

Pakistan

Pat Feeder Canal Rehabilitation and Improvement Project

Report Date: October, 2002

Field Survey: August, 2001

1. Project Profile and Japan's ODA Loan



Site Map: Baluchistan Province



Site Photo: Pat Feeder Canal & Command Area

1.1 Background

Baluchistan is the largest (in terms of area) but least developed of Pakistan's four provinces. While extending over 347,000 km² -- 44% of the total area of the country -- it has an estimated population of 4.9 million (1985), or only about 5% of the national total. The economy of Baluchistan is still at an early stage of development, characterized as agro-based. In spite of this, Baluchistan is not self-sufficient in most food crops, due to underdevelopment of agricultural infrastructure and insufficient supply of irrigation water. Baluchistan is situated at the border of Iran and Afghanistan and the economy of the region is of great importance.

The Federal Government set accelerated development of Baluchistan as an objective in the Fifth Five-Year Plan (1978/79-1982/83), and various programs and projects were taken up in the Province to achieve this goal. The Government put emphasis on developing the agricultural potential of the Province, especially through the provision of water, the major constraint on agricultural development in Baluchistan. Efforts were made to improve irrigation and drainage facilities, particularly the existing Pat Feeder Canal Irrigation System (PFCIS), which was the largest single irrigation scheme in the Province.

1.2 Objectives

To increase delivery of irrigation water – specifically, to raise peak discharge to 190 m³/sec from 89 m³/sec – over a 185,500-ha area of the Kachi Plain and thereby increase agricultural production and raise the living standards of local farmers.

1.3 Project Scope

The Project is the first phase of a step-by-step development plan. The scope of the Project is as follows:

- (1). Widening the main canals (182 km) to accommodate an increase in flow rate (from 89 m³/sec to 190 m³/sec)
- (2). Rehabilitation of distributary canals (320 km) and construction of minor canals (800 km)
- (3). Improvement of on-farm watercourses and other on-farm water management facilities
- (4). Construction of flood control works and improvement of drains and drainage facilities

- (5). Construction of facilities for a cotton research and maximization program
- (6). Mapping
- (7). Equipment and vehicles for supervision and O&M
- (8). Consulting Services

The Project is co-financed with the Asian Development Bank (through ADF window)¹. Components (6) & (7) above, are financed by Japan's ODA.

1.4 Borrower/Executing Agency

The President of the Islamic Republic of Pakistan / Water and Power Development Authority (WAPDA), and Government of Baluchistan (GOB).

1.5 Outline of Loan Agreement

Loan Amount/ Loan Disbursed Amount	1,551million yen/934million yen
Exchange of Notes/ Loan Agreement	July 1987/ September 1987
Teams and Conditions	
Interest Rate	2.75 % p.a.
Repayment Period (Grace Period)	30 years (10 years)
Procurement	Partially Untied
Final Disbursement Date	January 1995

2. Results and Evaluation

2.1 Relevance

During the Sixth Five-Year Plan (1983/84 – 1987/88), the Government of Pakistan did not have sufficient funding to fulfill development expenditure goals but, nevertheless, ensured that investments were made in three priority areas: agriculture (and irrigation), energy and the social sector. The Government's strategy for agriculture and irrigation under the plan called for maximizing the efficiency of existing irrigation facilities through canal remodeling and rehabilitation. The aim was to increase production of the four major crops (wheat, rice, cotton and sugarcane) and to emphasize diversification into high-value crops, with a view to achieving a structural transformation of the sector. In line with these macro and sector policy priorities, this Project was formulated so as to bring about an incremental increase in the production of wheat, rice and cotton, through canal remodeling and rehabilitation in the least developed province of Pakistan. Therefore, the Project was relevant to domestic policy goals.

Given the recent severely constrained outlook for the availability of domestic and external resources, much more emphasis is now being put on a sustained expansion of agriculture and industrial-based exports. In the irrigation sub-sector, there has been a shift in emphasis from physical development and/or improvement to management, with farmers' participation and burden sharing. Even in light of these developments, the Project maintains relevance because efforts are made in the following areas: (1) to expand the acreage cropped to cotton, which would contribute to a base for industrial-based export and (2) to substantiate the transfer of responsibility of watercourse management to farmers.

2.2 Efficiency

(2.2.1) Project Scope

The Project experienced major reformulation twice, first in 1993 (by ADB) and then in 1998 (by

¹ The estimated total project cost was US\$182.3 million. In the original financing plan, ADB committed US\$117 million equivalent, and expected ODA financing from Japan in the amount of US\$30 million equivalent, covering civil works. As the actual commitment of Japan's ODA for the Project was for mapping and equipment / vehicles, in the amount of ¥1,551 million, or US\$7.5 million equivalent, the Government of Pakistan assumed the responsibility for the increased funding.

the Government) due to the shortage of funds. Adjustments were made in the size and content of various Project components. The most substantial changes in the first reformulation were in the drainage components, the result of further analysis and a more detailed project design. At first, the sub-surface drainage component was scaled down; then in the second reformulation, it was transferred to the ADB-financed National Drainage Sector Project (NDSP) to allow time for detailed monitoring and confirmation of actual need. Monitoring was supposed to be implemented after the completion of the surface drainage network.

The agricultural components in the original scope were classified into three categories: on-farm water management, design and construction of marketing facilities, and implementation of a cotton research and maximization program. These components were transferred to the Pat Feeder Command Area Development Project (PFCADP), funded by the International Fund for Agricultural Development (IFAD), although cotton planting had already been initiated on the pilot farms in 1989/90 and 1990/91. IFAD approved a loan of \$30 million for that project. APFCADP provided materials for on-farm water management and equipment for soil and water testing, an agro-meteorological station, and seed testing and processing, which were required for work in cotton research and cotton maximization on the pilot farms. Prior to the IFAD intervention, Japan's ODA-financed On-Farm Water Management Project (Loan Agreement in March 1992) took up watercourse improvement sub-projects in selected areas of the Project.

For the components financed through Japan's ODA, there were no substantial scope changes. Mapping, equipment and vehicles for supervision were supposed to have played significant roles in project implementation, but no evidence showing the extent and depth of their roles was available from the Executing Agency.

(2.2.2) Implementation Schedule

The Project was originally scheduled for completion in seven years (1986 – 1993). The Consultants started to work in 1988, but construction did not start until 1991. At the time of project reformulation in 1993, the target completion date was revised to 1996. After the changes in scope were made, the Project implementation proceeded. It was deemed complete in December 1999, three years after the revised target. The delays were due to difficulty with consultant recruitment and bidding for a contractor, and, most significantly, to a number of incidents involving tribal groups in the project area that targeted the main canal.

The components financed by Japan's ODA were to be completed in the first two years of implementation. Mapping was done over a 19-month period ending in September 1991; it was originally scheduled to take 5 months. Equipment and vehicles were procured even after mid-1993, but delays in procurement were inevitable to a certain extent because of delays in project implementation.

(2.2.3) Project Cost

The original estimate² of the total project cost was US\$182.3 million, equivalent to Rs2,917 million or ¥37,918 million, based on the exchange rate of US\$1=Rs16.0=¥208. According to estimates made by the Executing Agency in 1998, the total actual expenditure amounted to Rs8,500 million, or US\$210 million, based on the exchange rate of US\$1=Rs40.5, although this could not be confirmed. The rise in total project cost could be attributed to delays in implementation, but the project cost estimate was too optimistic about the local situation and risks involved. ADB agreed to increase its financial commitment to the Project, shouldering a substantial portion of the cost overruns.

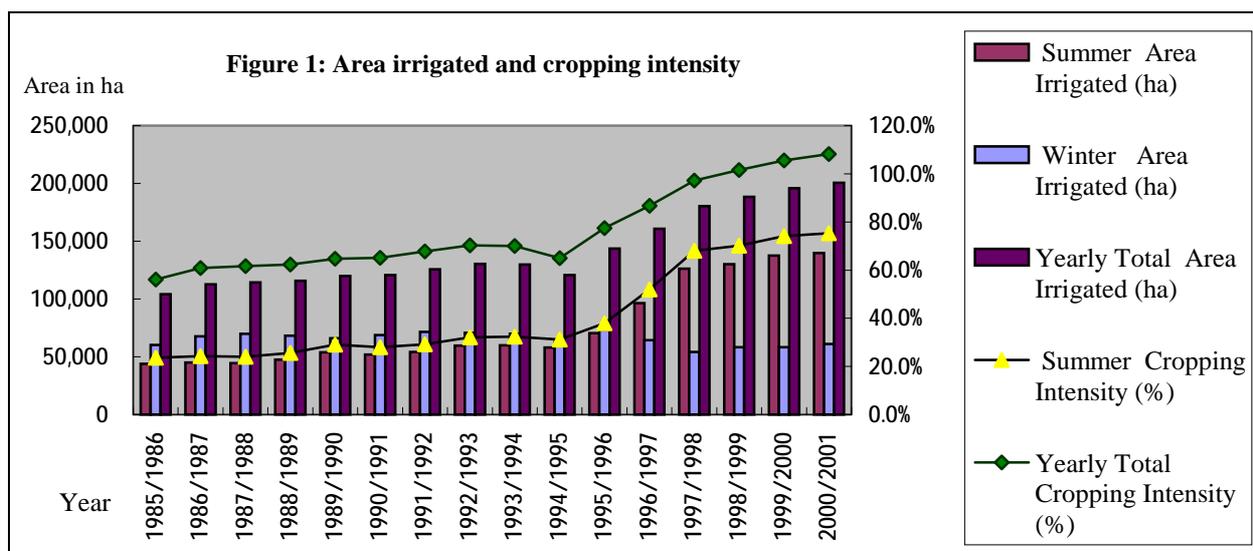
There were cost under-runs in Japan's ODA components, due mainly to appreciation of the Yen against the US Dollar and the Pakistani Rupee.

2.3 Effectiveness

Despite delays and cost over-runs, the Project did improve the delivery of irrigation water to the command area of the PFCIS considerably. As a result, irrigated area expanded. In the original plan, the cropping intensity was expected to increase from then-prevailing 77%, or 142,000 ha, to 100%, equivalent to 185,500ha. Figure 1 shows the increasing trend in cropping intensity, especially in the latter half of 1990's. This rapid increase is due to an increase in summer irrigation. As a matter of fact, area irrigated in the winter season stagnated in the latter half of 1990s. Nonetheless, the Project achieved the target for

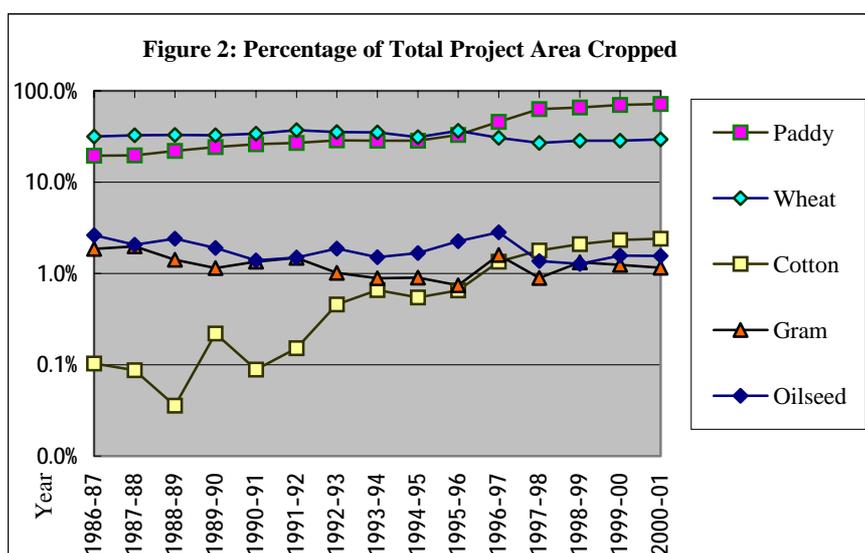
² Made in 1985 by ADB

cropping intensity in 1999 and thereafter.



Source: GOB: Baluchistan Irrigation and Power Department (BIPD)

Strong performance of summer season irrigation is a result of an increase in area cropped to paddy, as shown in Figure 2. In the original plan, however, cotton was to be cropped extensively in summer. Crop diversification as envisaged in the original plan has not materialized so far, but recent increases in area cropped to cotton is conspicuous. Given the appropriate policy incentives and improvements in marketing conditions, crop diversification, especially cotton, can be expected to improve more, as the availability of irrigation water has improved substantially.



Source: BIPD

Yields increased over the 15-year period from 1986 to 2000: from 2.4 ton/ha to 4.2 ton/ha for paddy, and from 1.2 ton/ha to 2.8 ton/ha for wheat. These increases are substantial, but still short of the targets: 4.8 ton/ha for paddy and 3.2 ton/ha for wheat. An attempt was made to ask the Executing Agency to give explanations on possible factors contributing to the gaps observed between the yield data provided and the target yields set in the original plan, but no explanations were given.

The impact on agricultural production is significant; paddy increased more than six times, from 87,000 tons in 1986 to 558,000 tons in 2000, 2.7 times the target of 205,000 ton. This increase in paddy production is a result of increased and more reliable supply of irrigation water. The project envisaged reduction in area cropped to wheat, with targets of 119,000 tons and 37,000 ha cropped. Actual wheat

production in 2000 was 153,000 tons from 55,000 ha.

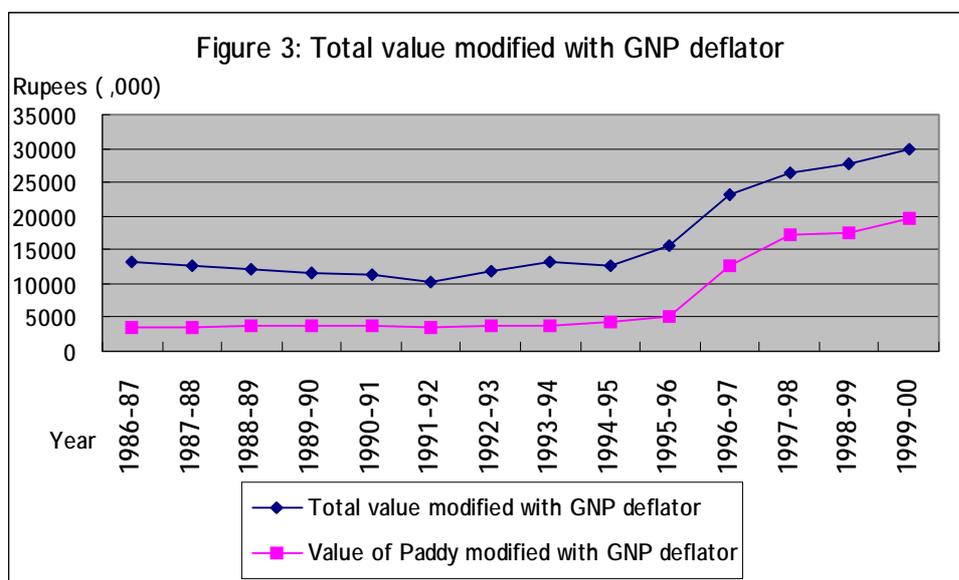
The **EIRR** for the Project was originally estimated at about 13.0 %, assuming a project life of 50 years and realization of full project benefits in the 6th year after project completion. The **EIRR** was re-estimated by the Executing Agency at 13.4% in 1997, when the second reformulation was undertaken. The assumptions employed in the revision included some modifications, as follows:

1. Retention of the current area (about 150% of the original) of wheat;
2. Increase (nearly twice the original) in the area for cotton;
3. Reduction (about one-third the original) in the area for paddy.

Given the costs as revised by the Executing Agency, which incorporated the expenditures incurred and included the commitment made by IFAD for command area development, the **EIRR** was recalculated taking 1997 as a base year . The resulting return was 6.6%.

2.4 Impact

The Project has brought about many changes in socio-economic conditions in the project area. Figure 3 shows the increasing value of agricultural produce. This value is calculated by taking the annual production amount of each of the major crops (paddy, wheat, oilseed, sorghum, cotton, gram, and fodder) and multiplying that figure by the associated price. This value increased throughout the latter half of the 1990's, nearly trebling over that period from 1991-92 to 1999-2000³. Increases in total value can be accounted for to a large extent by the increased supply of irrigation water.



Source: BIPD

Living standards in the project area reportedly improved significantly, particularly among farmers at the tail of canal system, who had never received adequate water before the Project. The number of farm families in the project area was 17,412 in year 1986 and 28,625 in 2001⁴. The overall trend is clear from Figures 1 through 3, although an in-depth study is needed to evaluate how the benefits are actually shared among various farmers, i.e. big, small and landless.

There have been no reports of adverse impacts on water quality or on project area aquatic life as a result of increases in agrochemical usage.

2.5 Sustainability

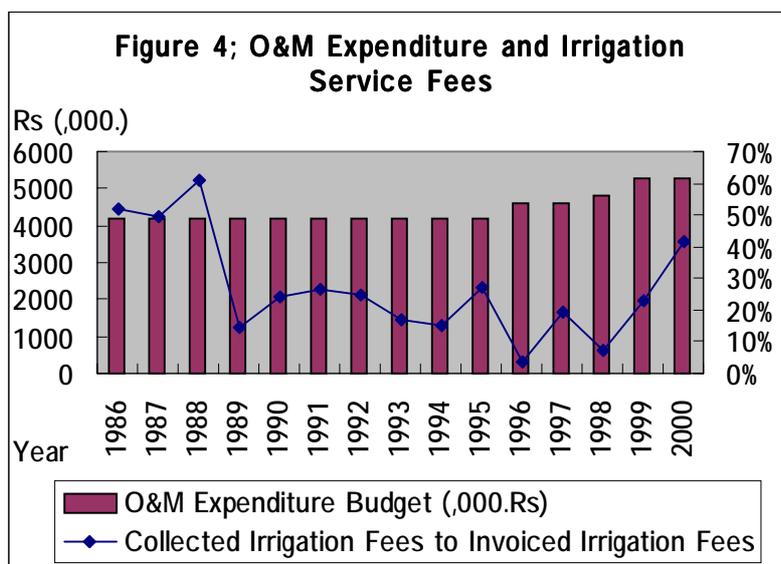
The Project was officially handed over from WAPDA to GOB in June 1998. At the present, GOB is maintaining the irrigation system, including the main canal, distributaries and minor canals, and drains. The sections of the main canal and distributaries that were observed are in good shape.

³ GDP volume increased from 100 to 114 from 1995 to 1999.

⁴ Annual population growth rates in Pakistan were 2.5% to 2.3% in the latter half of the 1990s.

Responsibility for the operation and maintenance of the Watercourses lies with the beneficiary farmers, and the strengthening of water users associations is covered by the IFAD-financed Area Development Project.

Figure 4 shows the amount of the annual budget authorized by GOB for O & M of the PFCIS. There were only nominal increases in funding after completion of the Project; accordingly, the number of staff assigned to the O & M of the PFCIS has remained the same. Under the direction of the Superintending Engineer there are 16 engineers and 200 technicians, operators and workers now engaged in O & M. Increase in annual funding is nominal compared with the substantial increase in irrigation and drainage works to be maintained.



Source: BIPD

GOB (Revenue Department) increased irrigation fee in the latter half of the 1990s⁵. But, the fee collection rates have remained low between 4% and 41% since 1996. Institutional frameworks for fee collection system have to be strengthened to improve the collection rates of irrigation fees.

⁵ The amount of irrigation fees collected in 1999 and 2000 exceeded the O & M budget by more than 100%. The fees collected are added to the Province's general revenue, not directly allocated to the O & M budget.

Comparison of Original and Actual Scope

Item	Plan	Actual
1 Project Scope		
1.1.widening of main canal	190 m3/sec	as planed
Desert Pat Canal (12km)	(12km)	as planed
Pat Feeder Canal (170km)	(170km)	as planed
1.2 remodeling of distribution canals	11 canals(320km)	13 canals(302km)
1.3 construction of minor canals	265 canals(800km)	164 canals(500km)
1.4 improvement of on-farm facilities	1235 watercourses	Removed to IFAD
1.5 flood control works	1 no.	as planed
1.6 remodeling of carrier drain	43km	43km plus 2 nos.of new
-drainage pump stations	2 nos.	as planed
-evaporation pond	1 no.	as planed
1.7 construction of surface drainage	77,000ha	185,000ha
1.8 construction of sub-surface drainage	25000ha	Deferred to NDP
1.9 mapping: 1/5000 scale	185,000ha	as planed
1/600 scale	about 7000ha	no confirmation
1.10 Vehicles and equipment for implementation and o/m		
WAPDA		
-- 4 WD jeep type vehicle	25 nos.	35 nos.
BIPD		
-- 4 WD jeep type vehicle	25 nos	as planed
-- motorcycle	18	as planed
-- 130 HP floating dredger	1	Replaced by 5 no draglines
-- backhoe	2	4
-- motor grader	3	4
-- 50 HP tractor	3	4
-- 600 gal water trailer with pump	3	as planed
-- smooth road roller	3	as planed
-- sheep foot roller	-	3
-- wheel loader	-	3
-- sheep foot roller	-	3
BAD		
-- 4 WD jeep type vehicle	10 nos	20 nos
-- 4 WD pick-up	10	as planed
-- motorcycle	10	20
-- Office equipment and furniture	10	7
-- survey equipment	10	as planed
1.11 facilities for cotton research	1 no.	Removed to IFAD
1.12 consulting services	364 m/m,	3467 m/m
2 Implementation Schedule		
2.1 Mapping	January 1988 to June 1988	19 Feb 1990 to 15 Sep 1991
2.2 D/D	July 1988 to Sep 1991	July 1988 to Dec 1995
2.3 Main Canal	April 1989 to Dec 1992	March 1991 to June 1998
2.4 Distributary and minor canal	October 1990 to Sep 1993	Sep 1990 to Dec 1999
2.5 Watercourses and on-farm facilities	Jan 1989 to Sep 1994	not applicable
3 Project Cost		
Foreign currency	19,706 million yen	Rs 3,793. million
Local currency	18,212 million yen	Rs 4,708. million

Total	37,918million yen	Rs 8,500. million
ODA loan portion	1,551million yen	934 million yen (Rs 248.million)
Exchange Rate	US\$1=Rs.16 = 208 yen	US\$1=Rs.40.5

Independent Evaluator's Opinion
on Pat Feeder Canal Rehabilitation and Improvement Project

Rana Sarwar, Independent Evaluator

Equitable development of all regions and provinces has always been a strategy of the Federation of Pakistan, and it has taken up steps to achieve this goal with its limited resource base. The development of agriculture and the improvement of sources of irrigation such as Pat Feeder Canal Irrigation System in Balochistan is a part of development strategy of the federation Government. As the government continuously pursuing a long-term strategy for sustained expansion and improvement in the existing irrigation infrastructure, hence Pat Feeder Canal Rehabilitation and Improvement Project (the PFCRIP) is still relevant for the target group, the government and the donors.

The strategy to maximize efficiency of existing irrigation facilities through 'canal remodeling and rehabilitation' is quite relevant to the domestic policy goals of the Sixth Five Year Plan of the GOP. The project is also relevant to the macro and sector policy priorities aimed at increasing agriculture productivity and raising the living standard of the people through increased delivery of irrigation water.

The major components of the PFCRIP were the widening the main canals (182 km), rehabilitation of distributaries (350 km), construction of minor canals (88km) and flood control works /drains, establish a cotton research facility and mapping and provision of equipment and vehicles to facilitate on-farm water management activities. Major infrastructure development activities completed with a time lag of seven years and 292% cost over run. The ODA Japan components i.e. mapping and provision of equipment and vehicles, however, completed within original timeframe and with cost under runs. The Government of Balochistan's recent shift of emphasis on transfer of watercourse management to the beneficiaries further enhances the relevance and sustainability of the investments made on this component.

Two major indicators i.e. the time lag and cost over-run, quoted above are sufficient to prove the efficiency of the implementing agency. The stated constraints as delays in recruitment of consultants, purchase of equipment and machinery and designing of different components and the incidence of local tribal resistance combined reflecting the incompetence of the implementing agency in planning design and implementation of the project. The tribal resistance is an indicator of ignoring social impact analysis on indigenous people at planning mitigation measures during implementation. The major reason of local resistance has been political and economic – the allotment of land to the outsiders.

The project interventions very effectively helped in improving the delivery of irrigation water, expansion in irrigated area and the cropping intensity. Comparing my three personal visits to the project area 1995, 1999 and 2001, I observed a gradual increase in the above three factors and also the crop diversification. But not at the same rate, as projected by JBIC. It would be better if the consultants use some PRA techniques to assess effectiveness rather base their analysis on the data provided by the implementing agency. For example (fig.1) showing continuous increase in cropping intensity since 1985-86. This may be attributed to other factors.

Irrespective of the initial difficulties in developing lands, managing the watercourses and settling in the new agro-ecological zone the farmers presently feeling a change in their socio-economic conditions. As a result of increased supply of irrigation water for majority of the farming communities, there is a substantial increase in cropping area and yield per hectare. The increase in productivity brings in marketing facilities and increase in the value of agriculture produce and enhanced capacity to absorb more labor from outside.

The evaluation rightly stressed for a benefit monitoring evaluation (BME) of the project The proposed BME should also evaluate the negative and positive impact of the project on the indigenous people and the change of ownership titles and landholding size and the ratio of absentee landlords during the project period. There are strong indicator of allotment large pieces of Pat Feeder lands to landlords and civil and military bureaucracy and members of establishment.