# INCURSION OF TECHNOLOGY:
## THE CASE OF THE KALIWA-KANAN DAM IN TANAY, RIZAL

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The worldwide reorganization of industrial production brought about by changed conditions for capital expansion[1] on the one hand, and the rise of authoritarian states in the Third World on the other – serve as the context against which the nature and extent of the impact of technology in the Philippines could be better understood. It is only in understanding such a context that "development" and "underdevelopment" could be seen as related facets of a single process rather than separate phenomena.

In the mid-fifties, a new scientific and technological revolution swept the industrialized countries bringing forth a new basis in the international division of labor.[2] The innovations that emerged out of soplisticated high technology brought with them new conditions for the expansion of capital.[3] Technological advancement in transport, communications, data transmission and processing rendered production control less dependent on the geographic distance of industrial locations. It became "possible to have producion units in many different locations and yet control the whole network with a global management policy from the central headquarters."[4]

Hence in the mid-sixties, a reorganization of industrial production on an international scale ensued in the form of a massive relocation of world market-oriented industries for the industrialized capitalist countries to the Third World. This was the beginning of a re-devision of labor on the basis of which a small number of industrialized countries and a much greater number of under-developed countries (integrated into the world economy essentially as suppliers of raw materials and occasionally of cheap labor) stood ranged against each other."[5] The new order of the international economy has made it possible for the Third World to become production sites of light, labor-intensive industries which utilize locally available cheap manpower to produce low-cost manufactured products of luxury food for export.

The abovementioned changed condition explains the presence in our midst of intermediary, processing types of industries exemplified by the export-processing zones, part of the complementation schemes promoted by transnational corporate interests. At first glance, this development appears to be a step towards industrialization in the Third World, but in reality, it has been "designed to channel and control techno-industrial development of these countries to suit global purposes" of transnational capital.[6] The chimera of technological know-how and the relatively high employment

level that these schemes seem to bring, give the Third World the illusion of progress and development, even the hope of industrialization through the transfer of technology.

The character of the political and economic relationship of the industrialized countries and the Third World has been beclouded by such an appearance of technological sharing. Little has been said about the fact that:

> Only that type of technology is transferred which benefits the owner of the process. The countries to which the technology is transferred are confined to light and medium industries producing consumer goods for other markets. Many restrictions are imposed, such as stipulations which enable the technology supplier to control and intervene in the management of the buyer's enterprise, restrictions on research and technological development by the buyer, requirements that the technology buyer obtain equipment, tool parts or raw materials exclusively from specified sources, prohibitions on the export of goods to certain markets, prohibition on the use of supplementary technology by the buyer, limitation on production, etc.[7]

There has been less acknowledgment (on the part of policy makers and planners) of the fact that the relationship between the lender of technology and the borrower or between the loan donor and the recipient is one of dominance by the one wielding control over superior technology. While the roots of the dominant role of the industrialized countries and the subordinate role of the rest could be traced historically, the status of such a relationship has been "maintained through an international division of labor in science and technology in which the highly developed countries keep control over advanced scientific research and dynamic technologies while the Third World countries are limited to the acquisition of low-level, obsolete or static technologies."[8]

Incongruous scenes of huge technological complexes in the midst of communities living in marginal existence have been common sights in our part of the world. One of the most familiar scenarios of the decade of the seventies and the early eighties has been the launching of World Bank or Asian Development Bank loan-funded hydro-electric power dams on land occupied by tribal Filipinos and settlers. Out of the mouth of planners come prophesies of cheap energy sources and "development". The people who are to be displaced by the technological marvels resist or demand decent relocation sites. Military forces then enter the picture to insure that local resistance does not stand in the way.

There may be more of such scenarios since the government, as part of its electrical power generation scheme and strategy of export-oriented industrialization plans to build at least forty major dams during the next twenty

years. Thirty-one have been scheduled for construction within the Ten-Year Energy Program from 1979-1988.[9]

It is significant to note that almost all the dams to be built are in lands presently occupied by ethnic minorities. Since they will be built in wide valleys in otherwise mountainous areas, they threaten to submerge the best farm land and settlements of the communities affected by the projects.[10]

The Chico River Development Project, if it pushes through, will displace approximately 15,000 families or 100,000 Kalingas and Bontocs. Unable to push through its dam projects along the Chico River, attention has been shifted by planners to the Abulug river in the sub-province of Apayao. Construction has proceeded without much fanfare. The Abulug dams will affect some 30,000 Isnegs.

In Nueva Vizcaya, the giant Magat dam complex is about to dislocate thousands of Ilongots, Igorots and also lowland settlers.

In Surallah, South Cotabato, some 5,000 Tibolis are in danger of relocation in the wake of plans to tap the waters of the Lake Sebu for a dam.

In Bukidnon, the waters of the Pulangi River (one of the largest river systems in the Philippines) will be harnessed to run six dams affecting an estimated area of 500,000 hectares and thousands of Bukidnons.

There are more examples of dams that threaten to dislocate tribal Filipinos and settlers from their land, the source of their livelihood. The funding for those projects has been significantly in the forms of loans from two international financing institutions, the World Bank and the Asian Development Bank. Their participation also covers pre-feasibility studies, contract agreements, technical assistance, consultancies, equipment, import requirements, etc. In fact, the World Bank has gone beyond the project basis of participation. It has "suggested" to the national planners (and apparently, the suggestion was accepted as evidenced by the official reports of the Ministry of Industry)[11] the "restructuring" of one of the key sectors of the economy according to World Bank specifications as condition to loans.[12] This comes in the form of "structural adjustment loans" which require the dismantling of protective tariffs to allow products of Western business to flood domestic markets; the expansion of export promotions schemes to assure the same markets cheap raw and intermediate materials; and the establishment of free trade zones to guarantee low-cost production for transnational corporations' subsidiaries.[13] These requirements have been incorporated in the seven major components of the Philippine industrial strategy for the eighties – i.e. the "rationalization and restructuring of existing key industry sectors" (Annual Report, Ministry of Industry, 1 May, 1981,pp 16-22).

There appears to be a division of spheres of operation between the two

international banks when it comes to funding projects. The Asian Development Bank concentrates in Mindanao where Japanese investments are quite entrenched. The World Bank takes care of the Luzon and Visayas projects. Four out of the seven Agus dams in Lake Lanao and Agus River of Lanao are funded by Asian Development Bank. The Lake Sebu dams of South Cotabato, the six dams of the Pulangi River, Bukidnon and Cotabato, the three dams in Agusan del Sur, etc. will be ADB-funded. The Magat River Multipurpose Project in Isabela, the Abulug Dam I and II and the Chico River Dams in Kalinga-Apayao, the Kaliwa-Kanan Dams of Tanay, Rizal, the Wahig-Pamacsalan Dam in Bohol will have World Bank funding.

As development plans are made in the drawing boards of the lending institutions and national ministries, technology in the form of hydroelectric power dams has become a continuing threat to the most vulnerable citizens of the Republic. This is more pronounced among those living within the affected watersheds of the proposed dams.

> Under new government legislation, the National Power Corporation has wide-ranging powers which include the powers to restrict or prohibit farming within the watershed of a proposed dam and the power to enforce relocation of residents to areas outside the watershed as and when they deem it necessary. There is, in the scale of the over-all program, a danger that most of the watersheds of the major rivers of the country will be redefined as 'critical watersheds.' This would threaten the mountain homes of many minorities – and a total of more than one and a half million people.[14]

A closer look at the case of the barrios of Tanay, Rizal will visualize and concretize the dilemma that tribal Filipinos and small farmer-settlers face vis-a-vis the incursion of technology they are not in control of.

The case of the Kaliwa-Kanan Dam Project of Tanay, Rizal illustrates the logic of the apparent frantic move to build hydro-electric power plants through World Bank or ADB loans.

In a small barrio of Tanay, Rizal, the early morning crowing of roosters and chirping of birds are drowned out by the relentless droning of machines drilling and testing the strength of the ground. Engineers display gray-colored, tube-shaped rock samples from the earth's crust neatly piled in boxes ready for transport and further study. Similar drilling operations are going on in the nearby barrios of Mamuyao, Laiban and Sto. Niño near the confluence of the Limutan and Lenatin rivers, site of a dam to be built in the area.

The project has been called the Kaliwa River Project or the Manila Water Supply III. It calls for the construction of a dam at Laiban, Tanay to transform the Lenatin and Limutan rivers (which drain into the Kaliwa

River). The dam will have a 21-megawatt hydro-electric power plant. This is a joint effort of the Manila Waterworks and Sewerage System and the National Power Corporation.

To be specific, the project will have the following components:

- a 113 meters-high rockfill dam (volume: 9.7 million cubic meters), with
- a reservoir with a live storage of 500 million cubic meters
- a 12.4 kilometer tunnel, 3.1 to 3.4 meter in diameter
- a hydropower plant with an installed capacity of 21 MW
- a water treatment plant with a 2,400 mld (630 MGD)
- an 80 MG treated water storage reservoir
- 307 kilometers of primary (300 mm to 3900 mm) mains
- 1010 kilometers of secondary (100 mm to 250 mm) distribution network
- 250 kilometers of tertiary (50 mm to 75 mm) distribution network
- 700,000 domestic service connections; 52,000 industrial-commercial-institutional service connections.

The dams and reservoir are designed to provide drinking water and electricity to Metro-Manila and the planned industrial complex in Infanta, Quezon Province called "Lungsod Silangan".

The Kaliwa-Kanan Dam is only part of the Lungsod Silangan Project which envisions the growth of the area along the Marikina-Infanta Road, all to facilitate the development of Infanta as a shipping point for export of minerals, logs and associated secondary products that can be processed.[16]

Lungsod Silangan itself falls under the country's general thrust towards export-oriented industrialization which relies primarily on foreign technology and capitalization. It will be the site of another export-processing zone project promulgated by virtue of Investment Incentives Act of 1967 and the Export Incentives Act of 1970 – laws which gave assurance of more returns for transnational corporations and traders through tax holidays, etc. The projects to be put up are as follows:[17]

1. Marikina-Infanta Highway (ongoing)
2. An Export-Processing Zone (Infanta)
3. An International Airport

4. A container trans-shipment port and other port facilities
5. A damsite (Kaliwa-Kanan Rivers)
6. An Aqua-Farming Development Project
7. A marine fisheries complex
8. A recreation center
9. A communications center/coordination center with Central Bank and other ministries
10. A national park
11. A security and defense base.

The Kaliwa Dam has been chosen to provide 1,909 million liters of water daily in order to satisfy the water needs of the Lungsod Silangan and the inhabitants of Metro-Manila.

The total cost of the project is estimated at ₱5.7 billion (by January 1980 prices). The government needs $450 million in foreign loans if it is to build the project by 1987. The World Bank, Asian Development Bank, and the Overseas Economic Cooperation Fund (OECF) of Japan have been asked to finance the project. Not satisfied with the technical feasibility study made by five consultancy firms, the World Bank has delayed granting more loans until it is assured of the viability of the project. A World Bank-recomended consultancy agency, James Montgomery, is presently doing its own feasibility study.[18] To date, "the Asian Development Bank has programmed an initial allocation of $60 million for this project out of its country lending program. Funding will be sought in four loan packages."[19] Loans for the construction stage (aside from the diversion tunnel) have not yet been obtained.

The construction of the project is divided into three phases over a 14-year period from 1981 thru 1994. Phase I will comprise the construction of the Kaliwa Dam between the barrios of Layban and Daraitan in Tanay, Rizal at the confluence of rivers Limutan and Lenatin. Phase II will include the construction of Kanan Dam at the upper Kanan river in the Quezon province. Phase III will be the construction of a series of dams, the first of which will be at the confluence of Rivers Kanan and Matalia and along the Agos River. As per government planners' agenda, the first phase will become operational by 1987 while at least, one barrio, Layban, will have been converted into a huge reservoir of water by 1984.[20]

From interviews with some MWSS engineers, the life-span of the dam (Kaliwa-Kanan) will be around fifty years.

How many and who will be affected by the dam project?

Massive dislocation awaits close to 1,500 families or 10,000 people in the Kaliwa Dam area alone. The impounded waters of the dam will submerge seven barrios, namely, Sta. Inez, Sto. Niño, San Andres, Mamuyao, Tinucan, Cuyabo and Layban. Twenty-nine thousand hectares of land will be inundated. This could increase to around 200,000 hectares if the watershed areas are included. Part of those which will be submerged are communal irrigation systems, rice fields and other subsistence and cash crops.

To the horror of the residents of the seven barrios, in November 1980 (and recently in December, 1981), they received notices saying to the effect that their land "will be withdrawn from settlement, cultivation and further disposition."[21] A number of the settlers has been in the area for twenty to twenty-five years, some coming from Aklan, Iloilo and Capiz. Others come from various parts of Central Luzon, Bicol and the Mountain Province. There had been some who tried to work in Manila, mainly as drivers, mechanics, laundresses, dressmakers, etc.

In 1956, President Ramon Magsaysay declared the mountains from Montalban to Tanay a settlement area. Similar areas were also opened in Mindoro and Mindanao for settlers, partly to ease the land tenure problems of tenants and sharecroppers in some areas of Luzon and the Visayas. Confrontations between government forces and peasant armed groups were on the rise at this period.

By all indications, from talks with the farmers of the area, very few have titles to their land. In one barrio of around 130 families, for instance, the barangay captain can only cite three who had titles to their land, despite their ten to twenty years of stay in the area.

Around 500 families of Dumagats and Remontados stand to lose their homes and their sources of livelihood because of the project. At the other side of the Sierra Madre in the Infanta-Real-General Nakar area, some 600 Dumagat families will be ejected from their land for the operationalization of an export processing zone, a network of highways and other infrastructures related to Lungsod Silangan. These tribes are shifting cultivators. They are also engaged in hunting and gathering forest products, like rattan, honey, and fish from the rivers. They have considered this part of the Sierra Madre the land of their ancestors. Take them away from their land and they will be completely disoriented.

What have been planned by the government for those who will be dislocated because of the dam?

Ministry of Waterworks and Sewerage Systems general manager Oscar Ilustre said that the agency "will pay for all expenses" in the relocation of the affected families. There had been meetings with representatives of the barrios, according to project manager Arsenio Macaspac. In such consultation

meetings (with barangay captains and some town officials) the people were supposed to have been willing to give way to the project.

But from interviews and statements of officials who visited Tanay, there appears to be no definite plan for resettlement of the people of the seven barrios to be submerged by the project. "Somewhere in Quezon", was the Ministry of Agrarian Reform's official reply to the barriofolk's queries about where the government intends to put them. The project manager was quoted saying that a definite relocation site has not been determined, although proposed sites have been Daraitan, Rizal and in the Lungsod Silangan areas in Infanta, Quezon.[22]

An ad hoc committee had been created to take charge of the relocation of the affected families. It is composed of the Ministry of Waterworks and Sewerage Systems (MWSS), Ministry of Human Settlements, Ministry of Agrarian Reform (MAR) and the local officials, including Tanay's governor and mayor.

To determine how much compensation is due each of the farming families, the MAR conducted an inventory of houses and farms in 1979. It was mentioned by the residents in early 1981 that they "discovered that the inventory contains a number of names of non-existent people," making them wonder where the compensation money will go.[23] Another inventory was conducted in February 1982.

So far, what is the status of the project?

There had been groups of workers who were digging the ground and drilling in the sitios of Magata, Leyban and Sto. Niño, Tanay last year (1981). Recently, the people in the area noticed that they have stopped this activity. GROGUN, the same company that did the drilling for the Pantabangan Dam, is the corporation in charge of this. Blasting for the tunnel is going on both in the Tanay area and in the Infanta side. This diversion tunnel is scheduled to be finished by late 1983.

The government has already invited foreign contractors to manage the construction of the dam. The announcement for bidding was made in Switzerland and circulated in the local dailies' classified ads section.

What is the response of Tanay residents to the project?

In the barrios affected and in the outlying communities, the people are meeting to discuss the measures to be taken in relation to their problem, most immediate of which is the Kaliwa-Kanan Dam Project. Some residents of the area also had occasion to meet with government officials of the MAR and MWSS.

Not without basis, they have been very cautious about believing the terms and promises offered in exchange for the dam package. A fact-finding team mentioned the case of the Remontado families of sitio Bayucboc in the nearby barrio of Baras. They were promised that they would be paid for

their fields and houses which were bulldozed by men from the Manila Seedling Bank two years ago. Until now, they have not received a single centavo. The same team report mentioned that "in another Tanay barrio, many trees were felled, fields ran over and deep pits dug in a site in which the First Lady had chosen to build a basilica. The owners of the land were promised payment; but when the project was abandoned, so were the promises."[24]

They have also heard of the Pantabangan farmers, some of whom are relatives of some residents of Tanay. They narrated how they have to eke out a living in the hilly, stony place where they were relocated with grand promises for just compensation for their land and homes.

In a series of barrio meetings held between February and March 1981, the residents expressed their opposition to the project and resolved to unite and sign a petition towards that effect. Concretely, a petition was signed and passed through the seven barrios enjoining people to get unified in a common stand against the project. In a copy sent to President Marcos, the following were mentioned as reasons for opposing the project:

1) The time, money and efforts that the people and the government poured into the development of these seven barrios which will be inundated by the dam will go to waste;

2) A watershed with lush forest cover is necessary for the efficient storage of water, the prevention of siltation and the long-term existence of the dam. At present, such a necessary watershed does not exist within the dam collection basin; and

3) The construction of the dam will severely upset the lives of tribal Filipinos, the Dumagats and Remontados who have been living in the area for generations.

In one of those petition signing meetings, two truckloads of Philippine Army personnel were spotted by the residents in the vicinity. But through the insistence of the barrio captain of the area, they left. The people proceeded to discuss their main agenda for the day, and gathered almost 2,000 signatures for their petition letter. One time, a Philippine Army Medical Team (Dentist), in a sudden burst of 'civic action' visited the barrios which will be affected by the project. The residents wondered about the timing of the visit of such a teeth-pulling team.

Recently, representatives of the barrios and of Tanay, Rizal formed the Ugnayan-Damayan Alang-alang sa Katiwasayan ng mga Mamamayan sa Kabundukan ng Sierra Madre (Rizal-Quezon). They have asked for the holding of a public hearing to clarify the problem related to the project. They have also asked for the fulfillment of certain promises to the people, like the titling of their lands, the compensation of the people of the sitio Mayagay,

Sampaloc, Tanay, Rizal in connection with the planned but discontinued basilica in the area; the electrification of the mountain barrios of Tanay; the provision of doctors badly needed by the barrio folks; and additional transportation for the people of the area.

Certain characteristic features of the energy-generating technology introduced and encouraged by our planners are illustrated in the case of the Kaliwa-Kanan Dam Project.

First, it requires massive capitalization. Because of the scale and complexity of the major energy projects, no local firm has the capacity to compete with TNCs from the industrialized countries for contracts on the projects. For some minor aspects, subcontracting is passed on to local firms; sometimes, joint ventures are practiced.

Second, it is dependent on international loans and the expertise of the "owners" of such technology. This being so, it is usually contract-linked. The *quid pro quo* comes in the form of an agreement which insures the participation of firms on the choice of the donor. It is, in other words, subject to the requirement needs of the financing sources, like the World Bank or the ADB, even if such needs run counter to the rights of tribal Filipinos and small farmers to their lands and other prerogatives of living.

Third, it is complementary supportive technology. The annual report of the Ministry of Industry says, for example, that "the government's main role in industrialization in the eighties will be to provide the infrastructure and policy environment which will allow the market mechanism to operate effectively."[25] The hydro-electric power dams provide cheap-energy sources for industrial enclaves, like export processing zones and urban industries dominated largely by TNCs. In 1975, for instance, only around 14% of Philippine electricity was consumed for household use. Within the city areas, consumption is dominated by industrial consumers led by foreign-controlled companies (see Table I).[26]

Fourth, it has been pushed without meaningful consultation with the people who will be directly affected by the project, specifically, the Tribal Filipinos and the small farmers.

Fifth, there is a lack or in some cases, an absence of plans for the people to be displaced in the process.

Sixth, it displaces and dislocates people; and since many are located in tribal lands, it threatens the very survival of ethnic minorities in the areas. Inasmuch as the cultures of the Tribal Filipinos are deeply rooted in their lands, the complete loss of the latter would likewise mean the complete loss of their identity as distinct peoples.

Seventh, having been denied participation and not having been consulted in the planning and implementation process, and because of its effects

Table I. **Energy Consumption Shares (1965 – 1978) and Projected Consumption Shares (1981 – 1985)**

In percentage shares

| Sector/Year | 1965 | 1970 | 1975 | 1977 | 1978 | 1981 | 1985 |
|---|---|---|---|---|---|---|---|
| Industry | 32.01[1] | 33.7[1] | 46.0 | 47.9 | 49.0 | 42.8 | 47.5 |
| Transportation | 60.0 | 58.3 | 32.1 | 29.4 | 29.0 | 35.7 | 30.5 |
| Household | 6.9[2] | 6.8[2] | 13.9 | 14.9 | 13.8 | 13.1 | 13.5 |
| Others | 1.1[2] | 1.2[2] | 8.0 | 7.8 | 8.2 | 8.5 | 8.5 |

Notes:

[1]Coal and electricity consumptions of industry sector for years 1965 and 1970 are not available.

[2]Electricity consumption of households and other sectors for the years 1965 and 1970 are not available.

Sources: 1965-1978 based on computations from Annex Table 2.
1981-1985 based on computations using data from Five-Year Energy Program 1981-1985.

on the people in or near the sites, it is being resisted in many forms. It has been considered an incursion into the social and economic existence of the residents affected by the project.

Eighth, its continued operation is insured by the presence of military forces in the area, or at least their availability for the protection of government agencies and TNCs in case the people affected by the project decide to take some drastic moves to defend their rights to the land.

Given the abovementioned features, not a few concerned tribal Filipinos and small farmers affected or soon-to-be-affected by the hydro-electric power dams ask the question: In the context of the present political economy, has technology become part of the solution? Or has it become part of the problem?

As experienced in the Third World peripheries, technological marvels, such as hydro-electric power dams, etc., have become perennial threats to the survival of marginalized communities.

The assumptions of the policies of development, under which technology is an important component, have to be re-examined. The government has pursued what has been termed as "an aggressive industrial strategy". Its main features include the encouragement of export-oriented industries and foreign investments (or capital) which planners hope could provide the "market access, technology and entrepreneurial knowhow" required for such a chosen path.

Development, as operationalized in the Third World, still reflects the assumption that all sectors of society have a homogeneous interest in the process, and that lending institutions, such as the World Bank and the Asian Development Bank, share this interest. The basic question of who benefits from government-sponsored projects remains unasked or, too often, the answers are presumed.

Historical experience, however, reveals that there is no such thing as homogeneous interest for all segments of society. Varying sectors within a given society certainly have conflicting and contradictory interests which serve as determinants of their respective perceptions of what constitutes "development" (or"underdevelopment") and how it could be achieved. On one hand, development could mean increased productivity and general improvement in the standards of living of elements belonging to the privileged group of society – on the other, it could mean increased misery for the many. Still there is the lurking insistence that suggests the complementarity between the interests of donor nations with that of the majority of the country. The insistent plea comes naturally, from the most benefited of a system which depicts the urban consumers of Western-produced luxuries and static technologies as the vanguards of the process of modernization by diffusion.

There are other prescriptions to insure the centralization of the benefits that the abovementioned type of "development" brings to the dominant political and economic minority. Since the main impetus for the development of labor-intensive, export-oriented industrialization is an assurance of a cheap and docile labor force, wage levels have to be maintained low, even pushed down while any manifestation of political unrest has to be controlled, if not suppressed. Thus, one of the major features of the current type of industrialization in Third World economies involves the destruction of liberal-democratic governments and the consolidation of authoritarian states.[27] Such are the political requirements for the global strategies of monopoly capital.[28] As some scholars have put it:

> The expansion of capital into the underdeveloped periphery on the scale desired, and in real sense needed, by the oligopolistic corporations of the advanced countries would be totally impossible without the massive and unremitting application of the power of their states either individually or collectively (including through such agencies as the International Monetary Fund and the World Bank), and to the shaping and maintenance of an institutional setting and what is known as 'investment climate' favorable to the functioning of capitalist enterprise.[29]

The Philippines' "aggressive industrialization strategy" has not been made independently by our industrial planners. There is no doubt about the link of World Bank advice and Philippine policy legislation and changes.[30] In a manner bespeaking such a relationship, McNamara himself, former head of the World Bank said in his final report on the new "structural adjustment loan" that the Philippine government has implemented nearly all the recommendations on export promotion made in the bank's industrial sector report."[31]

Third World countries like the Philippines have looked upon technology as a major solution to their problems, like energy, communication and the basic needs. However, it can be misdirected; it can undermine the political and economic independence of the developing nations. It is no secret that the U.S. and U.S.S.R. governments send huge quantities of highly sophisticated conventional weapons to their respective allies among Third World countries. In not a few cases, these have been used against those who refuse to accept technologies beyond the bounds of their needs, like the massive construction of hydro-electric power dams in the midst of a variety of other alternative energy sources within their reach.

There is a growing realization that ownership and control are important in the utilization, management and direction of technology. As D. Bhattacharya once stated, "Since technology is never neutral, the control

and distribution of any technology and other production inputs are vital for any proper understanding of their role in economic development."[32] In the hands of the present political and economic minority interests, technology, as shown in the case of the operationalization of hydro-electric power dam projects in the Philippines, has become misdirected and, at times perverted. Control over technology and access to its use by a few dominant interests are the bases for the consolidation of their hold over the majority of the population.[33]

For Third World societies, it is becoming clear that social and polical restructuring are pre-requisites to a successful introduction of dynamic or static technologies, that is, without the dispossessing and marginalizing effect that they presently entail.

## NOTES

1 Folks Frobel, Jurgen Heinrichs and Otto Kreze, "Export-Oriented Industrialization of Underdeveloped Countries," *Monthly Review,* (Vol. 30, No. 6), Nov., 1975, pp. 22-27.

2Roger Posadas, "Science and Technology and Their Opponents," *U.P. Newsletter,* March, 1982.

3F. Frobel, et. al., *op. cit.*.

4Gerald Sussman, "Telecommunciations Transfers: Transnational Corporations, the Philippines and Structures of Domination,". *Third World Studies Series No. 35,* (Quezon City: U.P., Diliman), June, 1981.

5F. Frobel, *op. cit.*, p. 23.

6 Renato Constantino, *Insight and Foresight,* (Quezon City: Foundation for Nationalist Studies), p. 169.

7 *Ibid.*, p. 175.

8 Posadas, op. cit.

9 *Ten-Year Energy Program, 1979-1988,* (Manila: Ministry of Energy), 1979.

10 This is shown in a listing of the projects (hydro-electric-power dams) and their corresponding location in the Appendix. Location of potential sites in Luzon and Mindanao is shown in the annexed maps.

11 *Annual Report, Ministry of Industry,* (Makati, Metro-Manila), May, 1981.

12 Robin Broad, "The Philippines as Guinea Pig: New Directions at the World Bank," *Economic and Political Weekly.* (Bombay, India), Nov. 21, 1981. See further Anthony Rowley, "Capitalizing on the World Bank's Goodwill," *Far Eastern Economic Review,* March 26-April 1, 1982, p. 138.

13 R. Broad, op. cit.. p. 2.

14 Position Paper on "Tribal Peoples in the Philippines," Anti-Slavery Society for the Protection of Human Rights, presented at the International Conference of Non-Governmental Organizations (NGO) on Indigenous Peoples, (Geneva, Switzerland) 1981. Also see Richard Dorall, "Comments on the Proposed Ministry of Energy Regulations for the Integrated Managements of Resources in Watershed Reservations," (Manila, Philippines), January, 1979.

15 *Highlights of the Manila Water Supply Projects,* (Quezon City: Metropolitan Waterworks and Sewerage System), June, 1981. Also see further MWSS, "A Brief on the Manila Water Project III," February, 1981. These were confirmed in interviews with MWSS engineers in February, 1981.

16 *Ten-Year Development Plan, 1978-1987,* (Manila Philippines), September, 1977. Also see further *Annual Report, Philippine Export Processing Zones Authority,* 1980.

17 "Brief on Manila Water . . . ", *op. cit.*

18 From an interview of MWSS engineers in March 11, 1981 (Quezon City Main Office). As detailed engineering is funded by World Bank loan, the bank must approve the choice of consultants. This was the implication made by the respondents from MWSS.

19 "Brief on the Manila Water . . . ", *op. cit.*

20 Interview, March 11,1981.

21 *Bulletin Today,* Nov., 1980; *Bulletin Today,* Dec. 10, 1981.

22 These areas are only tentative sites as officials could not confirm. In the March 11, 1981 interview, an area south of Real, Infanta and east of Lungsod Silangan 3 was indicated as the site (near proposed EPZ) in a resettlement map shown by the interviewees.

23 Interviews with residents were conducted in February and March, 1981 and March, 1982. The foregoing data were taken in a series of visits to Tanay, Rizal and from tapes of meeting with government officials held in the area between January 1981 to September 1981.

24 Sheila Coronel, "Defying the Dam: Dumagats and Remontados," *Tribal Forum,* April-May 1981, pp. 7-11.

25*Annual Report, Ministry of Industry,* op. cit.

26"Philippines – Energy Sector Study," *Asian Development Bank Regional Energy Survey,* Sept. 1980, p. 15.

27Joel Rocamora, "The Structural Imperatives of Authoritarian Rule," *Southeast Asia Chronicle,* (No. 65, Nov.-Dec., 1978), pp. 7-19.

28Paul Sweezy, "Corporations, the State and Imperialism," *Monthly Reivew,* (Vol. 30. No. 1978), pp. 1-10.

29*loc, cit.*

30R. Broad, *op. cit.* Also see further Edberto M. Villegas, "The Philippines and the IMF-World Bank Conglomerate," *The Philippines in the Third World Papers,* (Series No. 17, Third World Studies Center, U.P., Diliman, Q.C.), May, 1979.

31Quoted by R. Broad, *Ibid.*, p. 4.

32Debesh Bhattacharya, "Development and Technology in the Third World," *Journal of Contemporary Asia,* (Vol. 6, No. 3), 1976.

33*Ibid.*

APPENDIX

## Existing and Proposed Hydro-Electric Dam Projects Affecting Philippine Minorities

| River | Namesite | Completion Date | Megawatt Capacity of Dams | Affected Peoples To be submerged/ within watershed | Approximate Population of Affected Watershed Total/Minority |
|---|---|---|---|---|---|
| **LUZON** | | | | | |
| Abulog | 1. Abulog I (Gened) | 1989 | 600 | Isneg | |
| | 2. Abulog II (Agbulu) | 1991 | 400 | Isneg | 14,000/14,000 |
| Chico | 3. Chico I (Bontoc) | N.S. | 100 | Bontoc/Kankanai | |
| | 4. Chico II (Sadanga) | 1991 | 250 | Bontoc/Kankanai | |
| | 5. Chico III (Basao) | 1991 | 100 | Kalinga/Bontoc/Kankanai | |
| | 6. Chico IV (Tomiangan) | 1988 | 360 | Kalinga/Bontoc/Kankanai | |
| Pasil | 7. N.S. | 1997 | 100 | Kalinga | 85,000/85,000 |
| Tanudan | 8. Tanudan | 1992 | 140 | Kalinga/Bontoc | 10,000/10,000 |
| Mallig | 9. | 1997 | 55 | Gaddang/Kalinga | |
| Siffu | 10. | 1996 | 130 | Gaddang/Bontoc | 16,000/16,000 |
| Abra | 11. Abra I (N.S.) | 1996 | 130 | Tingguian/Kankanai | |
| | 12. Abra II (Supo) | 1991 | 225 | Tinguian/Kankanai | |
| Amburayan | 13. | 1994 | 150 | Kankanai | 105,000/105,000 |
| Agno | 14. Ambuklao + | 1996 | 75 | Ibaloi, Kankanai, Ifugao | |
| | 15. Binga + | 1960 | 100 | Ibaloi, Kankanai, Ifugao | |
| | 16. Tabu | 1996 | 110 | Ibaloi, Kankanai, Ifugao | 76,000/76,000 |

Existing and Proposed Hydro-Electric Dam Projects Affecting Philippine Minorities (Cont'

| River | Namesite | Completion Date | Megawatt Capacity of Dams | Affected Peoples To be submerged/ within watershed | Approximate Population of Affected Watershed Total/Minority |
|---|---|---|---|---|---|
| Pampanga | 17. Magat I-IV and | 1983 | 360 | Ifugao, Gaddang, other Filipinos/ | |
| | V-VI | 1996 | 180 | Kalahan, Kalanguya | |
| Magat | 18. (Cabingatan) | 1992 | 140 | Ilongot, Kalahan, other Filipinos | |
| | 19. (Gadeng) | 1996 | 135 | Ilongot, Kalahan, other Filipinos | |
| Casecnan | 20. (Dakgan) | 1997 | 115 | Ilongot, Kalahan, other Filipinos | |
| | 21. | 1991 | 400 | Ilongot, Kalahan, other Filipinos | 384,000/150,000 |
| | 22. Pantabangan + | 1977 | 100 | Dumagat | |
| Diduyon | 23. Angat | 1967 | 212 | Dumagat | |
| Umiray | 24. | 1996 | 100 | Dumagat | |
| Agus | 25. Kaliwa and Kanan | 1994 | 115 | Dumagat | |
| | (Quezon) | 1990 | 280 | Dumagat, Remontados, other Filipinos | 11,000 |
| **MINDANAO** | | | | | |
| Agus | 1. Agus I (Marawi) | 1982 | 80 | Maranao/Maguindanao | |
| | 2. Agus II (Saguiaran) | 1979 | 180 | Maranao/Maguindanao | |
| | 3. Agus III (Calangan) | 1984 | 225 | Maranao/Maguindanao | |
| | 4. Agus IV (Matampay) | 1983 | 150 | Maranao/Maguindanao | |
| | 5. Agus V (Matampay) | 1982 | 55 | Maranao/Maguindanao | |
| | 6. Agus VI + (Ditucalan) | 1977 | 200 | Maranao/Maguindanao | |
| | 7. Agus VII (Ditucalan) | 1981 | 54 | Maranao/Maguindanao | 480,000/470,000 |

| | | | | |
|---|---|---|---|---|
| Cagayan | 8. Cagayan I (Talakag) Bukidnon | 1988 | 100 | Bukidnon, Manobo, Other Filipinos |
| | 9. Cagayan II (Baungor) | 1991 | 100 | Bukidnon, Manobo, Other Filipinos |
| | 10. Cagayan III (N.S.) | 1989 | 100 | Bukidnon, Manobo, Other Filipinos |
| Tagoloan | 11. Tagoloan I (N.S.) | N.S. | | Bukidnon, Manobo, Other Filipinos |
| | 12. Tagoloan II | N.S. | | Bukidnon, Manobo, Other Filipinos |
| | 13. Tagoloan III (M. Fortich) | 1990 | 90 | Bukidnon, Manobo |
| | 14. Tagoloan IV (Malit) | 1989 | 105 | Bukidnon, Manobo, Other Filipinos |
| Pulangui | 15. Pulangi I (N.S.) | 1986 | 69 | Bukidnon, Manobo |
| | 16. Pulangi I (N.S.) | 1985 | 343 | Bukidnon, Manobo |
| | 17. Pulangui III (Valencia, Bukidnon) | 1985 | 130 | Manobo |
| | 18. Pulangi IV (Maramag, Bukidnon) | 1984 | 255 | Manobo |
| | 19. Pulangi V (Balakuran, N. Cotabato) | 1987 | 348 | Manobo, Maguindanao |
| | 20. Pulangi VI (N.S. N. Cotabato) | 1988 | 70 | Manobo, Maguindanao |
| | 21. Maganoy (Maguindanao) | 1991 | 300 | Maguindanao/Tiruray, Manobo |
| Lake Sebu* | | N.S. | 30 | T'boli |

\+ – In operation

x – Include resettled Ifugao, Bontoc, Kankanai and Ibaloi

* – Not included in the Ten Year Energy Program 1979-1988. The Lake Sebu project is one of many more dams classified primarily on the bases of their irrigation potential.

Sources: Ten year Energy Program 1979-1988. Manila: Ministry of Energy, 1979, pp. 52-61.

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