

OLD AND NEW PARADIGMS FOR WATER AND DEVELOPMENT

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The old paradigm

Integrated rural development was the key development paradigm from the mid 1960's to the mid 1980's. This was the era of top-down, standardized, integrated projects run by centrally-financed bureaucracies which were highly dependent upon foreign loans for their financing. Integrated infrastructure development projects were the main event--such as resettlement projects in Africa and Indonesia and command area development programs in India. Projects combined resettlement, development of roads, irrigation, land levelling, agricultural inputs, electrification, etc. into single projects all "coordinated" by the government.

The old paradigm considered government as the engine for development. Rural people were mere beneficiaries, dependent for their welfare on standardized packages of inputs provided by government. Top-down, integrated planning also included state control over the economy, including numerous subsidies and price controls.

Probably the most important example of integrated rural development during this period is the green revolution. It depended people applying a standard package of inputs, including fertilizers, pesticides or integrated pest management, and--most importantly--water control. The government supplied credit. This standardized approach was well suited to government bureaucracies. The green revolution resulted in a huge and rapid increase in agricultural intensification and crop yields. It created a huge demand for labor. Within a few years it seemed that famine had become a thing of the past. One could argue that the green revolution was the single most important technological innovation of the 20th Century. It was clearly a success. But was it a sustainable success? And was it enough to fulfill the aspirations of modern society? Apparently not.

Why the world needs a new paradigm for rural development

Under the old paradigm governments found it difficult to provide and coordinate inputs in a timely, efficient way. Sometimes roads and irrigation systems were built but the people didn't come (or they came too late, such as with the Luwu transmigration project in South Sulawesi). Seeds were poor quality or were not available on time. Due to corruption or poor supervision, roads, bridges, and canals began to deteriorate immediately after construction. This resulted in a repeating vicious cycle of externally-financed rehabilitation followed by rapid deterioration followed again by rehabilitation.

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Bureaucracies had hired too many people at salaries that were too small. Officials were accountable to their superiors or to local elites who came to bribe the underpaid staff to show favoritism in redirecting project benefits toward the privileged few. Rural people were dependent on the government, which was in turn dependent on foreign loans. By the mid 1980's it became apparent that this kind of integrated rural development was not sustainable, nor was it fulfilling the aspirations of society. Governments could not afford to pay the cost of managing irrigation systems and protecting forests. There would never be enough forestry department personnel walking around with pistols to protect against rampant deforestation. No amount of regulations could prevent groundwater tables in northwest India from dropping at alarming rates.

The changing world and what water means for rural development today

Water has been called "the first resource." 70% of the human body mass is water. Food production, drinking, washing, cleaning, sanitation, manufacturing and industry, and production of energy all depend on water to some extent. The World Bank predicts that over the next 40 years, 90 million people will be added to the world's population each year. World population will grow from 6 billion today, to 8 billion in the 2030 to 10 billion in 2050. The World Bank also predicts that there will be a 650% increase in demand for water over the next 30 years. Availability of clean water for drinking and sanitation is a major factor for health or disease, especially for the poor. Water is also a key factor of production for manufacturing and industry in diversifying economies.

In developing countries 70-80% of accessible fresh water is used for agriculture. Approximately 40% of the world's food is produced on 17% of the cultivated land which is irrigated (Serageldin 1995). The Food and Agriculture Organization of the U.N. has said that 60% of the additional food needed to meet the needs of the earth's growing population through the year 2050 will have to be produced on irrigated land (FAO 1996). China's Ministry of Water Resources has estimated that at least 50% of future required increases in agricultural production can only be obtained through improvements in the management of irrigation systems (MWR 1996).

Experts affirm that there is a significant gap in unfulfilled potential productivity related to under-utilized irrigation capacity and the potential to increase the productivity of water--or in other words, *to increase the amount of crop produced per drop of water delivered* (Seckler 1996). Hence, much if not most of the increased food production will have to be created by improvements in water management.

By the mid 1980's the world had changed considerably from what it was in the mid 1960's. It became apparent that a side effect of the green revolution was a widening gap between rich and poor, between head enders and tail enders in irrigation systems, and between farmers, money lenders and middlemen.

During the latter 1980's and 1990's, crop yields for most basic cereal crops have levelled off. Between 1950 and 1990 the world's average annual grain yields rose 2.1% per year, but this dropped to only 1% during the 1990s. At this rate it will take 70 years for the total world grain production to double!

Environmental problems such as loss of soil fertility and contamination of aquifers, which are associated with green revolution inputs, are likely to limit further intensification in the use of petro-chemical inputs in the future. It seems reasonable to assume that any future bio-technology miracles will likewise not be stand-alone innovations but will be co-dependent upon availability and quality of scarce resources.

Population increases, economic diversification and environmental degradation are rapidly increasing competition for ever more scarce farm land and water. An example of the effects on irrigation of population increase and economic diversification is the Meteng irrigation system in northern Thailand, which was built about 30 years ago to irrigated 25,000 ha of farm land. Since construction of the Meteng system, the city of Chiang Mai has grown up around the main canal and has become a major city of 5 million people. Today, hotels and factories take water out of the main canal and dump pollution back into it. And there are pressures to divert water from the reservoir to an industrial park near the city. Demographic and economic changes are overwhelming lagging modernization in systems of water rights and regulations to protect water quality.

On the densely populated island of Java the spread of cities, towns and factories cause the disappearance of about 10,000 ha of irrigated rice land each year. It has been estimated that, worldwide, one in every 5 hectares of irrigated land is losing productivity due to increasing salinization of soil (Postel 1999). Salinization is particularly serious in Pakistan, India, the north China plain, Central Asia and the United States. It has been estimated that salinization of soil of irrigated farmland is spreading at a rate of approximately 2 million ha per year (Umali 1993) and that this costs the world's farmers about \$11 billion in loss of income due to declines in productivity (Ghassemi, et al 1995). Salinization is aggravated by poor management of irrigation and drainage systems.

Over-exploitation of groundwater and subsequent drawdown of aquifers is already a serious problem in India, Pakistan, China, and the United States, where underground water tables have been dropping over the last 30 years at rates of between .5 and 1.5 meters per year. Seckler, et al (1998) estimate that approximately one quarter of India's grain production could be under threat from depletion of groundwater caused by over-extraction of the annual renewable supply. It has proven difficult for governments to regulate against unsustainable levels of extraction of groundwater by farmers. Clearly, farmers must be involved in curtailing unsustainable practices if the problem is to be dealt with effectively.

One result of these demographic, economic and environmental pressures is that the irrigated land per capita has decreased by 5% since 1978 (Rosegrant 1997). Despite the likely 650% increase in global demand for water by 2030, common sense tells us that except for a few possible but costly inter-basin water transfers and the possible effects of climate change, the annual renewable supply of water

in river basins and underground aquifers is fixed. The logical conclusion then, is that the over-riding challenge for the world's irrigated agriculture now and in the future is, "How can the world produce more food with less water and less agricultural land?"

Failures of the old rural development paradigm are all manifested in water and are most noticeable in irrigation. Irrigation development in the modern era has passed through three phases. The first was the capital-intensive, government-sponsored **construction and expansion phase** from the 1950's to the 1970's. In 45 years between 1950 and 1995, the world irrigated area grew from 100 million ha to 255 million ha. Between 1970 and 1982 the global irrigated area increased by 2% per year (Rosegrant 1997). But the rapid expansion of irrigated area exceeded the rate of increase in expenditures for irrigation system O&M per ha. O&M staff were poorly trained, poorly equipped and poorly paid. As noted above, this led to deferred maintenance, rapid deterioration, and shrinking service areas.

The construction phase left an institutional legacy, especially in less developed countries: construction-oriented irrigation agencies and governments which dominated economic development, considered themselves as sole right-holders over water, and which provided water to poor farmers as a welfare benefit.

The second phase of irrigation development can be called the **improvement phase**, between the mid 1970's and mid 1980's. Although construction and expansion of irrigation systems continued, new emphasis was given to rehabilitation, training, new technologies, information and decision support systems, and other managerial and technical improvements. Farmer participation in government projects was promoted as were attempts to collect water charges from farmers.

Unsatisfactory water delivery

When upper-end farmers divert extra water out of main or distributary canals maldistribution of water is amplified until there is a serious lack of water in the tail ends of irrigation systems. The **tail-ender problem** is well known throughout the world. In large canal schemes in South Asia it is common for one-third to one-half of the tail-end of a scheme's designed service area to not receive water from canals. Numerous research studies by the International Irrigation Management Institute have documented the pervasive problem of inequitable water distribution in canal irrigation schemes in Pakistan, India, Sri Lanka and Indonesia (Merrey 1997).

Farmers in tail-end reaches may cope by obtaining water from tubewells, readily paying up to 5 to 10 times more to purchase water from a tubewell owner, to receive a reliable supply of water, than the amount of the official water charge for canal water. Under-paid agency staff are widely known to collaborate with head-enders or more wealthy farmers to divert extra water to those who pay bribes. This has been referred to as **rent-seeking behavior** of irrigation bureaucracies.

In addition to inequitable distribution of water is the problem of unreliable timeliness of water deliveries. This is especially common in systems with flexible

water control devices and numerous smallholder farmers with diverse cropping patterns and planting dates, a common situation in less developed countries. Under-financed, hierarchical bureaucracies typically have weak incentives to deliver water according to farmer demands.

Chronic under-investment in maintenance: a malignant equilibrium

The under-financing and rapid deterioration of irrigation systems is a serious threat to the imperative of sustained increases in the productivity of irrigation systems in less developed countries. The cycle of irrigation construction, rapid deterioration, and premature rehabilitation is as pervasive and endemic in the developing world as are centrally-financed bureaucracies which operate and maintain public irrigation systems and attempt to collect water charges from farmers. It has been estimated that 66% of funds spent annually on irrigation development is spent on "premature rehabilitation" (i.e., rehabilitation done before the end of the design life of the system). In a study on rehabilitation projects by the World Bank, Jones (1995) said that, "Almost all of them, when scrutinised, turn out to be deferred maintenance projects." Jones found that 55% of completed Bank projects had unsatisfactory procedures for operations and maintenance.

Deferred maintenance happens largely because of under-funding of maintenance. A survey by Desai and Jurriens (1992) found that in India the Government allocated approximately \$4-8/ha in 1992 for total O&M compared with the \$10-17/ha amount prescribed by government. Maintenance is given low priority. Skutch (1998) estimates that maintenance expenses typically represent only about 20% of total O&M budgets.

Another study on irrigation maintenance in India by Svendsen and Gulati (1995) found that while roughly \$2,300/ha (in 1989 dollars) is spent on irrigation construction and rehabilitation, generally less than \$20/ha is spent on routine maintenance. It has been estimated that the average budgetary requirement for maintenance in Indonesia's public irrigation systems is \$18-28/ha, compared with actual expenditures of \$5-13/ha. The estimated requirement in Pakistan is about \$5.70/ha compared with average actual expenditures of \$2.70/ha. (Skutch 1998). Bhatia (1989) has documented mutually dysfunctional trends for irrigation finance in the states of Bihar and Haryana in India during the 1980s. These are:

- Salaries and wages increased as a share of total O&M expenditures,
- Actual expenditures on maintenance and repairs decreased in real terms,
- A decline in the ratio of actual O&M expenditures relative to revenues from water charges.

Low and declining rates of collection of O&M charges are key threats to the sustainability of irrigation systems. Between 1965 and 1987, the overall water charge collection rate for India's irrigation systems declined from 100% to 40% (Gulati, Svendsen & Choudhury 1995). During the same time actual average O&M expenses increased from about 130 rupees per ha to 165 rupees per ha. Similarly, in Pakistan revenue collected from water charges equaled or exceeded O&M expenditures in the 1960's and early 1970's. But by the 1990s, revenue from water charges collected was only 44.4% of O&M expenditures, for surface irrigation. Not

counting labor inputs by farmers at the field level, it has been estimated that in public irrigation systems in Bangladesh irrigation charges collected equal only 10 to 15% of O&M expenses. In Indonesia it is less than 10%, in Pakistan it is 40 to 50%; in the Philippines it is 65 to 70% and in post-transfer Mexico it is 90 to 100% (Mody 1996, p. 139, Johnson 1997).

Another way to measure the gap between O&M requirements and expenditures, is to compare actual expenditures with gross agricultural income. The Irrigation Commission of India which reported in 1992, estimated that water charges should be approximately 5% for food crops and 12% for commercial crops. Actual amounts collected are between less than 1% to 2.9% of gross farm income (Gulati, Svendsen & Choudhury 1995). In Pakistan, the current level of water charges is calculated to cover only 70% of total O&M costs and is only about 5% of the costs of agricultural production or farm income. Ahmad and Faruquee (1999) have estimated that the water charge would have to double, to Rs. 70 per acre foot at the field level, to cover the full cost of O&M. By comparison, they report that the financial marginal value of water is Rs. 700 per acre foot and the informal market value of water is between Rs. 100 to Rs. 700 per acre foot. They also note that significant gains in water use efficiency could be made through more effective farmer organizations. Despite these advantages, political and institutional obstacles have prevented raising charges and improving water delivery and maintenance.

Typically all or most of the funds for irrigation construction come from loan programs sponsored by international donors. Convention dictates that donors finance capital costs and host governments and water users finance recurrent costs of O&M. Small budgets for O&M, unwillingness of dissatisfied water users to pay water charges, and expectation of future subsidies for rehabilitation all tend toward deferral of maintenance. Deferred maintenance brings about the need for premature rehabilitation (or rehabilitation which occurs before the end of the design life of the system). Rehabilitation and modernization are considered as capital costs, which are eligible for financing through foreign loans. This "build, neglect, re-build" cycle is primarily, though not exclusively, a problem for public irrigation systems.

There is another planning convention that creates a bias against investing in long-term sustainability of infrastructure. This is the economic practice of donors and government planning departments of discounting costs over time. In the project planning stage, discounting tends to make the difference between investing more in maintenance over time versus deferring maintenance and having premature rehabilitation have nearly equivalent values 15 years or so after construction (Skutch 1998). Tiffen (1987) and Price (1993) both reject the practice of discounting for its under-estimation of the importance of sustainability of irrigation schemes.

Unabated deterioration and premature rehabilitation can have enormous consequences for farmers and governments. Eventually deferred maintenance will begin to have noticeable negative impacts on performance, as structures break down and/or fill up with weeds and silt. This results in loss of system capacity for conveyance, distribution and drainage. The effects on performance may include

reduced efficiency and equity of water distribution, poor drainage and waterlogging, salinization of soils, reduced cropping intensities and crop yields, and declines in income of rural people (especially those with farms at the tail ends of irrigation canals).

Additional, secondary costs of premature deterioration and rehabilitation include an increase in government debt to foreign donors, increased use of foreign exchange for importing more food products, and less governments funds available for other uses due to their being used for more frequent rehabilitation projects.

In a study of financing irrigation maintenance in eight sample schemes in South and Southeast Asia, Skutch (1998) has estimated that the annual net benefit of providing satisfactory funding for maintenance² versus typically inadequate levels is between \$50/ha and \$100/ha (in 1992 dollars). For a scheme of only 20,000 ha, the net benefits of changing from inadequate to satisfactory maintenance would be \$1 to \$2 million per year. This is enough to supply over 25,000 people with a safe source of drinking water (at the World Bank estimate of \$150/person). A 1994 study by the World Bank estimated that the rates of return to satisfactory maintenance are potentially 40% (World Bank 1994).

On the other hand, inadequate maintenance costs approximately \$200/ha because of the requirement for early rehabilitation (Skutch 1998). Even without taking into account all the costs associated with premature rehabilitation, Small and Carruthers (1991) estimated that deferred irrigation maintenance in less developed countries costs approximately £20 (approx. US \$34 in 1990). A 1994 study by the World Bank pointed out that the returns to marginal increases in investment in irrigation O&M are high, approaching 40% in India (World Bank 1994).

Most project, policy and research reports which are concerned with improving irrigation maintenance propose technical or managerial solutions to the twin problems of under-financed and deferred maintenance. These include recommendations for more “flexible” or “structured” irrigation technologies, “low maintenance” designs, management information and decision-support systems, automated water level control technology, new performance assessment methods, advanced operational planning with simulated modeling, modern asset management systems, changes in water pricing, advanced fee collection arrangements and so on (see for example ICID 1998, Skutch 1998, Merrey 1997, Small and Carruthers 1991).

Numerous master’s and Phd degree studies and consultancy reports have proposed such technical and managerial solutions, some of which have found measureable improvements in maintenance performance under partly controlled, quasi-experimental conditions. There has been no shortage of technical and managerial recommendations—such things appear to be driven largely by disciplinary and organizational pre-dispositions. Yet these are rarely adopted and even less often evolve into routine practices.

² Satisfactory maintenance is defined as the level of maintenance required to prevent the need for premature rehabilitation during the expected design life of the irrigation system.

A study by Jones (1995) found that hundreds of World Bank loans for the irrigation sub-sector include legally-binding agreements that the host government will increase budgetary allocations for O&M and that water charges and collection rates will be increased. However, despite the agreements, the study found virtually no compliance with increased spending on maintenance. In India there has been a long series of reports by irrigation commissions and finance committees from the 1970s to 1990s that have recommended increases in irrigation O&M budget allocations, increases in water charge fees and collection rates, introduction of a two-part fee system (area-based and volumetric), new accounting methods, and so on (Gulati, Svendsen & Chaudhury 1995). Strikingly few recommendations have been complied with. This is apparently primarily due to political resistance and institutional obstacles. In India, spending on irrigation constitutes 24 to 38% of total state plan expenditures in most states. In most cases it is just not possible to raise the allocation further. Many other countries have similarly been up against a budget allocation ceiling for their irrigation sub-sectors since the mid 1980s.

In summary, the following are the most commonly cited causes of under-financing irrigation maintenance:

- Inadequate allocation of funds for O&M by governments; it is politically easier to mobilize funds from foreign lenders (for construction and rehabilitation) than from domestic budgets (for routine O&M);
- Low collection rates for water charges, low fee levels which are rarely increased, due to reluctance of politicians to charge for water, with no connection between amount of charges collected and amount allocated for O&M;
- Time lag between deferred maintenance and silent, gradual realization of effects on irrigation performance (Levine 1986),
- Farmers and O&M agencies expect the government to return and rehabilitate the scheme at its expense,
- Politicians and officials obtain political and remunerative rewards for construction rehabilitation projects, not maintenance.

Between the mid 1980s and mid 1990s, international lending for irrigation construction and rehabilitation decreased by 50%. From the mid 1980s to the present the rate of irrigation expansion has dropped off to a mere trickle. By 1997 it was only about 1.3% per year worldwide (Rosegrant 1997). Sector professionals began to realize that something fundamental was still missing in the world's irrigation development strategy. The lack of serious response to the seemingly endless stream of technocratic and managerial recommendations was cause for examination of under-lying institutional deficiencies in the irrigation sector.

By the end of the 1980s it became apparent that the problem was not primarily lack of irrigation technologies, training, water charge arrangements or modern management techniques. Such practices could be demonstrated in artificial pilot experiments with intensive outside inputs, but irrigation agencies failed to disseminate or continue practices imposed during pilot projects. It was becoming obvious that there were under-lying institutional constraints against good and sustainable irrigation performance. These included weak incentives for agency

staff, lack of property rights for farmers and water users associations, and measures to ensure accountability between water users and service providers. Centrally-financed bureaucracies were not accountable to the water needs of farmers. Moreover, they sometimes had perverse incentives such as neglecting O&M in favor of more lucrative and professionally interesting rehabilitation projects.

Key principles of the new paradigm for rural development and water

By the end of the 1980's, surveys, rural appraisals, public consultations and a more liberal press revealed that people did not want to be dependent on government. They did not want to be stuck at the level of only satisfying basic needs. They did not want to follow a standard approach imposed by government. They wanted choice, more diversified rural economy, more potential to increase income, more educational opportunities and better health care for their families.

The new paradigm for rural development is based on six essential principles of institutional reform. Today these are widely promoted by development agencies, NGO's, and many governments. They form the basis for development programs and macro-economic policies. They are described below.

Principle One: New partnership between government and civil society

Under the new paradigm, the government no longer sees itself as the main engine of development. It lacks the resources to directly implement, manage and control rural development. Its new roles are to **enable** and **facilitate**. Government development programs now focus on capacity building of community-based and private sector organizations, empowerment of rural people, creating more choice and opportunity for people, and overcoming institutional and financial obstacles which prevent rural people from taking initiative for their own development.

Under the new partnership, government provides an enabling framework within which rural people can more securely perform for themselves the roles of diversifying, integrating, and investing in their own livelihood strategies. The most important element in the new partnership is accountability between government and its clients—rural people. Public consultation and other communication forums are being promoted so that the government can be responsive to priorities identified by rural people. Government programs are restructured to be driven by demands and choices made by local people, not by central planning.

There are two key examples of the new demand-driven approach in Indonesia. One is the Kecamatan Development Program where a development fund is set up at the kecamatan (sub-district) level. Villages submit proposals for their own development projects and take turns or compete with other villages for KDP funds. Funds are provided on a matching basis, with significant local investment required. A second example is the new Decentralized Agriculture and Forestry Extension Project. The DAFE is setting up Balai Induk Penyeluhan Pertanian (BIPP) at the kabupaten (district) level. An Extension Advisory Committee composed of

stakeholders from farmer representatives, NGOs, universities and government staff will guide the BIPP in setting its priorities and planning its budgets.

The private sector is no longer seen as the enemy of the rural poor. Economic diversification and even globalization present potential for increasing employment opportunities for the rural poor. Enhanced government regulation is needed to protect the interests of society under increasing commercialization and off-farm employment. Rural poor themselves are increasingly trying to develop their own small business enterprises. Group action can open up economies of scale and create better bargaining positions for the rural poor relative to private companies. Rural people who want to develop cooperative agri-businesses require support of the government to become strong, legal entities. They need a new partnership with government and the private sector to come out of relative isolation and be able to articulate with the broader commercial world, to have access to new markets and market information.

An example of the new partnership is the so-called “Yogya Inc.” strategy promoted by the Sultan of Yogyakarta, where the sub-district (kecamatan) office is being developed to become a local center of access to demand-driven extension support, credit, training, and market information. Another example is the charismatic leadership of Chief Minister Chandrababu Naidu of Andhra Pradesh, and his programs to facilitate job creation through new partnerships between government, universities and private sector companies (including Microsoft).

Also, the new paradigm emphasizes creation of property and property rights through rural people making their own investments. When rural people invest in irrigation maintenance and improvements they establish rights to water, rights to acceptable service provision, and rights to use the infrastructure. As opposed to loan-based development, the new paradigm encourages rural people to make their own investments in infrastructure, agriculture, small or micro business development, etc. Government subsidies are restructured so as to stimulate rather than discourage local investment. This happens when subsidies require matching investments by local people, when property rights are clear, and when credit and creditworthiness is established among rural people.

Principle Two: Restructuring government agencies

How can governments transform their centrally-financed agencies from old-style bureaucracies into client-oriented enablers and facilitators? Will training and motivating speeches about accountability and civic-mindedness be sufficient? Are there enough patriotic, honest souls out there who just want to serve the rural poor and who don't care about low salaries and won't accept bribes? Unfortunately, experience suggests not.

How then do government agencies need to be restructured so that they are **compelled** to provide efficient and quality services according to the priorities of their principle clients—rural people? The following are the most common strategies for transforming government agencies into accountable, service-oriented organizations:

- **Decentralize** so that decision-making gets down closer to where the information is about local priorities;
- **Devolve** implementation and management functions to community-based organizations, NGO's, and the private sector;
- **Restrict the mandate** of agencies to essential regulation, capacity building, and facilitating choice among service providers and open access to markets;
- Convert centrally-financed organizations into **self-financing public utilities**;
- "**Right sizing**" of over-sized bureaucracies through early retirement programs and train and **redeploy staff** the new paradigm functions.

Agencies which are resistant to change should be brought into a serious, inter-departmental, inter-stakeholder and transparent process of strategic planning. Agencies generally do not volunteer to do this. They need some push and guidance from higher-level bodies, such as planning and finance ministries. Reform does not necessarily mean serious downsizing and loss of budgets. There are important future roles that need to be performed by government under the new paradigm—such as enhanced regulation, higher-level environmental management functions (such as moving upstream from irrigation systems to river basins), and capacity building. Reform task forces are needed to generate common visions for reform. The recent irrigation sector reform program in Andhra Pradesh, India and the current Irrigation Sector Policy Reform process in Indonesia are examples of this approach.

Principle Three: Devolution and stakeholder-oriented management of resources

Devolution is the transfer of authority and responsibility for management of resources from government agencies to the private sector or to community-based organizations. Sometimes it is called privatization or management transfer. In the 1990's it became widespread in many sectors, including those as diverse as telecommunications, transportation, irrigation, forestry, and even agricultural extension (in Mexico). The rationale for doing this is that the private sector must operate according to the discipline of financial viability. Services must be provided according to the demands of customers. The private sector and community organizations have the incentive to be efficient. And it is thought that users of irrigation systems and forests have more interest than anybody else in protecting the long-term productivity of their resources.

The Irrigation Sector Policy Reform Program in Indonesia is in the process of issuing government regulations to federate water users associations from the tertiary canal level up to the level of an entire irrigation systems. It is expected that after the federations (Gabungan P3A and Induk P3A) become legal entities the authority and responsibility for irrigation management will be transferred to them by local government (Pemerintah Daerah).

Principle Four: New balance between property rights and commercial orientation

As noted above, population increases and economic diversification are rapidly intensifying the competition for land and water and other resources. If devolution of management for forests, irrigation systems and other resources is going to work, resource users must feel secure in their access to resources or they will not be willing to invest in maintenance of infrastructure and sustainable use of the resources. The new paradigm requires much greater clarity about water rights, protection against land conversion and deforestation, use rights for infrastructure, financial rights, and so on.

This also requires clarity about the balance between the new rights and corresponding new obligations. Water use rights should be balanced with obligations to protect water quality; irrigation infrastructure use rights should be balanced with clear obligations to maintain the infrastructure; forestry use rights should be balanced against obligations to ensure sustainability of the forest; and so on.

Rising commercialization involves many new contractual relationships between community organizations, the private sector, and government, wherein rights and responsibilities must be spelled out clearly and become legally binding. Contractual provision of services will become the main arrangement for provision of public goods and services. Binding service-for-pay agreements are especially important where people need to be assured that their investments today will ensure the sustainability tomorrow of productive resources--whether these are irrigation systems, roads, schools, clinics, forests, parks, waste disposal facilities, and so on.

Principle Five: Comprehensive but unbundled support system

It is recognized that a comprehensive support system needs to be in place to support rural development. But the new support system has two key differences with the old paradigm of integrated rural development. First, the new support system is divided up among many different and "contestable" service providers. These may be in the public, private and community sectors. No single provider should dominate and rural people should have real choice among providers. It is expected that this competition and "contestability" among service providers will encourage responsiveness and efficiency.

Second, the main job of government is to eliminate obstacles and create choices and multiple opportunities for development, not to promote a single approach or a single service provider.

Third, the main job of doing the integrating for integrated development will be done by the rural people themselves. In Java rural incomes are highly diversified at the household level. Primarily due to land constraints, only 50% of household income in rural Java is obtained from agriculture. People pursue multiple activities for livelihoods, they bear the risks, coordinate different activities among household members and between seasons, and they must make the choices among

alternative opportunities. Perhaps the best thing government can do for people with these complicated life styles is to help simplify their lives by providing a more secure and stable regulatory framework within which they can better predict the consequences of their economic choices. They also need assistance in obtaining more “organizational capital” and political clout with which to articulate and bargain for their interests relative to the private sector and government.

In the future, we can expect to see more bottom-up or user-sponsored extension and development networks. In Colombia and Mexico, after the government transferred management of irrigation systems to water users associations, the associations created provincial and national-level networks to provide their own extension services to their members. These services included legal consultation, political lobbying, training in accounting, training in computers and information management, agricultural extension, coordination of planting dates around the country to stabilize crop prices over time, consultations to improve market access, and so on. A surcharge to the normal irrigation fee helps finance the organization. In Colombia, the head of the National Federation of Water Users Associations (Federriegos) sits as a member of the board of directors for the Ministry of the Environment. A national federation of water users associations has already been created in Nepal and now has over 2,000 water users associations in its membership.

Conclusion

It remains to be seen how effective the reform phase will be in opening up the energies of rural people and enabling them to become equal partners in the economy and political system. It is clear that high level political commitment and pressures from society will be essential. But the winds of cultural and political change are creating new opportunities for this to happen.

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