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Common Pool Resources: A gateway to insights from DFID's RNRRS.
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Common Pool Resources: A gateway to insights from DFID's RNRRS

1. Introduction

Common Pool Resources (CPRs) are central to the livelihoods of poor people in a wide range of production systems. Because of their importance to poverty alleviation, DFID has made a major investment in CPR research. This includes investment through projects managed under its Renewable Natural Resources Research Strategy (RNRRS) that have provided insights into various aspects of CPR management.

Initiated in 1994, the RNRRS was developed with the goal of the alleviation of poverty, the promotion of economic growth and economic reform, and the mitigation of environmental problems. It was structured around ten contracted out research programmes, namely:

- Natural Resources System (NRSP)
- Livestock Production (LPP)
- Animal Health (AHP)
- Crop Post Harvest (CPHP)
- Crop Protection (CPP)
- Plant Sciences (PSP)
- Forestry Research (FRP)
- Aquaculture and Fish Genetics (AFGP)
- Post Harvest Fisheries (PHFRP)
- Fisheries Management Science (FMSP)

Drawing on the findings of a synthesis study[1] of RNRRS work on CPRs conducted by the Centre for Ecology, Law and Policy (CELP) at the University of York, this handbook provides a gateway to some of the practical tools, techniques, methodologies, and research approaches that were developed and tested by RNRRS projects. The aim is to provide a simple reference point for land-use managers, researchers, and policy makers involved in various aspects of CPR management that highlights examples of best practice and directs readers towards relevant, more detailed literature.

As this document is confined to the outputs from the RNRRS, it does not deal with the full range of CPR issues, or all the main approaches that have been developed or proposed. Readers are urged to bear this in mind when using the document and to consult more widely with the broader literature on CPRs. A good potential starting point is the literature review within the Final Technical Report of the RNRRS CPR synthesis study upon which this document is based. This can be accessed via the NRSP website at www.nrsp.org.uk by performing a search for project number R8501.

Accessing further information. Throughout this document RNRRS projects are cited according to the RNRRS programme which managed the project (e.g. NRSP), followed by their designated project number (e.g. 'R7408'). Further information on

[1] This handbook was produced under project R8501 'Synthesis of Common Pool Resource Studies' supported by the DFID Natural Resources Systems Programme.

the projects cited within this document can be obtained via individual programme websites. This includes Full Technical Reports and any other project literature, such as academic papers. The relevant websites for programmes whose projects are referenced in this handbook are:

- NRSP: http://www.nrsp.org.uk
- FRP: http://www.frp.uk.com/
- AFGRP: http://www.dfid.stir.ac.uk/Afgrp/
- FMSP: http://www.fmsp.org.uk/

2. What are CPRs?

The livelihoods of many people in developing countries, especially from the poorest and most marginalised groups, are inextricably linked with CPRs. Common Pool Resources are natural or man-made resources such as forests, water, fish, and grazing land that are available to more than one person and are therefore accessed by multiple user groups. CPR systems can also apply to flows of individual products rather than the underlying resource itself. For example, certain species of fish relied on by poor people in areas of India and Bangladesh are managed under CPR systems - despite the ponds from which the fish are sometimes extracted being privately owned.

CPRs can be subject to degradation from overuse. In CPRs one person's use of the commons subtracts from its use by others, and there is difficulty in excluding access[2]. If communal management norms become eroded, CPRs can therefore be subject to degradation from overuse – the 'Tragedy of the Commons'[3]. Common property regimes are the institutional arrangements for CPR management and are dependent on property rights. A property right can be defined as '…an enforceable authority to undertake particular actions in a specific domain'[4]. Property rights are socially constructed, and therefore rights are only effective if they are recognised by the wider community (*de facto* rights), or in law (*de jure* rights). It is important to distinguish between *de facto* and *de jure* rights, since *de facto* rights tend to be only weakly enforced and are often overruled by governments. CPRs can be managed under a range of property right regimes – from open access through communal to private. For a broader literature review on CPRs and poverty reduction, refer to the full technical report of NRSP R8501.

It is important to note that, despite the centrality of CPRs to many poor people's livelihoods, the solution to achieving sustainable pro-poor natural resource management is not always to try and maintain the resource system as a CPR. In reality, CPRs form part of a continuum within which tenure and management can and will move back and forth between open access, collective management, private ownership, and state control, or combinations of these, as circumstances change. Understanding the conditions that define when and where these different tenure and management regimes are likely to be optimal is a central challenge in any CPR-related research or policy development. This understanding should include an awareness of the circumstances in which CPR systems are likely to be more

[2] Ostrom, E., 1990. Governing the Commons: the evolution of institutions for collective action. Cambridge University Press, Cambridge, Ostrom, E., 2000. Private and common property rights. In Encyclopaedia of law and economics, pp. 332-379. Edward Elgar Publishing, Cheltenham.
[3] Hardin, G., 1968. The tragedy of the commons. Science. 162:1243-1248.
[4] Commons, J. R., 1968. Legal Foundations of Capitalism. University of Wisconsin Press, Madison.

appropriate than the alternatives. For example, CPR-based management might be more appropriate where a resource or product flow cannot be split up and managed individually, or where group control over individuals' activities is needed. Ostrom[5] has argued that collective action for CPR management will be long enduring and successful under conditions of well defined boundaries, congruence between appropriation and provision rules, effective monitoring, graduated sanctions, efficient conflict-resolution mechanisms, and minimal recognition of rights to organise[6]. As this document cannot facilitate a full review of relevant literature in this field, readers are once again urged to consult the wider literature on CPRs to ensure their awareness of the work that has been done to date in this area. Two differing perspectives that contain good overviews of CPR research to date are Agrawal (2001)[7], and Johnson (2004)[8].

3. CPRs and poverty

The livelihood contribution of CPRs is well known. In India, for example, CPRs are estimated to contribute around $5 billion a year to incomes of poor rural households[9] (two-and-a-half times World Bank lending to India in 1996). As well as providing an essential subsistence base for the poorest and most marginalised social groups, CPRs have also often been observed to support access to new market opportunities among these groups. Maintaining these livelihood contributions is dependent on the CPR being managed sustainably. Under appropriate circumstances, sustainable CPR management thus contributes directly to both poverty reduction and environmental sustainability. Furthermore, CPRs have a fundamental role in enabling communities to cope with future stresses, such as those caused by climate variability, that are likely to worsen under future climate change predictions.

4. Policy

CPRs have a fundamental role to play in meeting policy obligations. They are central to poverty alleviation and so are important for tackling the first Millennium Development Goal[10] (MDG) of eradicating extreme poverty and hunger. Sustainable management of CPRs is also critical for achieving MDG 7 – ensuring environmental sustainability and reversing the loss of environmental resources.

Much of the world's biodiversity lives in ecosystems managed as Common Pool Resources, and continued access to CPRs is responsible for maintaining traditional lifestyles. CPRs thus have a central role to play in implementing the Convention on Biological Diversity[11].

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[5] Ostrom, E., 1990. Governing the Commons: the evolution of institutions for collective action. Cambridge University Press, Cambridge.
[6] Adhikari, B., 2001. Literature review on the economics of common pool resources. Available at http://www.york.ac.uk/res/celp/webpages/projects/cpr/tanzania/pdf/Annex1.pdf
[7] Agrawal, A., 2001. Common property institutions and sustainable governance of resources. World Development. 29(10):1649-1672.
[8] Johnson, C., 2004. Uncommon ground: The 'poverty of history' in common property discourse. Development and Change. 35(3):407-433.
[9] Beck, T. & Nesmith, C. (2001) Building on poor people's capacities: the case of common property resources in India and West Africa. World Development 29, 119-133. Additional references on the value of CPRs are in NRSP R8501 Annex A.
[10] http://www.un.org/millenniumgoals/.
[11] http://www.biodiv.org/. Article 8. In-situ Conservation.

The Kyoto Protocol came into force on 16 February 2005[12]. This opens the door for funding to flow to communal sustainable environmental management of carbon-positive CPRs under the Clean Development Mechanism. This is principally likely to be of relevance to forest CPRs.

Property rights are currently the focus of much attention in the policy arena. The recent launch of the 'High Level Commission on Legal Empowerment of the Poor'[13] emphasises the central role placed on guaranteeing the poor the right to property as a means to poverty alleviation. Ensuring the continued flow of benefits from CPRs to the poor will be fundamental to the commission's work. This is highlighted by the research and advocacy work of initiatives such as the CGIAR system-wide programme on Collective Action and Property Rights[14] (CAPRi), and the International Land Coalition[15] (ILC).

5. Threats to CPRs

CPRs are subject to a range of pressures, challenges and threats. For example, there is increasing pressure to privatise CPRs as exposure to market forces increases, which can lead to the exclusion of vulnerable groups from previously communal land. This trend may be exacerbated by trends towards private ownership at the level of national policy, such as in recent changes in African land law[16]. The 'High Level Commission on Legal Empowerment of the Poor'[17], launched on 6 September 2005, advocates privatisation as a means of poverty alleviation under the assumption that private land ownership will lead to access to credit and thus wealth generation. Protection for investment is a central theme of the 'Commission for Africa' report[18]. If investments are made in agriculture, aquaculture or forestry, then protection for investments through changes in land tenure can alienate local people from key CPRs.

Linked to the trend in privatisation of common land is the increasing emphasis by government and donors on macro-economic policy approaches to reducing poverty. Donors are moving away from project support in favour of direct budgetary support (i.e. debt relief), as this reduces the transaction costs of intervening. The emphasis on macro-economic approaches is further exacerbated via the failure of Poverty Reduction Strategy Papers (PRSPs) to recognise the role of CPRs in poverty reduction. There is widespread concern amongst researchers and practitioners that macro-economic policy approaches to reducing poverty will prove ineffective if sustainable natural resource management regimes are not in place.

As well as these significant macro-level pressures on CPRs, other challenges include the increasing fragmentation of user communities. There are also sometimes significant challenges to overcome in terms of weak or corrupt management

[12] http://unfccc.int/.
[13] The commission was launched on 6 September 2005 and is co-chaired by Madeline K. Albright, a former secretary of state of the USA and Hernando de Soto: http://legalempowerment.undp.org/.
[14] http://www.capri.cgiar.org/
[15] http://www.landcoalition.org/
[16] McAuslan, P. (1998) Making law work: restructuring land relations in Africa. Devel. Change 29, 525-552. Coldham, S. (2000) Land reform and customary rights in Uganda. Journal of African Law 44, 65-77.
[17] http://legalempowerment.undp.org/
[18] Commission for Africa (2005). Our Common Interest. Report of the Commission for Africa. Available at: http://www.commissionforafrica.org

institutions, both state run and community-based. The penetration of market relations into areas previously regulated by traditional institutions may present its own unique challenges to CPR management. There may also be conflicts between achieving livelihood and environment objectives within natural resource management. Understanding these pressures, challenges and threats is therefore integral to developing pro-poor policy and research that properly recognises and builds upon the role of CPRs in achieving the MDGs.

6. Management of CPRs

As highlighted in Section 4 above, managing CPRs is not a simple task, and they are subject to increasing external pressures. It is useful to note that these pressures mean management is increasingly likely to require the development of more complex institutions in order to survive. This could, for example, require greater involvement and/or support from government or NGO services under joint or co-management systems.

A key result of the increasing pressures on CPRs is that CPR management is increasingly characterised by the existence of conflict. Whether management is maintained at the community level, or whether more complex management systems are developed, conflict management has emerged as having a critical role to play in developing sustainable, pro-poor CPR management regimes. DFID's RNRRS funded a range of projects that developed and tested approaches to managing conflicts in CPR management. The remainder of this handbook details examples of best practice amongst these approaches to managing conflict around three specific areas, namely:

1. Managing conflicts between competing CPR user groups
2. Managing conflicts between commercial and non-commercial resource uses
3. Managing livelihood / environment conflicts

6.1 Managing conflicts between competing CPR user groups

CPR management is complicated by the fact that different people often depend on them for different reasons. This can lead to conflict between competing user groups. For example, in semi-arid areas conflicts can arise between agriculturalists and pastoralists over access to land and water[19], and in coastal zones there can be conflict between conservation, fisheries and tourism[20]. There can also be conflict at a more micro level, as has been observed, for example, within Nepali hill villages between poorer households needing goods to sell, and wealthier ones prioritising arboreal fodder for their livestock[21]. This is further complicated when usage patterns are seasonably variable. For example, in Bangladesh poor people tend to rely more heavily on access to privately owned ponds for fish resources in the dry season than in the wet[22].

6.1.1 Addressing institutional weaknesses

A key insight provided by RNRRS work on CPRs is the fact that technical solutions to natural resource management problems will not benefit the poor unless appropriate local management institutions are in place. An excellent example of this was provided by the suite of NRSP projects on rainwater harvesting in semi-arid Tanzania.

Planning rainwater harvesting schemes

Water is a critical CPR in semi-arid Tanzania, which is home to the majority of Tanzania's poor[23]. Rainfall is a limiting factor in agricultural production in most semi-arid regions, with most national planners considering them as marginal for agriculture. Despite this, the semi-arid region of Tanzania is the biggest producer of crops such as maize, rice and cotton. Efficient rainwater harvesting contributes to the security and intensification of agricultural production in semi-arid regions, and so helps reduce people's vulnerability to erratic and variable rainfall patterns. This has enormous potential for reducing poverty and hunger. It also realises environmental benefits by reducing pressure for land clearance at the same time as reducing conflicts between agricultural and pastoral communities over access to water. Technical solutions researched by the RNRRS, in particular the development of the 'Parched-Thirst model'[24] applied in Tanzania[25], offer enormous potential and have been taken up by the Tanzanian government at policy level[26].

Nevertheless, an important insight provided by this suite of projects is the fact that technical solutions enabling rainwater harvesting would not benefit poor people unless attention was given to the resulting need for changes in local management

[19] For example, see the Securing the Commons series that was part funded by DFID. Banzhaf, M., Drabo, B. & Grell, H. (2000) From conflict to consensus. Towards joint management of natural resources by pastoralists and agropastoralists in the zone of Kishi Beiga, Burkina Faso. Securing the Commons 3. SOS Sahel, Oxford. Egeimi, O., Mahmood, M.A. & Abdella, A.M. (2003) Towards a local peace. SOS Sahel's experience of conflict transformation between pastoralists and farmers at El Ain, North Kordofan State, Sudan. SOS Sahel, Oxford.
[20] NRSP R8317, R7408, R6919.
[21] FRP R6914
[22] NRSP projects R7562, R8223, R8306, R8195, PD131. AFGRP project R7917.
[23] NRSP project 7857.
[24] NRSP project R6758, R7888, R7949, R8088.
[25] NRSP project R8115.
[26] NRSP project R8116.

institutions. Adoption of rainwater harvesting leads to a need for change in access to CPRs such as runoff, rangelands, rivers and channels. In order to ensure that the poor do not become marginalised and find their access to these CPRs removed or restricted, uptake promotion of rainwater harvesting must be accompanied by changes in the management institutions that govern use of these CPRs. Indeed, NRSP Project R8116 found that existing institutional mechanisms in semi-arid Tanzania limited poor and marginal groups' access to agriculturally relevant CPRs. For example, the rich were more likely to have adequate access to runoff (approx. 50%) compared to the poor (approx. 30%). Overall, the results of the study found that there was a general trend towards weaker groups obtaining few, if any, benefits from rainwater harvesting.

The following specific institutional weaknesses were identified:
- Inequality in membership of CPR management committees between different social groups.
- Lack of organisation or planning above the village level, and lack of clear links between village and higher administrative levels, including national policy and strategies.

The project addressed institutional weaknesses through:
- The formation of catchment level and village level autonomous committees with improved representation of women and the young.
- Improved CPR tenure systems and management through simplified procedures for land leases and capacity building in land policy and laws.
- Guidelines for CPR management plans and capacity building for local stakeholders.

A key resource arising from the project was a six-step planning guide for the development of small-scale rainwater harvesting projects at the catchment level aimed at facilitating improved institutional robustness[27].

6.1.2 Understanding and resolving conflict in multiple-use CPRs

Conflicts arising from multiple uses of CPRs often result from stakeholders only being able to define management problems in the context of their own knowledge. Agreement on suitable solutions is difficult because stakeholder perceptions of desired responses to the problem arise from the different underlying assumptions with which they define the problem. Policy conflict over the management of CPRs is therefore not simply material, but also depends on the perceptions of protagonists[28]. An understanding of these differing perceptions is fundamental to resolving CPR management conflicts. RNRRS projects have contributed to the development of applied techniques which directly assist in developing such understanding.

Managing conflict in tropical fisheries

FMSP R7334 has made a significant contribution to understanding conflicts over CPRs, both in the context of multiple user groups and in terms of conflict

[27] Hatibu, N. and Mahoo, H.F. (2000) Rainwater harvesting for natural resources management. A planning guide for Tanzania. Sida Regional Land Management Unit, Nairobi. (Available via project R8116 at www.nrsp.co.uk)

[28] NRSP R7973. Adams, W. M., Brockington, D., Dyson, J., and Vira, B., 2003. Managing tragedies: Understanding conflict over common pool resources. Science 302 (5652), 1915-1916.

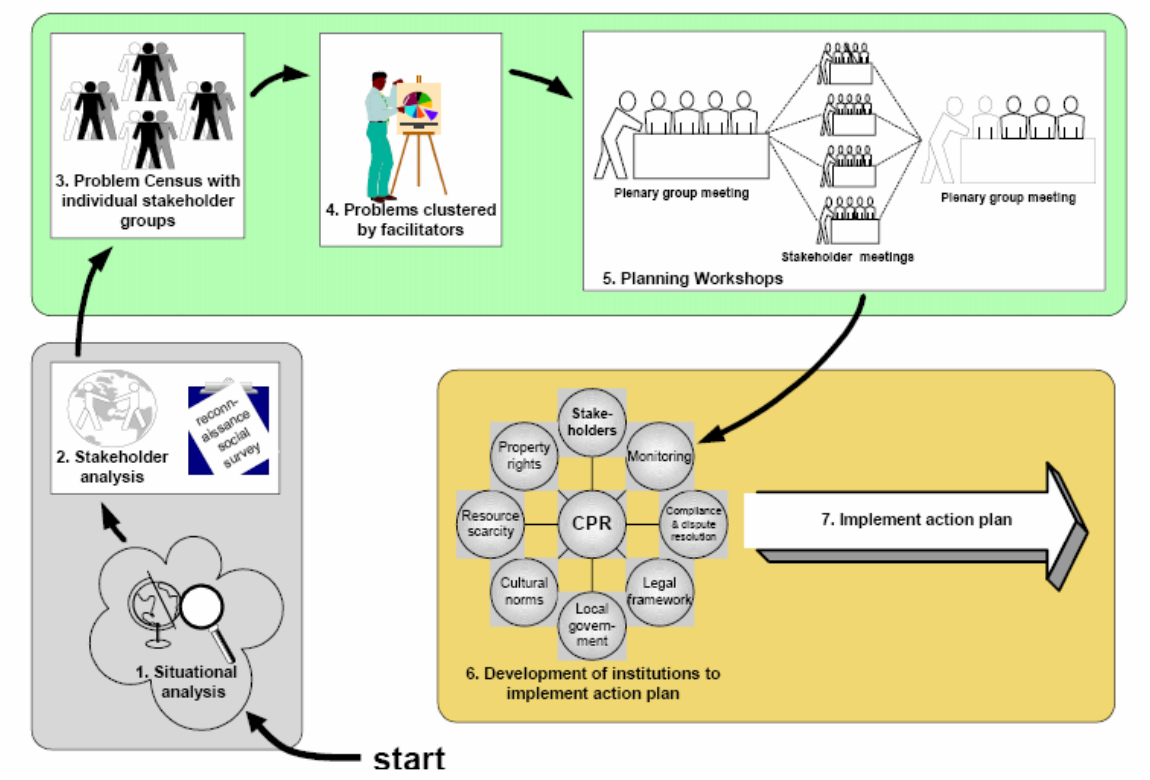
management more generally. This project used case studies based on complex inland floodplain fisheries (Bangladesh), over-capitalised, predominantly artisanal marine fisheries (Ghana), and small island fisheries (Turks and Caicos Islands, Caribbean). A key output of the project was the development of 'PICES', a new typology for understanding and responding to conflict in tropical fisheries contexts. By facilitating understanding of the types of conflicts reported by resource managers and users, the application of PICES can contribute to ensuring that subsequent initiatives in the sector by planners and policy-makers are designed so as to mitigate rather than exacerbate existing conflicts. The project produced a field manual on applying PICES[29].

Participatory Action Plan Development (PAPD)
For example, floodplains in Bangladesh are highly dynamic, diverse and productive ecosystems that are the basis for the livelihoods of the Bangladeshi people, in particular the rural poor. There are about 4 million hectares of open water, and 80 percent of households are engaged in fishing in both permanent ponds and open water. Fishing is seasonal due to flooding patterns, fish migration, and spawning. The flood plains also produce rice, vegetables, and other natural products. Integrated flood plain management offers the possibility of getting the best from these multiple resource systems[30].

Inevitably there are conflicts, and communities need help to be able to work together effectively and equitably. With support from NRSP[31] the technique of Participatory Action Plan Development (PAPD – see Figure 1) was developed to build consensus among local stakeholders on their common problems and solutions for natural resource management. The method involves a series of linked local workshops with scoping, planning and implantation phases. The method was tested in the field and compared with existing NGO facilitated community development. PAPD was associated with significantly more effective formation of community-based organisations, improved attitudes and time savings. The technique was also tested on riverine sand islands where about 7 million people live, 80% of whom earn less than one dollar per day[32]. The key importance of PAPD is in its recognition of the strengths of informal institutions and power relations, and being able to overcome the failures of existing legal and institutional frameworks.

[29] Bennett, E. & Jolley, T. (2002) The Management of Conflict in Tropical Fisheries - PISCES Field Manual. CEMARE, University of Portsmouth, UK. Available at http://www.fmsp.org.uk/ via project number R7334.
[30] NRSP Project R8306, R8195.
[31] NRSP Projects R7562, R8223, PD131.
[32] NRSP Project R8103.

Figure 1. The three phases of the Participatory Action Planning for Development



(PAPD) process with associated seven activities.

PAPD is a methodology that seeks to build consensus between the different users of CPRs to improve natural resource management (NRM) to improve the livelihoods of users. The PAPD process can be represented as a three-phase process:

1. A pre-workshop 'scoping' phase
2. A participatory problem identification and investigation (workshop) phase
3. A post-workshop phase

The scoping phase - normally carried out by a development NGO with a NRM remit - consists of an informal situation analysis to gain an overview of the socioeconomic and institutional characteristics of the communities in the location, and obtain an appreciation of their systems of natural resource use. Local functionaries and key informants are consulted and their information cross-checked, and NRM systems observed first-hand.

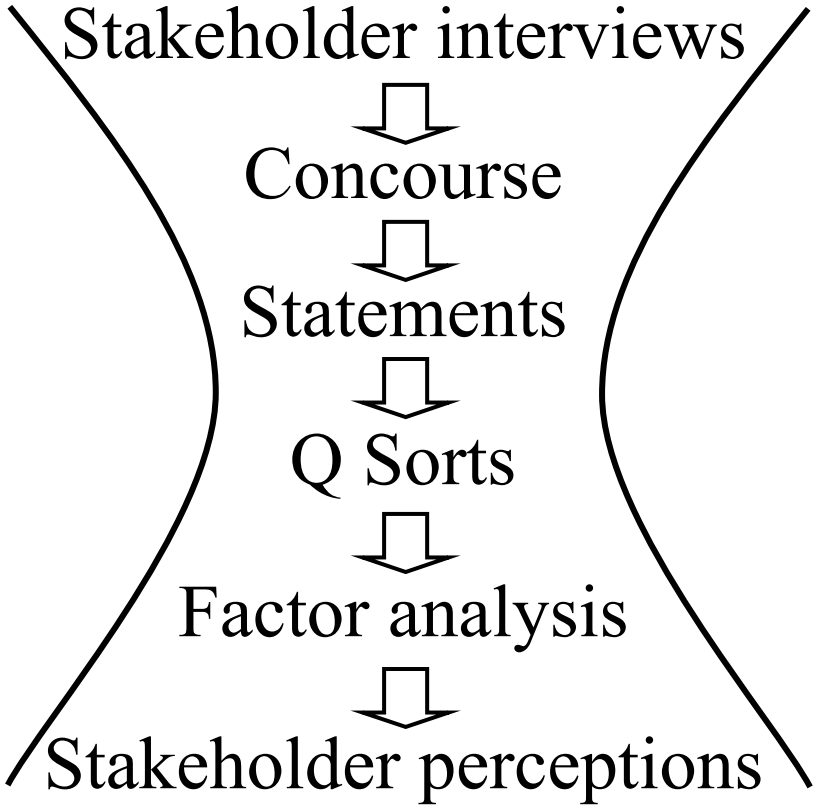
The second phase is the PAPD workshops, entailing knowledge generation, empowerment, and the building of social capital between participants.

The third phase is the post-workshop phase of developing appropriate institutions, building community support and implementing agreed action plans. Source: Dixon *et al.* 2001[33].

[33] Dixon, P., Barr, J. and Lewins, R., 2001. Shaping Common Futures - Best Practice Guidelines for Consensus Management of Common Pool Resources. Final Technical Report. DFID Natural Resources Systems Programme, UK.

Analytical framework enabling policy dialogue on contested CPRs
By comparing CPR conflicts in India, Tanzania and Zimbabwe, NRSP Project R7973 produced an analytical framework for enabling policy dialogue on contested CPRs. This is achieved by making explicit the different assumptions, knowledge, and goals for that resource which various stakeholders bring to their decision making. This framework was then tested, and a methodology for its empirical implementation developed by NRSP R8280 in the context of participatory forest management in India (see Figure 2). The methodology enables empirical articulation of the perceptions of key CPR users, including the poorest, most marginalised and often illiterate users.

Figure 2. Methodology for evidence-based analysis of stakeholder perceptions in CPR management



Drawing on the theoretical framework for analysis developed in R7973[34], the methodology developed and tested in R8280 is based on an innovative social science technique known as 'Q Methodology'. With its roots in psychology, this method allows for the empirical analysis of subjective stakeholder perceptions regarding CPR management. This provides the starting point for the evidence-based resolution of management conflicts. There is significant potential for applying this methodology across a range of natural resource systems and different country contexts.

Six principal steps are involved:

1. Interviews are held with a broad spectrum of stakeholders to discuss perceived issues relating to the management of the CPR in question.
2. Statements made by stakeholders in the interviews are collated to form a broad 'concourse' of statements.
3. The concourse is filtered to select a finite number of key statements from each main stakeholder group.
4. These statements are then administered on cards to a cross-section of stakeholders from each main group. Stakeholders are asked to complete a 'Q Sort' by ranking each statement card on a response scale from +2 (most agree) through 0 (neutral) to –2 (least agree). Statements can be read out to respondents or left for respondents to read and sort themselves, depending on literacy levels.
5. The Q Sorts are then correlated and factor analysed to reveal significant patterns of similarity across respondents.
6. These patterns are then analysed to provide an empirically tested view of the key stakeholder perceptions that exist with regard to the management of the CPR.

[34] Adams, W. M., Brockington, D., Dyson, J. and Vira, B., 2003. Managing tragedies: Understanding conflict over common pool resources. Science. 302(5652):1915-1916.

Trade-off analysis in coastal zone management
Working with coastal communities in the Caribbean, NRSP Project R7408 developed a technique of 'Trade-off Analysis', which includes all relevant stakeholders in negotiations to assess and develop appropriate management strategies. The trade-offs between different strategies are ranked or quantified, and multi-criteria analysis used to help achieve consensus[35]. Quantifying and analysing economic components of CPR use can be difficult, requiring specialist expertise, but is fundamental to identifying the costs and benefits of different management approaches and determining the incentives for those utilising the CPR. Techniques for conducting economic analysis using participatory approaches have been developed by FRP Project R6914[36] overcoming the lack of capacity for formal economic analysis often found in developing countries.

[35] Brown, K., Tompkins, E.L. and Adger, W.N., 2002. Making waves. Integrating coastal conservation and development. Earthscan, London.
[36] Richards, M., Davies, J. and Yaron, G., 2003. Stakeholder incentives in participatory forest management. ITDG, London.

6.2 Managing conflicts between commercial and non-commercial resource uses

When resources are communally owned there is always the potential for conflicts to arise from incentives to exploit the resource for new commercial purposes. For example, non-timber products from forests, such as fungi, fuel wood and cattle fodder, are critical to many poor people for both home consumption and sale. The harvest of these non-timber forest products relies on forests remaining intact. Increasingly, however, short-term financial incentives for timber harvesting are resulting in the destruction of forests and the loss of the non-timber CPRs that poor people rely on. Incentives for agricultural intensification are also driving forest clearance and the appropriation of previously common land into private ownership. It is rarely the poorest, most marginalised people that gain from these new commercial activities. They do, however, incur the greatest cost, as their reliance on CPRs such as non-timber forest products tends to account for a far higher proportion of their overall subsistence.

6.2.1 Global to local benefit transfers

One area of considerable interest in contemporary land management is the possibility of facilitating the transfer of global environmental benefits to local land users. This would take the form of payments that reflect the economic value to the global community of local land management practices. This idea has been explored extensively with regard to climate change through the idea of developing markets for carbon sequestration.

Markets for carbon

Two RNRRS projects (FRP R6320 and R7374) have looked at how such conflicts might be overcome through the creation of markets for carbon under the Kyoto Protocol. This would provide a contribution to rural livelihoods in which forests and their associated non-timber products remain intact. Potentially this is a ‘win-win’ approach with both environmental and social gains. The concern, however, is that it is more efficient to create large plantations specifically geared towards carbon sequestration. This approach may have negative effects on the livelihoods of poor people, as exotic plantations are unlikely to yield the kind of non-timber products that accrue in native forests. By introducing appropriate training in sustainable-yield forest management together with institutional development and the introduction of appropriate planning methodologies, these projects successfully implemented carbon sequestration activities at a village level in Mexico. This contributed to alleviating conflicts between commercial and non-commercial forest uses. It also demonstrates the possibility of a global to local benefit transfer if appropriate mechanisms are in place.

6.2.2 Non-commercial to commercial benefit transfers

A particularly novel insight provided by RNRRS projects involved the application of combined natural and social science approaches to demonstrate ‘win-win’ solutions to CPR usage conflicts by demonstrating benefit transfers between non-commercial and commercial resource uses.

Self-recruiting species in aquaculture

Fish ponds offer the potential for bringing much needed protein to the poor – helping with health and income. However, the technical innovation does not help poor people unless the right property rights are in place. Fish ponds in India were only leased for

one year, causing difficulties with pond management. NRSP project R8100 facilitated communication between the poor fish pond users and the government, leading to a policy change with extended leases on the ponds. This is a simple solution, but highly effective.

Sometimes it is not possible for poor people to manage the fish pond. Because they cannot afford the infrastructure needed for stocked aquaculture, they rely on a harvest of aquatic animals from community water bodies and from privately owned ponds and rice fields. Under suitable agreements they can still have access to CPRs in the ponds through harvesting self-recruiting species (SRS)[37]. SRS are aquatic animals that can be harvested sustainably from a farmer-managed system without regular stocking. They include species such as fish, prawns, crabs, and snails that exist in managed ponds, but do not represent the species of commercial interest to large pond owners. SRS are critical for poor people, for both home consumption and sale. Their importance varies seasonally, with the catch in open-access water bodies, including flooded rice fields, critical during the flood period, but shifting to an emphasis on ponds, ditches and as a by-catch from commercially operated ponds in the dry season. Conflicts arise between the interests of commercial pond owners who wish to pursue mono-culture fish production to the exclusion of 'wild' SRS, and poor people that rely on SRS as a CPR from private ponds. Research showed that SRS enhance productivity in commercially stocked ponds. Maintaining high levels of biodiversity in managed ponds by allowing sustained presence of SRS was therefore demonstrated to result in positive economic returns for all community members, including poor, CPR-reliant people, commercial pond owners, and the environment.

[37] AFGRP R7917

6.3 Managing livelihood / environment conflicts

A key potential conflict relevant to the management of CPRs is between livelihood requirements and the environment. Several RNRRS projects have researched evidence-based approaches for managing such conflicts, such as the coastal projects already mentioned, the creation of markets for carbon to provide financial returns for forest conservation, and the maintenance of SRS in aquaculture as discussed above.

Community wildlife conservation

Another project (NRSP R7150) that provided important insights in the area of livelihood / environment conflicts looked at the interactions between wildlife conservation, tourism, and pastoralism in Kenya. At first glance the potential for community wildlife conservation schemes to contribute to poverty alleviation is quite high. This project demonstrated, however, that actual benefits are often not high enough to compensate for the losses experienced by local land users, such as crop damage, livestock, and human losses. Although tourism income for countries such as Kenya can be considerable, few of these financial benefits reach local levels. Wildlife conservation schemes also have the potential for conflict with local livelihood strategies, especially agro-pastoral and agricultural livelihoods, although they may be more compatible with pastoral lifestyles.

The key lessons from this project are:

- Community wildlife conservation initiatives driven by tourism need to be in areas of high-income generation potential.
- There needs to be capacity building and accountability in local institutions, accompanied by dialogue and strong links between communities and local/national government structures.
- Without the conditions above, wildlife is likely to have a negative impact on food security and incomes.

As a result of its findings, the project developed the following criteria for overcoming livelihood/environment conflicts in community wildlife management:

- Potential for cash income generation is high
- Intervention tailored to local situation
- Improved institutional links and capacity
- Increased local participation
- Inter-sectoral policy coordination

Soil conservation

Farmers tilling the poor soils of the steeply sloping hillsides of Uganda face problems of soil erosion – resulting in loss of a key CPR. There are well known technical solutions, such as digging drainage ditches and planting contour bunds. However, effective implementation of these techniques has been limited. NRSP Project R7856 used participatory approaches to enable farmers to revise and reformulate existing by-laws so that they were effective. In this way, technical innovations could be implemented successfully and high level national policies made to reach out to poor farmers who rely on small scale resources.

Fisheries management conflicts

It has traditionally been assumed that conflicts might be caused between the environmental objectives of initiatives such as marine protected areas and the interests

of the fishermen who rely on the fishery for their livelihoods. The work of FMSP project R7334 in the Caribbean served to overturn this assumption.

7. Conclusion

CPRs have a vital role to play in reducing poverty and achieving the MDGs. However, among the challenges faced, CPRs are increasingly under threat from pressures towards privatisation and the current emphasis on macro-economic approaches to poverty alleviation. As a result of such pressures, conflict management techniques have emerged as having a central role to play in developing sustainable pro-poor CPR management. A range of useful tools and insights have emerged from the RNRRS in this area, and it is hoped that this document will provide a useful window to further relevant information for researchers and policy makers.

It must be emphasised, however, that the successful selection and application of the approaches highlighted in this document require a thorough awareness of the broader literature that exists on CPR management. There is a critical need for researchers and policy makers to ensure that they act within the context of a reflexive awareness of the unique social and physical dynamics that define individual natural resource management situations. These situations will vary according to both the physical nature of the resource and its spatial, cultural, and socioeconomic context. There is no ‘one size fits all’ approach to natural resource management, and current external pressures may increasingly require more complex, flexible management institutions that engage a wider range of actors in order for them to survive.