
- What actually happens?

Conflicts over resources

Studying conflict over resources can provide examples of how rules in the community really work instead of how they function in some idealized representation. Conflicts over resource use are often very revealing of the kind of issues communities face in managing their resources. They also illuminate the mechanisms that exist in dealing with problems when they arise (FAO, 1993; 1999; 2005).

An analysis of conflicts can be done identifying for each type of resource subject to significant competition, the actual disputants (through a conflict matrix for example) and later investigating, for each type of dispute, the mechanisms in place to resolve it (better if taking specific cases as examples). Also potential disputants can be considered in a scenario-setting exercise, in the case of mounting pressures over territorial resources.

Some questions to ask about conflict management schemes (adapted from FAO, 1993)

- Are there conflicting uses of community resources? For example, how do activities such as grazing and agriculture coexist?
- How are disputes concerning use of the commons settled? Disputes among members? Disputes between members and non-members?
- What are the principal causes of disputes over land and natural resources in the area?
- Why is one type of resource disputed more than another (if this is the case)?
- Are there mechanisms for resolving these disputes?
- What institution/committee is in charge of managing disputes? (refer to specific cases)
- Has the specific problem been resolved by the disputants themselves or by an intermediary of

their choice?

- Did the specific conflict require intervention by community officials or was it treated at a higher level?
- Has the nature or frequency of disputes changed over time?

Community ownership of a resource does not automatically lead to effective community control over it. The more extended the area of the commons the more difficult is control over the use of resources by community members and outsiders.

IV. Summary

A number of illustrations and examples on how to analyze and assess information gathered in relation to the natural resources tenure systems in the GIAHS communities have already been given all along this document. Thus, in this last section the key areas of the tenure analysis will be summarized highlighting their relevance with regard to the GIAHS project.

The hypothesis set at the start of this document is that normative systems for resource management are developed in response to the traditional communities' need to assure their living through risk minimization practises and livelihood diversification and to guarantee the nature and organization of its social structure. When analysing the results of a tenure appraisal in the GIAHS communities it is therefore important to explore the connections between the various components of the territorial system taking into account, beside the specific findings about the tenure system, also the information gathered about the community, its social organization and the status of the natural environment. In summary, the key notes of tenure assessment are as follows:

1. Understanding the principles that have supported the sustainable functioning of the GIAHS systems and that have guaranteed their historical resilience taking into account the way GIAHS communities have “constructed” their territories.
2. Identifying the “underlying relationships which lead communities to make the rules they do and the effects of such rules on sustainable resource use and community well-being”.
3. Assessment of the status of resources identifying what resources are used, unused and why; what resources are in ample supply or in shortage; which ones are degrading or improving and why.
4. Assessments of the changes in the resource base are impacting on people’s livelihood strategies and security of tenure.
5. Assessment of the functions of the customary tenure system taking into account resource endowment and characteristics. In particular, an interesting contrast can be made between areas where rules concerning access to and use of resources are “highly articulated” (rules are carefully defined and enforced; rights are clearly established and highly protected) and areas where rules seem much more flexible (rights may exist but be latent).
6. Assessment of the social and especially gender division of labour.
7. Focus the analysis on where the *loci* of decision-making are for various resources and their management at individual, family, community and government level or whatever levels are relevant to the area studied. Also whether decisions with regard to natural resources are made informally perhaps by individuals or more formally by specific institutions within or outside the community.
8. Assessment of how legal pluralism affect the functioning of GIAHS communities’ land and natural resources tenure systems today, focusing on the way rules pertaining to different formal and informal normative spheres interact, whether they form a coherent system or create bottlenecks to resource use and management or conflicts.
9. Changes in the local institutions and whether such change is affecting the way natural resources are managed.
10. Identification of bottlenecks to wellbeing due to lack of access to resources or discontinuity between access and management, resulting in unsustainable uses of resources.

11. Assessment of the potentials of the systems and the opportunities for an improvement of people livelihood conditions.
12. Hypothesising about future scenarios in the area of natural resource use and management, marginal and excluded groups, conflicts, etc.
13. Hypothesising about the impacts of the GIAHS project on the selected communities and on the broader agrarian system in the area with regard to the use of traditional technologies, the social organization and the relationships of the community with neighbouring or more distant communities.

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