

**Social capital and
connectedness: Issues and
implications for agriculture,
rural development and natural
resource management in ACP
countries**

Review paper for CTA

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Summary

Social capital is a new term that refers to the value of connectedness and trust between people. It is a pre-requisite for sustainable management and development of natural resources.

For as long as people have managed natural resources, they have engaged in forms of collective action. As a result, constructive resource management rules and norms have been embedded in many cultures and societies. But in recent agricultural and rural development, it has been rare for the importance of local groups and institutions to be recognised.

Social capital is one of five key assets for sustainable livelihoods. Although some believe that the term 'capital' does not add anything to existing social theories and practice, it does nonetheless draw clear attention to the problem of depletion of assets. Sustainability implies maintaining or improving renewable assets for future generations.

As it lowers the costs of working together, social capital facilitates cooperation. People have the confidence to invest in collective activities, knowing that others will also do so. They are also less likely to engage in unfettered private actions that result in negative impacts, such as resource degradation. Four features have been identified namely:

- relations of trust;
- reciprocity and exchanges;
- common rules, norms and sanctions;
- connectedness, networks and groups.

Three types of connectedness have been identified as important for the networks within, between and beyond communities. These are called bonding, bridging and linking types of social capital.

The implications of social capital for development assistance are important. Regulations and economic incentives are commonly used to encourage change in behaviour. Although these may change practice, there is rarely a long-term effect on attitudes. External agencies or individuals can act on or work with individuals to increase their knowledge and skills, their leadership capacity, and their motivations to act. They can act on or work with communities to create the conditions for the emergence of new local associations with appropriate rules and norms for resource management. If these then lead to the desired natural capital improvements, then this again has a positive feedback on both social and human capital.

Recent years have seen an extraordinary expansion in collective management programmes throughout the world, described variously by such terms as community management, participatory management, joint management, decentralised management, indigenous management, user-participation, and co-management. These advances in

social capital creation have been centred on participatory and deliberative learning processes leading to local group formation in seven sectors:

- watershed/catchment management;
- irrigation management;
- micro-finance delivery;
- forest management;
- integrated pest management;
- wildlife management;
- farmers' research groups.

Social capital can be operationalised in several ways – by building social capital through participatory and social learning methods (the software); by developing information technologies to support networks; and by developing ways to measure and monitor social capital improvements.

There are five core components of agricultural and rural programmes that successfully promote social capital development and sustainable resource management:

- a conceptualisation of sustainability as being an emergent property of systems high in social, human and natural capital;
- the recognition that rural people can improve their agro-ecological understanding of the complexities of their farms and related ecosystems, and that this better access to information and practices can lead to improved agricultural outcomes;
- that increased understanding is also an emergent property, derived in particular from farmers engaging in their own experimentation supported by external professionals;
- that if changes to individuals are embedded in social capital in the form of relations of trust, reciprocity and cooperation, then good ideas for improvements are more likely to spread from farmer to farmer, and from group to group;
- that social learning processes should become an important focus for all natural resource management programmes, and that professionals should make every effort to appreciate both the complementarity of such social processes with sustainable technology development and spread, and the subtlety and care required in their implementation.

Although group-based approaches that help build social and human capital are necessary, they are not sufficient conditions for achieving improvements in agriculture and natural resources. Policy reform, in the patterns of ownership, new incentives and protective regulations, plus the removal of destructive subsidies, is an additional condition for shaping the wider context, so as to make it more favourable to the emergence and sustenance of local groups.

However, these policy issues raise further questions that must be addressed – what happens to state-community relations when social capital in the form of local associations

and their federated bodies spreads to very large numbers of people? What are the wider outcomes of improved human capital, and will the State seek to colonise these new groups? What new broad-based forms of democratic governance could emerge to support a transition to wider and greater positive outcomes for natural resources?

Important questions also relate to the groups themselves. ‘Successful’ programmes may falter if individuals start to ‘burn-out’ – feeling that investments in social capital are no longer paying. It is vitally important that policy-makers and practitioners continue to seek ways to provide support for the processes that both help groups to form, and help them mature along the lines that local people desire and need, and from which natural environments will benefit.

1 Why connectedness is important

Most of the history of humans has been played out close to the land. Since our divergence from apes, humans have been hunter-gatherers for 350,000 generations, then mostly agriculturalists for 600, industrialised in some parts of the world for eight to ten, and lately dependent on industrialised agriculture for just two generations. People still have close connections to nature. Yet many in industrialised countries do not have the time to realise it, and in developing countries, many are still closely connected, yet are tragically locked into poverty and hunger (Pretty, 2002).

For as long as people have managed natural resources, they have engaged in forms of collective action. Farming households have collaborated on water management, labour sharing and marketing; pastoralists have co-managed grasslands; fishing families and their communities have jointly managed aquatic resources. Such collaboration has been institutionalised in many forms of local association, through clan or kin groups, traditional leadership, water users' groups, grazing societies, women's self-help groups, youth clubs, farmer experimentation groups, church groups, and labour-exchange societies.

Although constructive resource management rules and norms have been embedded in many cultures and societies, from collective water management of Egypt, Mesopotamia and Indonesia to herders of the Andes and dryland Africa; from water harvesting in Roman north Africa and south-west North America to shifting agriculture systems, it has been rare for the importance of such local groups and institutions to be recognised in recent agricultural and rural development. In both developing and industrialised country contexts, policy and practice has tended to be preoccupied with changing the behaviour of individuals rather than of groups or communities. As a result, agriculture has had an increasingly destructive effect on the environment (Huxley, 1960; Palmer, 1976; Jodha, 1990; Netting *et al.*, 1990; Ostrom, 1990; Pretty, 1995a, 1998; Kothari *et al.*, 1998; Uphoff, 2002).

Some believe that the ruin of common resources is inevitable and an unavoidable tragedy. Each person feels compelled to put another cow on the common, as each derives all the benefit from the additional animal, but distributes the costs amongst all the other common users. Today, each polluter continues to add greenhouse gases to the atmosphere, as they get all the immediate benefit of not having to pay the cost of abating the pollution, or of adopting clean practices. The costs, though, are spread amongst us all – including future generations who will have to pay for climate change. This indicates a problem with free-riders – individuals who take the benefit, but do not invest anything in return. The temptation, some would say, is always to free ride.

In some contexts, the loss of local institutions has provoked natural resource degradation. In India, the loss of management systems for common property resources has been a critical factor in the increased over-exploitation, poor upkeep, and physical degradation observed over the past half century. Jodha's (1990) now classic study of 82 villages in seven states found that only 10% of villages still regulated grazing or provided watchmen

compared with the 1950s; none levied grazing taxes or had penalties for violation of local regulations; and only 16% still obliged users to maintain and repair common resources.

Elsewhere in India, private ownership or operation of surface and ground water use for irrigation has generally replaced collective systems (Pretty, 1995a; Singh and Ballabh, 1997; Kothari *et al.*, 1998). Again, the result is substantial degradation of natural resources – a classic example of an n-person prisoner’s dilemma (Ostrom, 1990). The future for natural resources and for the many rural households that rely on them is bleak in the absence of these disappearing institutional structures.

At the same time as local institutions have disappeared, so the State has increasingly taken responsibility for natural resource management, largely because of a mistaken assumption that these resources are mismanaged by local people (Ostrom, 1990; Scoones, 1994; Pretty and Pimbert, 1995; Leach and Mearns, 1996; Pretty and Shah, 1997; Ghimire and Pimbert, 1997). But a variety of studies of rural development have shown that when people are well organised in groups, and whose knowledge is sought, incorporated and built upon during planning and implementation, then they are more likely to sustain activities after project completion (de los Reyes and Jopillo, 1986; Cernea, 1991; Uphoff, 1992; Pretty, 1991; Bunch and López, 1996; Röling and Wagemakers, 1997; Singh and Ballabh, 1997; Uphoff *et al.* 1998; Pretty, 1995a, 1998; Krishna, 2002).

One study of 25 completed World Bank agricultural projects found that continued success was associated clearly with local institution building (Cernea, 1987). Twelve of the projects achieved long-term sustainability, and it was in these that local institutions were strong. In the others, the rates of return had all declined markedly, contrary to expectations at the time of project completion. Outcomes were unsustainable where there had been no attention to institutional development and local participation.

Many non-sustainable systems have emerged because of the public good aspects of the environment. Unlike conventional capital, natural capital (or nature’s goods and services: see Costanza *et al.*, 1997) tends to be at least partially a public good – more correctly, they are complex mixtures of public, club and private goods and so rarely have a market value. Public goods are goods or services which, when consumed by a group member, cannot be withheld from other members of the group, or when consumed still can be consumed by other members of the group (Taylor, 1982; Ostrom, 1990, 1996).

Like all public goods, it is difficult to say who is at fault when natural capital declines. Without rules, the tendency is for individuals to overuse and underinvest in it: they are tempted to take the benefit without contributing anything themselves – in effect, to free-ride (Hardin, 1968). When such public goods and services are considered free and so valued at zero, the market signals that they are only valuable when converted into something else.

So the profit from converting a forest into timber is counted on the nation’s balance sheet, but all the lost services (wild foods, fodder grasses, climate regulation, biodiversity) tend not to be subtracted. Social institutions based on trust and reciprocity, and agreed norms and rules for behaviour, can mediate this kind of unfettered private action.

It is clear that new thinking and practice are needed, particularly to develop forms of social organisation that are structurally suited for natural resource management and protection at local level. This usually means more than just reviving old institutions and traditions. More commonly, it means new forms of organisation, association and platforms for common action. The past decade has seen a growing recognition of the effectiveness of such local groups and associations for sustainable environmental and economic outcomes, together with the idea that social connectedness should be seen as a capital asset (*see* Fine, 2001, for a sceptical view).

2 What is new about the social capital concept?

There has been a rapid growth in interest in the term 'social capital' in recent years. The term captures the idea that social bonds and norms are important for sustainable livelihoods. Its value was identified by Ferdinand Tönnies (1887) and Petr Kropotkin (1902) in the 19th century, shaped by Jane Jacobs (1961) and Pierre Bourdieu (1986), later given a novel theoretical framework by James Coleman (1988, 1990), and brought to wide attention by Robert Putnam (1993, 2000). Coleman describes it as "the structure of relations between actors and among actors" that encourages productive activities. These aspects of social structure and organisation act as resources for individuals to use to realise their personal interests. Thus local institutions are effective because "they permit us to carry on our daily lives with a minimum of repetition and costly negotiation" (Bromley, 1993).

As it lowers the costs of working together, social capital facilitates cooperation. People have the confidence to invest in collective activities, knowing that others will also do so. They are also less likely to engage in unfettered private actions that result in negative impacts, such as resource degradation. Four central aspects have been identified (Pretty and Ward 2001; Pretty, 2002), namely:

- relations of trust;
- reciprocity and exchanges;
- common rules, norms and sanctions;
- connectedness, networks and groups.

Relations of trust

Trust lubricates cooperation. It reduces the transaction costs between people, and so liberates resources. Instead of having to invest in monitoring others, individuals are able to trust them to act as expected. This saves money and time. It can also create a social obligation – by trusting someone this engenders reciprocal trust. There are two types of trust: the trust we have in individuals whom we know; and the trust we have in those we do not know, but which arises because of our confidence in a known social structure. Trust takes time to build, but is easily broken (Gambetta, 1988; Fukuyama, 1995), and when a society is pervaded by distrust, cooperative arrangements are unlikely to emerge (Baland and Platteau, 1998).

Reciprocity and exchanges

Reciprocity and exchanges also increase trust. There are two types of reciprocity (Coleman, 1990; Putnam *et al.*, 1993). Specific reciprocity refers to simultaneous exchanges of items of roughly equal value; and diffuse reciprocity refers to a continuing relationship of exchange that at any given time may not be met, but eventually is repaid

and balanced. This contributes to the development of long-term obligations between people, which can be an important part of achieving positive environmental outcomes (Platteau, 1997). Participatory biodiversity thrives on such relationships.

Common rules, norms and sanctions

Common rules, norms and sanctions are the mutually agreed on or are handed down norms of behaviour that place group interests above those of individuals. They give individuals the confidence to invest in collective or group activities, knowing that others will also do so. Individuals can take responsibility and ensure their rights are not infringed. Mutually-agreed sanctions ensure that those who break the rules know they will be punished.

These are sometimes called the rules of the game (Taylor, 1982), the internal morality of a social system (Coleman, 1990), or the cement of society (Elster, 1989). They reflect the degree to which individuals agree to mediate or control their own behaviour. Formal rules are those set out by authorities, such as laws and regulations, while informal ones are those individuals use to shape their own everyday behaviour. Norms are, by contrast, preferences and indicate how individuals should act; rules are stipulations of behaviour with positive and/or negative sanctions. A high social capital implies high 'internal morality', with individuals balancing individual rights with collective responsibilities (Etzioni, 1995). It is precisely this sense of interest bonding that can work to promote, or to antagonise, local communities.

Connectedness, networks and groups

Connectedness, networks, and groups and the nature of relationships are a vital aspect of social capital. There may be many different types of connection between groups (trading of goods, exchange of information, mutual help, provision of loans, common celebrations, such as prayer, marriages, funerals). They may be one-way or two-way, and may be long-established (and so not responsive to current conditions), or subject to regular update.

Connectedness is manifested in different types of groups at the local level – from guilds and mutual aid societies, to sports clubs and credit groups, to forest, fishery or pest management groups, and to literary societies and mother and toddler groups. It also implies connections to other groups in society, from both micro to macro levels (Uphoff, 1993; Flora, 1998; Grootaert, 1998; Woolcock, 1998; Ward, 1998; Pretty and Ward, 2001; Krishna, 2002; Pretty, 2002). High social capital implies a likelihood of multiple memberships of organisations and links between groups. It is possible to imagine a context with large numbers of organisations, but each protecting its own interests with little cross-contact. Organisational density may be high, but inter-group connectedness is low (Cernea 1993).

Three types of connectedness have been identified as important for the networks within, between and beyond communities (Woolcock, 2001). These are called bonding, bridging

and linking types of social capital. Bonding social capital describes the links between people with similar outlooks and objectives, and is manifested in different types of groups at the local level – from guilds and mutual aid societies, to sports clubs and credit groups, to forest or fishery management groups, and to literary societies and mother’s groups. Bridging social capital describes the capacity of groups to make links with others that may have different views, particularly across communities. Such horizontal connections can sometimes lead to the establishment of new platforms and apex organisations that represent large numbers of individuals and groups. Linking social capital describes the ability of groups to engage vertically with external agencies, either to influence their policies or to draw down on resources.

Evidence increasingly suggests that if these conditions are met, then local people’s economic and social well-being improves. Households with greater connectedness have been shown to have higher incomes (Narayan and Pritchett, 1996; Krishna, 2002; Wu and Pretty 2003), better health, educational achievements and longevity (Fukuyama, 2000), improved social cohesion (Schuller, 2001) and lead to more honest government (Putnam, 2000).

Even though some agencies may recognise the value of social capital, it is common to find that not all of these connections are being emphasised. For example, a government may stress the importance of integrated approaches between different sectors and/or disciplines, but fail to encourage two-way vertical connections with local groups. A development agency may emphasise the formation of local associations without building their linkages upwards with other external agencies that could threaten their success.

In general:

- the more linkages the better;
- two-way relationships are better than one-way;
- linkages subject to regular update are generally better than historically-embedded ones.

Rowley’s (1999) study of social capital in sub-Saharan Africa found a loose relationship between connectedness and wealth, but causality was unclear: “*did well connected people become rich or are rich people able to afford to be well-connected*”. However, there may be cases where a group might benefit from isolation, because it can avoid costly external demands.

3 Social capital and livelihood assets

Sustainable livelihoods have been defined in the following way:

“a livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base” (Carney, 1998).

Livelihoods rely for their success on the value of services flowing from the total stock of natural, social, human, physical and financial capital (Coleman, 1990; Putnam, 1993, 1995; Costanza *et al.*, 1997; Daily, 1997; Carney, 1998; Pretty, 1998; Scoones, 1998; Pretty and Ward, 2001; Krishna, 2002). A sustainable livelihood, therefore, means better access to renewable and non-renewable assets and better capacity to derive value from them.

Natural capital produces nature’s goods and services, and comprises food (both farmed and harvested or caught from the wild), wood and fibre; water supply and regulation; treatment, assimilation and decomposition of wastes; nutrient cycling and fixation; soil formation; biological control of pests; climate regulation; wildlife habitats; storm protection and flood control; carbon sequestration; pollination; and recreation and leisure.

Social capital yields a flow of mutually beneficial collective action, contributing to the cohesiveness of people in their societies. The social assets comprising social capital include norms, values and attitudes that predispose people to cooperate; relations of trust, reciprocity and obligations; and common rules and sanctions mutually agreed on or handed down. These are connected and structured in networks and groups.

Human capital is the total capability residing in individuals, based on their stock of knowledge skills, health and nutrition. It is enhanced by their access to services that provide these, such as schools, medical services, and adult training. People’s productivity is increased by their capacity to interact with productive technologies and with other people. Leadership and organisational skills are particularly important in making other resources more valuable.

Physical capital is the store of human-made material resources, and comprises buildings (housing, factories), market infrastructure, irrigation works, roads and bridges, tools and tractors, communications, and energy and transportation systems, that make labour more productive.

Financial capital is accumulated claims on goods and services, built up through financial systems that gather savings and issue credit, such as pensions, remittances, welfare payments, grants and subsidies.

These five assets are transformed by policies, processes and institutions to give desirable outcomes, such as food, jobs, welfare, economic growth, clean environment, reduced

crime, and better health and schools. Desirable outcomes, when achieved, feed back to help build up the assets base, while undesirable effects, such as pollution or deforestation, or increased crime or social breakdown, reduce the asset base.

The basic premise is that sustainable systems, whether farms, firms, communities, or economies, accumulate stocks of these five assets, thereby increasing the per capita endowments of all forms of capital over time. In contrast, unsustainable systems deplete or run down these various forms, spending assets as if they were income, and so leaving less for future generations.

The assets-based model described in Figure 1 shows how farms and rural livelihoods take inputs of various types, including renewable assets, and transform these to produce food and other desirable outputs (Pretty and Hine, 2000).

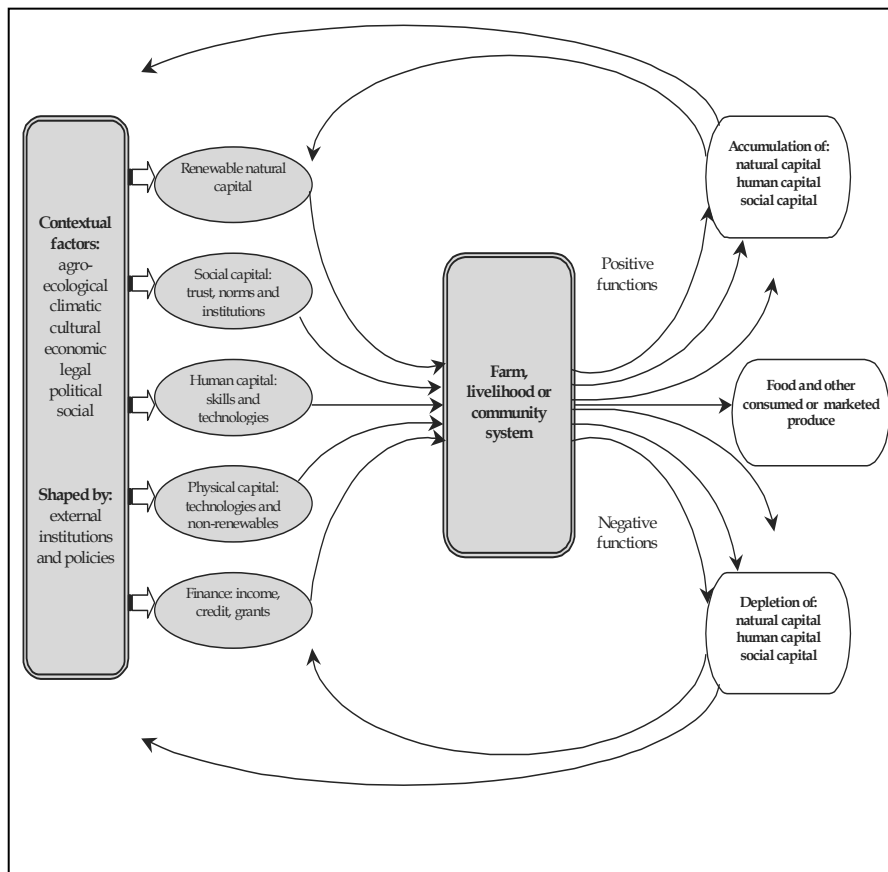


Figure 1: Assets-based model of agricultural systems

These can be processed for home consumption, transformed through value-added processes for sale, or sold directly as a raw product. The inputs are shown as:

- renewable natural capital – soil, water, air, biodiversity etc;
- social and participatory processes – including both locally embedded and externally induced social capital, and partnerships and linkages between external organisations;

- new technologies, knowledge and skills – both regenerative (e.g., legumes, natural enemies) and non-renewable (e.g., hybrid seeds, machinery);
- non-renewable or fossil-fuel derived inputs (e.g., fertilizers, pesticides, antibiotics);
- finance – credit, remittances, income from sales and grants.

Availability and access to these five inputs is shaped by a wide range of contextual factors (on the far left of Figure 1). These include unchanging ones (at least over the short-term), such as climate, agro-ecology, soils, culture; and dynamic, economic, social, political and legal factors shaped by external institutions and policies. These contextual factors are an important entry point for shaping and influencing agricultural systems (such as national policies, markets, trade).

4 Implications for development assistance

To what extent, then, are new configurations of livelihood assets, in particular social and human capital, prerequisites for long-term improvements in agriculture and natural resources? It is true that natural capital can be improved in the short-term with no explicit attention to social and human capital. Regulations and economic incentives are commonly used to encourage change in behaviour. These include establishment of strictly protected areas, regulations for erosion control or adoption of conservation farming, economic incentives for habitat protection, and environmental taxes (Pretty *et al.*, 2000, 2001). And although these may change practice, there is rarely a long-term effect on attitudes: farmers commonly revert to old practices when the incentives end or regulations are no longer enforced (Dobbs and Pretty, 2001).

The social and human capital necessary for sustainable and equitable solutions to natural resource management comprise a mix of existing endowments and that which is externally facilitated. External agencies or individuals can act on or work with individuals to increase their knowledge and skills, their leadership capacity, and their motivations to act. They can act on or work with communities to create the conditions for the emergence of new local associations with appropriate rules and norms for resource management. If these then lead to the desired natural capital improvements, then this again has a positive feedback on both social and human capital.

Although there is now emerging consensus that social and human capital manifested in groups does pay for local people (Narayan and Pritchett, 1996; Rowley, 1999; Mukherjee, 2001; Krishna, 2002), there are surprisingly few studies that have been able to compare group with individual approaches in the same context (most have observed changes over time, with changing performance of groups being compared with earlier performance of individual approaches).

For farmers to invest in these approaches, they must be convinced that the benefits derived from group or joint or collective approaches will be greater than those from individual ones. External agencies, by contrast, must be convinced that the required investment of resources to help develop social and human capital, through participatory approaches or adult education, will produce sufficient benefits to exceed the costs (Grootaert, 1998; Dasgupta and Serageldin, 2000).

The World Bank's internal 'Learning Group on Participatory Development' conducted a study to measure the comparative benefits and costs of participatory versus non-participatory projects (World Bank, 1994). The principal benefits were found to be increased uptake of services; decreased operational costs; increased rate of return; and increased incomes of stakeholders. It was also found that the costs of participation were greater, notably that the total staff time in the design phase (42 projects) was 10–15% more than non-participatory projects, and that the total staff time for supervision was 60% more than non-participatory projects (loaded at the front-end). The costs were primarily for convincing borrowers of the value of participation; for conducting extensive institutional

assessments; for building capacity and social institutions; for running interactive workshops and making field visits; and for negotiating between stakeholder groups.

Ostrom (1998) puts it this way: “*participating in solving collective-action problems is a costly and time consuming process. Enhancing the capabilities of local, public entrepreneurs is an investment activity that needs to be carried out over a long-term period*”. For initiatives to persist, the benefits must then exceed both these costs and those imposed by any free-riders in the group-based or collective systems.

There is a danger, of course, of appearing too optimistic about local groups and their capacity to deliver economic and environmental benefits. We must be aware of the divisions and differences within and between communities, and how conflicts can result in environmental damage. Not all forms of social relations are necessarily good for everyone in a community. A society may be well-organised, have strong institutions, have embedded reciprocal mechanisms, but be based not on trust but on fear and power, such as in feudal, hierarchical, racist and unjust societies (Knight, 1992). Formal rules and norms can also trap people within harmful social arrangements. Again a system may appear to have high levels of social assets, with strong families and religious groups, but contain abused individuals or those in conditions of slavery or other exploitation. Some associations can also act as obstacles to the emergence of sustainability, encouraging conformity, perpetuating adversity and inequity, and allowing some individuals to get others to act in ways that suit only themselves. We must always be aware of the dark side of social relations and connectedness (Olson, 1965; Taylor, 1982; Knight, 1992; Portes and Landholt, 1996).

Some types of social capital are known to be on the decline, such as bowling leagues, church attendance and voting patterns in the United States of America (USA) (Putnam, 2000), but these are being replaced by new forms of social capital, such as community-based organisations, cross-denominational churches and new public-private partnerships (Sirianni and Friedland, 1997). Thus the total social capital may not be the key indicator – membership in the national Federation of Women’s Clubs in the USA is down by a half since the 1960s, but newer women’s groups have addressed issues such as domestic violence that were previously not dealt with in old forms of social capital (Civic Practices Network (CPN), 1999).

It is important, therefore, to distinguish between social capital embodied in such groups as sports clubs, denominational churches, parent-school associations and even bowling leagues, and that in resource-oriented groups concerned with watershed management, micro-finance, irrigation management, pest management, and farmer research. It is also important to distinguish social capital in contexts with a large number of institutions (high density) but with little cross-membership and high excludability, with that in contexts with fewer institutions but multiple, overlapping membership of many individuals.

CPN (1999) focuses on the types of social capital that “*enhance capacities to solve public problems and empower communities*” rather than just quantitative increases or decreases in social capital. This is an important distinction for the challenges of sustainable

development. In the face of growing uncertainty (e.g., economies, climates, political processes), the capacity of people both to innovate and to adapt technologies and practices to suit new conditions becomes vital. Some believe uncertainty is growing – if it is, then there is greater need for innovation. An important question is whether forms of social capital can be accumulated to enhance such innovation (Boyte, 1995; Hamilton, 1995).

Another issue is the notion of path-dependence (a term used by Putnam to imply a degree of historical determinism). It is now appreciated that social capital can increase with use. Under certain circumstances, the more it is used, the more it regenerates. Social capital is self-reinforcing when reciprocity increases connectedness between people, leading to greater trust, confidence and capacity to innovate. So, can social capital be created where it has been missing, and can it lead to positive environmental outcomes?

5 Improvements in social capital in seven agricultural and natural resource sectors

Recent years have seen an extraordinary expansion in collective management programmes throughout the world, described variously by such terms as community management, participatory management, joint management, decentralised management, indigenous management, user-participation, and co-management.

These advances in social capital creation have been centred on participatory and deliberative learning processes leading to local group formation in seven sectors:

- watershed/catchment management;
- irrigation management;
- micro-finance delivery;
- forest management;
- integrated pest management (IPM);
- wildlife management;
- farmers' research groups.

It has been estimated that in the past decade 408,000–478,000 new groups have arisen in these sectors – mostly in developing countries (*see Annexes*). Most have evolved to be of small rather than large size (as predicted by Olson, 1982), typically with 20–30 active members (40 for micro-finance). This puts the total involvement at some 8.2–14.3 million people. Most groups show the collective effort and inclusive characteristics that Flora and Flora (1993) identify as vital for improving community well-being and leading to sustainable outcomes. In these groups, social capital is both operational and effective.

Watershed and catchment management groups

Governments and non-governmental organisations (NGOs) have increasingly come to realise that the protection of whole watersheds or catchments cannot be achieved without the willing participation of local people. Indeed for sustainable solutions to emerge, farmers need to be sufficiently motivated to want to use resource-conserving practices on their own farms. This in turn needs investment in participatory processes to bring people together to deliberate on common problems, and form new groups or associations capable of developing practices of common benefit.

This has led to an expansion in programmes focused on micro-catchments – not whole river basins, but areas of probably no more than several hundred hectares, in which people know and trust each other. The resulting uptake has been extraordinary, with most programmes reporting substantial yield improvements, often of the order of two- to three-fold. At the same time, most also report the substantial public benefits, including groundwater recharge, reappearance of springs, increased tree cover and

microclimate change, increased common land re-vegetation, and benefits for local economies. It is estimated that some 50,000 watershed and sustainable agriculture groups have been formed in the past decade in Australia, Brazil, Burkina Faso, Guatemala, Honduras, India, Kenya, Niger, and the USA (Pretty and Ward, 2001).

Irrigation and water users' groups

Although irrigation is a vital resource for agriculture, water is rarely used efficiently and effectively. Without regulation or control, water can easily be overused by those who have access to it first, resulting in shortages for tail-enders, conflicts over water allocation, and waterlogging, drainage and salinity problems. Where social capital is well developed, then local water-users' groups with locally developed rules and sanctions are able to make more of existing resources than individuals working alone or in competition. The resulting impacts, such as in the Philippines and Sri Lanka, typically involve increased rice yields, increased farmer contributions to design and maintenance of systems, dramatic changes in the efficiency and equity of water use, decreased breakdown of systems and reduced complaints to government departments (de los Reyes and Jopillo, 1986; Ostrom, 1990; Uphoff, 1992; Singh and Ballabh, 1997; Uphoff, 2002). Lam's (1998) analysis of 150 irrigation systems in Nepal indicates that *"irrigation systems that are governed by farmers themselves ... deliver more water to the tail-end of the system and have higher productivity than those ... governed by the Nepal Department of Irrigation"* (Ostrom, 1998).

Micro-finance institutions

One of the great recent revolutions in developing countries has been the development of credit and savings systems for poor families. These families lack the kinds of collateral that banks typically demand, appearing to be too high a risk, and so have to rely on money-lenders who charge extortionate rates of interest. A major change in thinking and practice occurred when professionals began to realise that it was possible to provide micro-finance to groups, and so ensure high repayment rates. When local groups are trusted to manage financial resources, they can be much more efficient and effective than banks.

The Grameen Bank in Bangladesh was the first to help people find a way out of the credit trap. It helps women to organise into groups, and lends to these groups. The Grameen Bank now has more than 2 million members in 34,000 villages, who are organised into subgroups of five members, which are joined together into 40-member centres (Grameen Trust, 2002). Elsewhere in Bangladesh, the NGO Proshika has helped to form some 75,000 local groups. Such 'micro-finance institutions' are now receiving worldwide prominence: the 57 micro-finance initiatives (in Nepal, India, Sri Lanka, Vietnam, China, Philippines, Fiji, Tonga, Solomon Islands, Papua New Guinea, Indonesia and Malaysia) analysed for the Bank-Poor '96 meeting in Malaysia have 5.1 million members in some 127,000–170,000 groups, who had mobilised US \$132 million in their own savings (Fernandez, 1992; Gibbons, 1996).

Joint and participatory forest management

In many countries, forests are owned and/or managed by the State. In some cases, people are actively excluded; in others some are permitted user rights for certain products. Governments have not been entirely successful in protecting forests. In India, for example, less than half of forests remain under closed canopies, with the remainder in various stages of degradation (Society for the Promotion of Wastelands Development (SPWD), 1992). However, recent years have seen growing recognition amongst governments that they cannot hope to protect forests without the help and involvement of local communities. This means the granting of rights to use a range of timber and non-timber produce, and the allocation of joint responsibility for protecting and improving degraded land.

The most significant changes have occurred in India and Nepal, where experimental local initiatives in the 1980s so increased biological regeneration and income flows that governments issued new policies for joint and participatory forest management in 1990 (India) and 1993 (Nepal). These encouraged the involvement of NGOs as intermediaries and facilitators of local group formation. There are now nearly 20,000 forest protection committees and forest users' groups in these two countries, managing some 1.85 million hectares of forest, mostly with their own rules and sanctions (Malla, 1997; Shrestha, 1997; SPWD, 1998; Raju, 1998; Mukherjee, 2001). Benefits include increased fuel wood and fodder productivity, improved biodiversity in regenerated forests, and income growth amongst the poorest households. Old attitudes are changing, as foresters come to appreciate the remarkable regeneration of degraded lands following community protection, and the growing satisfaction of working with, rather than against, local people (though some 31 million hectares of forest are still said to be degraded in India).

IPM and farmer field schools (FFS)

IPM is the integrated use of a range of pest (insect, weed or disease) control strategies in a way that reduces pest populations to satisfactory levels and is sustainable and non-polluting. Inevitably IPM is a more complex process than relying on spraying of pesticides: it requires a high level of human capital in the form of analytical skills and understanding of agro-ecological principles; it also requires cooperation between farmers. Recent years have seen the establishment of the FFS ('schools without walls', in which a group of up to 25 farmers meets weekly during the rice season to engage in experiential learning) and farmers' groups for IPM (Kiss and Meerman, 1991; Matteson *et al.*, 1992; Eveleens *et al.*, 1996; Kenmore, 1999).

The FFS revolution began in South East Asia, where research on rice systems demonstrated that pesticide use was correlated with pest outbreaks on rice (Kenmore *et al.*, 1984). The loss of natural enemies, and the free services they provided for pest control, was a cost that exceeded the benefits of pesticide use. The programme of FFS is supported by the Food and Agriculture Organization of the United Nations (FAO) and other bilateral development assistance agencies and has since spread to many countries in Asia and Africa (Kenmore, 1999; Uphoff, 2002). At the last estimate, some 1.8 million

farmers are thought to have made a transition to more sustainable rice farming as a result. FFS have given farmers the confidence to work together on more sustainable and low-cost technologies for rice cultivation. It is not clear how many graduates remain connected up to local groups. It is assumed that only 25–50% of the 1.8 million graduates remain in groups (*see Annexes*).

Community-based wildlife management

There are a variety of biodiversity outcomes from collective action and group-forming programmes, including:

- effects on agrobiodiversity, especially crop varietal and animal breed diversity;
- effects on farm system diversity, comprising increases in numbers of biodiversity components in the farm system (e.g., fish, trees, vegetables, animals);
- effects on non-farm biodiversity on or near farms, including plants, animals and fish in hedgerows, woodlands and forests, fishponds and gullies;
- effects on protected area biodiversity, from which farming is excluded but collection and use of wild production may be permitted.

Actions are required at all these levels to achieve significant biodiversity improvements, though of course no single programme of action is able to do this alone. For example, watershed and catchment management programmes are usually targeted at the first three system levels, whilst joint forest management addresses non-farm and protected biodiversity, but not agrobiodiversity and farm system diversity. The important conclusion is that a combination of these socially-inclusive programmes will be required at any given location for there to be real improvements in biodiversity across whole ecosystems and landscapes (Roy and Jackson, 1993; Singh and Ballabh 1997; Posey, 1999; Duffy, 2002; United Nations Environmental Programme (UNEP)/World Conservation Monitoring Centre (WCMC), 2002).

Farmers' groups for co-learning and research

The normal mode of agricultural research has been to experiment under controlled conditions on research stations, with the resulting technologies being passed to farmers. In this process, farmers have little control, and many technologies do not suit them, thus reducing the efficiency of research systems. Farmers' organisations can, however, make a difference. They can help research institutions become more responsive to local needs, and can create extra local value by working on technology generation and adaptation. Self-learning is vital for sustainable agriculture, and by experimenting themselves, farmers increase their own awareness of what does and does not work. There have been many innovations in both industrialised and developing countries, though generally the numbers of groups in each initiative tend to be much smaller than in watershed, irrigation, forestry, micro-finance and IPM programmes (Pretty, 1995a, b; van Weperen *et al.*, 1995; van Veldhuizen *et al.*, 1997; Braun, 2000; Pretty and Hine, 2000; Uphoff, 2002).

6 Methodologies for operationalising social capital

It is clear that there is a need to incorporate ideas about social capital into projects and programmes. There are three priorities:

- build social capital through participatory and social learning methods (the software);
- develop information technologies to support networks;
- develop ways to measure and monitor social capital improvements.

Participation and social learning

The term participation is now part of the normal language of most development agencies. It is such a fashion that almost everyone says that it is part of his or her work. This has created many paradoxes. The term participation has been used to justify the extension of control of the State as well as to build local capacity and self-reliance; it has been used to justify external decisions as well as to devolve power and decision-making away from external agencies (Pretty, 1995b).

In conventional development, participation has commonly centred on encouraging local people to contribute their labour in return for food, cash or materials. Yet these material incentives distort perceptions, create dependencies, and give the misleading impression that local people are supportive of externally driven initiatives. When little effort is made to build local skills, interests and capacity, then local people have no stake in maintaining structures or practices once the flow of incentives stops. The dilemma for authorities is they both need and fear people's participation. They need people's agreement and support, but they fear that such wider involvement is less controllable and less precise. If this fear permits only stage-managed forms of participation, distrust and greater alienation are the most likely outcomes. This makes it all the more crucial that judgements can be made on the type of participation in use.

'Participation' is one of those words that can be interpreted in many different ways – it can mean finding something out and proceeding as originally planned; it can mean developing processes of collective learning that change the way that people think and act. The many ways that organisations interpret and use the term participation can be resolved into distinct types. These range from passive participation, where people are told what is to happen and act out predetermined roles, to self-mobilisation, where people take initiatives largely independent of external institutions (Pretty, 1995b).

It has become increasingly clear that social learning is a necessary, though not sole, part of the process of adjusting or improving natural resource management. The conventional model of understanding technology adoption as a simple matter of

diffusion and cultural seepage as if by osmosis no longer stands. The alternative is however, neither simple nor mechanistic. It is to do with building the capacity of communities to learn about the complex ecological and physical complexity in their fields, farms and ecosystems, and then to act in different ways. The process of learning, if it is socially embedded and jointly engaged upon, provokes changes in behaviour (Argyris and Schön, 1978; Habermas, 1987; Kenmore, 1999) and can bring forth a new world (Maturana and Varela, 1992).

The past decade has seen an increasing understanding of how to develop these operating systems through the transformation of both social and human capital. This is social learning – a process that fosters innovation and adaptation of technologies embedded in individual and social transformation. It is associated, when it works well, with participation, rapid exchange and transfer of information when trust is good, better understanding of key ecological relationships, and rural people working in groups. The empirical evidence tells us several important things about the benefits. Social learning leads to greater innovation as well as increased likelihood that social processes producing new practices will persist.

Information technology to support networks

Information is an important commodity for rural people short of access to financial resources. Yet information and associated technologies, whether locally or externally sourced, are vital for making improvements to livelihoods and economies. These can take many forms, including market information, technology updates, policy signals and climate/weather summaries.

However, provision of information alone does not guarantee that recipients will find it useful or even understand it. Networks that are socially and culturally contextualised thus need to be built on demand-side rather than supply-side principles.

Decentralised networks for information technologies can therefore help in the sharing and exchange of new ideas, advance understanding of the policy connections for rural development, and build power amongst rural people to demand the information they require.

This necessitates a participatory approach to networking, including capacity building for civil society organisations, and a commitment to investments in hardware and the skills base to operate such technology. An advantage of such an approach is to widen the base for information management and control, thus allowing people to have more choice in the face of increasingly monopolised global media.

Measuring and monitoring stages in the development of social capital

It is clear that there has been a remarkable emergence of social capital manifested in groups and associations worldwide. Some natural resource sectors are being transformed, such as forest management in India, with 15,000 forest protection committees, or participatory irrigation in Sri Lanka with 33,000 groups. Some countries or regions are being transformed – a third of all Australian farmers are members of 5,000 Landcare groups; and there are some 1.8 million South East Asian farmers engaged in sustainable rice management.

However, the fact that groups have been established does not guarantee that resources will continue to be managed sustainably or equitably. What happens over time? How do these groups change, and which will survive or terminate? Some will become highly effective, growing and diversifying their activities, whilst others will struggle on in name only. Can we say anything about the conditions that are likely to promote resilience and persistence? There is surprisingly little empirical evidence about the differing performances of groups (though see Bunch and López (1994) for Honduras and Guatemala; Bagadion and Korten (1991) for Philippines; Uphoff *et al.* (1998) for Sri Lanka; Krishna (2002) for Rajasthan, India; and Curtis *et al.* (1999) for Australia). These variously show reasonably normal distributions from low-performing to mature high-performing groups, or very skewed distribution to either end.

An analysis of 112 villages of Honduras and Guatemala found that 20–35% of communities were highly effective; 40–50% in the middle; and about 25–30% were low performers. The best communities were associated with continued yield increases long after the sustainable agriculture project terminated; the low performers showed no real change after project termination, though agricultural yields were significantly better than those of farmers not in groups or part of the programme (Bunch and López, 1994; Bunch, 1999). In the Philippines, only about 3% of irrigators' associations have entered into full turnover contracts in which they manage all the processes of irrigation management and distribution; 37% have entered into maintenance contracts; and 60% are engaged in systems operation, but still require substantial external support (Bagadion and Korten, 1992). In Sri Lanka, autonomous, isolated irrigation groups perform least well; those with narrow vertical linkages but no horizontal ones performed next; whilst those with multiple horizontal and vertical linkages performed best (Uphoff *et al.*, 1998). In Australia, Victorian Landcare groups answering a survey were found to be mostly highly effective (Curtis *et al.*, 1999). And in Rajasthan, Uphoff and Krishna's (2000) development of a social capital index for 64 rural communities showed a normal distribution.

We developed a model (*see* Figure 2) to describe how changes in the renewable assets base (natural, social and human capital) affect the performance or outputs of managed natural systems, such as farms, forests or fisheries, or regional systems such as watersheds or river basins (Pretty and Frank, 2000).

Assets can be in one of two states: either in positive state (to the right of the y-axis) and so are being maintained or increasing; or in a negative state (to the left of the y-axis), and so diminishing. Where they are positive, they can be in one of three stages or phases, *see* Figure 2. The line on the graph describes the relationship between the stocks of assets and the performance of the system, where outputs can include food, timber, jobs, social cohesion, landscape value, a clean environment and so on. The model contains both stable equilibria (solid circles), and unstable breakpoints.

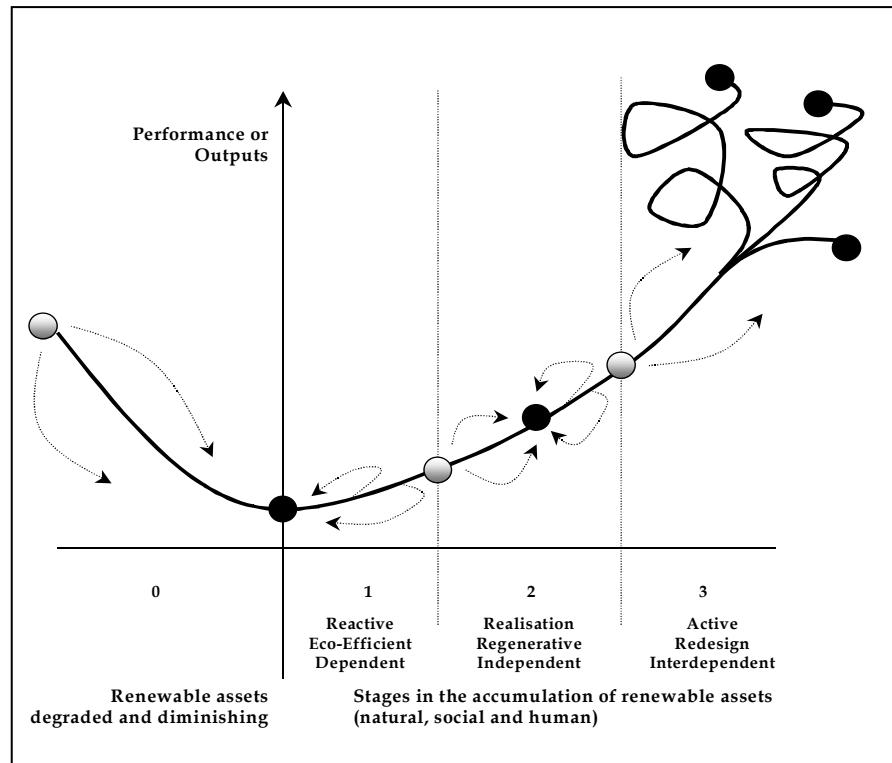


Figure 2: How changes in renewable assets affect the performance or outputs of managed natural systems

Managed systems can either be in the top-left or top-right quadrants. We assume that systems with a negative performance are unviable. Systems in the top-left appear to be highly successful. They are producing high levels of desirable outputs, but they are doing so by reducing the assets base (capital is being converted into income, so leaving less for future generations). Such systems are productive, but unsustainable.

Alternatively, systems may be in the top-right quadrant, where performance or output is positive, but assets are also being accumulated. This equates to the more sustainable sector – systems are producing desirable outputs, but not by degrading renewable assets.

The model identifies distinct stages to relate the levels of total renewable assets to performance or outputs:

- reactive-dependence;

- realisation-independence;
- awareness-interdependence.

These stages can be further differentiated according to 15 criteria clustered in five themes (*see Annexes*):

- worldviews of members;
- internal norms and trust;
- external linkages and networks;
- technologies and improvements;
- group lifespan.

Stage one: Reactive-dependence

When groups form, they do so to achieve a desired outcome. This is likely to be in reaction to a threat or crisis, or as a result of the prompting of an external agency. They tend at this stage to be looking back, trying to make sense of what has happened. There is some recognition that the group has value, but rules and norms tend to be externally imposed or borrowed. Individuals are still looking for external solutions, and so tend to be dependent on external facilitators. There is an inherent fear of change – really members would like things to return to the way it was before the crisis arose and the need to form a group occurred. For those groups concerned with the development of more sustainable technologies, the tendency at this stage is to focus on eco-efficiency by reducing costs and damage: in agriculture, for example, this will mean the adoption of reduced-dose pesticides and targeted inputs, but not yet the use of regenerative components.

Stage two: Realisation-independence

The second stage sees growing independence, combined with a realisation of new emerging capabilities. Individuals and groups tend to look more inwards, beginning to make sense of their new reality. Members are increasingly willing to invest their time in the group itself as trust grows. Groups at this stage begin to develop their own rules and norms, and start to look outwards – they develop horizontal links with other groups and realise that information flowing upwards and outwards to external agencies can be beneficial for the group. With the growing realisation that the group has the capacity to develop new solutions to existing problems, individuals tend to be more likely to engage in active experimentation and sharing of results. Agricultural approaches, for example, start incorporating regenerative technologies to make the best use of natural capital rather than simple eco-efficiency. Groups are now beginning to diverge and develop individual characteristics. They are stronger and more resilient, but still may eventually breakdown if members feel they have achieved the original aims, and do not wish to invest further in achieving new ones.

Stage three: Awareness-interdependence

This stage involves a ratchet shift for groups – they are very unlikely to unravel or, if they do, individuals have acquired new worldviews and ways of thinking that will not revert. Groups are engaged in shaping their own realities by looking forward (bringing forth a new world – cf Maturana and Varela, 1992), and the individual skills of critical reflection (how we came here) combined with abstract conceptualisation (how would we like things to be) means that groups are now expecting change and are more dynamic. Individuals tend to be much more self-aware of the value of the group itself (the value of social capital). They are capable of promoting the spread of new technologies to other groups, and of initiating new groups themselves. They want to stay well linked to external agencies, and are sufficiently strong and resilient to resist external powers and threats. It is often part of the rhetoric of development that external agencies should have an ‘exit strategy’ – a time and rationale for leaving local people to continue on their own. This is a mistaken idea based only on the notion of groups moving from dependence to independence.

In practice, mature groups never want external agencies to leave – they wish to make the best use of all the linkages that they have developed. The external agency, however, may need to exit for financial or administrative reasons. Groups are more likely to come together in apex organisations, platforms or federations, to achieve higher level aims. At this stage, agricultural systems are more likely to be redesigned according to ecological principles, no longer adopting new technologies to fit the old system, but innovating to develop entirely new systems.

This typology suggests important relationships between maturity and social capital. Are groups endowed with social capital more likely to proceed to maturity, or can they become arrested because social capital is a form of embeddedness that prevents change? Does feedback occur between maturity and social capital? If so, is it positive (e.g., success with a new sustainable practice spills over into success for others, or create new opportunities for cooperation), or negative (e.g., changes in worldview and technology could unsettle traditional practices, erode trust, and make existing networks redundant)?

An important, and as yet unanswered, question is whether this typology is a construct that accurately describes discrete stages, or whether there is in reality a continuum of steady change. It is suspected that real-life situations represent a great diversity of degrees of more or less of several indicators at each stage. However, it is also suspected that there are likely to be one or more distinct thresholds or ratchets along the continuum. Groups and individuals at stage three appear unlikely to regress to a previous stage, as worldviews, philosophies and practices have fundamentally changed. Groups at stage one are unstable and could easily regress or terminate without external support and facilitation.

7 Priorities for technical assistance

There are five core components of agricultural and rural programmes that successfully promote social capital development and sustainable resource management:

- a conceptualisation of sustainability as being an emergent property of systems high in social, human and natural capital;
- the recognition that rural people can improve their agro-ecological understanding of the complexities of their farms and related ecosystems, and that this better access to information and practices can lead to improved agricultural outcomes;
- that the increased understanding is also an emergent property, derived in particular from farmers engaging in their own experimentation supported by external professionals;
- that if changes to individuals are embedded in social capital in the form of relations of trust, reciprocity and cooperation, then good ideas for improvements are more likely to spread from farmer to farmer, and from group to group;
- that social learning processes should become an important focus for all natural resource management programmes, and that professionals should make every effort to appreciate both the complementarity of such social processes with sustainable technology development and spread, and the subtlety and care required in their implementation.

What, then, can be done both to encourage the greater adoption of group-based programmes for environmental improvements, and to identify the necessary support for groups to evolve to maturity, and then to spread and connect with others? It seems vital that international agencies, governments, banks and NGOs must invest more in social and human capital creation through a variety of mechanisms (Box 2).

Box 2. Mechanisms to incorporate social capital into agricultural and natural resource management programmes

- Focus on capacity development to improve the resilience and operational abilities of agricultural and rural organisations.
- Provide information and communications management services for rural organisations.
- Develop new platforms and partnerships for collective stakeholder action.
- Develop new portals for opening windows of opportunity for information exchange and marketing.
- Incorporate a sustainable livelihoods approach into programmes and projects, with a focus on all five capital assets.
- Offer training programmes for community leadership – to avoid the problem of long-term burn-out of key individuals.

The danger is not going far enough – being satisfied with any degree of partial progress, resulting in, as Ostrom (1998) puts it: “*creating dependent citizens rather than entrepreneurial citizens reduces the capacity of citizens to produce capital*”. The costs of development assistance will also inevitably increase – it is not costless to build human capital and establish new organisations.

Although group-based approaches that help build social and human capital are necessary, they alone are not sufficient conditions for achieving improvements in agriculture and natural resources. Policy reform, in the patterns of ownership, new incentives and protective regulations, plus the removal of destructive subsidies, is an additional condition for shaping the wider context, so as to make it more favourable to the emergence and sustenance of local groups. This has worked well in India for the spread of joint forest management, in Sri Lanka with the national policy for water users’ groups taking charge of irrigation systems, in Nepal with buffer zone management, and in Brazil for microwatershed programmes.

One way to ensure the stability of social capital is for groups to work together by federating to influence district, regional or even national bodies. This can open up economies of scale to bring greater economic and ecological benefits. The emergence of such federated groups with strong leadership also makes it easier for government and NGOs to develop direct links with poor and excluded groups, though if these groups were dominated by the wealthy, the opposite would be true. This could result in greater empowerment of poor households, as they better draw on public services. Such interconnectedness between groups is more likely to lead to improvements in natural resources than regulatory schemes alone (Röling and Wagemakers, 1997; Baland and Platteau, 1998).

However, these policy issues raise further questions that must be addressed – what happens to state-community relations when social capital in the form of local associations and their federated bodies spreads to very large numbers of people? What are the wider outcomes of improved human capital, and will the State seek to colonise these new groups? What new broad-based forms of democratic governance could emerge to support a transition to wider and greater positive outcomes for natural resources?

Important questions also relate to the groups themselves. ‘Successful’ programmes may falter if individuals start to ‘burn-out’ – feeling that investments in social capital are no longer paying. It is vitally important that policy-makers and practitioners continue to seek ways to provide support for the processes that help groups to form, and help them mature along the lines that local people desire and need, and from which natural environments will benefit.

There are, though, concerns that the establishment of new community institutions and users’ groups may not always benefit the poor. There are signs that they can all too easily become a new rhetoric without fundamentally improving equity and natural resources. If, for example, joint forest management becomes the new order of the day for foresters, then there is a very real danger that some will coerce local people into externally run groups so as to meet targets and quotas.

This is an inevitable part of any transformation process. The old guard adopts the new language, implies they were doing it all the time, and nothing really changes. This is however, not a reason for abandoning the new. Just because some groups are captured by the wealthy, or are run by government staff with little real local participation, does not mean that all are seriously flawed. What it does show clearly is that the critical frontiers are inside us. Transformations must occur in the way we all think if there are to be real transformations and improvements in biodiversity and the lives of people.

Annexes

Summary of recent social capital formation in agricultural and rural resource management sectors

Country and programme details	Numbers of local groups
<i>Watershed and catchment groups</i>	
• India – programmes of state governments and NGOs in Rajasthan, Gujarat, Karnataka, Tamil Nadu, Maharashtra, Andhra Pradesh	30,000
• Brazil – 275,000 farmers in 3 southern states adopted zero-tillage and conservation farming as part of microbasins (watersheds) groups	15,000–17,000
• Australia – national Landcare programme with about one third of farmers in landcare, waterwatch and coastcare groups	4,500
• Kenya – Ministry of Agriculture catchment approach to soil and water conservation	3,000–4,500
• Honduras/Guatemala – NGO programmes for soil and water conservation and sustainable agriculture	700–1,100
• USA – farmer-led watershed initiatives	1,000
• Burkina Faso/Niger – water harvesting programmes	3,000
<i>Irrigation water users' groups</i>	
• Sri Lanka – Gal Oya and Mahaweli authority programmes	33,000
• Nepal – water users groups as part of government programmes	5,000–8,000
• India – participatory irrigation management in Gujarat, Maharashtra, Tamil Nadu and Orissa	1,000
• Philippines – National Irrigation Administration turned over 1.2 million hectares to local management groups	3,500–5,000
• Pakistan – water users' association in Punjab and Sindh	14,000
<i>Micro-finance institutions</i>	
• Bangladesh – Grameen Bank nationwide	50,000
• Bangladesh – Proshika groups	75,000
• Pakistan – Aga Khan Rural Support Programme in Northern Areas	2,600
• 12 countries (Nepal, India, Sri Lanka, Vietnam, China, Philippines, Fiji, Tonga, Solomon Islands, Papua New Guinea, Indonesia and Malaysia) with wide variety of bank and NGO programmes	127,000–170,000
<i>Joint and participatory forest management</i>	
• India – joint forest management and forest protection committees in all states	15,000
• Nepal – forest users' groups	5,300
<i>IPM</i>	
• Indonesia (1 million graduates trained in rice and vegetable IPM programmes with FFS), Vietnam, Bangladesh, Sri Lanka, China, Philippines, India (a further 800,000 trained) – not all remain in groups	18,000–36,000
<i>Farmers' groups for research and experimentation</i>	
• Kenya – organic farming groups	185
• Colombia – farmer research committees	250
• Denmark – pest management groups	620
• Netherlands – farmer study groups for horticulture and arable farming	500
TOTAL	408,000–478,000

Sources: See Pretty and Ward (2001) for references

Note: The group structures for micro-finance institutions in these countries are assumed to be the 'centre' groups (30–40 members), and not the 5 member sub-groups.

Criteria for the measurement of the evolution of social groups

	Stage 1: Reactive- dependence	Stage 2: Realisation-independence	Stage 3: Awareness-interdependence
1. Worldviews and sense-making			
1.1 Sense-making	<ul style="list-style-type: none"> Individuals in group tend to be looking back – making sense of old realities 	<ul style="list-style-type: none"> Individuals and group looking inwards – making sense of new reality 	<ul style="list-style-type: none"> Group self-determined and shaping reality by looking forward
1.2 Views of change	<ul style="list-style-type: none"> Fear of change 	<ul style="list-style-type: none"> Adjusting to change 	<ul style="list-style-type: none"> Expect change as a norm
1.3 Attitudes and values	<ul style="list-style-type: none"> No significant change in attitudes, beliefs and values 	<ul style="list-style-type: none"> Realisation of new capacities 	<ul style="list-style-type: none"> Critical reflection and abstract conceptualisation lead to new insights
2. Internal norms and trust			
2.1 Rules and norms	<ul style="list-style-type: none"> Tend to be externally imposed or derived 	<ul style="list-style-type: none"> Development of own rules and norms 	<ul style="list-style-type: none"> Evolution and strengthening of rules and norms
2.2 Recognition of group value	<ul style="list-style-type: none"> Some recognition that group has value to achieve something new 	<ul style="list-style-type: none"> Members increasingly willing to invest in group itself 	<ul style="list-style-type: none"> Group likely to express social value of group
2.3 Sharing ethic	<ul style="list-style-type: none"> Some sharing of ideas, but tendency to mistrust the new 	<ul style="list-style-type: none"> Sharing within group common 	<ul style="list-style-type: none"> Sharing to and from external actors
3. External links and networks			
3.1 Horizontal	<ul style="list-style-type: none"> Few or no links with other groups 	<ul style="list-style-type: none"> Links with other groups 	<ul style="list-style-type: none"> Groups capable of promoting spread and initiating new groups
3.2 Vertical	<ul style="list-style-type: none"> Links one way (from above to below) 	<ul style="list-style-type: none"> Realisation that information can flow upwards 	<ul style="list-style-type: none"> Groups well-linked to many external agencies and strong enough to resist external power
3.3 External facilitators	<ul style="list-style-type: none"> Group relies on external facilitators to sustain group activities 	<ul style="list-style-type: none"> New roles for facilitators, such as conflict resolution 	<ul style="list-style-type: none"> Facilitators no longer needed
4. Technologies and improvements			
4.1 Environmental aspects	<ul style="list-style-type: none"> Eco-efficiency – reducing costs and damage 	<ul style="list-style-type: none"> Regeneration – making best of natural capital 	<ul style="list-style-type: none"> Redesign according to basic ecological principles
4.2 Source of technologies	<ul style="list-style-type: none"> Waits for external solutions – hoping for a new silver bullet 	<ul style="list-style-type: none"> Realisation that solutions must be internally generated 	<ul style="list-style-type: none"> Internal and external solutions
4.3 Capacity to experiment	<ul style="list-style-type: none"> Some experimentation and adoption 	<ul style="list-style-type: none"> Collective planning for experimentation; some innovations 	<ul style="list-style-type: none"> Experimentation leads to adaptation and innovation
5. Group lifespan			
5.1 Reason for being	<ul style="list-style-type: none"> Initiated by external agency or emerging after threat or crisis 	<ul style="list-style-type: none"> Groups successfully achieve planned activities 	<ul style="list-style-type: none"> Groups now engaged in different activities
5.2 Resilience	<ul style="list-style-type: none"> Breakdown easy 	<ul style="list-style-type: none"> Breakdown possible after achievement of initial goals 	<ul style="list-style-type: none"> Unlikely to breakdown – passed a threshold
5.3 Variability	<ul style="list-style-type: none"> Groups with same programme look the same 	<ul style="list-style-type: none"> Groups diverge 	<ul style="list-style-type: none"> Groups look completely different from each other

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Acronyms and abbreviations

ACP	African, Caribbean and Pacific Group of States
CPN	Civil Practices Network
CTA	Technical Centre for Agricultural and Rural Cooperation
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FFS	farmer field schools
IPM	integrated pest management
NGO	non-governmental organisation
SPWD	Society for the Promotion of Wastelands Development
UNEP	United Nations Environmental Programme
USA	United States of America
WCMC	World Conservation Monitoring Centre (UNEP)