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Hydropower Dams and Social Impacts: *A Sociological Perspective*

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Social Development Department

**Hydropower Dams
and Social Impacts:
*A Sociological Perspective***

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January 1997

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Acronyms and Abbreviations

EA	Environmental Assessment
ICOLD	The International Commission of Large Dams
NORAD	Norwegian Agency for Development
NRCR	National Research Center on Resettlement (China-Nanjing)
OECD	Organization for Economic Cooperation and Development
OECF	Overseas Economic Cooperation Fund (Japan)
OED	Operations Evaluation Department (The World Bank)
SA	Social Assessment
SIDA	Swedish International Development Agency

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1. Introduction

Why is the construction of hydropower dams, which generate energy that is renewable and cleaner than oil, coal, or nuclear power, increasingly attacked in the press and assaulted by many critics?

The answer – surely not the full answer, but a good part of it – is that the environmental critique of dams has shifted considerably from their *physical* to their *social* impacts. During the last decade the thrust of this social critique has been sharpened, new arguments are being used, while practical responses to the newly raised

social issues are lagging.

Indeed, the adverse social impacts of hydropower dams, if unaddressed, can be very serious. Unless these negative social impacts are mitigated by governments through explicit policy, legislation, and financial resources, and by planners through socially sensitive resettlement planning, hydropower expansion in developing countries will be retarded by social tensions and by increasing political and environmental opposition.

2. The Social Side of Investing in Infrastructure

Dams and reservoirs — as well as the network of canals, transmission lines, highways, railways, etc., spawned by the building of major dams — are essential to the infrastructure required for economic development. The experts predict that the 1990-2020 period will represent “three decades of explosive growth in energy demand and supply in the developing world” (Churchill, 1993), with dam construction likely to continue in a sustained rhythm. ICOLD data confirm indeed that a high rate of dam construction is characteristic for the current decade.

Yet on the social side, dam construction does not bring only unmitigated blessings: it causes also serious negative effects, when preventive and mitigatory actions are not taken.

Social impacts of dam construction are best identified through basin-wide cumulative social and environmental assessments, rather than through piecemeal, single-dam by single-dam unrelated studies. But both in a river-basin approach, as well as in a dam-focused assessment, at least *three main classes* of such adverse social effects can be distinguished. Thinking and practical actions can be organized easier by focusing on these distinct classes of social effects. These three classes are:

- Boomtowns around major constructions;
- Downstream changes in agro-production systems; and
- Population displacement/involuntary resettlement.

Among these three sets of impacts, the single most complex and difficult is clearly the third—the involuntary displacement and relocation of local groups. But before I turn in full to the social issues of forced population displacement and resettlement, a few brief comments¹ on the first two sets of impacts are in order.

Boomtowns

The set of socio-cultural impacts collectively summarized under the term “boomtown effects” are already long and well known. The sudden inflow of a large army of construction workers and related groups within small, often traditional local communities causes social/health/economic and cultural problems particularly at the local community level. For example, Syagga and Olima (1996) describe the following “boomtown” type of impacts caused by a relatively small dam constructed by the Kenya Third Nairobi Water Supply project:

“The sudden socio-economic changes in the environment caused an increase in marital problems, such as family breakdowns, increased immorality, and teenage pregnancies. It was reported that the dam construction had a major effect on the school-going pupils. During the peak construction period many girls were lured out of school, became pregnant, and dropped out of school. There were court cases where some of the dam employees were sued by parents for making the girls run away from home to live with them. Although some girls went back to school, the damage was considerable, particularly for those who either became pregnant or contracted sexually transmitted diseases.”

After construction workers leave there is another set of necessary adjustments, and the socially destabilizing effects of dam construction are of multiple kinds. These impacts are long discussed, in detail, in the interdisciplinary literature on high dams (Conac, 1995; Finsterbusch, 1980; Unseld, 1978), and this paper will not expand on them further. There is already considerable experience in managing the growth of boomtowns. The investment studies for dam construction should explicitly anticipate this set of effects and mitigate them methodically (Gilmore and Duff, 1975).

Downstream Social Impacts of Dams

Irrigation benefits, as well as prevention or control over disastrous floods, are the most important downstream effects of constructing dams and reservoirs. These are major positive effects. Even though the magnitude of such benefits vary with the type of dam and the local topography, the progressive socio-economic and cultural

changes induced by irrigation in local production systems are often huge and far-reaching. I think that these far-reaching and long-term benefits are sometimes not appreciated enough by hydropower critics in the current international debate on dams.

However, there are also some negative *downstream social impacts* of damming rivers. Traditionally, downstream impacts have been overlooked by dam planners, as well as by the authors of many Environmental Assessments (EAs) and Social Assessments (SAs) for projects that finance dam construction, often because these assessments did not take a basin-wide approach. Yet adverse downstream consequences can be serious; in recent years, they have been brought to the limelight more forcefully. Certain social impacts are particularly severe in those rivers—such as the Zambezi, Zaire, Senegal, Niger rivers—which flow through wide and gentle valleys (as opposed to canyon-shaped river courses), valleys in which agriculture has been historically based on the recurrence of natural and limited annual floods. These annual floods not only provide essential water, but bring rich nutrients in the silt they carry and deposit. Because such floods have been recurring for centuries and millennia, the local cultivators have adapted their agricultural and settlement patterns to this recurrence: they learned to “absorb” the flood into their agricultural strategies, practicing what is often called recessionary agriculture or wetlands agriculture.

A beautiful example of this high degree of social and environmental integration reached by agricultural systems in floodplain areas is given by Musokotwane (1994) from Mali’s inner Niger delta. This

integration involves cooperation between farmers and pastoral groups, and allows the best use of the available natural resources—land and water—for cropping and grazing.

“The inundation of the floodplains in the inner Niger delta in Mali provides a natural irrigation system. (Like) on many African floodplains, floating rice is seeded just prior to the annual flood. Then, as the flood waters recede, the rice is harvested and other crops are grown on this exposed, moist soil, such as sorghum or cow peas, which are often interplanted with vegetables. On the drier margins, drought-resistant crops, such as millet, are grown. After harvesting, when the dry season progresses, herds of cattle move in to graze on the crop stubble or on grass. The herds are welcome by the farmers as manure helps fertilize the soil, and animal products, such as milk and yogurt, can be traded for cereals. Repeated flooding also stimulates the breeding of riverine fish ... as the floodplain vegetation provides for spawning fish, eggs, and fry.”

However, once dams are built, such annual floods are often stopped from happening at all. With stunning suddenness, vast production systems of recessionary cultivation, evolved through centuries of creative human adaptation to natural opportunities, are rendered obsolete and impossible by reservoir impoundment. This results in lower harvests, drops in productivity, and impoverishment (Adams, 1991; Scudder, 1991b). Pioneering sociological studies by Michael Horowitz and Muneera Salem-Murdock (1990; see also Horowitz, 1991) on the

downstream impacts of the Manantali dam on the Senegal River have made Manantali impacts probably the best known and most analyzed case in the global anthropological literature. Moreover, Horowitz and Salem-Murdock went beyond static impact analysis: they outlined prescriptions for an alternative water management regime that would allow controlled water releases from the dam (with acceptable trade-offs in power generation capacity) and would substitute the natural annual flood with an artificial annual flood. This could protect the needs of downstream small farmers in terms of irrigation water and mitigate much of the adverse downstream socio-economic impacts of dams.

Another set of socio-economic and environmental impacts affect the livelihood of fishing communities. Riverine fisheries downstream may be significantly altered by dams. Some fish species that depend on seasonal migration may no longer be able to reproduce or feed. Many local traditional fishermen have seen their sustenance reduced or destroyed by dam construction.

To conclude on this issue, it is essential to stress one point: any comprehensive basin-wide consideration of hydropower’s social impacts during planning and implementation should include the assessment of downstream *full* impacts, either positive, such as added irrigation and flood control, or adverse, such as those outlined above. The elaboration of policy responses and mitigatory strategies must then flow from such assessments, orienting investments in hydropower so as to enhance the beneficial impacts and reduce/mitigate the harmful over.

3. Population Displacement and Resettlement

Today, the sharpest debate about the social liabilities of hydropower development revolves around population displacement and involuntary resettlement. These are grave issues indeed. Yet they are NOT intractable.

To explain why the social issues have overtaken much of the public debate around dams, both in developing countries (e.g., India, Thailand, Indonesia, Brazil) and developed ones (e.g., Norway, Canada, Sweden, USA), I would point out three factors:

- a) Magnitude of human impacts: many people are adversely affected, profoundly and immediately.
- b) Absence of regulations: policies and adequate legal regulations to counteract adverse effects are often missing in developing countries; arbitrary administrative practices characterize displacements.
- c) Biased design and planning methodologies: one-sided economic criteria and engineering approaches that externalize social costs, although they have been proven wrong, continue to be applied.

Severity of Impacts

The core problem in involuntary displacement is people's loss of livelihood and their potential impoverishment. When communities are forcibly displaced, the existing production systems are dismantled. Many jobs, much valuable land, trees, and other income generating assets are lost. Health care tends to deteriorate. Kinship groups and informal social networks for mutual help are scattered. Links between producers and their customers often are severed and local labor markets are disrupted. Symbolic markers, such as places of prayer and ancestral graves, must be abandoned, breaking links with the past and with people's cultural identity.

The most common social risks facing populations caught in reservoir displacement occur along several lines: (a) landlessness; (b) joblessness; (c) homelessness; (d) marginalization; (e) food insecurity; (f) decrease in health levels; (g) loss of access to common property assets; and (h) community disarticulation. Not all risks affect various resettler groups equally; some vulnerable groups have higher degrees of exposure to the risks of economic displacement or to the loss of their social support networks, others are more vulnerable to health risks, etc. (See a conceptual model of impoverishment risks

and reconstruction processes in Cernea, 1990, 1996; also Ganguly-Thukral and assoc., 1992.) For most rural resettlers, cash compensation instead of land-for-land has tended to aggravate the risks and increase the ruinous effects of displacement.

Not only the affected people are worse off: when displacement is massive, it weakens also the local and regional economy. Overall, the severity of unchecked displacement effects is such that doubts are increasingly expressed about the economic rationality and social justification of investing in such infrastructural projects, unless measures are taken to reestablish the affected people adequately.

Magnitude

Population displacement by major projects is particularly massive in the densely populated Asian countries that are engaged in vast industrialization and electrification drives. Our World Bank study group on resettlement has recently generated the first worldwide estimate of the magnitude of development-related population displacement. According to our analysis, each year about four million people are displaced by approximately 300 large dams (above 15 meters high) that on average enter construction phase annually (World Bank, 1994). In addition, six million people are displaced by the urban development and transportation programs that are started each year. Thus, a total of about 10 million people every year, or at least 80-90 million people over the past decade, are displaced as a result of infrastructure programs for dam construction, urban, and transportation development, taken together. If we consider also investments in other sectors, the total is higher.

High frequency, huge magnitudes, and severe adverse consequences combine in making development-related displacements a social problem of worldwide significance.

Among displacement causes, the construction of dams and related infrastructure accounts for some of the largest individual operations of population resettlement (see Table 1 below; see also in Annex 1 a much longer list of dams and their entailed loss of land and population displacement effects).

Table 1
Major Dams: Population Displacement

Dam	Country	# of People
<i>Already Built</i>		
Xinanjiang	China	306,000
Sanmenxia	China	319,000
Dongpinghu	China	278,000
Danjiangkou	China	383,000
Srisaïlam	India	100,000
Mangla	Pakistan	90,000
Saguling	Indonesia	60,000
Cirata	Indonesia	56,000
Sobradinho	Brazil	60,000
Itaparica	Brazil	50,000
Assad	Syria	60,000
Akosombo	Ghana	84,000
Aswan High Dam	Egypt	100,000
Kainji	Nigeria	50,000
Kariba	Zambia/Zimbabwe	56,000
Kossou	Côte d'Ivoire	85,000
<i>Currently Under Construction</i>		
Almatti	India	140,000
Tehri	India	105,000
Narmada	India	250,000*
Shuikou	China	67,000
Three Gorges	China	1,100,000
Xiaolangdi	China	181,000
Yacyreta	Argentina/Paraguay	50,000

* including people affected by loss of land and dwellings to the canal network for irrigation downstream.

On a relative scale, some of these displacements are an extraordinary burden in the context of a small country, even when the absolute number of displaced people does not appear, at first sight, to be very large. For example, the Nangbeto dam in Togo has displaced over 11,000 people, mostly shifting cultivators. Compared to Togo's total population however, this displacement affects a *larger proportion* of the country's population than many displacements which in absolute numbers are bigger—and are internationally famous—such as Narmada Sardar Sarovar dam in India, Yacyreta dam in Argentina, or Xiaolangdi dam in China. Reestablishing productively large numbers of displaced people is a formidable task. The difficulties caused by resettlement to the populations residing in the host/reception areas should not be underestimated either.

Some dams, however, due to topographically favorable sites, have a limited displacement effect. For instance, the Pangué hydropower dam in Chile, the M'bali dam in the Central African Republic, the Srinagar hydropower dam in Uttar Pradesh, India, or the Berke hydropower dam in Turkey are displacing only a few hundred people each. Many other dams displace some 1,000 to 3,000 people. (See Annex 1 for dams with larger population displacements.) However, the severity of the impacts suffered by the communities displaced in smaller operations is essentially the same as in larger ones. But large aggregate population sizes tend to compound the difficulties at the project level and it is always much preferable to find dam sites with reduced displacement impacts.

Again and again, studies comparing the impact of dams on the displaced people's

basic needs provide evidence that many states do not formulate a legally and morally explicit position about the problems confronted by these people, and delay the adoption of relevant state acts and laws. (Fernandes, 1995; Singh and assoc., 1992; de Santos and de Andrade, 1990; Dhagamwar, 1989).

Regulatory Policy and Legal Frameworks

Solutions to the problems created on such a vast scale must be crafted primarily through policy formulation and legal frameworks. Yet formal policies and legal regulations concerning involuntary resettlement caused by development are conspicuously absent in many developing countries. Interdisciplinary research, particularly sociological and anthropological research, has illuminated the impacts of forced relocations and offered important practical recommendations (see Roy Burman, 1961; Scudder, 1973, 1991; Butcher, 1990; Partridge, 1993; Guggenheim, 1992; Serra, 1993; Lassailly-Jacob, 1994; Mustanoja, 1993; Conac, 1995; etc.) but planners have frequently overlooked those recommendations. *Appropriate action* by relevant agencies and private entrepreneurs can and must be triggered primarily through the enactment of state policy and protective legislation.

Expropriation laws based on the eminent domain principle, which exist in many countries, are typically incapable of redressing the adverse socio-economic impacts. Specific legislation mandating effective public response to the social pathologies caused by hydropower development are necessary in all countries interested in their energy producing

potential (Shihata, 1988, 1993; World Bank, 1994). This will help make hydropower expansion socially sustainable. It will decrease the political and ethical controversies that now surround the hydropower investments which are oblivious to socially adverse effects. Some of the most credible experts (Goodland, 1994; Butcher, 1990) have convincingly demonstrated that hydropower is environmentally more sustainable than other sources

of energy, such as coal, gas, oil, or nuclear. I am convinced, in turn, that hydropower can definitely be made socially sustainable as well. This requires committed attention to all potential social impacts, starting with the earliest stages of planning, when investments in hydropower are weighed against other options.

Relying on findings from social science research and on feedback from its fi-

Box 1

Key Elements of the World Bank's Resettlement Policy

- **Avoid or minimize.** Involuntary displacement should be avoided or minimized whenever feasible, because of its disruptive and impoverishing effects.
- **Improve or restore livelihoods.** Where displacement is unavoidable, the objective of Bank policy is to assist displaced persons in their efforts to improve, or at least restore, former living standards and earning capacity. The means to achieve this objective consist of the preparation and execution by the Borrower of resettlement plans as development programs. These resettlement plans are integral parts of project designs.
- **Allocate resources and share benefits.** Displaced persons should be: (i) compensated for their losses at replacement cost, (ii) given opportunities to share in project benefits, and (iii) assisted in the transfer and in the transition period at the relocation site.
- **Move people in groups.** Minimizing the distance between departure and relocation sites and moving people in groups can facilitate the resettlers' adaptation to the new socio-cultural and natural environments. The trade-offs between distance and economic opportunities must be balanced carefully.
- **Promote participation.** Resettlers' and hosts' participation in planning resettlement should be promoted. The existing social and cultural institutions of resettlers and their hosts should be relied upon in conducting the transfer and reestablishment process.
- **Rebuild communities.** New communities of resettlers should be designed as viable settlement systems equipped with infrastructure and services, able to integrate in the regional socio-economic context.
- **Consider hosts' needs.** Host communities that receive resettlers should be assisted to overcome possible adverse social and environmental effects from increased population density.
- **Protect indigenous people.** Tribal and ethnic minorities, pastoralists, and other groups that may have informal customary rights to the land or other resources taken for the project, must be provided with adequate land, infrastructure, and other compensation. The absence of legal title to land should not be grounds for denying such groups compensation and rehabilitation.

(Based on *World Bank Operational Directive 4.30: Involuntary Resettlement.*)

nanced projects, the World Bank formulated an explicit policy regarding involuntary resettlement (World Bank, 1980; Cernea, 1988; Qureshi, 1989). This policy has evolved steadily since 1980 through several key steps (see World Bank, 1986, 1990, 1994; Cernea, 1994). Its basic elements are summarized in *Box 1*.

Four essential “instruments” or “procedures” are required by the Bank’s policy to address resettlement issues in the feasibility studies for, and the appraisal of, each hydropower project:

- a) a population and baseline income survey, as part of the feasibility study;
- b) a detailed resettlement plan for people’s socio-economic reestablishment;
- c) a relocation timetable correlated with advances in civil works;
- d) a distinct budget for resettlement.

The basic indicators generated through these instruments can be used as monitorable benchmarks for ongoing evaluation of resettlement progress and impacts.

The resettlement plans (point “b” above) should be built around a development strategy and “package” of provisions able to at least restore the economic basis and livelihood of those relocated. It is recommended that the preparation and appraisal of the population resettlement plan be done by professionally trained social analysts (sociologists, anthropologists, social geographers, resettlement specialists), jointly with economists.

In the early 1990s, all OECD member countries have also adopted unified policy

guidelines for involuntary resettlement under projects assisted by their own aid agencies (see OECD, 1991), which often finance dam construction. These guidelines are essentially similar to the World Bank’s policy and are based on the same principles. Yet the actual application of these guidelines, relatively new for aid agencies of some OECD countries, is uneven, as perhaps they have not been fully absorbed in practice. NORAD, for instance, has adopted general guidelines for the environmental assessment of hydropower development (see NORAD, 1993, 2nd printing), but these guidelines do not explicitly include the social principles and procedures resulting from the 1991 OECD resettlement guidelines, formally co-signed by Norway. The same is still the case for several other bilateral aid agencies. In Japan, OECF has started work on detailing the OECD general guidelines into more specific provisions.

Obviously, the updating of bilateral agency guidelines and their systematic implementation may significantly contribute to eliminating many of the disastrous displacement consequences occurring in projects (e.g., Kotmale dam in Sri Lanka, co-financed by SIDA, or Kotonpanjang hydropower dam in Indonesia) assisted by these bilateral agencies (Soeftestad, 1990; Pemul, 1993; Conac, 1995). More “voice” must be given to the affected people and their organizations in monitoring consistency in the application of these guidelines and in seeking resolution of their legitimate grievances.

Improving resettlement is not easy for developing country governments, particularly in low income countries with land scarcity, which face competing needs, resource limitations, and constraints on

institutional capacity. Progress has been made in recent years and, in some countries, has been remarkable. However, major difficulties and failures in involuntary resettlement continue to occur, and often implementation performance is lower than expected. The costs of inadequate resettlement can be very high, resulting in increased poverty for large numbers of people. This is especially serious since many of those affected are already very poor, and live in disadvantaged areas where infrastructure is lacking and social services are very limited. The remote locations of many dam sites are often inhabited by indigenous people, ethnic minorities, or pastoralists. This heightens the moral imperative to protect those most vulnerable groups by ensuring sound policies and good implementation. Indigenous people often cannot simply relocate and carry on their same way of life at another location, as their livelihoods are location-specific and intricately integrated with their habitat. Improved resettlement frameworks will benefit not only the directly affected groups, but also the society at large.

Biased Methodologies

The most damaging flaws in the social feasibility studies for hydropower is the underestimation of (a) the magnitude, and (b) the costs of population displacement/resettlement. Even high caliber consulting companies often fall prey to these fallacies.

Efforts to produce “least cost” project proposals make planners vulnerable to economic bias and inclined to overlook

some of the real *social* costs. This expresses itself in attempts to externalize a large part of the resettlement costs to the resettlers themselves, making them support part of the costs of the disruptions imposed on them. Obviously, such externalization has no legal, moral, or financial legitimacy. In turn, engineering bias expresses itself in the underestimation of the logistical and cultural difficulties of adequate resettlement.

Where and how can we “spot” such biases?

One manifestation of these biases is that the planning and implementation of resettlement has been much weaker in projects carrying out **involuntary** resettlement as compared to projects (in the same countries) supporting **voluntary** resettlement on newly developed lands. Perhaps most telling is the attitude of project authorities towards involuntary resettlers, who are seen as obstructions to progress, and not as unwilling victims entitled to full support and recovery. Their active participation is discouraged, and often they are not even consulted.

In the end, such biases, dismissive attitudes, and methodological errors, together with the reluctance to internalize costs, strike back: they make resettlement more difficult than it should be, slower, prone to cause political instability and to entail project delays and foregone benefits. Correcting such biased methodologies is therefore a foremost priority – for good social, economic, and political reasons.

4. Lessons from Studying Resettlement

To analyze the resettlement implications of development programs worldwide, and find better solutions to the severe social problems they raise, the World Bank has carried out in 1993/94 a major study² of all 1986-1993 Bank financed projects entailing resettlement, as well as of experiences in resettlement operations outside Bank-financed projects. I had the privilege to lead the special Bank Task Force in charge with this study. We have analyzed the socio-economic nature of resettlement processes in various countries; their causes and scale; the policy and legal frameworks governing such processes; their planning patterns and financing issues; and the actual resettlement implementation processes – with their strengths, weaknesses and outcomes. I will further discuss some of this study's key findings, and the Bank-adopted decisions for improving resettlement operations, as they are directly relevant to the subject addressed in this paper.

Within the worldwide picture of development-caused resettlement, projects financed by the World Bank account for a relatively small share of the total. In calendar year 1993, projects in the Bank's active portfolio accounted for some 3 percent of the resettlement caused by dam construction worldwide and for about 1 percent of the displacements caused by

urban and transportation projects in the developing world. (60 percent are concentrated in South and East Asia.) In total, these Bank-assisted projects entailed the resettlement of 2 million people over an eight-year period.

While limited in relative terms, compared to worldwide resettlement, the Bank's involvement in resettlement is nonetheless important and has a broader significance, far exceeding its sheer size. The reason for this significance is the Bank's explicit and innovative resettlement policy (see *Box 1*), which defined a clear goal – income restoration – and basic approaches, including a redevelopment plan, timetable, and budget for achieving good resettlement.

Causes of Failure or Success

The single most important message of the Bank's 1994 resettlement study is that good resettlement can prevent impoverishment and even reduce poverty by rebuilding sustainable livelihoods. If resettlement is not planned and financed adequately, resettlers end up worse off than before. Socially responsible resettlement, however, is also economically beneficial because otherwise the heavy costs of poorly handled displacement extend well beyond the immediately affected population – to

the regional economy, and to the host population in relocation areas.

Inadequate resettlement induces local resistance, increases political tensions, entails project delays, and postpones project benefits for all concerned; *the benefits lost because of such avoidable project implementation delays sometimes far exceed the marginal cost of a good resettlement package*. Ensuring that involuntary resettlement is minimized – and when unavoidable, is carried out without impoverishing the people displaced – is fully justified on both economic and ethical grounds.

Although displacement and resettlement have had a long and dismal history of failure, important learning has taken place over the last 10-14 years, pointing the way towards improving performance. Despite the vast differences among the countries and populations involved, much more is now understood about the *major common factors* that explain – by their presence or absence – why resettlement worked in some cases and failed elsewhere. These common factors are:

- a) *Political commitment* expressed in policy and law, functioning grievance procedures, fair resource allocations, and consistent implementation of set norms;
- b) Sound *social analysis*, reliable demographic assessments, and *technical* expertise in planning resettlement;
- c) Accurate *cost assessments* and commensurate *financing*;
- d) Effective executing *organizations* and *public participation* in identifying re-

establishment solutions, and implementing them.

Policy Vacuums or Political Commitment?

Resettlement involves moving people who have not themselves chosen to relocate. Moving people in this manner raises legal issues unlike any other project activity because of the possible encroachment on individual and group rights.

When resettlement is carried out in a manner that fully respects the rights of affected people, opposition to the implementation of the project is generally reduced. Otherwise, affected parties must have access to legal remedies to protect those rights, and to seek restitution different from that offered by the project or government. Therefore establishing adequate legal frameworks protecting people's rights is a necessary element for achieving successful resettlement.

Developing an adequate legal framework for resettlement has two dimensions: defining the legal entitlements of persons who are displaced; and ensuring the delivery of such entitlements. Introducing an effective process to identify losses and develop restitution measures requires addressing five sets of legal issues:

- Identifying the cause-effect relationship between projects and impacts.
- Identifying categories of adverse impacts.
- Defining eligibility: identifying affected people.
- Extending eligibility to displaced people with rights not recognized by the law.

- Including mechanisms for grievance and dispute resolution.

The main way governments express their political commitment to good resettlement is by creating adequate institutional capacity, defined as the *synergy between policy, organizations, and resources*. One main result of the Bank's catalytic policy impact is that several countries—such as Colombia, Brazil, Indonesia, China, and others—following dialogue with the Bank, have enacted or improved their own national or sectoral policies for resettlement.

The World Bank is concerned that developing countries adopt their own policy guidelines on resettlement because it has learned the hard way that the *absence* of domestic policy *is* a policy by default.

Some national agencies prefer to maintain a policy vacuum rather than issue binding norms and legal strictures. In effect, some agencies are stubbornly reluctant to formulate or accept public sector guidelines for activities that they know are going to be problematic, difficult, or controversial; the net result of such an anachronistic posture and mind-set is that the interests of the displaced people, and of development in a broader sense, are undercut. Avoiding formal policy commitments may allow more operational flexibility in the short term, but at the expense of higher long term costs, externalized to others. Weak policy responses to such issues are an enduring cause of poor performance. Legal vacuums and absence of policy for resettlement leave room for the use of violent displacement procedures, without due recognition and protection of the basic human rights and entitlements of those uprooted.

The case of China demonstrates that the improved resettlement performance it achieved in the last decade is directly associated with the major changes introduced in its national policies and legal environment surrounding resettlement operations. Before the late 1970s, vast displacements caused by high dams in China resulted in the disastrous impoverishment of many people and in serious political instability. As industrialization accelerated, civil works were seen as essential while systematic planning for adequate population resettlement was a low priority. Government insistence on a communal approach to life led planners to simply push displacees into the surrounding communities, with little compensation for assets lost. Other resettlers were simply shipped to the far west or the border areas of the northeast. At that time, China lacked a legal framework for resettlement: the results were tragic displacements, such as those from the Sanmenxia and Danjiangkou reservoirs in the 1960s and 1970s.

To correct this, a series of laws and regulations were adopted and refined in steady succession between 1978 and 1992, either with national applicability or tailored to specific investment sectors such as water, hydropower, transport, industry, and urban. These regulations, taken together, not only protect the prior living standards of those affected but also *affirm the principle of "resettlement with development."* This principle requires making resettlement a development opportunity and improving resettlers' livelihoods after relocation.

China has also started to develop its research capacity on resettlement pro-

cesses. In early 1990 the National Research Center on Resettlement (NRCCR) was created at Hohai University (Nanjing). Important advances have been made by this Center in the research methodology of investigating resettlement (Shi, Hun and Yu, 1996). In particular, intensive work is carried out to comprehensively evaluate the production levels and the standard of living of resettlers before and after resettlement, in order to assess the real impacts of China's policy of resettlement with development (Shi Guoqing, 1996a; Shi Guoqing, 1996b).

The Economics of Resettlement

Policy principles alone, however, are not sufficient. Adequate financial resources are indispensable for good results, and financial issues must be frontally addressed during the planning stage.

A major finding of our resettlement study was that *low resettlement performance is nearly always traceable to inadequate economic analysis*, externalization of reestablishment costs to the affected population, and underfinancing. The incomplete recognition of *all the costs* accruing to displaced people and the failure to *internalize* them in the overall project costs lead directly to resettlers' impoverishment, and distort altogether the economic rationale of some projects.

During the Bankwide Resettlement Review, an analysis of per capita resettlement budgets compared to per capita incomes was performed on a sample of 30 projects. The results were striking. All those projects which had a budget-to-income ratio of less than 3.5 encountered resettlement implementation problems, while only few of the projects with a ratio greater

than 4 had such problems. This only makes sense: if proper resettlement is seen as reestablishing resettlers' income streams, one would assume that a certain amount of "principal" has to be invested to yield sufficient returns.

Costs for compensation and resettlement can be a substantial component of a project's total cost, but usually they are not. A sample of 20 completed projects involving resettlement shows that resettlement averaged only 9 percent of costs approved at appraisal. Resettlement costs tend to climb as high as 35 percent where high compensation payments are involved and large numbers of people are relocated (China, Shuikou hydropower; Argentina, Yacyreta hydropower) or where the project undergoes a difficult resettlement process (Colombia, Guatape II hydropower).

Project budgets often did not distinguish between land acquisition, compensation costs, and the costs of providing development opportunities to resettlers in their new sites. They rarely distinguish — as they should — between the costs of compensation for public and for private assets, though the cost of reimbursing a railway company for a single big bridge may outweigh the costs for the private assets lost by 10 villages. The distinction is more than formal, because resettlement budgets that appear to be high may in fact mask very low per capita allocations that go *to help directly* displaced families by merging them with very large amounts allocated to compensate expensive public infrastructure.

When resettlement's true costs are assessed incorrectly, local communities are forced to bear an undue share of the burden.

Two problems are typical.

First, compensation rates rarely reflect the true replacement value of lost assets, particularly for resettlers who must replace lost land. Depreciation of assets (that must be replaced at market costs) and property underassessments are both common. In the Karnataka multipurpose dam project in India, for instance, local courts raised compensation rates up to five times the value assessed by project officers, but only for those farmers who could afford to bring a case. Recalculated costs for land acquisition and resettlement in Turkey's delayed Kayraktepe hydropower project went from an estimated \$30 million in 1986 to more than \$180 million in late 1993, an increase due partially to economic growth but primarily to initial underassessments of property values.

Second, delays in making payments to those displaced erode the real value of the compensation and force displaced families to go into debt to survive, thus increasing the difficulty of acquiring a new permanent site. Long delays in paying compensation are common: a case study in Nepal found an average delay of 10 years (!) between property expropriation and compensation payment. OED's 1992 study of the Karnataka project found families, displaced in the mid-1970s, that had yet to receive their compensation 15 years later! In Ghana's Kpong dam project, governmental shortfalls meant that compensation was never paid to about 7,000 affected people and their host communities.

Cost overruns for resettlement are often simple artifacts of initial underestimation of resettlement's true costs rather than, as some tend to interpret, the result of "gold-

plating" resettlement components. For instance, the analysis of all energy projects involving resettlement found that overall project cost overruns averaged 35 percent for hydroelectric dams and 10 percent for thermal power plants, while cost overruns for resettlement components only averaged 54 percent.

Poor resettlement can have major negative effects on a project's other economic objectives, at least in two ways.

First, inadequate resettlement preparation can cause implementation delays, which, in turn, lead to foregone benefits and reduce the project's returns. The costs of doing resettlement well are often less than the eventual costs of doing it poorly. In hard financial terms, resettler resistance to resettlement translates into forgone revenues because of delays in hydropower sales. When the expected stream of benefits from a project is delayed by one or more years, the project's economic rate of return can fall by several points. For instance, the construction of the Uri Hydropower Plant in India, financially and technically assisted by the Swedish International Development Agency (SIDA) fell about 18 months behind schedule largely because the Indian Government "has not solved the property issues with the landowners" (Development Today, 1994).

Our own World Bank study found that a resettlement-caused one-year delay in getting project benefits (with no delay in the schedule of project costs) will reduce the project's net present value by almost a third; a two-year delay, by more than half. Simple economic reasoning suggests that the gains from avoiding such large losses are more than sufficient to finance the cost

of resettlement. For example, in Colombia's Guatapé II Hydroelectric project, which had high resettlement costs – 22 percent of the project total – foregone benefits from even a one year delay (rather than the three years actually experienced), would have amounted to 83 percent of resettlement costs (see *Box 2*). The three year delay cost far more than the resettlement did. In other words, even if good resettlement turns out to be costly, it is even much costlier to tolerate bad resettlement. It is penny wise and pound foolish to do resettlement on the cheap.

Box 2
Avoidable Financial Losses

Delays caused by inattention to resettlement have contributed to driving down the actual or expected economic rate of return of several projects to very low levels, as, for example, in Mauritania's Gorgo dam project, or in India's Subernarekha multipurpose dam project. The following excerpt from the audit report for Colombia's Guatapé II Hydroelectric project is significant:

"... the resettlement and compensation of the individuals who were affected by inundation required lengthy negotiations, largely because the Borrower and the Bank failed to anticipate the complexity of the problem involved ... The final costs of the resettlement, in US\$ equivalent, was more than double the original estimate and the process took about three years longer than envisaged. This delay, which, in turn, delayed the filling of the reservoir and storing of water energy, cost the economy the equivalent of ... energy generation for an entire year." The resulting electricity losses amounted to \$25.5 million of unsold energy, equivalent to 18 percent of the total project cost.

Second, failing to recognize true resettlement costs at project start can exaggerate

an investment's attractiveness and, in extreme cases, can encourage economically marginal projects to proceed even though alternative investments would be more profitable. Instead, sound resettlement financing can enhance a project's overall benefits, because the increased incomes of resettlers can boost a project's rate of return.

Throwing money at resettlement will not solve all resettlement problems, but starving resettlement of resources is clearly the first step towards failure. Our study of Bank-assisted projects has revealed that, historically, World Bank financing for resettlement components of infrastructural projects has also tended to be low. In the past, over 80 percent of World Bank-assisted projects that entailed resettlement did not earmark direct Bank funding (foreign currency) for resettlement activities. However, when country budgets are under constraints, increasing the Bank's share in resettlement finance can help overcome underfinancing. When local funds are scarce anyway, if the Bank is financing civil works construction but does not assist in financing resettlement, the premises are set for unequal advance and uneven quality between these two parts of the same project. Learning from past experiences, in some recent projects, such as the Singur dam in the Hyderabad Water Supply project in India and the China Xiaolangdi Multipurpose dam project, the World Bank has considerably increased its directly earmarked financing for resettlement.

Enabling Resettlers to Share Benefits

Projects that resettle people productively *on land and in jobs* restore income more effectively, after a transition period, than

projects which hand out cash compensation, without institutional assistance for resettlement. Successful income restoration was achieved primarily when projects enabled resettlers to *share in some of the immediate benefits created by the very project that caused displacement*.

Existing evidence worldwide points to unsatisfactory income restoration much more frequently than to satisfactory outcomes. Declining income among relocated populations is significant, reaching in some cases as much as 40 percent. Contraction or non-replacement of income-generating assets reduces the resettlers' ability to recover. Conversely, when the principle of enabling the displaced peoples to share in the benefits generated by the project is adopted, additional opportunities are made available by design to support the recovery of relocated populations.

Sharing project benefits with resettlers has, in fact, multiple advantages. Benefit-sharing generates resources additional to those budgeted and allocated up front for resettlement. It also gives resettlers a vested interest in the project, not just an adversarial relationship. Resistance to dam construction and resettlement is likely to be reduced. Sharing also makes the project more equitable morally, as the beneficiaries are not gaining at the expense of the displaced, victimized people. Most importantly – sharing can improve resettlement performance and create a sustainable basis for resettlement.

In a recent study, dams were found to be a type of project with substantial potential for sharing benefits with resettlers (van Wicklin, forthcoming). Past experience shows that many projects shared irrigation

benefits by moving resettlers from the reservoir into the newly irrigated command areas. Relocation sites could be provided with electricity, as in Yantan Hydro in China. The reservoirs themselves became a benefit-generating resource when they were developed into fisheries using cage aquaculture: those resettlers who were given access to reservoir aquaculture were better off. The Saguling and Cirata reservoirs in Indonesia produced seven times as much income from fishing as the inundated land did previously when cultivated with rice. Some projects, such as Kedung Ombo in Indonesia and Ertan in China, also allowed resettlers to use the drawdown areas for agriculture. The China Lubuge Hydro project employed some resettlers directly in reservoir maintenance.

Another form of benefit-sharing is setting aside a portion of electricity revenues for resettlers and other people in the area affected by the dam and reservoir. The China Lubuge, Yantan, and Ertan projects set aside a small fraction of one yuan per thousand kilowatt-hours for use in the resettlement area. National policies in Colombia and Brazil require 4 percent and 6 percent respectively of hydro revenues to be used for this purpose. This creates an ongoing income stream, for long after project completion, to provide vitally needed resources during the resettlement stabilization phase, when the projects' resettlement budgets have been long exhausted.

Effective Institutions

Effective organizations are the keys to translating resettlement plans into practical, successful actions on the ground.

The Bank's experience with the institutions charged with planning and implementing resettlement programs shows repeatedly that institutional weaknesses are the soft link that undermines resettlement performance. But few projects have paid adequate attention to ensuring that organizations in charge with resettlement are well-designed and operationally capable, matching their *structure* with their *functions*. Where reliable organizational capacities to carry out resettlement do not exist, they must be created during the project.

Certain problems are intrinsic to most resettlement organizations. These include inadequate mandate, insufficient staffing, poor coordination, budgetary problems, poor management, and lack of accountability. Improving the performance of resettlement agencies depends most heavily on re-defining responsibilities, enhancing the incentives and capacities of resettlement agencies, increasing accountability, developing appropriate staff teams, and effective, participatory monitoring capabilities.

Resettlers' Participation

It may seem paradoxical to advocate the "participation" of people in projects that seek to involuntarily displace them. Yet securing such participation is essential in many respects. People whose existence and way of life will be profoundly changed by resettlement have the right to be consulted about their future and to participate in the decision-making that will transform their lives.

When resettlers are actively involved, premises are created for fewer conflicts and delays, greater resettler satisfaction,

and increased long-term sustainability. In many cases, giving displaced people a greater role in the planning and implementation of their resettlement reduces the need for institutional coordination, a major weakness in many resettlement programs. More participation can also lower total project costs, even though greater participation may require somewhat longer preparation time.

Participation takes several forms. The first is to inform the affected populations in time about the need to resettle, about their entitlements, eligibility, options, due process, and appeal mechanisms. Next, people and their organizations should be consulted about alternative options and solutions to *avoid or minimize displacement*, or to identify suitable, more desirable relocation sites.

Other possibilities for direct involvement include helping set correct land compensation rates, negotiation, designing income generation options, and involvement in handover activities. Many NGOs have proven themselves to be effective in *designing resettlement plans* and realistic options, acceptable both to the people and to governments, and in *mobilizing the energies of the resettlers* for timely implementation.

Finally, involving resettlers in project monitoring vastly increases accountability. In Mexico's Zimapan Hydroelectric project, project funds were used for the resettlers' bargaining committee to hire their own master architect to supervise construction of their new houses. In Colombia's Urra Hydro I project, resettlers maintained their own records describing the frequency and outcome of visits by project staff, which were then checked by independent monitors. Resettlers can also

monitor the quality of project services. To improve participation in planning resettlement in future projects, the Bank requires its borrowers to make the draft resettlement plans available to the population in the project area, for public review and comment *before* the Bank approves the funding for the new project.

Improving Resettlement for Development

Based on our Task Force study's recommendations, the Bank has adopted important decisions and measures to achieve further improvements in resettlement operations. Many such measures are probably relevant, with adjustments, to similar problems encountered in projects financed by bilateral donors and domestic sources. Broadly, these measures can be grouped into four sets:

Strategic priorities

These include:

- a) ensuring the government's commitment by, among other things, making the agreement on policy explicit from the outset, and requiring the adoption of legal frameworks for projects with large scale resettlement operations;
- b) enhancing the local institutional and organizational capacity through special assistance;
- c) improving project design by avoiding or reducing displacement as much as possible, and by creating explicit timetables that link progress in civil works to the gradual advance of resettlement;

- d) promote people's participation;
- e) provide increased Bank financing to future projects with resettlement, as well as supplementary financing to resettlement in ongoing projects, when appropriate;
- f) diversify project vehicles, so that future infrastructural operations requiring very massive displacements can be processed as twin projects—one for the civil works and another as a stand-alone resettlement project; and
- g) strengthen the Bank's own institutional staff capacity for addressing the complex issues of resettlement

Remedial and retrofitting actions

Near-term remedial actions have been initiated in midstream in those ongoing projects found to fall short of policy and legal provisions (e.g., substantial restructuring, additional financing, the creation of resettlement agencies, revised plans and budgets, and so on).

Improving project processing

Improvements are being introduced in the analysis of resettlement at appraisal, in the design of development packages, in the in-house review of resettlement components, and in the staffing of relevant departments, to enable them to address resettlement professionally. The Bank will encourage borrowers to carry out pre-project *pilot schemes* to test the adequacy of proposed resettlement options. In major operations—particularly for dams—resettlement advisory panels will be increasingly used, along the lines pursued in establishing dam safety panels.³

Supervision

Field supervision of resettlement components in projects will be intensified (at least once every 12 months) and the Bank will provide more technical and social assistance to the borrowing agencies for improving the quality of resettlement.

These days, the attention of governments and of the public opinion is shifting more and more to the social aspects of development. Involuntary displacements will continue to occur in all countries for reasons related to technical progress, the

betterment of living conditions, and expansion of public services. The experience with various types of involuntary resettlement has generated increased knowledge for planning and for protecting the entitlements and livelihoods of those affected. Since involuntary resettlement is recognized as an increasingly political, social, and financial matter affecting large numbers of people, it will command increased attention. Even with such resources resettlement will remain a formidable challenge, but a challenge that can and must be met successfully as part of the overall development process.

Annex 1: Dams Displacing more than 4000 People

Country	Project Name	FY**	MW**	HA**	Displaced People
Albania	Fierza	1978	500	5500	20000
Argentina	Aqua Vermelha	1979	1380	64300	4345
Argentina	Piedra del Aguila	1991	1400	29200	9000
Argentina/Paraguay	Yacyreta	1998	2700	172000	50000
Argentina/Uruguay	Salto Grande	1979	1890	78300	8000
Bangladesh	Kaptai (Karnafuli)	1962	1400	65600	100000
Brazil	Aqua Vermelha	1979	1380	54959	4345
Brazil	Cachoeira Porteira	PI**	1400	91100	8000
Brazil	Castanhao	PI	75	22900	12000
Brazil	Estreito	1969	1040	710	15000
Brazil	Foz do Areia	1980	1674	16700	8400
Brazil	Furnas	1963	1216	144000	8500
Brazil	Ilha Solteira	1973	3200	125700	6150
Brazil	Ita	1998	1620	13800	11500
Brazil	Itaparica	1986	2500	80000	49500

This table is based, in part, on resettlement data collected by our Task Force, which carried out the Bankwide Review of Resettlement in 1993-1994, complemented by information from a data-bank on dams assembled by Robert Goodland. The data comes from various sources, only some of which are in the public domain; part of the data are yet unpublished project documents. For some of these dams, the information reflects best estimates made at project inception. Efforts have been made to revise initial estimates in light of final results for all completed projects, and this has been done for virtually all dam construction projects assisted by the World Bank that were covered by the Bankwide Review of Resettlement. Data on projects not financed by the Bank are from published sources, as available. Readers who possess reliable information that can correct data in this table are kindly invited to write to the World Bank (the Environment Department, 1818 H. Street, NW, Washington, DC, 20433).

* Abbreviations: FY = fiscal year in which the project was completed, or is expected to be completed; MW = installed capacity in megawatts; PI = planned or under construction; HA = land lost to reservoirs, in hectares; 0 = not available to us when this table was compiled.

Country	Project Name	FY**	MW**	HA**	Displaced People
Brazil	Marimbondo	1975	1440	43800	5500
Brazil	Mochadinho	-	1200	25200	15700
Brazil	Nova Ponte	1994	510	43300	9298
Brazil	Paulo Afonso I-IV	1979	3984	1600	52000
Brazil	Porto Primavera	1994	1800	225000	5138
Brazil	Sao Simao	1978	2680	68000	14000
Brazil	Serra da Mesa	1996	1200	1784400	5900
Brazil	Sobradinho	1978	1050	415000	65000
Brazil	Tucuruí	1983	7600	243000	30000
Brazil/ Argentina	Garabi	PI	1800	81000	15000
Brazil/Paraguay	Itaipu	1982	12600	135000	59000
Cambodia	Sambor	PI	3300	88000	5120
Cambodia	Strung Treng	PI	980	64000	9160
Canada	Saunders/Moses	1958	1824	8094	6500
China	Daguangba		240	9900	23800
China	Dongjiang	1989	500	16000	53000
China	Ertan	1999	3300	10100	30000
China	Jinping Stage 1-Y	PI	3000	9500	5769
China	Longtan	2005	4200	37000	73392
China	Lubuge I		450	145	5000
China	Shuikou I & II	1996	1400	9350	67239
China	Three Gorges	2008	8200	110000	1300000
China	Wuqiangxi	1995	1200	17000	84800
China	Xiaolangdi	2001	1800	27200	181600
China	Xiawan	PI	4200	12000	25000
Colombia	Guatape		560	6340	5000
Colombia	Guatape (Penol)		560	6340	5000
Colombia	Guavio	1989	1600	1440	5500
Colombia	Salvajina		270	2220	10000
Colombia	Upia	PI	1670	39600	5000
Côte d'Ivoire	Kossou	1972	174	178000	85000
Egypt	Aswan High	1970	2100	400000	100000
El Salvador	Cerron Grande	1977	135	13900	13339
El Salvador	Zapotillo		216	9300	11000
El Salv./Honduras	El Tigre		704	7000	6700
Ghana	Akosombo/Volta	1965	833	848200	80000
Ghana	Kpong	1981	160	3500	7000
Honduras	El Cajon	1985	292	9400	4694

Country	Project Name	FY**	MW**	HA**	Displaced People
India	Balimela	1977	360	17496	10000
India	Bargi	1990	105	80900	113600
India	Bedhi		210	12400	5100
India	Bhakra	1963	1204	16600	36000
India	Gandhi Sagar	1962	1115	86000	52000
India	Godavari		660	100858	38100
India	Hirakud	1957	347	74300	110000
India	Indravati		1000	40000	8800
India	Kabini	1974	32	6100	15000
India	Nagarjunasagar	1974	810	28500	28000
India	Narmada Sagar	1993	1000	90820	80500
India	Pong	1974	360	29000	150000
India	Rengali	1992-9	250	414500	80000
India	Rihand	1962	300	46900	60000
India	Sardar Sarovar	2001	1450	37590	320000
India	Sharavathi (Karnata)	1987	510	5921	12500
India	Sri Rama Sagar (Po)	1983	36	43400	16000
India	Srisailam	1984	440	60629	100000
India	Tehri	1997	2400	4200	100000
India	Ukai	1972	300	60000	80000
India	Upper Indravati		600	11000	26505
India	Upper Kolab	1991	320	11350	15895
Indonesia	Cirata	1987	500	6200	56000
Indonesia	Kedung Ombo		29	5600	29000
Indonesia	Kota Panjang	C	114	12400	24930
Indonesia	Saguling	1984	700	5340	60000
Iran	Dez	1978	840	6290	17000
Kenya	Kiambere	1988	140	2500	6000
Korea	Ghungju	1985	470	9700	37000
Laos	Luang Prabang	PI	1410	11000	6580
Laos	Nam Beng 1	PI	45	6500	8000
Laos	Nam Khan 1	PI	115	5600	19300
Laos	Nam Lik 1	PI	130	16000	15300
Laos	Nam Ngum 3	1994	400	5870	4400
Laos	Nam Ou 1	PI	395	13800	23900
Laos	Nam Ou 2	2007	950	10700	26200
Laos	Nam Suang 1	PI	56	1330	5300
Laos	Nam Suang 2	PI	195	20500	8700

Country	Project Name	FY**	MW**	HA**	Displaced People
Laos	Nam Tha 1	PI	230	26500	5700
Laos	Nam Theun 2	1999	600	34000	4500
Laos	Ngum 4	PI	290	11800	4400
Laos	Pak Lay	PI	1320	11000	11780
Laos	Se Bang Fai 1	PI	60	27000	10600
Laos/Thailand	Chiang Khan	PI	570	9000	12950
Laos/Thailand	Low Pa Mong	PI	2670	56000	52000
Laos/Thailand	Pa Mong A	PI	2030	12000	23260
Lesotho	Katse (Highlands W)	1996	180	3600	8500
Malaysia	Bankun	2002	2400	70000	9000
Mali	Manantali	1988	200	48000	11000
Mali	Selingue	1980	44	40900	12500
Mexico	La Angostura	1974	1100	64400	5500
Mexico	San Juan Tetelecin	PI	620	14000	28000
Mozambique	Cabora Bassa	1974	2075	380000	250000
Nepal	Bagmati	PI	189	10500	10000
Nepal	Buhri Gandaki	PI	600	5000	17000
Nepal	Kali Gandaki 2	PI	660	10800	40000
Nepal	Karnali (Chisapani)	PI	10800	33900	60000
Nepal	Pancheswor	PI	7200	12100	14500
Nepal	Sapta Gandaki	PI	225	1800	6000
Nepal	Sapta Kosi	PI	3600	19500	75000
Nigeria	Kainji	1968	760	126000	50000
Pakistan	Kalabagh	PI	2400	55000	83000
Pakistan	Mangla	1967	1000	25300	90000
Pakistan	Tarbela	1976	3478	24280	96000
Panama	Bayano	1976	300	30000	4500
Philippines	Casecnan		156	3600	20000
Philippines	Pantabangan	1977	100	8900	13000
Romania/Yugoslavia	Portile de Fer (Iron G.)	1972	1050	5200	23000
Russia	Boguchany		4000	149500	12200
Russia	Bratsk	O	4500	549099	67400
Russia	Cheboksary	O	820	87500	35000
Russia	Gorky	O	520	129200	48000
Russia	Irkutsk	O	62.4	138600	18000
Russia	Kama	O	504	175500	48000
Russia	Krasnoyarsk	O	6000	175900	56100
Russia	Lower Kama	O	428	110600	38100

Country	Project Name	FY**	MW**	HA**	Displaced People
Russia	Volga (V.I. Lenin)	O	2300	504000	150000
Russia	Volga (XXII Congre)	O	2541	269300	15000
Russia	Votkinsk	O	1000	92200	61000
Russia	Zeya	O	13300	229500	4500
Sri Lanka	Kothmale	1988	200	950	13000
Sri Lanka	Victoria	1984	210	2270	45000
Suriname	Brokopondo	1965	30	150000	5000
Syria	Tabqua (Thawra)	1976	800	60000	60000
Tanzania	Rusumo		60	39000	30000
Thailand	Bhumibol	1964	535	30000	25000
Thailand	Khao Laem	1986	300	38800	10800
Thailand	Pak Mun	1994	34	6000	4945
Thailand	Srinagarind	1981	720	41900	6400
Thailand	Ubol Ratna	1986	25	41000	30000
Togo/Benin	Nangbeto	1988	63	18000	10600
Turkey	Altinkaya		700	11831	24565
Turkey	Ataturk	1993	2400	81700	55000
Turkey	Karakaya	1987	1800	29800	20000
Turkey	Kayraktepe	1996	420	13300	6000
Turkey	Keban	1974	1330	67500	30000
Turkey	Sir	1991	284	4750	7000
USA	Grand Coulee		6494	33306	10000
Uzbekistan	Charvak		620	4000	9184
Vietnam	Hoa Binh	1994	1920	5270000	58000
Zimbabwe/Zambia	Kariba	1959	1266	510000	57000

Notes

- ¹ I have dealt with these topics in several other writings as well (see bibliography).
- ² **Resettlement and Development.** *A World Bank Review of Projects Involving Involuntary Resettlement 1986-1993*, The Environment Department, April 1994 (Republished in 1996). This study can be obtained by writing to the World Bank's Environment Department or to the World Bank's Public Information Center, 1818 H Street, NW, Washington, DC 20433.
- ³ One excellent example of the effectiveness of such an Advisory Panel is the work carried out by the independent international panel created for the Ertan Hydropower dam in China. The panel consists of two internation-

ally reputed social anthropologists – Professor Fredrik Barth and Professor Thomas R. Williams – and of several Chinese experts. The social monitoring fieldwork of this panel during the implementation of Ertan's resettlement operations has led to important proposals for improving the process in mid-stream, including re-siting one of the initially envisaged new settlements and of some facilities (Barth, 1994; Williams, 1994). Another similar international panel led by an anthropologist, Professor Thayer Scudder, that monitors resettlement implementation in the Lesotho Highlands Water project, has helped identify important problems that otherwise could have been overlooked, and made effective recommendations for improving the relocation process.

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