

SOCIO-ECONOMIC METHODOLOGIES  
FOR NATURAL RESOURCES RESEARCH  
BEST PRACTICE GUIDELINES

PRA TOOLS USED FOR RESEARCH  
INTO COMMON POOL RESOURCES

Czech Conroy

*Natural Resources Institute*

*The University of Greenwich*

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## INTRODUCTION

### What are common pool resources?

The abbreviation CPR is sometimes used to refer to ‘common pool resources’ and sometimes to ‘common property regimes’: occasionally, a hybrid of these two terms, i.e. common pool regimes or common property resources, is used. This guide follows the convention adopted by some researchers/scholars of separating the resource from the property regime, and only uses the abbreviation CPR to refer to the resource – i.e. common pool resources.

Common pool resources have two key characteristics, namely:

- it is difficult to physically exclude potential users from them; and
- their consumption is subtractable: i.e. increased consumption by one agent implies that less is available for others.

Common pool resources occur at different scales, which can be categorized as micro, meso and macro. The various types of CPRs at the micro level include common pasturelands, small forests and small surface water bodies. At the meso level CPRs include large rivers and lakes, forests and mountains or mountain ranges, some of which transcend national boundaries. At the macro level CPRs are sometimes referred to as the global commons, i.e. the earth’s oceans, atmosphere and weather system. This report is primarily concerned with CPRs at the micro, or local, level.

Common property regimes can be defined as ‘institutional arrangements for the co-operative (shared, joint, collective) use, management and sometimes ownership of natural resources’ (McKean, 1995). In these regimes, no member of the user group has the right to exclude others, but the group has the right to exclude non-members from the use of the resource. Membership of the user group is usually contingent on having a presence in a location close to the relevant CPR, with the members living and/or owning land in that location.

Common pool resources have come under increasing pressure in recent decades, with the growth of human and livestock populations. These pressures have been exacerbated by a general trend towards privatization, both legal and illegal, as common lands become fenced off and converted to agricultural use. Where they existed in the past, many traditional management systems have broken down. As a result, both land-based and water-based CPRs have tended to become degraded and have shrunk in area. During the last 10–15 years, international development agencies and some developing country governments have been attempting to rehabilitate CPRs, and to improve people’s access to them, by promoting shared or joint management regimes, particularly in relation to forests.

Common pool resources, such as pastures and forests, are usually used in an apparently unregulated fashion commonly described as ‘open access’. Nevertheless, shifting groups (e.g. particular castes, villages or state agencies) may lay different claims to diverse resources (e.g. grazing, non-timber forest products, timber), and vie for access, control and use.

### Why researchers should be aware of common pool resources

Common pool resources are an important topic for research in their own right, since they can play a major role in people's livelihoods, particularly those of the poor. This is reflected in the fact that the Department for International Development (DFID) has forestry and fisheries research programmes, and that research on CPRs is also funded by other programmes, such as the Livestock Production Programme (LPP) and the Natural Resources Systems Programme (NRSP).

Common pool resources are also potentially important as a factor influencing crop production and animal husbandry. In recent years, increasing emphasis has been placed on understanding the context within which applied renewable natural resources (RNR) research is being undertaken, even when that research has a narrow focus. This is because research that does not take proper account of the context is liable to be misplaced or to come up with inappropriate recommendations. The context that researchers are expected to consider has broadened during the last 25–30 years: from cropping systems, to farming systems and – most recently – to livelihood systems.

Within DFID's Sustainable Livelihoods Framework, CPRs are one form of natural capital to which people may have access. The nature of that access will vary, however, depending on the nature of the structures and processes in place, including policies, legislation and customary rights. Common pool resources often make substantial contributions to the livelihoods of rural people, especially small and marginal farmers, pastoralists and rural landless labourers.

### Contributions of common pool resources to livelihoods

In general terms, CPRs:

- widen the range of income-generating activities available to people in rural areas;
- provide inputs to agriculture;
- provide inputs to the home;
- provide environmental services;
- serve as a safety net for people in drought years, in terms of income generation and/or food supply.

**Income-generating activities** Common activities based on CPRs include the collection and sale of: firewood, leaves made into plates and cups, fruits, grass for fodder, grass for thatching, honey and fish. Grass and tree fodder may also be fed to small ruminants, which can be a significant source of income, especially for the poor.

**Direct inputs to agriculture** Wood from forests is used in making agricultural implements and bullock carts and in fencing off fields, while water from surface water bodies or underground aquifers may be used for irrigation. Forage from forests and non-forest land-based CPRs is needed to feed livestock, some of which are an integral part of agricultural systems. Drinking water for livestock is another

prerequisite for their maintenance that often comes from CPRs, such as rivers, village ponds and tanks.

**Direct inputs to the home** Water and various fruits from CPRs are consumed by humans, while firewood is essential for cooking food. Wood and grass for thatching are used in house construction and maintenance, and wood is also used in furniture making.

**Environmental services** Forests act as a sponge when it rains, regulating water flows, preventing flash floods and prolonging the period during which surface water is available. Where forests are on sloping land (e.g. hillocks) near to farmers' fields they also prevent stones and poor quality soil being washed off the slopes and deposited in these fields, while supplying nutrients to the fields in the form of leaf litter.

**A safety net for people in drought years** Since forests are relatively resilient in the face of drought, many forest-based income-generating activities can continue when crop production has failed. In addition, some communities in forest areas fell trees in extreme drought years and sell the wood or firewood to generate income. Forests and other common lands may also be a source of emergency foods, such as weeds, tubers and mammals.

Common pool resources often contribute substantially to poor people's employment, income and assets accumulation in several direct and indirect ways. They can reduce income disparities between the landless and near landless, on the one hand, and the land rich, on the other. The degree and nature of CPRs' contribution to livelihoods varies tremendously from area to area, and social group to social group, depending upon the availability of, quantity and quality of these resources, and the socio-cultural traditions of the communities.

## SYNTHESIS OF RECENT WORK AND ISSUES

There are two separate bodies of work that are relevant: work that has applied visual participatory rural appraisal (PRA) methods to natural resources; and work on CPRs that has examined their contribution to livelihoods. Each of these includes some material on the use of PRA methods to generate information about the contribution of CPRs to livelihoods.

### **Application of visual PRA methods to natural resources**

#### **Forests**

Participatory rural appraisal methods have been used more in relation to forests than to any other CPR. Two general references that are easily obtainable are the books by Donald Messerschmidt (1995) and by Jane Carter (1996).

#### **Common grazing areas**

There are no references exclusively on this subject. However, three references on the use of PRA methods with livestock-keepers include guidance (and examples) on the use of certain visual methods in relation to CPRs (IIED, 1994; Waters-Bayer and Bayer, 1994; Conroy, 2001). Relevant methods that are described include natural resource maps highlighting grazing areas (and sometimes water points) and seasonal

feed calendars showing how sources and/or types of forage vary over the course of a year.

### **Water resources**

Two issues of *PLA Notes*, published by IIED, are relevant here: *Community Water Management* (IIED, 1999), and *Participation and Fishing Communities* (IIED, 1997). These describe the use of PRA methods and participatory planning and development in relation to these resources. Two manuals are also available that provide guidance on the application of PRA methods in relation to coastal fisheries (Townsend, 1993; Ward and Jeffries, 2000).

### **Research on CPRs and livelihoods**

Most published work is in the form of case studies of the situation in one or a few villages or localities. Sometimes there are also national or regional overviews, as illustrated by the case of India (Jodha, 1986; Osman *et al.*, 2001). Succinct general summaries are also available of the contributions to livelihoods of forests (Arnold, 1998b), aquatic resources (Townsend, 1998) and water resources (Soussan, 1998). A number of current research issues associated with CPRs and livelihoods will now be described.

### **Assessing the contribution of CPRs to livelihoods**

The growing prominence of livelihoods approaches in development has led to renewed interest in this topic. In some regions, such as southern Africa, the contribution of CPRs to livelihoods has been under-researched and underestimated, at least until recently (Shackleton *et al.*, 2000). In others, such as India, there has been research in the past, but this needs to be updated since the situation can change quite rapidly over a decade or two (Adolph *et al.*, 2001).

One reason why the contribution of CPRs has been underestimated is that there has been a focus on direct use (for subsistence) and monetary benefits, and a neglect of non-market values such as aesthetics, shade, sacred areas, existence values and ecological services (Shackleton *et al.*, 2000). Further work is needed on estimating the importance of these non-market values.

Much of the research on the African commons has tended to focus on certain resources or habitats in a 'sectoral' manner and to neglect the multiple-use character of most African commons (Cousins, 2000). The shift in focus to livelihoods necessitates more holistic analyses, and this may enable the identification of key strategic entry points for enhancing common pool resources more generally.

### **Differentiating between different groups**

There has been a tendency in much of the research on CPRs to look at their contribution to communities in general, without distinguishing between different groups within the communities, as can be seen from the following three examples. In the case of CPR research in Africa generally "insufficient attention [has been] paid to socio-economic differentiation within rural society" including gender dimensions of use of the commons (Cousins, 2000). A similar situation has prevailed in India in relation to shared forest management, where studies have generally failed to examine "who, within communities and households, has gained and who has lost by class,

caste, ethnicity and gender” (Sarin *et al.*, 1998). In the case of water resources there has been a focus on the physical availability of water, and a neglect of the social, economic and institutional factors that determine whether and how particular households have access to the resource (Soussan, 1998).

### **Effective management of CPRs**

To sustain and enhance the contributions of CPRs to livelihoods requires their effective management. Although there are cases of CPRs being appropriately managed under common property regimes, these tend to be exceptions. The state has often been nominally responsible for managing many CPRs, such as forests; but state management has generally been ineffective, with the exception of some high priority areas, such as national parks and reserves. Most CPRs have not been actively managed, and their use can be described as open access.

The degradation of forests and other CPRs has led to recognition that the state cannot protect and manage them alone, and that local people must be involved. This recognition has spawned a wide range of initiatives to promote community management. These include CAMPFIRE and related initiatives in southern Africa and joint forest management in India and Pakistan. Particularly during the last decade, there has been a growing body of research on indigenous management systems and on the functioning of the new initiatives in shared management of CPRs.<sup>1</sup>

One issue that has been highlighted in recent research is the importance of having a supportive enabling environment (regarding relevant policies, laws and procedures) if CPR management is to be effective. For example, there is often a lack of clarity in respect of rights to CPRs, and this contributes to inappropriate land use and management practices, and to ineffective rural governance (Cousins, 2000). Governments have an important role to play in creating such environments, and in ensuring that relationships between state agencies and communities managing CPRs are positive.

### **Conflict avoidance and management**

It appears that competition and resource-related conflicts are on the increase in Africa and elsewhere, and this trend is likely to continue as pressures on CPRs intensify. In the absence of effective institutional arrangements for their management, these can undermine the sustainable management of CPRs. This has drawn researchers’ attention to the nature of CPR-related conflicts and into how conflicts can be managed most effectively (Conroy *et al.*, 2001; Warner, 2001).

## **PRA METHODS, COMMON POOL RESOURCES AND LIVELIHOODS**

### **Introduction**

This section touches on some general aspects of PRA. Readers are encouraged to refer to other sources for further information about PRA (Nabasa *et al.*, 1995; Pretty

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<sup>1</sup>For example, participatory forest management in India: Conroy *et al.* (1999); Jeffrey and Sundar (1999), Khare *et al.* (2000); Sarin *et al.* (1998); Saxena (1997).

*et al.*, 1995). Researchers interested in following participatory approaches in other aspects of their work should consult other guidelines in this series: for technology development (Sutherland, 1998) and for monitoring and evaluation (Guijt, 1999).

Where researchers are interested in getting a general overview of a topic or a resource that is not specific to each household, 'visual PRA tools' can provide a sound qualitative picture relatively quickly. More formal methods tend to take longer to apply and to be more expensive, and for many types of research they may not be necessary. Even where they are necessary it is often useful to begin with PRA methods, then to follow up with the other methods later once the former have provided a general understanding of the situation.

In PRA visual techniques (e.g. maps and diagrams) are used because they encourage people to get involved in the process, to express the information in a way that is easily intelligible to them, to discuss issues amongst themselves, and to add to, refine and correct this information. When people have made the diagram or map it provides a useful basis for questions and discussion. There may be high levels of illiteracy among disadvantaged groups, especially women. Where this is the case, by utilizing symbols, rather than words and numbers, mapping and diagramming make it possible for these people to be involved in the process as much as literate people.

Visual techniques are part of the suite of techniques used in PRA. However, PRA is more than a collection of techniques. It is a general approach whose effectiveness depends heavily on the attitude of its practitioners: it will only work well if they listen to and respect the views of the local people with whom they are working (Chambers, 1997).

### ***Principles of PRA***

PRA has a few basic principles or characteristics. One is that it should not be conducted in a hurried way. A second principle of PRA/rapid rural appraisal (RRA) is 'triangulation' which basically means cross-checking information from different sources and using different approaches. The reason for doing this is that without cross-checking there is a danger of producing findings that are not entirely correct. This can be due to misunderstandings between the survey team and the participants, only getting part of the picture, participants deliberately giving false information, or unrepresentative individuals dominating discussions.

A third principle of PRA/RRA is 'optimal ignorance'. This means that development professionals only seek information about things that are relevant to their aims, and to the level of detail that they require, rather than collecting information that is not relevant, even if they find it interesting personally. One important reason for adopting this principle is that the time of the local people (particularly women) is precious. Another reason is that experience has shown that the collection of large amounts of detailed, quantitative information during the diagnostic or needs assessment phase tends to create problems in data management and analysis.

### ***General overview of visual PRA methods and common pool resources***

The principal visual PRA methods of relevance to CPRs and livelihoods are: 'mapping' of the CPRs and other natural resources; 'transect diagrams'; 'bio-resource flow diagrams'; 'seasonal calendars' showing which CPRs and CPR

products are used at different times of the year; and ‘matrices’, in which different livelihood activities, some CPR-related and some not, are scored and ranked for their relative importance. In addition, 3-D models of watersheds have occasionally been constructed by local people.

The drawing of the map or diagram is not an end in itself – it is a tool for facilitating discussion, so once the map/diagram has been drawn it should be used as a basis for asking questions. It may be necessary to make some revisions to take account of points raised in the discussion. Generally speaking, people find it quite easy to make maps of natural resources, and enjoy doing so. Seasonal calendars and matrix scoring can be more challenging, since they involve quite detailed recall and quantification, and facilitating their preparation can be quite a skilled job.

**Natural resource mapping:** maps and transect diagrams (see below) show ‘spatial dimensions’ of CPRs and other resources. It is important to allow enough room (on the ground) to show common pool (e.g. village ponds, rangelands, forests) and other resources (private fields) around the village and some distance away from it. People may forget to show certain resources on the map, in which case it will need to be revised: thus, a copy of it should not be made until the discussion has been completed.

**Transect diagrams** record information that has been collected on a transect walk<sup>2</sup>, which often follows the preparation of a natural resource map. The map shows where the different CPRs are located, and the route of the walk can be selected so as to take in any CPRs that are relevant to the work being done.

In order to obtain some historical information and an idea of trends, villagers can be asked to draw an historical transect. For example, an historical transect diagram of a forest, showing the different tree and animal species found in different parts of the forest, can be compared with a current one to see what changes have taken place.

**Seasonal calendars** show the ‘temporal dimension’ of resource use. They are diagrammatic representations of the various activities, problems and opportunities that occur at different times of the year, and which have an effect on people’s lives and activities. They can be used to show when different CPRs and their products are used, and how CPR-based activities fit in (temporally) with other livelihood activities.

**Matrix scoring and ranking** is a useful tool for assessing the relative importance of different activities in people’s livelihoods, including particular CPR-based ones. A matrix is a double entry grid that can be used to analyse two sets of variables. Once the main livelihood activities have been identified, participants should be asked what criteria (the column headings in the matrix below are examples of criteria<sup>3</sup>) they think are important when making comparisons between them. When these have

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<sup>2</sup>The walk itself is: (a) a form of direct observation of what is actually happening (e.g. are animals being grazed in the forest, and is there any evidence that tree branches are being lopped?); and (b) a mobile interview, in that key informants join the research team on the walk and answer their questions, while people encountered en route may also be interviewed.

<sup>3</sup>Other criteria that people sometimes use include: enterprise available most of the year, and flexibility (work can easily be fitted in around other activities).

**TABLE 1: Scoring and ranking of livelihood activities**

Activity	Income	Food	Other subsistence products	Total score	Overall rank
Crop production	3	5	1	9	1
Animal husbandry	1	2	1	4	4
Wage labour (non-agriculture)	5	0	0	5	2
Forest products	2	1	3	6	3

been agreed, the activities can be compared and scored, and then ranked in importance.

A hypothetical example of this, based on work by the author with forest-dependent communities in India, is given in Table 1. Scoring is on a scale of 0 to 5 (maximum). It should be noted that the total scores for each enterprise will not necessarily correspond with the rankings. This is because different criteria may have different weights (importance) in the minds of the participants. In this example, wage labour is ranked more highly than forest products, despite having a slightly lower total score. This is because ‘income’ is considered more important than ‘other subsistence products’, and wage labour has a much higher score against this criterion than forest products.

### *Exploring gender and other differences in common pool resources use*

The contributions of CPRs to men’s and women’s livelihoods often differ, as do their perceptions of the relative importance of CPRs and their products. Thus, it is advisable to discuss these matters with men and women separately, and to encourage each group to produce its own map or diagram. An example of gender differences is given in the resource use matrix in Table 2. This matrix was compiled by getting separate groups of men and women to put 1–15 beans in each box to indicate the relative importance of the resource to their group. This particular example does not specify whether the tree products, etc., are from CPRs or from private land, but the matrix can easily be modified to provide this information.

**TABLE 2: Resource use matrix scoring**

	Cropland	Kitchen	Tree wood	Tree leaves	Medicinal plants	Grasses
Men	12	3	6	3	6	10
Women	2	10	6	13	8	4

Source: adapted from Thomson and Schoonmaker Freudenberger (1997).

Matrices similar to the last one can also be used to explore the dependence on CPRs of households from different wealth or social categories. An example is given in Box 1 below, which is from an NRSP research project on forest-dependent communities in Orissa, India.

**BOX 1: The relative importance of various livelihood activities for different groups: the example of Adendungri village, Balangir District, Orissa**

**1. Matrix ranking (Mirdha Group – Tribals)**

	Food	Income	OSPs+	Rank
Agriculture	**		*	3
Forest products	*	****	*	2
Wage labour	****	***		1
Animal husbandry	*	*	*	3

**2. Matrix ranking (Scheduled Castes)**

	Food	Income	OSPs+	Rank
Agriculture	**		*	3
Forest products	*	***	**	1
Wage Labour	**	**		2
Baja	***	*		2
Animal husbandry	*	*		4

**3. Matrix ranking (Kulitas)**

	Food	Income	OSPs+	Rank
Agriculture	****	*	**	1
Forest products		***	***	2
Wage Labour	*	**		4
Animal husbandry	*	*	**	3

+ OSPs = other subsistence products (i.e. other than food).

There are three major groups in the village, of which the poorest are the Tribals and Scheduled Caste people. Though all three groups have four common livelihood options, the precise nature of activity implied within a livelihood option varies. Agriculture for the Mirdha and Scheduled Caste groups implies cultivation of short rotation paddy on upland; whereas for the Kulita group it also includes cultivation of a long rotation, high yielding variety plus cultivation of other crops like vegetables, oilseeds, etc. Income from forest and tree products for the Mirdha and Scheduled Caste groups is mainly from Kendu (*Diospyros melanoxylon*) leaves and firewood, whereas for the Kulita group it also includes Mahua (*Maduca indica*) flowers. Similarly, wage labour options vary a little from group to group. For all the three groups, the importance given to agriculture is based on the amount and type of land owned by them. The importance of wage labour within the livelihood system is determined to a large extent by the amount of agricultural land as well as the number of able workers in the family.

Forest/tree products for all the three groups are the most important source of cash income. However, particularly for the Kulitas, some of this income is from tree products on private agricultural land.

Source: Rai (1998).

## Livestock, grazing and nutrient flows

### *The contribution of forage from common pastures and forests*

One way in which CPRs contribute to rural livelihoods is by serving as a source of forage for livestock. In some regions CPRs are the major source of forage: these include southern Africa<sup>4</sup> and parts of India, notably Rajasthan. Forage from CPRs

<sup>4</sup> In southern Africa "a crucial component of agro-pastoralism throughout the region is a system of communal tenure on rangeland, which supplies the bulk of the livestock feed" (Cousins, 1992, p.3).

may make both direct and indirect contributions: it contributes directly by helping to sustain people's animals, thereby providing them with products (e.g. milk, meat) that they can consume or sell. It contributes indirectly insofar as the animals consuming the forage provide inputs to crop production, either in the form of manure or draught power.

A valuable tool for providing a quick indication of the relative contribution of CPRs to livestock feed over the course of a year is the 'seasonal feed calendar'. Some calendars focus on forage by type, while others focus on forage by source. In this case, we are primarily interested in the source. An example of such a calendar is given below (Figure 1), for large ruminants (cows and buffaloes). It is important not to use one calendar for all types of ruminant livestock, as the feeding systems of small ruminants (goats and sheep) are likely to differ significantly from those of large ruminants and between each other. The seasonal calendar can be usefully complemented by a natural resource map, showing where the different forage CPRs are in relation to the village and giving a rough indication of their relative sizes.

Source	Siyala (Winter)		Hunala (Summer)		Chaumasa (Rains)	
	Nov–Dec	Jan–Feb	Mar–Apr	May–Jun	Jul–Aug	Sept–Oct
Loppings				1	2	
Stored crop fodder	6	8	5	3		
Grass from protected area	6	5	9	10	8	
Concentrate/ grains	1	1	1	1	1	
Cultivated green fodder – Barseem						
Open grazing	3	2	1	1	1	4
Green grass cut					4	12

Source: Saint (2000).

**Figure 1: Feed calendar for large ruminants in Jogyon Ka Guda\***

\* The figures in each column add up to 16. This is based on the old Indian currency in which 16 annas was equal to one rupee. The figures in each cell can be converted into percentages. For example, the last column shows that 75% of feed (12 out of 16 annas) in September/October is cut grass, and the other 25% comes from open grazing.

In the village where this calendar (Figure 1) was prepared, there are two types of CPR. One is a closed area of common pasture land, where grazing is not permitted, which is managed under a common property regime: this is referred to in the first column as the 'protected area'. The other is an open access area, where animals can graze

freely, which corresponds to ‘open grazing’ in the first column. ‘Loppings’ is a little ambiguous, as these could come from trees on common land or on private land. The other sources are private, either produced on the farm or purchased.

The calendar shows that villagers obtain a large proportion of their feed intake from the protected pastureland between November and July, with this being the major source during the dry season and early rainy season. By contrast, the contribution from open grazing is quite small, reaching a peak of 25% in the second half of the rainy season. (The situation was very different for small ruminants, with open grazing on common lands being the main source throughout the year.) Thus, it is clear that if local people did not have access to these two CPRs for forage the contribution of animal husbandry to their livelihoods would be severely reduced.

### *Understanding inter-relationships between farms and common pool resources*

Bio-resource flow diagrams have been used in farming systems research and have been found to be useful “in identifying interrelationships between crop, livestock and tree components of the farm, and between private and common/government land... they also aided discussion on problems, and prompted suggestions from farmers on how these might be overcome” (Pound, 2000). Members of individual farming households were asked questions about different components of the farming system.<sup>5</sup> Details of each component were arranged on a large sheet of flip-chart paper, and flows between the components were recorded. Where possible, the direction, quantity and timing of flows were recorded on the diagram.

Bio-resource flow diagrams have also been used to study nutrient flows (see, for example, Brinn, 2001). These take place within the farm and between the farm and the external environment: nutrient flows from CPRs to the farm are one component of the overall picture, which varies in importance from farm to farm and from one place to another. Nutrient flows from CPRs include cut fodder, such as the grass from the protected area mentioned in the previous section, manure from animals that have been grazing on common lands, and fish from common water bodies.

### **Forests**

Natural resource mapping and seasonal calendars are commonly used in studies of people’s dependency on forest resources. Matrix ranking can also contribute to ascertaining the contribution of forests and their products to livelihoods, but has not been used as often: an example was given earlier, in Box 1. Box 1 includes a general indication of the relative importance of forest products, but does not distinguish between different products. The relative importance of particular products may vary from one group to another.

Non-timber forest products (NTFPs) can be important for both direct use (subsistence products), and as an income-generating activity for rural people living in or near forest areas. A seasonal calendar that shows when different NTFPs are harvested, and when different agricultural operations are carried out, can be a very useful way of showing how NTFP harvesting fits into people’s livelihood systems.

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<sup>5</sup> These were: household members, crops, livestock, trees, common land, off-farm and non-farm activities and inputs of knowledge, materials and services.

### Coastal fisheries

Fisheries development is characterized by specific challenges that other sectors do not face (Sarch, 1997). These include the nature of the resource, which is particularly difficult to monitor: “fish are highly mobile, hidden from view and subject to environmental fluctuations that are often not documented or well understood by outside experts” (Sarch, 1997).

Participatory approaches have been used to explore issues that have proved challenging to fisheries development (Sarch, 1997). For example, they have been used to investigate the operation of fishing tenure arrangements at community level: experiences in the South Pacific and Nigeria highlight the importance of documenting what were previously unwritten boundaries and understandings. They have also been used to tap local knowledge about the fish resource base and have proved valuable in ‘stock assessment’. However, much scope remains for the development of participatory techniques that will reveal community understanding of its fishing resources and provide bases for community development efforts.

The tools used to obtain information about the contribution of land-based CPRs can be used to study the contribution of coastal fisheries to people’s livelihoods. Box 2 gives a brief example of how different PRA tools were combined in work in the Philippines.

An example of a seasonal calendar is given in Figure 2. This calendar shows the different livelihood activities that are undertaken at various times of the year, including the different types of fishing technique and the species caught using each. It gives some indications, therefore, of how fishing fits into the overall livelihood system.

Some users of PRA tools in coastal fisheries research have encountered difficulties in applying them – particularly resource maps. They found that information such as the location of each boat’s fishing grounds and the composition of catches can be sensitive (Haque and Blowfield, 1997). This is because fisherfolk are usually competing with each other for a limited resource, so it is not in their interest to share their knowledge.

#### **BOX 2: Combining different PRA tools in studying coastal fisheries**

The fishing community of Santa Mercedes Village in the Philippines used a range of PRA techniques to analyse their fishing (and other) resources. The fishers were particularly pleased with their seasonal calendar, which they used to provide a detailed breakdown of the fish species available throughout the year. Matrix ranking was used to analyse species preferences. A sea map detailed the resource base of the estuary fished by the community: fish habitats, the location of different species, breeding grounds and gear types were included.

Source: Sarch (1997); adapted from Mascarenhas and Hidalgo (1992).

Months	Baishakh Apr–May	Jaistha May–Jun	Ashar Jun–Jul	Srabon Jul–Aug	Bhadra Aug–Sept	Ashin Sept–Oct	Kartik Oct–Nov	Agrahaian Nov–Dec	Poush Dec–Jan	Magh Jan–Feb	Falgun Feb–Mar	Chaitra Mar–Apr
Gill net Hilsha	•••	••			•••••• ••••••	•••••• ••••••	•••••• ••••••	••••••	••••••	••••••	••••••	••••••
Set bag net Chiri, phaisha, popa, bombay duck, kamila, pomfret, cat fish, shrimps, other small species	••••••	••••••	••••••	••••••	•••••• •	•••••• ••••••	•••••• •	•••••• ••	•••••• ••	•••••• •	••••••	••••••
Long line Red popa, mud, kala, popa, keri popa, sundari, nakra, aus	••••••	••••••	• •	••••••	•••••• ••	•••••• ••••••	•••••• ••••••	•••••• ••	•••••• ••••••	••••••	••••••	••••••
Current net Jhatka, phaisha, pata, bombay duck, tailla, alua, batasha	••••••••	•••••••• •	••••••	••••••	•••	••	••	•••••••• ••	•••••• ••••••	•••••• ••••••	•••••• ••••••	•••••••• ••
Phailla net Rupchanda, kalachanda, big hilsa, tailla									•••••• ••••••	•••••• ••••••	••••••	
Mashari net (shrimp fry)	•••••••• •••	•••••••• ••••••	•••••••• ••••••	•••••••• ••••••	•••••••• •	•••••••• •	••••	••••				
Paddy cultivation	•••••••• •••	••••••	••••	•••••• ••••••			••••	•••••••• •••		•••••••• ••••••		
Net making (women)	••••••	••••••	••••••	•••••• ••••••	••••••	••••	••••	••••	••••	••••	••••	••••
Wage labour (fishing)	•••••••• •••	••••	••••	••••	•••••• ••••••	•••••• ••••••	•••••• ••••••	••••••••	•••• ••••	•••••••• •	•••••••• ••••	•••••••• ••••
Wage labour (paddy fields)	•••••••• •••			•••••• ••••••	••••	••••	••	••••••	••••	•••••••• ••••	•••	
Income (boat owner and crew)	••••••	••••	••••	••••	•••••• ••••••	•••••• ••••••	•••••• ••••••	•••••••• •••	•••••• ••	••••••	••••••	••••••
Marriage	•••••••• •••	•••••• ••••••				••••		••••	••••			•••••••• ••••
Need for cash and credit	••••••••		•••••• •	•••••• ••••••	•••••• •		•••••• •					
Financial crisis (wage labourers)	••••	•••••• ••••••	•••••• ••••••	•••••• ••••••						••••••		

Source: U. Kleih (personal communication).

Figure 2: Seasonal calendar of Hatkhola para village, Bangladesh

## CONCLUSIONS

Common pool resources make important contributions to the livelihoods of a large proportion of rural populations in developing countries. As populations grow, and CPRs decline in both area and quality, the contributions of CPRs will generally decrease, but will still be important for many years to come, particularly for poorer groups in remoter areas. Where CPRs have become severely degraded their rehabilitation may even increase the size of the benefits that certain groups derive from them. The increasing pressure on CPRs tends to increase the likelihood of conflicts over access to them, so conflict issues can be expected to grow in importance. This in turn suggests that tools will increasingly be required that can specifically address conflict situations, for example, stakeholder analysis (see Grimble, 1998, in this series), and more recent and ongoing work on conflict resolution.

### Sources of expertise

Three types of expertise have been referred to in these guidelines: expertise in CPRs, PRA and livelihoods analysis. Natural scientists can acquire such expertise either by undergoing training themselves or by commissioning work from others who have this expertise. It is possible to obtain a basic training in the use of PRA methods or in livelihoods analysis by doing short courses at various organizations in the UK, but such training is not available in relation to CPRs.

Common pool resources are a research topic in their own right. There is a large amount of literature about them, both empirical (e.g. for forests, Arnold, 1998a) and theoretical (e.g. Ostrom, 1990); and some social scientists (anthropologists, economists and political scientists) specialize in research on CPRs. Thus, if natural scientists need assistance on the subject of CPRs and their contribution to livelihoods, they should contact research or consultancy organizations in the country concerned or in the UK, who have social science staff. Such persons may also be experienced in the use of PRA, which is now widely used in developing countries. Expertise in the application of the sustainable livelihoods framework and approach is more difficult to find in developing countries, as these concepts are still relatively new.

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