5.7 Donor Basin Sustainable Development Fund

(1) Introduction

This section presents a framework for a Donor Basin Sustainable Development Fund (DBSDF), through which the richer beneficiary areas pay for the water they receive and with this revenue RID can promote sustainable rural development in the poorer donor areas. In effect, the Fund represents an opportunity for the donor communities to benefit from providing the beneficiary communities with water.

The study comprises the following elements:

- definition of donor area needs that could be satisfied by a DBSDF;
- review of potential funding sources, particularly in the beneficiary area;
- quantitative assessment of fund;
- review of similar funds in terms of disbursement mechanism;
- design of possible institutional framework for DBSDF, including the fund's role, functions and accountability.

The methodology comprises:

- rural appraisal, including formal Participatory Rural Appraisal (PRA), as described in Section 5.2;
- informal discussions with villagers during other aspects of the environmental study;
- meetings with relevant central and local government officers, and funding agencies;
- review of documentation, including legislation, other funds and previous studies;
- recommendations for fund implementation;
- review of recommendations with RID.

(2) Donor Area Needs

The Rural Appraisal exercise (Section 5.2) revealed a consistent primary problem in the lower Ing Basin: that of a lack of water in the dry season. Generally this is a lack of water for agricultural use, though for some there is also a lack of water for domestic use and drinking. As will be shown below, the provision of money for agricultural-water resource development and conservation measures could be a purpose of the Fund. The full range of possible socially-orientated developments identified by the rural appraisal were:

- water resources and irrigation development to enable agricultural development;
- agricultural diversification to restructure farm production through the introduction of integrated farming, aquaculture, agro-forestry, etc., on a sustainable basis;
- supporting social services for farmers, women, youths and children to improve their quality of life;
- conservation and rehabilitation of natural resources with an emphasis on community forests;
- non-farm employment promotion especially cottage, rural and community industries in rural areas;
- upgrading rural infrastructure such as rural water supply, flood protection, rural road improvements, etc.; and
- strengthening of existing people's organisations, for example through the promotion of village development funds (as initiated as by various organisations).

The availability of dry-season water, together with the lack of good village roads, was also mentioned by villagers as being a problem during discussions in support of the Spoil Utilisation study (Section 5.5).

The Watershed Management study (Section 5.1) revealed concerns about dry-season water, but also soil fertility and land title. Resolution of the current problem of illegal occupation of forest reserves is a particularly vital but sensitive issue. If the Fund is able to ease encroachment pressures equitably, whether through giving restricted land title or by resettlement, this would be a worthwhile use of funds, benefiting everyone. The Fund could also be used to support participatory watershed management (as discussed in Sub-section 5.7(5) below). The Fund clearly should not be used instead of government money, but if communities propose small-scale projects that will ease encroachment, then support should be considered.

The People's Irrigation System study (Section 5.3) examined fourteen PIS groups along the proposed Kok-Ing water diversion route. Most identified a lack of water as being the key problem for both the group and the community it serves, either only in the dry season or all year round. This lack of water led to disputes and there have also been some thefts of water. Five of the groups reported flooding as also being a problem. Six groups reported maintenance problems (damage to infrastructure) and four that the group was weak or inefficient. Several groups cited a lack of knowledge, skill and technology as being a problem for the communities.

After the lack of water, the most consistent complaint was the low or uncertain price of farm produce (ten groups), the high cost of agricultural inputs (six groups), and the lack of farm credit (five groups). Related problems included the lack of good markets, the setting of prices by middle men and the shortage and high cost of labour (each reported by four groups). As well as seeking irrigation water from the proposed diversion, several groups expressed an interest in aquaculture and in crop diversification.

(3) Potential Funding Sources

The conceptual planning study identifies three key benefits of the Kok-Ing-Nan project:

- increased availability of water for irrigation in the Chao Phraya basin, leading to increased agricultural production and greater wealth;
- increased urban water supply for Bangkok urban and industrial uses;
- increased hydropower potential at Sirikit dam.

These three benefits have been quantified as 4,312 to 6,261 (depending on area to be irrigated), 4,024 and 328 million baht, respectively[100]. The full benefit of the irrigation water is expected to take up to five years to be realised. By contrast, the donor areas will receive only minor benefits (e.g. minor irrigation works, compensation for land take, improved roads, availability of spoil material) while suffering numerous losses (e.g. loss of land, environmental degradation, disturbance). The benefits to the Chao Phraya basin suggest three possible funding sources for the DBSDF, by charging:

- farmers for irrigation water,
- the Metropolitan Water Authority for urban water supply and the Provincial Waterworks Authority for industrial water supply, and
- EGAT for electricity generation hydropower.

These three funding options are discussed in turn. However, in all three cases the revenue that might be raised may be reduced because the volume of water supplied will be less than the design

[100] All benefit figures are from *The Study on the Kok-Ing-Nan Water Diversion Project in the Kingdom of Thailand : Main & Supporting Reports (Conceptual Planning Study)*, March 1997, Sanyu Consultants & Nippon Koei for JICA & RID.

quantity. This has implications for the income of the DBSDF but also, and more importantly, for project viability. There will be substantial water losses along the diversion and once the water reaches Sirikit reservoir. (These losses will be in addition to the water supply losses identified in paragraph (b) below, i.e. the water supply loss factor that allows for a 30% loss.) Analysis of inflows into Sirikit reservoir and outflows from it (Source: RID, Sirikit, 1974-1997) reveal losses of only 5%, but there will be further losses from the diversion canals and tunnels and it is intended that a number of small irrigation schemes be supplied along the route; the economic internal rate of return is reduced by over 1% per 10% 'loss' of water.[101]

(a) Irrigation Water Charges

The *Conceptual Study* identified an economic benefit arising from increased irrigated agriculture in the Chao Phraya basin. The supply of 1,800 MCM per annum to agriculture should lead to an economic benefit of 4,312 to 6,261 (depending on areas irrigated) million baht, annually.

The table below summarises the irrigation benefits for three different plans presented in the *Conceptual Study*, it shows only the benefit in the Chao Phraya basin and excludes those areas in the donor basins that would benefit (where areas totalling 32,000 ha will be irrigated). The table also shows a possible charge for irrigation water.

	Units	Plan A	Plan B	Plan C
Project cost	(million baht)	47,600	47,600	55,600
Economic benefit in Chao Phraya	(million baht)	5,588	3,639	4,762
New irrigated area in Chao Phraya	(ha)	270,000	224,000	335,000
	(rai)	1,687,500	1,400,000	2,093,750
Project cost per rai in Chao Phraya	(baht/rai)	28,207	34,000	26,555
RID's potential charge at 5 baht/rai	(million baht)	8.44	7	10.47

Section 8 of the Government Irrigation Act B.E. 2485 (1942), as subsequently amended, defines the limit on the fee for irrigation water use, being 5 baht per rai. As indicated above, this yields a very limited sum of 7 to 10 million baht per annum.

There is also a limitation on how this money be spent. Section 8 *bis* of the same Act would require that the money raised be used for irrigation and that the Minister of Agriculture and Co-operatives issues rules allowing this, with the approval of the Minister of Finance. It might reasonably be disputed that the money would be used for irrigation, unless the DBSDF were to fund only irrigation works.

The relevant legal provisions of the Government Irrigation Acts are reproduced below.

Government Irrigation Act B.E. 2485 (1942), as amended by Government Irrigation Act (No. 2) B.E. 2497 (1954), Government Irrigation Act (No. 3) B.E. 2507 (1964), Government Irrigation Act (No. 4) B.E. 2518 (1975) and Government Irrigation Act (No. 5) B.E. 2530 (1987).

Section 8. - The Minister shall have the power to collect irrigation fee from an owner or occupier of the land within the irrigation zone, or from a user of water from the irrigation waterway regardless of whether he is inside or outside the irrigation zone, by issuing Ministerial Regulations prescribing

[101] The economic internal rate of return for the Plan A defined in the *Conceptual Planning Study* is reduced from 15.0% to 14.0%, 12.9% or 11.7% for losses of 10%, 20% and 30%, respectively.

(1) each line or each zone of the irrigation waterway where irrigation fee is collected, with a map showing boundaries thereof;

(2) the zone and locality which is the irrigation zone where irrigation fee is collected, with a map showing boundaries thereof;

(3) rates of irrigation fee to be collected from an owner or occupier of land within the irrigation zone or from a user of water for agriculture outside the irrigation zone;

(4) rates of irrigation fee to be collected from a user of water for factory, waterworks or other undertakings inside or outside the irrigation zone;

(5) rules, regulations and procedures for collection or payment of irrigation fee, as well as for exemption, reduction or payment of instalments thereof.

The rates of irrigation fee to be collected from an owner or occupier of the land within the irrigation zone or from a user of water for agriculture outside the irrigation zone shall not be more than five Baht per rai per annum.

The rates of irrigation fee collected from the user of water for factory, waterworks or other undertakings shall not be more than fifty stang [0.5 Baht] per cubic metre.

Section 8 bis. - There shall be established in the Royal Irrigation Department a revolving Fund called the Revolving Fund for Irrigation.

The irrigation fee collected under section 8 shall be credited to the account of the Revolving Fund for Irrigation, and not be remitted to the Treasury as State revenue.

The payment of money from the Revolving Fund for Irrigation shall be made only for the irrigation pursuant to the rules prescribed by the Minister with the approval of the Ministry of Finance.

Furthermore, there is a lack of willingness-to-pay for irrigation water on the part of the farmer, and a lack of political will to attempt such a strategy. Numerous studies have championed irrigation water charges, but they have never seriously been implemented. The phrasing of the current National Economic and Social Development Plan is clear in its implications: Systematic management of water resources will include "collecting fees for raw water from industrial and agricultural producers and from domestic consumers. The pricing structure for domestic consumption and industrial production" [*but not agriculture, by implication,*][102] "will be adjusted to properly reflect the actual costs of procurement, production, distribution and wastewater treatment." These three factors (the limited amount of revenue, legal doubts and political sensitivity) suggest that this is not a suitable source of funds for the DBSDF.

(b) Municipal and Industrial Water Supply Charges

The *Conceptual Study* identified an economic benefit arising from increased municipal and industrial water supply. Annually, the benefit should amount to 4,024 million baht, calculated thus:

[102] Report author's inference.

4.79 baht/m^3	x	the opportunity cost of urban water, the figure being the cost of groundwater in the Western Water Supply Project[103]
1,200 MCM	x	newly available water for urban water supply
0.7		water supply loss factor
4,024 million baht		

The volume of water available for water supply has since been revised downwards to 800 MCM. The Irrigation Act104 defines a limit on the irrigation fee of 0.50 baht/m3. This limit would eventually yield a substantial annual sum of 400 million baht, as the amount of available water is taken up. However, as noted previously, section 8 bis limits how this money might be spent.

This option nonetheless offers reasonable hope of a substantial income for the DBSDF if the Cabinet can accept such a use of the Revolving Fund for Irrigation. A way forward might be to limit funded projects to:

- works for the development and maintenance of irrigation infrastructure and agriculture, and
- watershed management that would protect downstream irrigation infrastructure and agriculture.

A further alternative is to impose a levy on the charges imposed by (a) the Metropolitan Waterworks Authority (MWA) on its municipal customers, and (b) the Provincial Waterworks Authority (PWA) on its industrial customers. However, the legislation quite properly imposes restrictions on how the MWA and PWA spend their income (as below for the PWA), and this would appear to simply complicate the matter.

Provincial Waterworks Authority Act B.E. 2522 (1979)

Section 7. - The Provincial Waterworks Authority shall have the power to conduct any or various business within the context of its objectives pursuant to section 5 and such powers shall include:
[...]
(4) to determine the selling prices of piped water, service charges, equipment cost and other facilities cost including methods and conditions in paying for such prices and considerations.
[...]

Section 17. - The Board shall have the power and duties to lay out policy and to have general control of the business of PWA. Such power shall include:
[...]

[103] The use of a single, unjustified figure would appear unwise given that the newly available water represents a 50% increase in supply, and that this economic benefit represents approximately half of the total project benefit. However, the figure is within the range of marginal value of water in municipal use (3.79-6.99 baht/m^3) suggested by David Wardell, Major Constraints and Opportunities to Improve Watershed Management in Thailand: A Review of Current Knowledge and Institutional Arrangements, in *Proceedings of the International Workshop on Strategies and Institutional Arrangements for Natural Resources and Environmental Management in Watershed Areas*, February 1997, Chiang Rai, Thailand, published by OEPP.

[104] Section 8 of the Government Irrigation Act B.E. 2485 (1942), as subsequently amended. Ministerial Regulation No. 11 (1975) set an irrigation fee for factories, waterworks and similar users, with rates being 0.20 baht/m^3 up to 50,000 m^3, 0.30 baht/m^3 for the next 50,000 m^3, and 0.50 baht/m^3 thereafter.

(11) to determine the selling price of piped water and rate of service charges including methods and conditions in payment of price and service charges, and
[...]

Section 32. - Income received by the PWA each year shall become the revenue of the PWA for use as operational budget and after the reduction of operational expenditures, and for other consideration costs such as maintenance, depreciation, reserve capital fund according to section 10 and contribution to the Welfare Fund or other subvention according to section 36 and investment capital approved by the Cabinet. The balance therefrom shall be delivered as state revenues.

The issue of water supply charges is likely to change substantially over the coming two years. The World Bank has offered funds to study further waterworks privatisation of the PWA and MWA, and the Government would appear willing to accept the study[105] and, indeed, to extend the privatisation process. Not only would the PWA and MWA legislation be replaced, but the Government might take the opportunity to alter the RID water supply charge. RID has collected charges from the PWA since 1992, so the concept of payment is not alien to RID or PWA, though the sums collected thus far have been very limited.[106]

(c) Electricity Generation Charges

Sirikit Hydropower Station operated with three 125 MW units from 1974 to 1995, with an annual average production of 821 GWh. In 1995, a fourth 125 MW unit was installed. The Kok-Ing-Nan diversion is expected to increase power production by about 400 GWh per annum, with possible further increases due to greater operating flexibility. EGAT will be able to sell this electricity at relatively little capital cost.

Hence, the *Conceptual Study* identified an economic benefit arising from increased hydropower, yielding an annual benefit of 328 million baht,[107] calculated thus:

2,000 MCM	x	newly available water passing through Sirikit Reservoir
1kWh/5.8 m^3	x	generating efficiency
1.12 baht/kWh	x	the opportunity cost of electricity, the figure being the price paid by EGAT to the private sector
0.85		transmission loss coefficient
328 million baht		

It might be hoped to levy a charge on EGAT, for it to pass on to its customers, for the increased electricity supply. However, the legal provisions reproduced below would appear to prohibit such charges, unless the interpretation of 'indebtedness' in its broader sense could be defended. Again, this situation may change greatly over the project implementation period given the possible privatisation of EGAT activities. A levy on hydropower should not be ruled out.

Electricity Generating Authority of Thailand Act B.E. 2511 (1968), as amended by Acts (No. 2) B.E. 2521 (1978), (No. 3) B.E. 2527 (1984) and (No. 4) B.E. 2530 (1987)

[105] Source: World Bank offers to fund a fresh government study, in *Bangkok Post*, 8 December 1998.

[106] Annual revenue from surface water charges (irrigation water used for agriculture or domestic water supply) totalled 23 million baht in 1996 (Source: RID).

[107] According to an analysis of EGAT's figures presented in the editorial of *Watershed*, 4(2), Nov. 1998 to Feb. 1999, the generating efficiency is 1 kWh/7.12 m3 and electricity generation with natural gas or lignite costs less than 1 baht/kWh. Applying these figures yields a maximum benefit of 239 million baht per annum.

Section 18 - The Board shall have the powers and duties to lay down policies and exercise general control over the operations of EGAT. Such powers and duties shall include: [...]
(9) to fix rates for sales of electrical energy [...] and to issue rules for such payments, and [...]
The charges on the rates as provided in (9), shall be at such reasonable and proper levels as will provide revenue sufficient:
(a) to cover all operating expenses [...],
(b) to meet expenses regarding repayment of indebtedness to the extent that such repayments exceed provisions for depreciation, and to meet increases in cost of replacement of assets, and
(c) to provide reasonable reserve funds [...].

(4) Budget

The most promising source of funds would appear to be the 0.5 baht/m^3 charge for urban and industrial water supply. It would not be expected that the full charge would be passed to the DBSDF as RID would expect to cover some of its costs in supplying the water. Nonetheless, a substantial rate could be set in the Cabinet resolution required for project approval. The rate might best be expressed as a percentage of the water charge, especially given the possible changes to this charge. There is no legislation covering such a levy but there is the precedent of payments to TAOs for mining and petroleum royalties and groundwater fees, which are in the range 20 to 30%. A regular transfer of funds could then be made between the Revolving Fund for Irrigation and the DBSDF; the exact amount could be adjusted to reflect the quantity of water passing through the Ing-Yot tunnel with respect to the anticipated annual 2,000 MCM.[108] The DBSDF could smooth out seasonal variations so as to allow a more convenient disbursement schedule.

Given that water is a national resource, it may seem inappropriate to set a precedent of payment for water to the donor areas. The Revolving Fund for Irrigation provides a means of dislocating the link between the beneficiaries and the donors. Payments to the DBSDF could nonetheless to linked to receipts in the Revolving Fund, but perhaps be limited to a range of amounts.

It is anticipated that the DBSDF would be in part a revolving fund, with some money being disbursed as loans and some as grants. Repayment of loans would thus generate some income for the Fund. Typically, half of the Fund disbursements might be as loans at 9% interest,[109] with say 5% defaulting (non-performing loans).

The Fund could also receive income from dredging operations in the river diversions and from sale of excavated material from the diversion tunnels and canals, if either proves feasible. The possible revenue from sales of tunnel and canal spoil is discussed in Section 5.5. The water-diversion settling ponds would capture substantial quantities of material. This may be at the expense of dredging operators currently active further downstream, so it may be considered more acceptable to provide flushing of the settling ponds back into the main river, Kok or Ing. The actual volumes of sediment captured in the settling ponds would probably be rather less that the total possible amount shown in the table below, but the table does indicate the order of magnitude.

[108] The amount payable would also need to reflect the availability of water within the Nan basin; in a wet year need for water from the Kok and Ing will decrease and the levy should be reduced accordingly. A further study would be required before implementation to take account of the prevailing market situation regarding privatisation and water markets, etc..

[109] As reportedly offered by the Bank for Agriculture and Agricultural Co-operatives.

River	Water volume (MCM)	Sediment load (%)[110]	Sediment load (m^3)
Kok	1100	0.015	165,000
Ing	900	0.015	135,000

If the sediment were to be dredged from the settling pond, RID could offer the contract on a competitive-bid basis with the resulting income being passed on to the DBSDF. However, the sediment would be light silts and clays having been suspended high in the water column, rather than sands that stay close to the river bed and that will not tend to enter the diversion because of a raised sill. Such light material is not marketable and RID may indeed have to pay for its removal. Therefore, it is assumed that dredging operations will not yield an income for the Fund.

Any unspent money in the Fund will generate interest (at approximately 6% p.a.[111]), though the fund managers should aim to maximise use of the Fund, while only keeping a small reserve. The total annual income for the Fund might therefore be expected to be very approximately as below:

Period	Source	Minimum estimate (million baht)	Maximum estimate (million baht)
During construction	spoil sales	0	20
During operation	water charges[112]	65	120

Note: very approximate figures, further rounded to nearest 5 million baht.

The Fund would have operating costs, fees payable to the bank managing disbursements, and costs associated with other activities (notably the *Watershed Conservation and Information Centre* discussed below).

Finally, the Government through RID could provide seed funding to the Fund, before project construction begins, to show a commitment to the donor areas.

(5) Fund Operation

The Fund would have the following objective: the provision of capital to poor communities in the Kok-Ing-Nan donor areas, to enable them to develop their communities[113] for themselves, sustainably. The organisation of the Fund should be minimal, keeping money raised for rural development, not administrative overheads. The Fund should be independent of RID's Revolving Fund for Irrigation and independent, but influenced by, provincial government. Fund operations are illustrated in Figure 5.7.1.

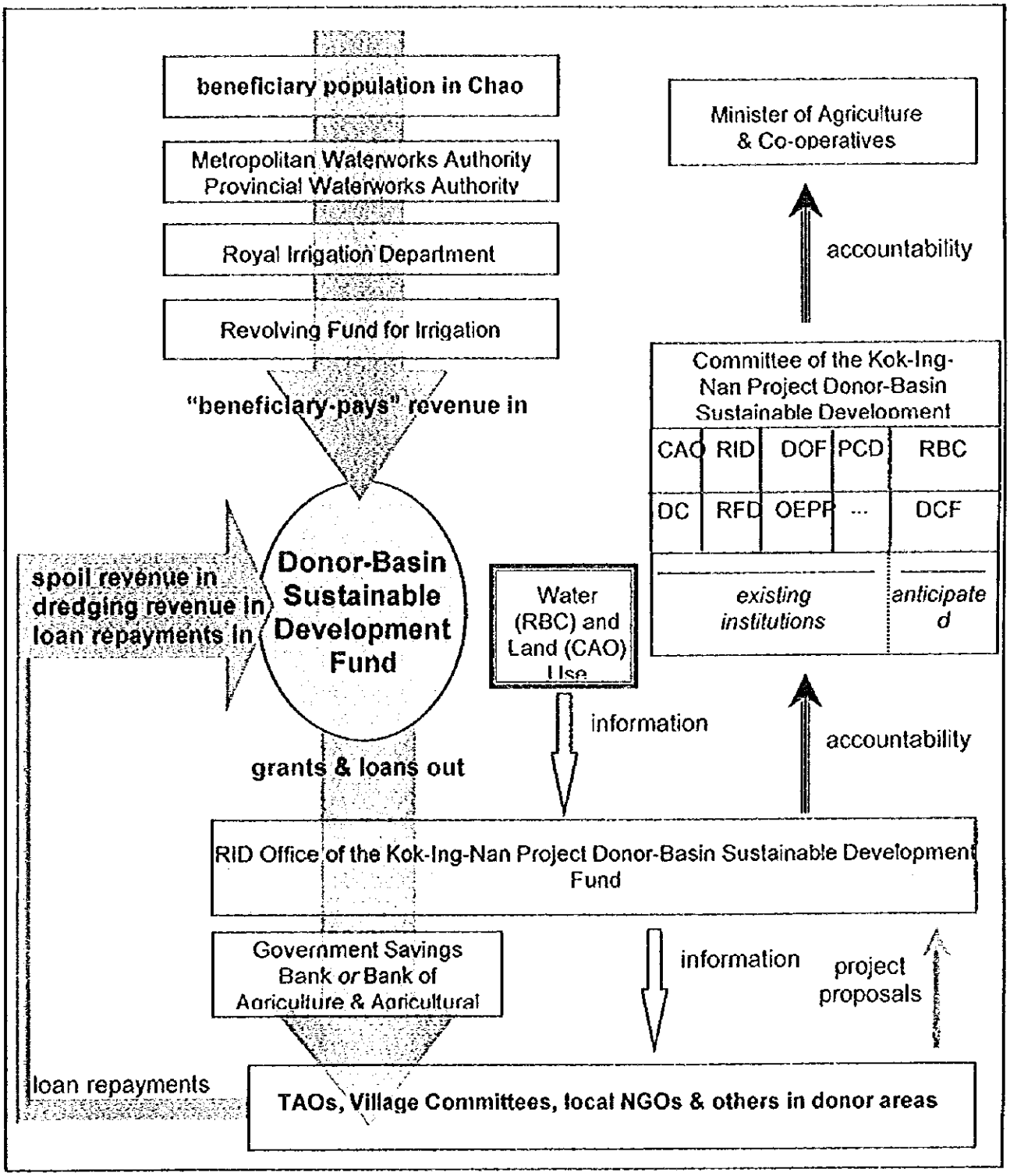
[110] Loads calculated as 0.015 and 0.013 % for Kok and Ing, respectively, using the following information: on the Nam Mae Kok at Ban Pong Na Kham the mean annual load over the period 1967-87 and 1995 was 799,190 tonnes, and on the Nam Mae Ing at Thoeng the mean annual load over 1968-95 was 264,386 tonnes (source: DEDP); and the annual flow of the Kok at the diversion site is taken as 5,500 MCM and of the Ing as 2,000 MCM (source: project documents).

[111] Government Savings Bank, and others, 3-month fixed deposit rate, Source: *Bangkok Post*, 15 January 1999.

[112] The maximum estimate assumes 400 million baht is raised on water charges and 30% paid to the Fund. The minimum assumes only 80% of the predicted water volume is available and that only 20% levied.

[113] Community here implies village, tambon or district.

Figure 5.7.1. Operation of the Donor Basin Sustainable Development Fund.



CAO	Changwat Administrative Organisation
DCD	Dept. of Community Development
DCF	District Civic Forum (proposed)
DOF	Department of Fisheries
NGO	Non-governmental Organisation
OEPP	Office of Environmental Policy & Planning
PCD	Pollution Control Department
RID	Royal Irrigation Dept.
RFD	Royal Forestry Dept.
RBC	River Basin Committee (proposed)
TAO	Tambon Administrative Organisation

Project proposals would be assessed against a set of project selection criteria. The World Bank's Social Investment Fund (SIF)[114] criteria provide a suitable model, modified to generate the following criteria:

- the project meets the legal constraints imposed on Fund disbursements (e.g. "irrigation only" for income via the Revolving Fund for Irrigation);
- the project benefits poor communities as a group, not single individuals;
- the project is an economically or socially productive investment;
- the project complies with water and land use plans;
- the project applicant is capable of effectively managing the project's implementation, but not necessarily unassisted;
- the financial, technical and institutional requirements for the operation and maintenance of the project are in place;
- the project is small-scale, technically sound and technologically simple;
- beneficiary communities are involved in the decision-making related to the project, or in management of the project, e.g. planning, implementation, supervision and regular reporting;
- beneficiaries contribute in cash or kind at least 10% of total project costs;
- the project costs do not exceed a set upper limit;
- the project is distinct from existing or planned public investments, and does not replace them.

Proposals having private sector involvement would also be encouraged. Initially, funds would arise from spoil sales only, if at all, and these would be directed to projects proposed by the relevant affected communities. Subsequently, disbursements would be spread more evenly across the donor areas. Example projects might include:

- education and training programmes, e.g. for development of community organisations, sustainable agriculture, watershed management, soil and water conservation;
- development of community organisations (including Village Watershed Network Organisations and District Civic Forums) and co-operatives;
- support of community forestry, e.g. planting and fencing providing local employment and emphasising community ownership;
- reforestation of class 1 watersheds, again providing local employment, watershed conservation and community involvement;
- agricultural diversification, e.g. multi-crop farming, agro-forestry, aquaculture, fruit trees;
- agro-processing and other activities adding value to rural production, but without encouraging excessive reliance on cash crops;
- organic fertiliser and biological pest management initiatives that lead to reduced use of agro-chemicals; and
- perhaps construction of minor water management structures (e.g. small dams), to increase productivity and discourage expansion into the forests.

A village committee or TAO might request seed funds for their own revolving fund, e.g. a village development fund for participatory watershed management,[115] which the community would

[114] The Social Investment Project (SIP) of the World Bank and the Ministry of Finance (*Project Appraisal Document : Social Investment Project*, World Bank, June 1998) is a social protection project that includes a community-oriented Social Investment Fund (SIF), supporting labour-intensive public works that give employment and incomes to the poor. The project has two components: (i) supporting government programmes; and (ii) direct financing of locally-generated projects. The SIP as a whole has a substantial budget (including US$300 million from the World Bank, US$123 million from OECF and US$38 million from the Royal Thai Government); it will disburse money over a four-year period. The SIF grants total US$113 million and are administered by the Government Savings Bank.

then manage; the community would itself select projects for funding, subject to previously agreed criteria. See Box 5.7.1 for an example of a successful local development fund. Infrastructure construction projects would be far less favoured than 'soft' social ones, given the higher claimed incidence of corruption associated with construction projects[116] and that such projects are more commonly included in formal development plans.

RID would establish the Office of the Kok-Ing-Nan Project DBSDF (OKD), which would have the following functions:

- management of the Fund;
- co-ordination and liaison with central government departments, local authorities and NGOs;
- definition of project selection criteria;
- dissemination of information on the Fund, how to propose projects and project selection criteria;
- operation of a Watershed Conservation and Information Centre (discussed below in Sub-section 5.7(6));
- assistance in defining projects, and in writing project proposal documents;
- vetting of project proposals to assure that they meet legal constraints imposed on Fund disbursements and the other project selection criteria;
- definition of loan conditions, i.e. interest rate, repayment period, grace period, etc.;
- Fund disbursement to TAOs, Village Committees, local NGOs and others, as grants or loans, via the Bank of Agriculture and Agricultural Co-operatives, the Government Savings Bank,[117] or similar;
- monitoring of project implementation and performance;
- loan recovery, via the chosen bank;
- review of Fund performance;
- publishing of Fund accounts, audited independently.

The OKD would be a small RID department, sufficient to satisfy its functions efficiently and effectively, but consuming as small a proportion as possible of the Fund's resources. The banks have experience of administering such funds, so RID staffing should be minimal. Operational costs would be highlighted in the Fund's accounts. The risk of DBSDF funds replacing RID expenditure in the area would not appear to be substantial as RID funds only a few large projects, whereas the Fund is targeted at small-scale community projects. The placing of the Fund within RID would also allow RID and the Kok-Ing-Nan project to be seen in a more positive light.

The OKD's operations would be controlled by the Committee of the Kok-Ing-Nan Project DBSDF (CKD); the Chairman of the Committee would rotate through the government agencies represented on the Committee. The CKD should include representatives of the provincial administration[118] and of provincial or regional RID, RFD, DOF, DCD, PCD[119] and OEPP. Two new

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[115] The Upper Nan Watershed Management Project (*Nan Basin Development: Strategy for Forest and Watershed Management Project*, RFD, October 1995.) may provide a suitable model for support of such village development funds. The DANCED and Centre for Grant Assistance (MOAC) environmental and forestry sector project is centred on participatory watershed management and includes disbursement of grants through revolving funds via Village Development Fund committees, in consultation with project's Community Co-ordinators. DANCED is providing US$3.38 million while the Royal Thai Government provides US$7.75 million in cash and kind.

[116] See, for example, *Bangkok Post*, 10 January 1999.

[117] The Bank of Agriculture and Agricultural Co-operatives is favoured by ordinary farmers and provides a low (9%) interest rate, whereas the Government Savings Bank has been chosen by the World Bank for the SIF disbursements because of its "relative independence, management capacities, experience in financial intermediation, and new mandate to serve as the *people's bank*".

[118] Provincial administration is included to assure project compatibility with local development plans.

[119] PCD is included for two reasons: it administers the Environment Fund and it operates at the provincial level.

types of institution should also be represented, as described below: District Civic Forums and River Basin Committees.

District Civic Forums are anticipated to aid in bottom-up development with the World Bank's SIF. "District Civic Forums are informal district level institutions expected to emerge spontaneously from within communities with the aim of promoting networking and social learning and mutual development among community organisations and institutions within the district."[120] Though the formation of these Forums may not in fact be completed during the lifetime of the SIF, it might reasonably be expected that they be in place by the time the DBSDF begins functioning. Representatives of these Forums could provide representation of the target communities on the CKD; the relevant amphoes are listed in Table 5.7.1. (See also Figure 5.5.1.)

Box 5.7.1. The Case of the Mae Tan Project Agricultural Demonstration Project

The project is located at Ban Mae Gua, Mu 4 and 5, Sobprab district, Lampang Province. The project covers an irrigated of 2,000 rai (rainy season) and 1,500 rai (dry season). The objective of the project was to promote the use of irrigation water, develop a farmers' organisation and create a revolving fund system. Before the project began, the farmers did not care about using the available irrigation water. They preferred to plant sugar cane and cassava on fields outside the irrigation area after the main rice crop.

The project was implemented over the period 1989-1993, covering seven growing seasons. Farmers were advised to plant soy bean that did not require a large amount of water. The planted area of soy bean increased from zero before the project began, to 511 rai at the start of the project, to 1,581 rai at the end, accounting for 90% of the project area. The value of production from the irrigated area rose from 0.3 million baht in the first year to 2.5 million baht at the end of the project. A farmers fund was created.

With regard to farmer's organisation, a committee was formed to manage the use of irrigation water and farm production, from planning, provision of farm inputs and marketing of produce. The committee comprised the chairman, deputies for water use, a deputy for farm inputs, a secretary, a treasurer and representatives from the twenty water-using areas with the project.

The fund for the farmers was initially provided by the Korean Government. The farmer obtained a loan from the fund. When he repays the loan to the fund at the end of the season, the repayment is the kept as a seed fund for subsequent cropping seasons, as well as for various development activities. After seven growing seasons, the 330 farming households were managing a fund of 1.1 million baht.

The main conclusions drawn from the project were:

- *The management of irrigation water can benefit from improving the farmers' management capability.*
- *The farmers' organisation should come from the local community, and not be dependent on government-initiated organisations, though they will require support from official agencies at the start.*
- *The success of the project was attributed to the availability of the fund to relieve the capital constraint of the farmers and provided an incentive to improve production.*
- *The supporting agency should be a single agency directly involved in the area, and not a body with representatives from various agencies. Co-ordination can be achieved through joint actions as and when needed.*

[120] *Project Appraisal Document : Social Investment Project*, World Bank, June 1998.

Table 5.7.1. Amphoes to be represented on the DBSDF Committee and to receive funds.

Province (changwat)	Districts (amphoes)	
Chiang Mai	Mae Ai	
Chiang Rai	Wiang Chai	Doi Luang
	Muang Chiang Rai	Mae Lao (king amphoe)
	Chiang Khong	Mae Chan
	Phaya Meng Rai	Phan
	Thoeng	Wiang Chiang Rung
	Khun Tal (king amphoe)	
Phayao	Chiang Kham	
	Phu Sang (king amphoe)	
	Chun	
Nan	Song Khwae (king amphoe)	
	Tha Wang Pha	

The draft Water Resources Act[121] produced by the Office of the National Water Resources Committee includes the establishment of a River Basin Committee for each specific river basin, or group of basins. Similarly, a study on water management of the Chao Phraya Basin[122] recommends establishment of a body responsible for integrated water management in that basin.

The Fund and the OKD would be audited by an independent auditor. The CKD would define the OKD's operational practices, e.g. the relative proportions of grants and loans, loan conditions. It would also scrutinise operational costs, project selection criteria and the auditor's report. The CKD would be answerable to the Minister of Agriculture and Co-operatives.

A change in, or special interpretation of, the law would appear to be necessary to allow the channelling of funds from the beneficiary area to the donor area. Nonetheless a substantial sum might be raised by diverting some portion of RID's water supply charge (0.5 baht/m^3) to the Donor Basin Sustainable Development Fund. Other lesser sources of income might also be available. Documents will need to be prepared for Cabinet for the establishment of the Fund and its Office and Committee, and for assuring its income, should the Kok-Ing-Nan project receive Cabinet approval.

The Fund is intended to benefit the Donor Basin population and its operation is accountable to local people, particularly through the inclusion of District Civic Forums in the OKD. However, it is suggested that the DBSDF concept be developed further through public involvement, beyond the limited level of participation achieved during this environmental study.

The creation of the DBSDF affects the economic viability of the project, though not significantly. Payments into the Fund should be viewed as project costs with the economic internal rate of return (EIRR) being reduced as a result. Using data presented in the JICA *Conceptual Planning Study*, the EIRR would be reduced by 0.1% per 100 million baht transferred to the Fund per year.

(6) Watershed Conservation and Information Centre

Rather than create a new organisation and duplicate effort, the project should encourage co-operation and co-ordination between the key watershed conservation bodies: RFD, OEPP and, once established, the relevant River Basin Committees. A *Watershed Conservation and Information*

[121] Version of 23 September 1997 (unofficial translation).
[122] *Chao Phraya Basin Water Management Strategy* final report (October 1997) to NESDB, RID and PCD.

Centre run by the OKD could provide some co-ordination, encouraging these organisations to support communities in the donor areas.

The Watershed Conservation and Information Centre (WCIC) would promote sustainable development, but it would not be a public relations machine for either RID or the Kok-Ing-Nan Project. The WCIC would disseminate information on watershed management and identify projects in co-operation with local authorities, RFD and the River Basin Committees. Any such projects must include community participation and meet the general objectives of the Fund. RFD reforestation projects that do not directly benefit the local community would not qualify, for example. The WCIC should be very small; it might be staffed by only two people, one responsible for information dissemination, the other for agency co-ordination. The WCIC would be supported by the OKD's administrative staff (secretary, etc.)

Thus the DBSDF and WCIC would complement each other, providing financial and technical support, respectively, to communities that will themselves define and implement sustainable development projects.

6. *Conclusions and Recommendations*

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

(1) Environment Assessment and Development Needs

Concerning Environmental Impact Assessment (EIA), it is recently an international trend that the environmental assessment be carried out in early stage of the project formulation, where particular importance is given to the social environment survey. Because learning the development needs of the local people and people's participation are recognized to be highly important from the initial stage of the project formulation.

(2) Overview of EIA Report initiated by RID

The EIA Report presents a baseline data for environmental data concerning various environmental aspects compiled through secondary data review, field surveys, investigations and sampling programmes for various parameters. Based on that, the social and natural environment study has been evaluated. From among further works and their impacts and mitigation measures having wide-ranging implications on several environmental parameters, the following issues are likely to be important.

- Tunnelling-related impacts of construction
- Impacts related to access roads and spoil material stockpiling, and impacts on surface water quality and drainage, and on groundwater, at all tunnel inlet, outlet and adit locations.
- Site management of all locations proposed to be used for stockpiling or disposal of spoil material resulting from canal excavation and from tunnelling.
- The Impacts of the Nam Yao river-training works, particularly those related to the human and social environment (e.g. use of the river for domestic, livestock, navigational and fisheries purposes) and impact on aquatic ecology.

In association with the proposed tunnel, which runs unavoidably underneath the natural reserve forest and the area designated as watershed classification 1A where any development activities are strictly regulated, environmentally-related legal matters has arose so that due consideration should be paid to consultation with the government agencies concerned. This matter is one of the requirements well addressed in the OEPP guidelines.

(3) Importance of Social Environment Study

In cope with the OEPP guidelines and the international guidelines, the supplementary studies, discussed in Chapter 4 focusing on the social environment and people's participation aspects, were carried out.

The development of the northern Thailand is given a rather high priority. As addressed in the OEPP's comments on IEE, the natural resources in the region should be managed for the best use for the region concerned. In order to learn the real development needs and from the viewpoint of the environmental assessment in the planning stage as well, the social environment survey based on PRA is firstly recommended to be done. The most importance in learning the development needs, is to examine the needs in a well-balanced manner, from several aspects. It is necessary to learn how deeply the local people by himself understands his own needs.

From several methods of social survey, a participatory PRA method has been recognized to be appropriate because diversified needs could be learned in a wide range through dialogue with local people from the planning stage of the development study.

Finally, in formulating this kind of huge project, it is quite necessary to pay due attention to public disclosure and transparency in respect of strengthened power of Tambon Council as well discussed in the new Constitution. In this context, the participatory social environment survey is highly advised to be carried out in close collaboration with DCP from now on in a wide range in the Donors Basins for the project formulation. Here, the recommendations to learn the development needs are described in the next page.

6.2 Recommendations

The primary recommendations of this report are that further social environment studies with a focus of PRA and actual funding be provided for rural development in the donor basins area.

The environmental studies suggest a number of avenues for promoting social environmental survey for rural development in the donor area together with supplementing the environmental assessment and mitigating measures carried out by the RID's environmental study. The following recommendations arose from these studies:

Recommendations to be raised in the subsequent stage

- further environmental study including handling of the spoil material (the amount of spoil excavated from canal, tunnel construction, etc. estimated at less than 20 million m^3) and study on spoil utilization;
- implementation of various improvement plan for P.I.S. proposed by the provincial agencies;
- public participation and security of public disclosure and transparency in the project appraisal process;
- the benefits for the beneficiary basin be shared with the donor areas through a Donor Basin Sustainable Development Fund (DBSDF).

Recommendations to be raised in a broader and long-term aspects in due consideration of watershed conservation and others.

- a Co-operative Reforestation Programme and a Forest Protection and Encroachment Prevention Programme be undertaken to improve watershed management;
- Participatory Rural Appraisal be applied to identify themes for rural development;
- assessment of impacts on fisheries, aquatic ecology and freshwater biodiversity be carried out more thoroughly and impartially.

The environmental studies recorded in this report have already identified a number of themes (for project programmes), but these themes should be developed by examining local needs across the donor basins. The development needs of the donor basins are rather high, and the environmental degradation is still in progress, to justify more immediate activity. It has also been noted that development funds such as the World Bank's Social Investment Fund take some time to be fully used, with the initial take up being slow. It would therefore be wiser to set up the development fund and its operation without waiting for the results of the further PRA studies.

As potential source for the development in the donors basin, there is Social Investment Fund of World Bank (SIF). RID and DEDP have supported the small irrigation projects in the region concerned, the fund of

which could be utilized for this purpose. By establishing the "Watershed Conservation and Information Center" proposed in this report, the information on watershed management are disseminated to the public and projects are recommended to be prepared in a close cooperation among local government, RFD, DOF, local people/NGOs, etc..

The socio-economic baseline survey with PRA as a part of this environmental study was carried out in a very limited area due to insufficient time available. In promoting the rural development in the northern Thailand, it is firstly important to learn the social needs and the problems of local people together with understanding current socio-economic conditions in the donor basins consisting of Kok, Ing and Yao river basins.

In the donor basins of the Northern Thailand, there are a lot of local differences. Therefore, it is proposed that the social environment survey with PRA be done firstly for the selected villages selected from among total 253 villages, covering the target area of the same Lower Ing Basin. By doing PRA survey in these villages, an appropriate development theme common in the several villages is expected to be identified, finally leading to facilitation of the sustainable rural development. This social environment survey is advised to be applied to the other basins of Kok and Nan as well.

The schedule of the social environment survey within the Lower Ing basin for rural development is presented as below;

Social Environment Study in the Lower Ing Basin

Stage 1 (survey period : 6 months)

1. Collection of information on development plans at the levels of Amphoe and Tambon
2. Data collection and study of socio-economic materials at the level of Tambon (Khor Chor Chor)
3. Site survey in the target area
4. Selection of villages for PRA survey

Stage 2 (survey period : 12 months)

5. PRA survey (identification of problems and development needs)
6. Definition of development theme by target region (target region consisting of several Tambons)
7. Formulation of rural development plans
8. Selection of priority projects

Required Experts

1. Team Leader (Rural/Social Development)
2. Social Expert (PRA)
3. Institutional Expert
4. Agro-economist
5. Irrigation/Drainage Expert
6. Environmental Management Expert
7. GIS Expert

Through more in depth public relations activities which are required to the people in the donor basins with correct and honest information, the RID will be expected to get more valuable and useful information which will be incorporated into the comprehensive EIA. In parallel to these activities, the social environmental survey with a participatory method such as PRA, will be required to be carried out, particularly in the Lower Ing basin and Yao river, in a wider range to grasp the development needs of the people, which are eventually reflected in the associated projects proposed in the Feasibility Study. Finally, the formulation and implementation of those projects on people's participatory basis will contribute to and result in facilitation of people's consent of the project in the donor basins.