Groundwater Demonstration Plot
Pukdale, Kabupaten Kupang, Timor
Nusa Tenggara Timur

Monitoring Report No. 3
Process Documentation

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May, 1986

Executive Summary

This report traces the development of a 7 hectare groundwater demonstration plot in the village of Pukdale, Timor, NTT throughout the first year of its existence. The demplot was created by P2AT, the groundwater division of the Department of Public Works of the Government of Indonesia. P2AT provided a new irrigation system to enable farmers to grow palawija (secondary) crops during the dry season; and a staff member of this agency worked with the farmers to create a water users association (P3A). P2AT intends to take full responsibility for operations and maintenance of the demplot for approximately two years.

The new irrigation system includes a 50-meter tubewell on which a diesel-powered centrifugal pump has been installed as well as 600 meters of concrete-lined irrigation canals. This system provided water for two crops of corn during the dry months of the year; and it afforded the farmers their first experience with groundwater irrigation. The P3A worked with a P2AT staff member to develop a rotational irrigation schedule and the association has begun to play a major role in managing water allocation. Also, the association collected a small post-harvest subscription fee from each demplot farmer to start a fund for pump repairs and other contingencies from which the P3A can draw once P2AT has transferred responsibility for the demplot to the farmers. No mechanism has been developed yet to recover operation and maintenance costs, however.

A qualitative methodology, process documentation, was employed to monitor the development of the demplot. This approach enabled the consultant to chronicle and describe demplot activities, to identify the participants involved and to describe their interactions, and to discuss the problems and issues that emerged during the first year of project launch and implementation. Process documentation was not intended to be used as a means of passing judgement on the performance of P2AT personnel or on the demplot project itself. Rather, the principal aim of the research was to determine and describe lessons learned from the demplot experience that might be incorporated in the planning, implementation, and coordination of future P2AT projects.

Based upon this research, two major areas for improvement within P2AT have been identified:

1) Planning and program direction - It is suggested that P2AT in NTT develop a comprehensive plan and a specific set of guidelines for groundwater development in the province. This would enable the staff to devise long- and short-term plans for effective and appropriate utilization of resources and personnel; and it would facilitate regular evaluation of office performance

and the monitoring of progress toward programmatic objectives.

2) Review and evaluation of current staff - Some aspects of P2AT's operations have suffered from shortages of appropriately trained or experienced personnel. A general review of the qualifications and experience of all staff members might enable the P2AT administration to determine areas in which further training of existing staff members and/or the introduction of new personnel would be needed to fulfil its long- and short-term plans for groundwater development. At the same time, P2AT should develop specific and comprehensive job descriptions for all staff positions. This would facilitate staff reorganization, if deemed appropriate; and it would enable the administration to conduct regular evaluations of the progress and performance of each staff member.

In terms of developing viable groundwater irrigation sites, it is suggested that P2AT consider the following:

1) Development of comprehensive site selection procedures - Technical feasibility has played the primary, if not the exclusive, role in P2AT's determination of drilling sites to date. P2AT's choice of the Pukdale site was determined by the existence of an aquifer in a relatively vast flat agricultural area to which the village head gave P2AT access. These are primary considerations for choosing the general location for a project site. The choice of the specific location of the well within the broad potential area, however, was not based on a careful examination of other variables relating to the future sustainability of an irrigation system. It is suggested that P2AT develop a mechanism for systematically comparing and evaluating various potential drilling locations in order to determine which sites would benefit the largest number of people and would be sustainable by those people in the future.

2) Experimentation with cost-effective technologies - P2AT should consider the relevance of undertaking cost-benefit analyses of proposed irrigation systems both in terms of the costs to P2AT of the installation and initial operations and maintenance and of the future costs to the beneficiaries. P2AT followed a Javanese model in developing the Pukdale irrigation system, although ecological features, socio-economic conditions, and agricultural practices and capabilities differ significantly between Timor and Java.

3) Preparation of beneficiaries to utilize and manage the systems that are introduced - The farmers in Pukdale have not been informed effectively of the extent of their future responsibility for the operations and maintenance of the dempiot. Their obligatory contribution to the P3A fund is only about four to six percent of the estimated cost of operating the system, and it is payable after they have sold their harvests and have available

cash. To date, most of the burden of providing information and support to demplot farmers has been borne by one individual from the P2AT irrigation staff. Farmers have depended upon him for assistance in all aspects of demplot operations. In order for P2AT to develop other groundwater sites in the future, all appropriate staff members should be coordinated to provide (or enlist from other agencies) logistical, agricultural, and institutional monitoring and support. Furthermore, there should be a concerted effort to prepare farmers for their future management of demplot operations by withdrawing support gradually and consistently.

It should be emphasized that the provincial branch of P2AT in NTT cannot act alone in improving its existing operations, in effecting institutional change, in experimentation with new technologies, and so on. At the national level, policy decisions regarding the long-term decentralization of authority may be required.

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I. Introduction

This is the third of four reports regarding the groundwater demonstration plot established by P2AT in the village of Pukdale, Kabupaten Kupang Timur, Nusa Tenggara Timur. The first report[1] described the methodologies employed in monitoring demplot development and in conducting a socio-economic baseline survey of the households involved in the demplot. The second report presented the findings of this survey. These findings will be compared to data collected in a follow-up survey of the demplot households. The second survey will take place at the end of the third harvest of demplot crops. In the consultant's final report, data from the two surveys will be compared in order to assess the socio-economic impact of the groundwater irrigation system on its beneficiaries. Specifically, the final report will analyze changes in production strategies between the first, second and third cropping seasons and will discuss the implications for future sustainability of the system. The report also will provide an overview of the consultancy, summarize lessons learned and make recommendations for future monitoring activities for this site and the demplots which P2AT will be developing.

This third report presents process documentation of the implementation of the groundwater irrigation system in Pukdale over the course of its first year of operation. To date, process documentation has been used most extensively by researchers working in the Philippines and Sri Lanka. By their definition, it refers to a method of chronicling activities of a sub- or pilot project. Process documentation researchers describe activities observed, identify the participants involved and describe their interactions, and discuss the problems and issues that emerged in the course of the implementation of the subproject. The goals, focus, and methodology of process documentation differ significantly from other forms of evaluation research. Process documentation research is qualitative, unlike other evaluation research that employs surveys to collect quantitative data. Process documentation is not intended to pass judgement on either the performance of the agency personnel or on the subprojects that they implement. Rather, the principal aim of process documentation research is to determine and describe lessons learned from the

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[1] See consultant's preceding reports: Groundwater Demonstration Plot, Kabupaten Kupang, Timor, Nusa Tenggara Timur: Monitoring Report No. 1 - Definition of Methodology; December, 1985 and Monitoring Report No. 2 - Results of the Baseline Socio-Economic Survey of Demplot Households; April, 1986.

subproject that could be incorporated in the planning, implementation, and coordination of future subprojects.

In its application to the Pukdale demplot, process documentation research followed the introduction of a new irrigation system and the creation of a water users' association by the implementing agency, P2AT. Attention was focussed on the users and intended beneficiaries of the new technology as well as on the staff of the implementing agency, all of whom have been involved in the development of the demplot project.

The report is divided into four principal sections. These consist of:

a) II. Chronological Overview of Demplot Development - covering the construction and maintenance of the irrigation system by P2AT, the establishment of the P3A (water user association) farmers' agricultural activities, and other aspects of the development of the demplot during its first year of existence.

b) III. P2AT's Functions and Activities - including a brief description of P2AT in NTT and a description and assessment of P2AT's role in the development of the demplot during the launch and implementation phases of the irrigation system.

c) IV. Farmers' Role in Demplot Development - regarding their interaction with P2AT, their interaction with other farmers, the establishment of their water users' association, and impact of the irrigation system in terms of the costs and benefits to the users.

d) V. Conclusion - recapitulates the formal and institutional factors that influence the future sustainability of the Pukdale irrigation system; reviews aspects of the experiment that render it unique; and proposes ways in which P2AT might be strengthened to develop and implement a successful groundwater program in the future.

II. Chronological Overview of Demplot Development

The following month to month summary of the activities of P2AT and of the farmers at the Pukdale demplot was extracted from longer regular reports submitted by the consultant to P2AT-NTT and/or to USAID. See Annex A, Consultant's Monitoring Reports: May, 1985 - April, 1986, for a complete set of these documents.

The reports contain fairly detailed descriptions of the activities of the farmers, the P3A, and P2AT irrigation staff from each week or month in the first ten months of the demplot's existence. The reports cover two full cropping seasons during the dry months in which the demplot pumping system was used to irrigate corn. The last reports in the series cover the preparation and planting of a third rainy season crop (paddy rice).

Also included are five reports written by Hari Suwito, P2AT Irrigation Division staff member, who oversaw all phases of demplot activity and worked with the consultant on the farmer survey. These reports were provided to USAID during periods of the consultant's absence from NTT. They were intended not only to sustain the regular flow of monitoring logs, but also to provide Mr. Suwito with experience in conducting and reporting on monitoring activities himself. Annex B, Pukdale Demplot: Summary Description, contains an abbreviated description of the demplot pumping system, operating costs, farmer participation, and agricultural activities. It was prepared in late February, 1986 after the first crop of irrigated corn had been harvested.

January - April, 1985

P2AT:

-- Drilled a 50 meter tubewell and installed a temporary pumping system that was intended to be used until a permanent system with new equipment could be installed after the start of a new fiscal year in April. Temporary system included a used diesel engine and used surface-mounted centrifugal pump taken from P2AT storage which were sheltered in a makeshift shed with concrete floor. Plans for permanent system include: new Kubota diesel 18 hp surface-mounted centrifugal pump, up to 8 smaller (2") supplementary wells in and around the 7 ha. demplot, concrete-lined irrigation canals leading from pump to at least 25% of demplot, and concrete-floored building to house pump and fuel supplies.

-- Pump broke down within a month of installation and was not repaired. (P2AT did not send staff out to monitor or

maintain the system, despite visits to the P2AT office from the village head to report the pump's failure.)

Farmers:

-- Planted rice on about 33% of 7 ha. demplot land in Januuary and February on the assumption that water supply was guaranteed by P2AT's pumping system; but lost about 25% of crop due to failure of the system and inadequate rainfall.

-- Dug temporary irrigation ditches and built a fence around 75% of the demplot at the instigation of the village head.

May - June, 1986

P2AT:

-- Irrigation staff member, Hari Suwito, assigned to demplot, to: 1) oversee demplot development [specifically, to advise farmers on water management, coordinate agricultural activities, and establish water user's association (P3A)]; and 2) work with USAID consultant on monitoring demplot development and in conducting socio-economic surveys of beneficiary households.

-- Attempts to put pumping system into operation were frustrated almost every day by a series of mechanical problems, lack of spare parts, general poor repair of equipment, and lack of personnel with appropriate skills. Two significant improvements in the temporary system were made: 1) Narrow fan belts that had been used to connect generator and pump pulleys were the wrong size and wore out after less than 50 hours of use. They were replaced with larger belts. 2) Galvanized pipe was installed to carry water from pump to highest section of demplot, channeling water to over 1 ha. that had not received water previously. By the end of June the system was operating for about 60 hours/week at a pumping rate of 5-6 ltr/sec. Monthly cost of operation were:

- diesel fuel (60 hrs @2 ltr/hr @Rp242/ltr)	=	Rp 116,160
- oil (4 4-ltr cans @Rp7500)	=	22,500
- pump operator salary	=	20,000
- fan belts (3 sets of 3 belts wore out due to faulty alignment of pulleys and to initial miscalculation of proper belt size @Rp7500/set)	=	22,500
Total		Rp 181,160

-- P2AT irrigation staff member appointed pump operator began working fulltime in mid-June at Rp. 20,000/month to be paid by P2AT until operating costs of demplot are transferred to P3A. The young man was selected because he has a vested interest in the project (his father owns the largest single block of land in the demplot), he was available and useful to P2AT staff who worked on the pumping system, and he has a certificate in diesel mechanics from a 3-month training course in Kupang.

Farmers:

-- The village head organized a cooperative labor effort of all demplot households to finish fencing the entire demplot area and to clean out clogged irrigation ditches.

-- One demplot farmer bought a Rp. 500,000 Honda kerosene surface-mounted pump to use on a WHO drinking water well drilled by P2AT in 1982 on his land within the demplot. This pump was used to provide supplementary water for his and adjacent plots because of the unreliability and inadequacy of water supply from the demplot irrigation system. This well was "borrowed" for demplot irrigation off and on for about six months during the dry season. (The WHO well has not been used officially since its drilling, though WHO has plans to install an electric submersible pump there.)

-- Organizational meeting for P3A called by village head at instigation of P2AT irrigation staff. 19 of 23 male demplot landowners attended. 5 to 10 other men (members of demplot owners' extended families) went in and out of the meeting as well. No women attended; nor were they invited to the meeting. Prior to the meeting P2AT staff member suggested that the village head's father be selected as head of the P3A because he owns a large section of the demplot (.6 ha.) and is a respected older man. The village head rejected this suggestion and, at the meeting, he nominated a different person (head of the hamlet in which the demplot is located) and also suggested candidates for the other offices of the organization. These choices were accepted by the assembled farmers after several hours of debate about the merits of these men versus possible alternative candidates.

-- Meeting of P3A and local agricultural extension coordinator (PPM) and extension worker (PPL) assigned to Pukdale demplot area held at instigation of P2AT irrigation staff member. PPM and P2AT staff previously agreed that first demplot crop should be green corn because of guaranteed market, availability of seeds (in farmers' own stock and from local commercial sources), and relative ease of cultivation. Purpose of meeting was to discuss palawija

(secondary crops) suited to dry season irrigation of the demplot, to explain reasons for choosing corn as the first demplot crop, and to discuss planting methods. All farmers eventually agreed to plant corn after several hours of heated discussion about other palawija (e.g., mung beans and peanuts) and vegetable crops. P2AT's position was: farmers should plant cash crops (exclusively) in order to gain experience for the future when they will have to recoup cost of operations and maintenance of the irrigation system without assistance from P2AT; and since unaccustomed to dry season agriculture, they should begin with crops that are most likely to succeed. The PPM stated that he would arrange for supplies of seeds, fertilizer, and insecticide. After this meeting, however, there was no further assistance from either the PPM or the PPL assigned to the demplot area, despite proximity of their headquarters (BPP) to the demplot (1/2 km.).

-- By end of June, 80% of demplot had been planted in corn (approximately 25% in local 60-day varieties and 75% 90-day HYV). Agricultural activities were supervised by P2AT irrigation staff member who helped farmers find commercial sources of seed and fertilizer in Kupang. Corn was planted at intervals of .5 x 1 m. with 2 seeds/hole. Assuming yield would be 1 ear/stalk, optimal yield would be 40,000 ears/ha. (@ farmgate price of Rp50/ear, the optimal gross would be Rp2,000,000/ha.).

July - September, 1985

P2AT:

--- Borrowed diesel submersible pump from Waskita Karya and, installed it on WHO well to provide supplementary water supply and to serve as back-up in event of further problems with demplot pump. Combined output of two pumps is 10-11 ltr/sec. At this rate, given dry, cracked condition of most of demplot fields and poorly dug irrigation ditches it took 30-50 hours to flood 1 ha. depending upon distance from pumps.

-- P2AT irrigation staff member spent 8-24 hr/day in demplot working with individual farmers to oversee and advise on proper planting and fertilizing methods and with P3A head and sub-group leaders to assure water distributed equitably. (50% of farmers frequently complained angrily when not given water on demand, so P2AT staff member spent nearly every day trying to demonstrate how equitable rotational water distribution system should work).

-- Construction began in September on permanent irrigation

system at estimated cost of Rp35 million (including construction of 3-room pump house with cement foundation and floor, zinc roof, glass windows, and reed (bebak) walls; concrete lining of 600m of irrigation canals; concrete division box; drilling of 8 supplementary (2") tubewells in and around demplot; purchase of 18hp Kubota diesel-powered surface-mounted centrifugal pumps for principal well and kerosene pumps for smaller wells). Work was contracted to a private firm, C. V. Sumber Griya Permai. P2AT irrigation staff member, Hari Suwito, was appointed overseer for P2AT.

Farmers:

-- Gradually developed confidence in P2AT irrigation staff member and became more tolerant of numerous problems with pumping system in belief that permanent system would work more reliably.

-- 6 ha. were fully planted by August.

-- All farmers prevented from working in demplot (weeding, maintaining clean irrigation ditches, etc.) nearly every day for 2 months (Aug.-Sept.) due to compulsory participation in AKABRI Masuk Desa activities. (Approximately 100 young army officers and soldiers from Java spent 2 months in village to organize construction of village office building.)

-- Meetings of full P3A were held in August and September. At the first of these meetings, 2 of 5 original sub-group heads were replaced (by group consensus) after original leaders resigned due to lack of time for the job.

The village head attended at the invitation of the head of the P3A to lecture farmers on the necessity of following P2AT staff member's instructions about irrigation rotation and maintenance of demplot.

The P2AT irrigation staff member explained the water distribution system (based on calculation of pumping capacity and minimum amount of water needed to sustain corn crop). Water would be provided to each field every 15 days and provided within 2 days of fertilizing. Farmers were asked to report to their sub-group leaders when they wanted to fertilize in order to coordinate water distribution. The P2AT staff member emphasized the necessity of farmers being present in the demplot on days when their land is scheduled to be flooded. In most cases, farmers had not been in their fields to regulate water flow. The P2AT staff member, head of P3A, sub-group head, and pump operator had overseen daily water distribution, leaving them little time for their own work in and outside of the demplot. This system was

expedient, but did not foster a sense of mutual responsibility for the irrigation system among all members of the P3A.

A second meeting was held to discuss strategy for the second planting. Farmers agreed to plant corn primarily. By consensus, P3A members agreed to make required contributions of Rp100 per .10ha of demplot land cultivated at the end of each harvest. The P3A treasurer will establish a Tabanas savings account at a bank in Kupang after funds from the first harvest have been collected. Money will be saved for future repairs to pumping system after P2AT has transferred full responsibility for operations and maintenance to P3A.

Harvesting began in September. Farmers arranged with vegetable vendors from roadside market Tarus (15 km. west of demplot) to sell green corn at Rp50/ear. Buyers harvest the corn and provide their own transport. Retail price in Tarus, Oesao and Kupang markets is Rp100-150/ear. Farmers prefer that buyers come to the demplot. (Most farmers are busy with cattle herds and gardens elsewhere.) Farmers are using corn stalks as feed for their own livestock.

Stem borers found on 1-2 month old corn on about 1 ha. of demplot. P2AT staff member advised farmers on use of Sumithion insecticide and helped them locate sources in Kupang (@Rp3000/ltr). Total insecticide use was 2ltr. Losses were estimated to be under 1%.

October - December, 1985

P2AT:

-- New Kubota pump was installed at P2AT well and used until the onset of the rainy season in late November (though permanent irrigation canals and pump house were not completed). The output of the pump was 8-9 ltr/sec. Operating capacity and cost of the new system cannot be determined until first dry season crop of 1986 is planted and system is put into operation for first time. P2AT irrigation staff member made the following calculations of real and estimated costs of production based on the experience of the first corn crop:

Total operating cost of the temporary pumping system for the first four months (including flooding dry land to make cultivation preparation easier and irrigating one crop of green corn):

- diesel fuel (3000 ltr @ 1.5 ltr/hr x Rp242/ltr with pump operation at 15-20 hr/day) = Rp 726,000

- oil (40 ltr @ 4 ltr per 160 hr. operation @ Rp1000/ltr) = 40,000

- pump operator's salary (4 mo. @ Rp20,000/mo) = 80,000

Total Rp 846,000

-- Based on first crop experience, the P2AT staff member's rough estimate of cost of water use per hour (once P2AT no longer funds the demplot) is:

- fuel (1.5 ltr/hr @ R.242/ltr) = Rp 363

- oil and grease = 50

- share of operator's salary = - 100

- " " gate tender's honorarium = 100

- contribution to P3A savings = 50

Total Rp 663

Total estimated cost of water per hectare (based on the calculation of 30-50 hours to flood 1 ha. and total of 8 floodings during a single season cycle as determined optimal by farmers and P2AT irrigation staff member through trial and error) is: Rp 159,120 - 265,200.

Total estimated cost of production (green corn) per hectare:

- seed (25 kg. @ Rp200) = Rp 5,000

- fertilizer (260 kg of TSP & urea @ Rp 100/kg) = 26,000

- insecticide (2 ltr @ 3000/ltr maximum) = 6.000

Total Rp 37,000

Total estimated cost of production (irrigation plus agricultural inputs): Rp 196,120 - 302,000 per ha.

Farmers:

-- Harvest of the first corn crop complete in October. Yields were:

- Total harvested = 221,510 ears
- " sold @Rp 50/ear = 95,440 " (43%)
- " amount of sales = Rp 4,722,000
- Avg/ha (6 ha planted) = Rp 787,000
- Total consumed = 27,760 ears
- " dried for storage (@15/ears/kg) = 98,310 ears (± 6.5 t.)
- Market value of stored corn @ Rp. 150/kg = Rp 975.000
- Overall cash value = Rp 5,697,000
- Cash value per ha. = Rp 949,500

Yield information was collected separately by consultant with P2AT staff member and, at P2AT staff member's suggestion, by the head and sub-group leaders of the P3A for the organization's own records.

All demplot farmers considered this harvest a boon since they did not have to pay for water. Their only costs were seed, fertilizer, and in two cases insecticide (maximum cost per hectare is Rp37,000 - see above). Labor for the most part came from within each demplot household. About 25% of the landowners gave relatives from outside the demplot use of portions of their land but there were no formal arrangements for compensation. One farmer hired 4 laborers to plant and weed his .6 ha. parcel at a total cost of Rp45,200 (4 x Rp750/day for 15 days).

After the experience of the first harvest, farmers became willing to follow P2AT staff's advice on cropping methods (proper spacing, use of fertilizer and insecticide, and appropriate watering intervals) on the assumption that their yields could be raised.

-- Second planting took place between late September and late October.

-- P3A met to organize planting such that it was staggered from one sub-group to another to facilitate irrigation rotations. 90% of the farmers cooperated in this planting strategy and also consulted with their sub-group head on appropriate times to fertilize.

January - April, 1986

P2AT:

- The P2AT irrigation staff member's primary role during first months of year was overseeing final stages of construction on behalf of P2AT. (All construction work was contracted to a private firm.) Work was completed in February roughly two months behind contract schedule. Delays were due to: late starting date (end of August rather than early July); necessity to re-do work due to laborers' poor workmanship and inattention to blueprints; delays in procurement of equipment; heavy rainfall; and absenteeism among laborers.

- P2AT undertook plans to develop another demplot in Pukdale and one in Pariti where successful exploratory wells had been dug the previous year. The consultant attended a meeting with members of the P2AT staff (planning, surveying, and irrigation divisions) and the village head of Pukdale (behind whose home the well is located) and other potential beneficiaries. Hari Suwito (the irrigation staff member in charge of overseeing the first demplot) described the function of a P3A and discussed with farmers the type of irrigation system proposed. At least 3 farmers from the Pukdale I demplot have land in this area and all the other farmers present were generally familiar with the the first demplot's organization and activities. In an initial survey of the Pukdale II area conducted the previous year, 8 ha. of land owned by a major Timorese cattle exporting company and at least 2 ha. of land owned by the current and former village heads would have been the primary beneficiaries of the new irrigation system. P2AT's surveyor and other staff members agreed to re-survey the land after this problem with equity was explained by the farmers. The former and current village heads also agreed to divide some of their land among farmers from the area whose land may not be reached by the new system. The farmers indicated a preference for a piped water system which they believe would be easier to maintain and less costly to build. P2AT will consider using galvanized pipe at this site. The farmers agreed to fell a large number of gewang palm trees on flat land near the well site. This would clear 5-10 ha. of prospective demplot land.

  The meeting with farmers in Pariti (located about 80 km. northeast of Kupang) was planned by the P2AT team who visited Pukdale II, however only Hari Suwito and the consultant attended. The pump operator and head of P3A from Pukdale I accompanied us of their own volition and played a useful role in the meeting. After the P2AT staff member described plans for a demplot there and the consultant explained the monitoring activities she was conducting in Pukdale, the P3A

head elaborated on what we had said in bahasa Roti, the native language of both Pukdale and Pariti. He was able to clarify information and reassure the farmers of the success to date of the Pukdale demplot. This suggested to us that he or others from the first demplot might be enlisted as motivators in the development of future demplots.

Farmers:

-- Head of P3A called a meeting in early January. 60% of the members attended. Business concerned:

1) outstanding post-harvest contributions to P3A fund from 3 members: resolved by unanimous decision to withhold water from those still delinquent at the end of the month (this was not followed as a strict rule - water was withheld for 1 or 2 days at most from 2 farmers who paid their dues after this "penalty" had been levied); also resolved that anyone who plants within the demplot, whether a landowner or others given usufruct of the land, must contribute according to the amount of land (s)he plants.

2) prepare for 3rd (rainfed) demplot crop: resolved to plant rice exclusively; irrigation staff member stated firmly that seedbeds planted within the demplot were to be used only for demplot fields; he suggested they level off land and improve tertiary irrigation ditches on their land to facilitate planting of rice and future palawija.

3) hear complaints about an inactive sub-group leader: P2AT staff member said this was a problem for sub-group discussion only; they should explain their grievance to the leader themselves and if necessary choose a willing replacement.

4) determine a policy for dealing with requests from outsiders: after heated debate P3A members resolved to allow other villagers to take water freely from the demplot irrigation canals in buckets or other small receptacles; outsiders from Pukdale or elsewhere may get water in drums for special occasions as long as the pump is running and does not have to be started up for their benefit; a charge of Rp1000 will be levied on anyone who asks to have pump turned on to collect water regardless of the amount taken; policy will be reviewed again when P3A is fully responsible for demplot and must bear all costs.

The second harvest was completed by February. The amount of land planted was less than first cropping season (5.34 ha. rather than 6.08 ha.). This was due to the owner of the largest demplot parcel (1.25 ha.) who planted .75 ha. of his first corn crop very late due to the initial shortage of

pumped water; and there was not enough time during the remaining second harvest period to produce another crop on this land before the expected onset of the rainy season. Also, farmers purposely sold less of their harvests in order to save dried corn to be used as a staple food for home consumption in the event of a poor rice crop. They also consumed (and gave away) more green corn than during the previous harvest. This was due, in part, to the numbers of official visitors (see below) who came to the demplot and were given corn to eat and/or to take home. Corn (10-100 ears) was contributed by all demplot owners for at least one of these visits.

Second harvest yields were as follows:

- Total harvested	=	178,100 ears
- " sold	=	35,860 " (20%)
- " amount of sales	=	Rp 1,800,000
- Average/ha. (5.34 ha)	=	Rp 337,172
- Total consumed	=	27,400 ears
- Total dried for storage (@ 15 ears/kg)	=	106,390 (± 7 t.)
- Market value of stored corn @ Rp150/kg	=	Rp 1,050,000
- Overall cash value	=	Rp 2,850,000
- Cash value per ha.	=	Rp 533,000

Demplot paddy rice was planted by end of February and was entirely rain fed. At least 50% of the farmers claimed they used earnings from corn crops to pay for tractor rental in preparing their demplot land for paddy. (Customary rental fee is Rp100,000 - 125,000 /ha. Farmers who use cattle to puddle the land instead pay cattle owner 1/3 share of their rice harvest at end of the season.)

P3A treasurer of his own volition asked to resign because he claimed not to have the time to do the job. In March P3A met to choose a replacement. When no nominees or volunteers were forthcoming, the head of the Pukdale elementary school (who has usufruct to part of his brother's land in the demplot and usually attends P3A meetings) suggested that school teacher who is a demplot farmer undertake the job. This was approved by popular consent. The new treasurer established

a Tabanas savings account in the Bank Negara Indonesia in Kupang. Some contributions remained outstanding at that time so the initial deposit (and current balance) is Rp 80,000.

Vistors to the demplot

During the course of its first year, the Pukdale demplot was the focus of considerable attention in addition to the visits from P2AT irrigation staff member, Hari Suwito (5-6 days/week) and the consultant (2-6 days/week). Pukdale was one of the few areas in Kabupaten Kupang where irrigated crops grew during the dry season (and the first to use groundwater). For this reason, a number of visitors from within and outside the Province came to see the site. These included: numerous Kepala desas, the local camat, bupati and other local officials; Minister Sumarlin, the head of BAPPENAS (National Development Planning Council); the Ambassadors of the United States and Australia; the Director of USAID in Indonesia and other USAID officials; officials from the central and regional Ministry of Agriculture branches on study tours; and film crews from TVRI. The demplot appeared on television at least three times during the year, including a year-end report on various development projects throughout the nation.

These visits have enhanced the prestige of the leaders of the P3A and other demplot farmers. They have not been without cost to the farmers, however. This continual public attention (in addition to the financial boon of two corn harvests to the demplot farmers) has aroused the jealousy of other villagers. Demplot leaders fear that outsiders may try to sabotage the irrigation system by damaging the pump or concrete canal linings or by letting their cattle lose in the demplot at night to destroy the crops. This is one reason for the P3A's rather generous policy regarding outsiders' use of their water.

In addition, P3A members have been required to provide contributions of money and food to entertain some of the important visitors who have come to the demplot. It is customary to provide food and traditional music and dance performances for guests; however the demplot has had significantly more important guests than most other villages in Timor. For the visit of the United States Ambassador in September, 1985, the village head demanded that each demplot household contribute corn, rice, and vegetables and collectively contribute cattle and chickens. On the strong advice of Hari Suwito of P2AT and the consultant, the village head was convinced, albeit reluctantly, that they should serve only corn and tea. Each household was asked to contribute some of their harvest. The P3A also collected Rp5000 from each member in order to purchase a piece of Rotinese cloth for the Ambassador and his wife. Money left over from this fund was used to purchase Rotinese cloth for subsequent visitors and to purchase food as necessary for the visits of Minister Sumarlin and for the Australian Ambassador.

III. P2AT's Functions and Activities

Description of P2AT-NTT

P2AT in NTT is the provincial branch of the Sub-Directorate for Groundwater Development. This department is located within the Directorate General of Water Resources Development (DGWRD) of the Ministry of Public Works under its Directorate of Irrigation II. At present, groundwater development in NTT is in the exploration and development stage. Most of the policy- and decision-making is retained at the central level, although routine management decisions are made at the provincial P2AT unit in consultation with the Chief of the Provincial Water Resources Development Division (WRD). P2AT has no organized units below the provincial level.

At the provincial level, the basic organizational divisions within the P2AT unit are: Accounting, Technical Assistance, Administration, Finance, and Logistics (see Table 1). In addition, there are subdivisions directly under the project leader: Planning, Drilling, Irrigation, and Mechanical Equipment.

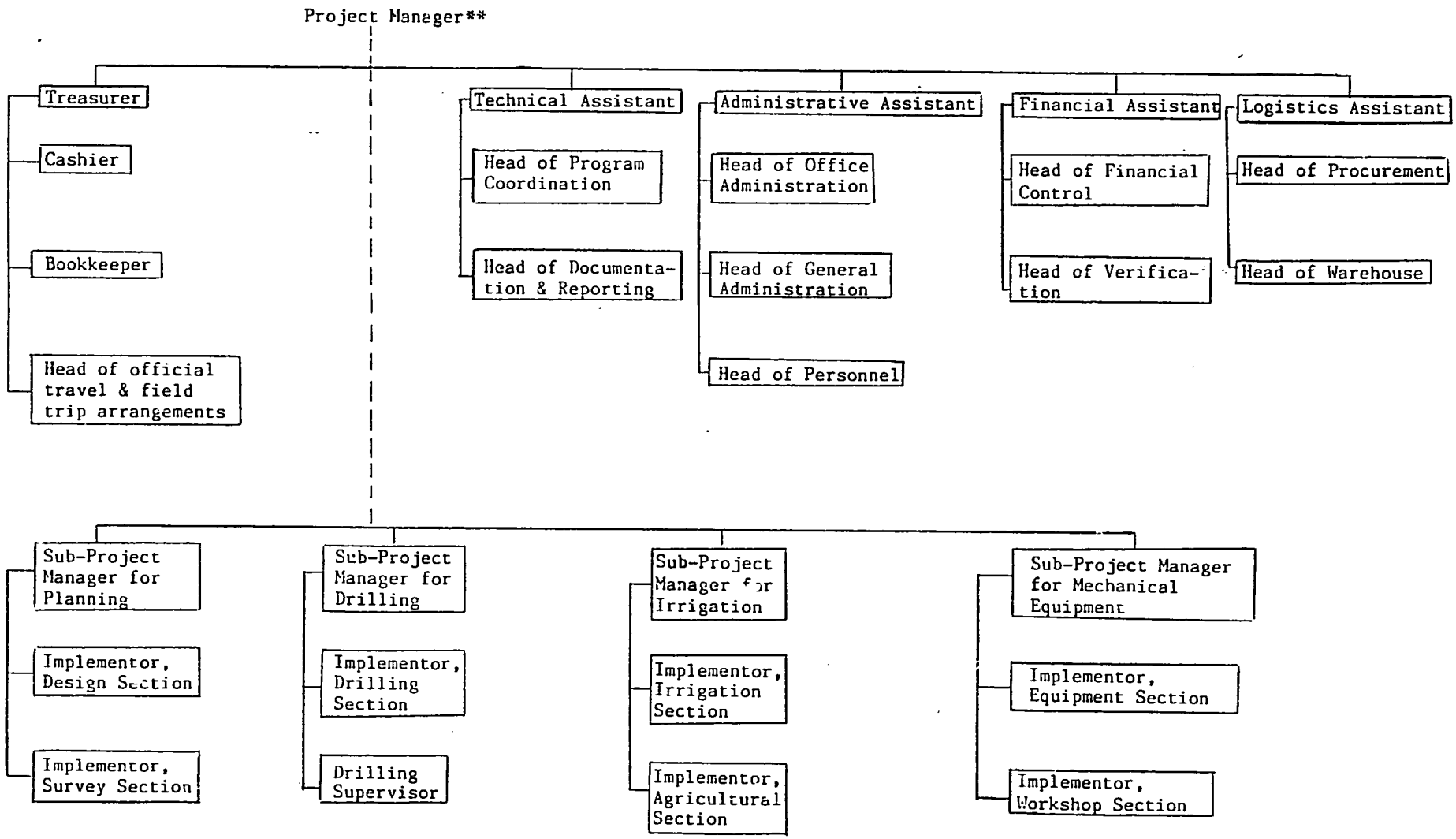
In practice, the P2AT office is in an interim phase. Indeed many of the problems of demplot coordination that have emerged during the first year of the project stem from a lack of administrative definition in the P2AT office. For example, the position of Project Leader was filled until April, 1986 by the head of the provincial WRD, although the de facto head of the P2AT office was the man listed as Technical Assistant on the administrative chart. In late March a new project leader was appointed by the Directorate of Irrigation II, and he officially assumed the position from the head of WRD in late May, 1986.

In the case of some other staff positions, one individual held two posts (i.e., Logistics Assistant and Sub-Project Leader for Drilling) while other positions were empty. These staffing problems were compounded by the fact that there were no readily available and complete job descriptions for each of the P2AT positions. Similarly there was no complete list of the current staff that would facilitate the appropriate assignment of individuals with the requisite skills and experience for particular jobs. Since the new Project Leader has just assumed his post it is premature to speculate on staff reorganizations or other administrative changes at P2AT.

In addition to weakness in the interim administrative structure of P2AT, there have been logistical impediments to efficient administrative management and project development. P2AT moved from a complex it shared with WRD to its own quarters in a relatively inaccessible part of Kupang in July, 1985.

Table I

ORGANIZATIONAL STRUCTURE OF P2AT, NTT*



* Translated directly from the Indonesian version provided by P2AT
** Actually means Head of the Office

Public transportation to this area is limited and erratic. Staff members who do not have their own vehicles often must wait up to an hour or more for a public mini-bus and, therefore, arrive up to one to two hours late in the morning. P2AT has few vehicles and they often are in a state of disrepair, which delays or prevents travel to field sites as well as to other Public Works offices in Kupang. Furthermore, a telephone was not installed until the end of May, 1986 (ten months after the office had moved to this new location) although the office was equipped with an airphone to connect P2AT with WRD.

Over the past year travel to field sites outside of Kupang was often delayed due to the combination of administrative and logistical obstacles. For example, travel must be authorized by the Project Leader in an official form letter (surat jalan). This states the dates and duration of the trip and is used to calculate (and justify) a standard allowance for food and lodging (uang jalan) and fuel purchases. For P2AT staff, the letter had to be approved first by the Technical Assistant at P2AT and then by the head of WRD as acting Project Leader. This process often took days given the problems of traveling between the P2AT and WRD offices and the frequent absence of one or the other of the two necessary signatories. Once authorization was received there was often a further delay in collecting fuel and travel money from the staff of the treasurer's office.

Depending upon the urgency of a project and the initiative of individual staff members, the inefficient functioning of this system may or may not have been an obstacle to project activities. In the case of the irrigation staff member who worked in Pukdale, he could not have undertaken his job effectively had he waited to complete this full administrative process. He did not receive uang jalan for the majority of his trips to the demplot. In addition, frequently he used his own funds to purchase fuel for the P2AT vehicle he used though he was not always compensated later.

P2AT's role in the launch and implementation of the demplot

The development of the demplot can be viewed as a three-stage process involving the launch, implementation and transfer of responsibility for the system. The goals and specific activities on the part of P2AT are:

1. Launch

   Goals: introduction of new technology and beneficiary experience with using this technology for a limited period of time.

   Specific activities:
   a) site selection
   b) installation and technical operation of system

(e.g., well drilling, construction of distribution system, installation of pump, putting system into full operation)

c) formation of water users' association (P3A)

d) agricultural extension assistance provided or sought from other agencies

2. Implementation

Goals: smooth operation of irrigation system involving both beneficiary participation in its operation and ongoing support from P2AT; as well as full beneficiary use of the system for agriculture.

Specific activities:

a) management of irrigation system by P3A

b) overseeing and supporting technical operations of the system (e.g. providing regular supplies of fuel and spare parts; paying pump operator; regular technical monitoring, servicing, and repair of equipment)

c) coordination of intersectoral participation and assistance as necessary (i.e., ongoing agricultural extension services)

3. Transfer of responsibility for the system

Goals: P2AT withdraws from active involvement in project and ceases to provide regular material support and technical assistance.

Specific activities:

a) beneficiaries pay all operating costs as financial and other material support from P2AT is withdrawn

b) beneficiaries service and maintain equipment (i.e., know how to make small repairs and where to seek assistance for larger problems)

c) increasingly less frequent visits to site by P2AT staff and gradual withdrawal of all regular maintenance and monitoring activities

A fundamental assumption about the development of the demplot is that throughout each phase P2AT will:

1) monitor and evaluate the progress of the system's development to identify problems and weaknesses;

2) make adjustments wherever necessary based on this ongoing

monitoring and evaluation; and

3) prepare beneficiaries for their eventual control of and responsibility for the entire system.

As the chronological description of demplot development in Part II demonstrates, the launch and early stages of implementation of the project are now complete. The following analysis describes and assesses the extent to which P2AT has fulfilled the general goals and accomplished the specific activities ascribed to each of these stages.

Launch

a) Site selection: The site of the Pukdale demplot was chosen prior to USAID's involvement in any irrigation activities in NTT. According to the P2AT staff, formal criteria used for site selection are dictated by their central government office. These include:

1) geological and geohydrological potential for groundwater;

2) semi-arid conditions (i.e., rainfall and other water sources are insufficient);

3) demonstrable need for irrigation (i.e., area is cultivated but has insufficient water supply); and

4) response of farmers to idea of introducing groundwater irrigation is favorable.

The former de facto Project Leader (Technical Assistant on the administrative chart) and members of the irrigation staff are aware that the prospect for an irrigation system's sustainability by the beneficiaries is, in part, a function of appropriate site selection. Nonetheless, current site selection procedures at P2AT are not derived from an integrated approach whereby technical constraints are considered in conjunction with socio-economic issues, agricultural constraints, and the prospects for long-term economic feasibility. The site selection criteria cited by P2AT and listed above do not constitute a specific set of guidelines that can be adopted in order to evaluate and compare potential project sites. At this point, the P2AT staff is not coordinated to work in divisional or inter-divisional teams to collect or evaluate data appropriate to this task.

In the case of the Pukdale demplot, the P2AT staff cited the above criteria as post facto justification for its location. They explained that the primary reasons for boring a well in that particular spot were: 1) there was an expanse of flat land in an area in which they expected to strike an aquifer; and 2) the head

of the village there was enthusiastic about the prospect of a well. Subsequent drilling elsewhere in Timor by P2AT has been undertaken for the same basic reasons. These are defensible justifications for digging wells and constructing irrigation systems. As the exclusive factors involved in site selection, however, they betoken a lack of understanding of the variables involved in long-term project development and success.

b) Installation: As the chronological description of project development suggests, this phase is now underway after a frustrating beginning. The temporary irrigation system that served the demplot during the first two cropping seasons was plagued with minor mechanical problems with the used equipment that was installed initially. At least five different pumps were used during the first five months of demplot operation. There were delays in obtaining spare parts due to administrative sluggishness at P2AT in processing requests and/or to the unavailability of needed parts in P2AT's storage or in stores in Kupang. In addition P2AT staff members sent to repair faulty equipment often lacked the technical expertise to accomplish the task. (The farmers also played a crucial in this early implementation phase by digging irrigation ditches. See Part IV below.)

By February, 1986 P2AT (using a local private building contractor) had installed a permanent irrigation system at the demplot. This includes: 600m. of concrete-lined irrigation canals, concrete division box, pump house and storage area, 18 horse-power diesel-powered surface-mounted centrifugal pump, and eight 2-inch supplementary wells in and around the demplot which P2AT expects to fit with kerosene-powered surface-mounted pumps.

The amount of the contract for this work was over 35 million rupiah and does not include the cost of drilling the initial demplot well (nearly 20 million rupiah). P2AT installed this expensive water distribution system following a model from Java, with one major alteration: the substitution of a surface-mounted centrifugal pump for a submersible pump which would have been more costly and difficult to repair. The differences between the Javanese and Timorese settings in terms of such factors as evapo-transpiration and percolation losses, land contours, potential uses of the system, economic feasibility, etc. were not evaluated in detail, however. Furthermore, alternative distribution systems were not given serious consideration. This is understandable to the extent that the Pukdale demplot is the first groundwater irrigation system to have been designed by P2AT in NTT. In general, the staff has had little or no experience with and exposure to alternative systems. In addition, they are limited by a lack of appropriate equipment and facilities.

P2AT acknowledges that other systems might be feasible. They recognize, however, that their experience and expertise have not prepared them to experiment with alternative systems. They are concerned as well that the central government office would not support their experimentation.

While it is inappropriate to evaluate P2AT's performance on

the basis of what they might have done, it is reasonable to examine the procedures they did follow in installing the system that is now in place in Pukdale. This system was designed without a careful analysis of the long-term costs, maintenance requirements, reliability, availability of spare parts and replacement materials, and so forth. Furthermore, the capacity and availability of P2AT staff members to maintain and repair the system were not evaluated prior to installation. Thus, during the first year of the demplot's existence there has been no routine technical monitoring. One person from the irrigation staff was charged with all monitoring, community organizing, agricultural extension, system maintenance and construction supervision reponsibilities for the demplot. This became a full-time job, involving his spending six to seven days and two to three nights each week in the demplot between the months of May, 1985 and February, 1986.

Fuel, spare parts, and other supplies have been provided by P2AT throughout this launch phase. Nonetheless, there have been intermittent delays in the delivery of these supplies due to administrative inefficiency. In most cases, this was due to the absence from Kupang of the individuals who must approve the release of supplies or money (the head of WRD and P2AT Technical Assistant, as acting and de facto Project Leaders respectively); or due to the slow speed at which P2AT's logistics and accounting divisions process requests. Temporary solutions to this problem usually involved the P2AT irrigation staff member purchasing fuel or spare parts with his own funds.

c) P3A formation: A water users' association was established through the coordination of the village head and P2AT irrigation staff member assigned to the demplot. All male heads of household whose land was included in the demplot were called to an organizational meeting by the village head. There was never a discussion about including women in this or in subsequent meetings. At some subsequent meetings wives or daughters of male demplot owners went in and out to listen and/or to serve refreshments; but they never spoke in these meetings, nor were they expected or called upon to participate. It should be noted that women worked in the demplot fields and contributed at least 30% of the total labor. They usually collected cash from the buyers of their demplot corn and put this money into their household expense fund. (As is customary, the women are responsible for the money from household agricultural activities. Whether it is women or men who receive money from agricultural sales, women keep all or most of this money to use at their discretion to cover household expenses.)

At the initial meeting of the P3A, the P2AT staff member explained the plans to install a permanent irrigation system. He told them they would be expected to form a P3A, to work together to maintain temporary irrigation ditches, and to coordinate planting schedules and water distribution. Since this P2AT staff member had had no previous experience with groundwater irrigation

or with establishing a demplot, he did not have a fixed model from which to work. This proved to be an advantage in the sense that he worked closely with the farmers to establish the water users' association and to organize the water distribution system. As described in Parts II and IV, the leadership of the P3A was selected at the initial meeting of the group. Candidates nominated by the village head were accepted after group debate and prevailed over alternative candidates suggested by the P2AT irrigation staff member. The farmers debated about alternative candidates, but eventually agreed upon those proposed by the village head.

Throughout the demplot's first year there have been disputes over amounts and timing of water allocation, intermittent dissatisfaction with P3A sub-group heads, etc. These have been resolved by the P2AT staff member who acts effectively as a trusted neutral party. He also encourages the head of the P3A to hold regular meetings and helps him organize the agenda for these events. The specific activities and responses of the farmers are discussed in more detail in Part IV.

d) Agricultural assistance: Neither the farmers nor the P2AT staff member had had previous experience with irrigated dry season crops. The P2AT staff member attempted to enlist the assistance of the local agricultural extension workers based near the demplot, however this was not forthcoming. Thus, nearly all advice on planting methods and on fertilizer and insecticide use was provided by the P2AT staff member who consulted books and, when possible, knowledgeable individuals. This was not a formal or systematic process but it was an effective short-term expedient to launch a new agricultural experiment.

Intersectoral cooperation is, in general, difficult to develop. In the case of P2AT and the provincial and kabupaten level offices of the Ministry of Agriculture, there are few occasions or programmatic reasons for their staffs to meet. The initiative for engendering such cooperation as is required at the demplot should come from P2AT, beginning with contact between the Project Leader and his structural equivalent in the agriculture department and followed up with regular contact between appropriate staff members from each office. The experience of the demplot demonstrated, in this case at least, that informal attempts by field staff to develop useful inter-sectoral cooperation were inadequate.

Implementation

a) Management of irrigation system by P3A:

Throughout the launch and early implementation phases of the project, irrigation management has been the joint responsibility of the P2AT staff member, the head of the P3A, sub-group leaders, and the pump operator. The operator has been taught by the P2AT staff member to keep accounts of fuel consumption, hours of

operation, and so on, and has learned to make minor repairs on the pumping equipment by working with P2AT staff in solving the myriad problems with the initial equipment. He is paid a monthly salary by P2AT; and he is the only villager who receives compensation for demplot-related work.

With the guidance of the P2AT irrigation staff member, the P3A has developed slowly but steadily into a viable organization. Its treasurer has begun collecting obligatory contributions of Rp100 per 1/100 ha. planted from each member in order to create a fund for future repairs and other contingencies once P2AT has transferred responsibility for the demplot to the P3A. In addition, the leaders of the P3A worked closely with the P2AT irrigation staff member in experimenting with watering intervals to determine the minimum amount of irrigation necessary for dry season corn. The procedure for requesting and scheduling water distribution that they devised was followed by the demplot farmers during the second cropping season. The P3A leaders hope that this rotational scheme which was developed using P2AT's temporary irrigation system will work more effectively with the permanent facilities that have been installed recently. There has been no opportunity to test the new irrigation system yet, however.

The successful development of the P3A has been due to the initiative and commitment of its head and many of the members as well as to the continual formal and informal support provided by the P2AT irrigation staff member. During the months following the second cropping season harvest, the P2AT staff member began gradually to withdraw from daily demplot activities. This was due in large part to the fact that the pumping system was not operating and P2AT was not supplying fuel to the demplot. It provided an opportunity for the P3A to begin relying on its own leaders to resolve problems and manage the demplot more independently. There were no full P3A meetings held in the absence of the P2AT irrigation staff members. Nonetheless, the head of the P3A held several meetings with the P3A sub-group leaders to discuss collection of overdue contributions to the organization's fund.

Working with the P3A has enabled its head and other leaders to begin developing organizational skills (e.g., calling and presiding over meetings, resolving disputes, and encouraging full group participation in decision making and problem solving). Albeit a preliminary observation, the head of the P3A has the potential to become a successful motivator or community organizer as he showed during the meeting between the P2AT staff member and prospective demplot farmers in Pariti (p. 14). This led members of the P2AT staff to speculate about enlisting him or other P3A leaders in a more serious and formal manner to help P3As in future demplot sites to develop the capacity to manage their own irrigation systems.

b) Overseeing and supporting technical operations of the system by P2AI:

In terms of the technical operations of the demplot, the implementation phase has not begun since the permanent irrigation system will not be put into operation until the fourth planting season begins at the end of the rice harvest in June, 1986.

c) Coordination of intersectoral participation:

As discussed above (p. 24), P2AT has not been successful in enlisting the cooperation of local agricultural extension staff whose headquarters is located within one kilometer of the demplot. Their only visit to the demplot since they attended a P3A meeting in June to plan the first cropping season came at the end of the second cropping season harvest in early 1986. The extension coordinator (PPM) and extension worker (PPL) assigned to the hamlet in which the demplot is located visited the site and told the farmers that they would assist them with their paddy rice crop and would arrange for fertilizer and insecticide to be made available (for cash or credit). None of this assistance materialized. The P2AT irrigation staff member speculated that the agriculturalists' visit was consistent with their yearly routine responsibility to assist rice producers throughout the Oesao plain area. The lack of follow-up of any kind suggested that they had no specific interest in working with the demplot farmers.

IV. Farmers' Role in Demplot Development

Interaction between farmers and their organizations with P2AT

The site for the Pukdale demplot was chosen by the P2AT unit in NTT prior to the time the consultant was hired to monitor project development. According to both P2AT and the farmers, initial contacts were between P2AT staff and the village head at P2AT's initiative.

Having chosen a potential site on the basis of physical criteria (e.g., existence of an expanse of flat land in an area in which an aquifer was expected), P2AT proposed to the village head that they drill a well there. His favorable response to this proposition provided them with necessary access to the village. The specific spot in which the well was drilled was determined by P2AT and approved by the village head. The landowner was consulted after the choice had been made and was instructed by the village head to provide the land without compensation from P2AT.

According to the P2AT staff this is standard procedure in NTT. The NTT office does not allocate funds to pay for the land on which they drill or on which they construct sections of irrigation systems. Thus they rely of the landowners' expectation of future benefit from a productive well as the incentive for their willingness to surrender a portion of their land. There may be subsequent meetings between the village head and potential beneficiaries at a designated site to discuss the project. By this time, however, it is regarded as an inevitable intervention. The Pukdale farmers say that they were pleased with the prospect of an irrigation system. It is clear, though, that they were not fully informed about their ultimate financial responsibility for the system. (Indeed the eventual approximate cost of operating the system once it has been transferred to the P3A has not been calculated formally by P2AT.)

Just as the initiative for choosing the Pukdale site derived from P2AT, the specific plans for the form and construction of the irrigation system were developed by the P2AT staff without consultation with the farmers. The amount of land to be served by the system was determined largely by the expected output of the well. Prior to making a commitment to construct the system, however, the P2AT staff did not have specific information about the numbers of farmers whose land would be served or about the percentage of land owned by individuals within the area. The particular type of water distribution system they designed (using concrete-lined irrigation canals) was not presented to the farmers as one of several options, but rather as the most (if not the only) appropriate system.

The farmers in Pukdale, then, had no significant role in the planning and design phase of the demplot project. On the other hand, their role in its implementation has increased in importance steadily since the project was undertaken. When the well was first dug, P2AT asked the village head to organize the farmers to dig irrigation ditches, clear their land, and construct a fence around the demplot area for protection from livestock. He organized cooperative labor activities to carry out these tasks. (By the time the second demplot crop was planted, the P3A had assumed the responsibility for overseeing the cleaning of ditches and fence repair.) During the installation of equipment in February, 1985, several of the demplot farmers provided minor assistance and learned how to operate the pump and generator. They did not know how to fix the system when it broke-down, however. Although the village head reported the problem to P2AT in Kupang, there was no follow-up. Thus, the system ceased to function soon after it was installed, and the farmers had no incentive to maintain the irrigation ditches and fences in good repair.

The situation changed after P2AT appointed the irrigation staff member to oversee demplot activities in May, 1985. He realized that the project would fail altogether if the farmers lost all confidence in P2AT, and worked diligently to compensate for P2AT's neglect in the previous months. The initial task of putting the temporary system into operation involved days of frustrating attempts to make minor repairs. Throughout this time there were usually at least two or three farmers from the demplot area at the pump site watching or trying to provide assistance. This not only enabled them to learn something about pump operations, but also involved them in the project. As the chronicle of demplot development in Part II indicates, the farmers became increasingly interested in demplot operations as they gained confidence in the P2AT irrigation staff member's dedication to the project's success. This was demonstrated by his presence in the demplot every day - usually for many hours a time - and his determination to keep the pumping system operating, even at personal expense.

The formation of the P3A in June, 1985 was the first formal commitment o the farmers to demplot development. The incentive to form the organization came from the P2AT staff member in consultation with the village head. The basic structure and function of the organization (based roughly on a model used by P2AT in other provinces) was presented to the farmers as a given rather than as an option to consider. Nevertheless, as explained above, the P2AT staff member had had no previous experience with other groundwater projects from which he followed a fixed model or system. Thus, he was able to work flexibly with demplot farmers to develop an appropriate organization. A number of specific features of the P3A have developed over the course of its first year. In most cases, these grew out of discussions and cooperative work involving the P2AT staff member and the P3A leadership and other farmers. These features include: the

development of an irrigation rotation system for dry season corn, the procedure for requesting water through sub-group leaders, the collection of post-harvest contributions for a P3A contingency fund, the collection of harvest data from each P3A member at the end of each season, the capacity for replacing P3A officers who are unresponsive to their group's needs, policies regarding water use by outsiders, and the readiness to purchase fuel for the pump when provisions from P2AT are delayed.

Interaction of farmers with other farmers

Pukdale is ethnically Rotinese. As the anthropologist, James J. Fox, has noted,[2] these people are characterized by their litigiousness, enjoyment of debate and playing politics, and inter-group (if not inter-family) competition and disputes. Heated debates over such relatively straightforward issues as fertilizer use, timing of planting and irrigation, types of crop to be planted, and so on usually do not betoken serious conflicts over demplot activities. Rather, they are expected forms of discourse at meetings .

In the early stages of pump operations there were serious problems of inequity of water distribution. These were due largely to the timing of pump break-downs rather than to conscious attempt by P3A leaders and the P2AT staff member to deprive certain individuals of water, as some believed. Some demplot farmers were (and, in one case, continue to be) irresponsible about following group regulations about timing of planting, fertilization, and insecticide use. Similarly they did not keep the irrigation ditches around their land in good repair to facilitate water flow. Each of these problems has been discussed at most of the P3A meetings and pointed out to recalcitrant farmers informally by the P3A leaders and the P2AT staff member. It was not until the pumping system became more reliable and the farmers had their first successful irrigated crop that the majority of farmers began to demonstrate that they understood and respected the justification for the P3A's regulations and activities.

The most reliable and efficient opportunities for coordinating farmer activity in the demplot have been fortuitous and are incidental to normal demplot operations. These are scheduled visits from outsiders for which there always is considerable preparation, since local custom dictates that guests be received with generous displays of hospitality. This involves not only preparing food and arranging cultural performances, but also serves as an opportunity for farmers to improve the appearance of the demplot. Cleaning of irrigation ditches, fence repairs,

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[2] See Fox, James J. Harvest of the Palm: Ecological Change in Eastern Indonesia. Cambridge, Massachusetts: Harvard University Press. 1977.

weeding, and so on can be accomplished on short notice if farmers are informed that an important guest will be inspecting the demplot.

Routinized cooperation outside of adat (traditional, ceremonial)-related activities is not as common among farmers in NTT as it is in Java and other areas in which gotong royong (mutual assistance) may be standard practice. This fact is not always understood by P2AT (and other institutions) in NTT that are dominated by individuals from Java and other parts of western Indonesia. Thus they may be frustrated in their expectation that farmers will work together to accomplish particular tasks. Nonetheless, cooperative efforts in the development of the Pukdale demplot have been achieved when the village head and, as the P3A has gained credibility with the farmers, the head of the P3A have firmly instructed that particular tasks be undertaken.

Establishment of effective P3A

As has been mentioned throughout this report, the P3A and its leaders gained legitimacy gradually as the irrigation system began to function smoothly and as farmers profited from it. In part because they have watched and, in some cases, participated in P2AT's initial struggle to put the irrigation system into operation, the farmers probably have a greater appreciation for the project than they would have had if the irrigation system had been constructed efficiently and had begun operating smoothly from the beginning.

Over the course of the year, members of the group worked to coordinate planting schedules and to institute a system for channeling requests for water through the P3A's sub-group heads. That the farmers began to follow the procedures indicates that they learned to take seriously one of the P3A's principal roles as a regulatory body to assure the equitable distribution of water throughout the demplot. By the time the rainy season began last year and the pump was shut down, there had been no legitimate complaints from farmers about water distribution problems for over one month. The extent to which the P3A is able to sustain its regulatory role, however, will be more thoroughly tested when the new irrigation system begins operating for the first time. Now that there is an institutionalized procedure for water distribution (and assuming there are no significant interruptions due to mechanical failures, there is no reason that water should not reach its scheduled targets on time. For their part, farmers who follow the proper procedures can hold the P3A leaders accountable for mismanagement if untoward delays occur.

No formal procedure for the selection of P3A officers has been developed. In the case of the head of the group, his nomination was proposed by the village head at the organizational meeting of the P3A. Acting as chair, the village head allowed considerable (heated) discussion about alternative candidates, but his choice ultimately was accepted. Indeed, it would have

been uncharacteristic of the farmers to override the village head. His nomination was regarded as an instruction rather than an open suggestion. In fact, few farmers wanted the top leadership position of the P3A and no one, including the village head, really knew what actual responsibilities the job would entail. The man who was chosen to become the P3A head was already a member of the village government. He had demonstrated some management skills in executing his previous (and ongoing) government responsibilities unlike other potential P3A candidates. In addition, his father is the largest single landowner in the demplot and his brother is the pump operator so his family has a vested interest in its success.

Most of the other officers and sub-group heads were determined by default after no other nominees (proposed by the village head or by other farmers) or volunteers for the job emerged. Over the course of the year, about 50% of these officers and sub-group leaders have requested to be replaced either because they have no time for the job or do not want the responsibility. In two cases, officers were replaced (through group discussion and consensus) after members of the group complained at P3A meetings that those individuals were not fulfilling the job.

Given the structure of the water distribution system, the leaders of each sub-group must take responsibility for regulating water flow within their group after coordinating their schedules with other sub-group leaders and the pump operator. This is enabling some of the leaders to develop management skills as well as a sense of commitment to the project. Despite the systematic guidelines for water distribution, however, there are inevitable impediments to the smooth functioning of the system for which recourse to the regulations is of little value.

For example, 90% of the farmers have rice land, gardens, and herds of animals located outside the demplot. Throughout the year they must divide their time between these various concerns and, often, are not present in the demplot on days when water is scheduled for their land. Sometimes these absences are unavoidable. Nonetheless, they incur resentment since the heads of the sub-groups themselves (or other P3A members) have to oversee the water flow to the absent farmers' plots.

This problem can be eased if water distribution schedules are prepared well in advance by the sub-groups as a whole. Then it would become the responsibility of the sub-group heads to remind farmers in their groups of the distribution days. Farmers who would not be available should be required to send a substitute.

The P3A membership has agreed on the policy of fining members by withholding water from their plots for such infractions as not following fertilization schedules and not paying their post-harvest contributions. To date, such measures have not been taken effectively. The primary reason for this is that the offenders do not attend P3A meetings. By remaining formally ignorant of the group's activities and decisions they

have the excuse that they were not aware of P3A procedure.

At least two of the families represented in the demplot are engaged in ongoing feuds. Members of these families usually do not cooperate with one another; and they often let longstanding tensions between them precipitate disputes (even when there is no apparent justification for conflict). With respect to the demplot, members of these families have engaged in disputes over the timing of irrigation rotations, quarreled over responsibility for demplot maintenance, and refused to participate in any demplot-related projects as long as certain other people were also involved. In general, the most common institutional recourse in situations of conflict or dissension is for lower level officials to call upon those in superior positions (sub-group leader to P3A head to village head to camat, and so on up the government hierarchy) to intervene. In general, higher authorities - particularly those who are disinterested parties - can be successful in resolving inter-group problems, at least temporarily. Despite occasional threats to do so, however, the P3A leadership has not sought outside assistance in resolving problems with uncooperative members. Thus far, the leadership has relied on the P2AT staff member to discuss the problem with those involved and to work with them in resolving it. In fact, he has successfully helped to reduce tension between two of the feuding demplot families for the time being, at least. Whether the leadership can maintain control over problematic situations in the future when the P2AT staff member is no long involved in the daily operation of the demplot remains untested.

Determination of initial well impact

Thus far, the cost of demplot participation to individual members has been minimal, involving only cash outlays for small amounts of fertilizer, seed, and in a few cases, insecticide (see Part II). Their required contribution to the P3A fund is nominal when compared to crop yields, and they have not had to pay for the water they have received. The consultant's final report will compare profits from irrigated corn and rain-fed rice during the past year. It is clear at this point both to outsiders and to the farmers themselves that they have profited from participation in the demplot. They have not incurred unreasonable expenditures of time, labor, or money; and have found that the production of irrigated palawija crops can be more profitable than that of rain-fed rice.

All farmers were able to market their first two demplot crops without difficulty, particularly since theirs was the only green corn produced in the Kupang area during the dry season. In fact, given the popularity of green corn as a snack food, the demplot supply could not satisfy the demand in the Kupang market. The farmers have expressed concern that additional demplots in the area would compete for the same market, however. In P3A meetings they have discussed the necessity of developing inter-

demplot coordination in the future to assure that different groups do not plant the same crops in a given season.

As mentioned above (p. 16), the farmers were required to contribute money and food for the entertainment of visitors. In general, they do not begrudge this cost of participation in the demplot since they derive honor and prestige from such visits. Nonetheless, the many visitors who came to the demplot within the period of a few months last year did interrupt their normal activities and prevented the head of the P3A and others from fulfilling other responsibilities. In addition, the P3A head's household bore a disproportionate amount of the burden for food preparation and spent money of their own to buy necessary supplies. While some members of the P3A have said they are jealous of the attention and prestige of the P3A head, they also acknowledge that such recognition is not without its costs in expenditures of time and money.

V. Conclusion

The farmers of the Pukdale demplot are not poor by Timorese standards. The initial farmer survey indicated that most of them own cattle and rice land outside the demplot. Twenty percent of the farmers own less than 1/4 hectare within the demplot as compared to two or more hectares elsewhere. In short, they have not depended upon the land within the demplot for their primary means of subsistence. Thus, they have been willing to take the risk of participation in its activities, even without an initial guarantee of success. Now that the demplot has proven to be a profitable concern, it is likely that their participation will become increasingly more serious.

At this time, then, the Pukdale demplot can be viewed as a success. The pumping system has operated since May, 1985 enabling the farmers to harvest two seasons' worth of corn from which all profited. The farmers and their organization (P3A) developed a water distribution scheme and meet as necessary to coordinate agricultural activities to facilitate water management.

A water users' association was formed and it has begun to play a major role in managing water allocation. Although no mechanism has been developed yet to recover operation and maintenance costs, a small fee is assessed and collected from each farmer at the end of each harvest season. Its purpose is to create a contingency fund for the future when P2AT is no longer involved in demplot operations and maintenance; and it serves to accustom the farmers to paying for their water, albeit in small sums at this point.

The sum collected from each farmer is a nominal 4-6% of the estimated operating cost per hectare of the system (Rp10,000 as compared to roughly Rp 160,000 - 265,000 per hectare). The fact that the farmers pay this post-harvest contribution does not necessarily provide an accurate indication of their future willingness to pay for hourly water since the sum involved is so small. Nevertheless, at most meetings the farmers mention the fact that the responsibility for full operation and maintenance will fall to them when P2AT is no longer involved in the demplot. Thus, they acknowledge that the irrigation water will not be provided to them virtually free of charge in the future just as they express their understanding of their future financial responsibilities.

P2AT might consider suggesting to the P3A that it increase the amount of the obligatory contribution after future harvests in order to provide the farmers with a more realistic appreciation of the cost of benefiting from the irrigation system. This, of course, would have the added advantage of increasing the

amount of the group's contingency fund prior to P2AT's withdrawal from the demplot. The knowledge that the P3A had enough money to handle routine repairs and other contingencies also might provide P2AT with the incentive to extricate themselves from the demplot within the two year time limit that they originally proposed.

The success of the demplot to date has occurred in a village where cropping is normally possible only during the rainy season and where farmers find it difficult to coordinate for any task other than prestige enhancing rituals. Furthermore, this has been achieved despite considerable initial scepticism on the part of all demplot farmers about the possibility for success, given the first efforts of P2AT to launch the demplot at the beginning of 1985.

An analysis of the reasons for the current success of Pukdale, however, reveals that the relentless efforts of one individual, the P2AT irrigation staff member, are largely responsible. There has been minimal cooperation from local offices of the Ministry of Agriculture and little effort on the part of the P2AT office in Kupang to facilitate such necessary inter-sectoral activity. Furthermore, the other forms of institutional support from P2AT which would be required to replicate this experiment are not generally available due to a shortage of experienced and properly qualified staff as well as to inadequate administrative management.

To date, technical criteria appear to have been the principal issues considered when selecting locations for drilling. Specifically, P2AT's choice of a drilling site at Pukdale was determined by the existence of an aquifer in a relatively vast flat agricultural area to which the village head gave P2AT access. Certainly these are primary considerations for choosing the general location for a project site. The choice of the specific location of the well within the broad potential area, however, was not based on a careful examination of other variables relating to the future sustainability of an irrigation system. There was no mechanism for systematically comparing and evaluating various potential drilling locations in order to determine, for example, which would benefit the largest number of people and would be sustainable by those people in the future.

Thus, socio-economic criteria and issues of equity have not been regarded by P2AT as viable considerations in choosing drilling sites. High priority has not been given to the relevance of undertaking cost-benefit analyses or to the necessity of considering experimentation with alternative technologies in order to determine the most economical and suitable for local conditions. Plans for providing adequate support to a demplot, be it logistical (i.e., provision of fuel, oil, spare parts, or mechanics), agricultural (i.e., provision of extension advice and inputs), or institutional (i.e., assistance with development of the P3A) have not been developed yet.

Institutionalizing the role of the P2AT irrigation staff member as logistical facilitator and water management advisor should not prove difficult for P2AT, in principle. Developing

and institutionalizing the role of effective liason between village communities and P2AT, however, is more problematic. It will require considerable close attention in the future in order for subsequent demplots to be launched and implemented such that final responsibility for their operation and maintenance can be transferred to their beneficiaries within a fixed time period.

There are a number of weaknesses within the P2AT office in NTT which could be ameliorated if they were addressed systematically. This would ensure that the phases for project development proposed in Part III of this paper can be followed. Two principle ways in which P2AT in NTT could be improved are:

1) to clarify its short- and long-term plans for the development of groundwater resources in the region such that these provide clear, coherent goals and guidelines for the entire staff, and

2) to strengthen the overall management of the office such that all members of the staff gain a better sense of their job responsibilities and of the interrelationships between the tasks of their respective offices.

The experience of the implementation of the groundwater development pilot project at Pukdale thus far suggests that inadequate or inappropriate management, rather than scarce resources, is the primary constraint to successful project implementation. The difficulties encountered do not appear to arise out of too few resources, but rather out of a need to make more efficient and effective use of the human, material and financial resources which are already present.

The implication of this analysis is that the provision of additional resources (new equipment, training or technical assistance) cannot effectively improve P2AT's capacity to develop successful groundwater systems unless it is accompanied or preceded by policy decisions affecting management practices. Policy decisions at a senior level will be required to restructure institutional incentives and procedures so that improved performance is encouraged within the P2AT, if not within the Ministry's broader irrigation program.

There are several specific areas where the evidence presented in this report suggests that policy decisions or innovations can improve management practices and through this affect institutional performance and capabilities, perhaps without the need for many additional resources. The first major area concerns the program and project planning process. As noted earlier, there is no specific statement of program objectives. A decision to require the articulation of program objectives and a strategy to achieve those objectives would impose a coherence and direction on P2AT activities which presently do not exist. It would provide the basis for the more efficient and effective use of existing resources.

Based on this strategy, both office and individual work plans could be required. (While these have been developed by P2AT staff members in the past, these plans have not been used consistently and effectively.) Ideally, work plans would

establish specific objectives for a given year and would identify benchmarks for tracking both office and individual performance. Project resources and staff time could then be coordinated more effectively and it would be possible to assess office achievements on a continuous basis.

In addition, an annual review would be undertaken of the office and individual work plans to ensure that they are consistent and continue to remain appropriate for P2AT in Kupang. This review should involve all staff members in order that people become oriented towards fulfilling a strategic goal as opposed to finishing a task only.

If the articulation of a programmatic strategy and the formulation of work plans were required, this would have important consequences for the development of project plans. It would be possible to assess a project plan in the context of the strategy. Project staff and supervisors could look beyond the one year time horizon established by the annual budget cycle and pay closer attention to the long-term effectiveness of P2AT activities. In this connection, project plans could be required to include assessments of socio-economic conditions which affect project implementation and the achievement of programmatic objectives. Equally important, it would be clearer to P2AT staff why such information is required and why it should be important to them as they go about the task of implementing a given project.

The second major area for policy decisions concerns the creation of an effective monitoring system. At present P2AT, like almost every other government department, is required only to report quarterly on two aspects of project implementation: physical achievement and financial disbursements. In the absence of an articulated strategy or office and individual work plans with clear benchmarks, it is difficult to know what else could be monitored systematically. The establishment of a monitoring system, then, only makes sense if it is coupled with policies requiring programmatic strategies, work plans, and improved project planning documents.

The significance of a monitoring system arising out of strategies, work plans, and project plans is that it enables P2AT leadership to collect information systematically on progress toward achieving broader objectives. Equally importantly, it allows P2AT to focus attention on the long-term results of their work and to assess the sustainability of benefits.

Finally, the third major area for policy decisions affecting P2AT management concerns decentralization of authority. The effectiveness of P2AT activities will always be hampered if staff have no authority to deviate from nationally determined models and to develop programs responsive to local needs and requirements. Policy decisions affecting decentralization of authority, however, are only possible if they are coupled with the policy innovations affecting program and project planning and monitoring systems which were discussed above. This is because any decisions to encourage decentralization of authority must be

coupled with an effective means for enforcing accountability. This is one of the major uses of an effective monitoring system, which in turn rests upon the articulation of a programmatic strategy and the formulations of work plans.

Without this support from the national level, it is unlikely that additional equipment, training, or technical assistance (the usual mix of inputs provided by AID projects) will result in marked improvement in the performance of P2AT and the effectiveness of their programs. With these kinds of policy decisions and support from the national level, it will then be possible to determine what kind of training or technical assistance will be required to implement the new policies. For example, training and technical assistance could be targeted specifically to support the development of program strategies, the formulation of office work plans, and the establishment of an effective monitoring system, once it has been determined that these should be introduced into the present system.

Discussions to date between AID and members of the national staff of P2AT indicate that at least some people view the groundwater program in NTT as experimental in the initial stages. They are interested in testing various technologies and in developing models appropriate to local environmental, social, and economic conditions and do not feel that the Javanese blueprint automatically needs to be used. Furthermore, issues of recurrent costs and long-term system sustainability are viewed as significant ones to be addressed. From discussions and observations, however, it does not appear that these concerns of national staff have been communicated convincingly to the provincial staff. The latter indicate instead their fear of innovating without clear signs of support from the center, and as is a common bureaucratic syndrome, believe that reaching the targetted number of hectares or amount of construction activities is a primary goal.

It is clear, then, that the suggestions for strengthening P2AT at the provincial level must be reinforced by policy decisions from higher levels of the Ministry hierachy. P2AT staff at the provincial level do not have the authority to initiate these changes and to incorporate them into the ongoing management procedures of the Ministry. This suggests that the first step in trying to bring about the policy changes proposed here is to review them at the national level showing how they are based on an analysis of empirical data generated by close monitoring of the work of P2AT and do not arise simply out of unique circumstances or contingent conditions.

Annex A

Consultant's Monitoring Reports
May, 1985 - April, 1986

MEMO

To: Nancy M. Tumavick
Chief, Water Resources Division

Date: May 4, 1985

From: Suzanne E. Siskel
P2AT - Kupang

Subject: Weekly Log
April 29 - May 4, 1985

General comments:

The start of my work with P2AT was postponed for nearly a month due to the absence of my assigned counterpart who was in Surabaya for a training program in adult education. Pak Basuki informed me on April 25 that space would be prepared for me in the P2AT offices by Monday, 29 April and that I could begin to work with my counterpart at that time. (Pak Basuki left for Jakarta after speaking with me on the 25th and has not returned to Kupang yet.)

My counterpart, Hari Suwito, is a graduate of a technical (agricultural) high school in Pati; Central Java and has a diploma from Cendana University, Kupang for a 3-year non-degree program in integrated agricultural extension. He has lived in Kupang for 10 years, working first as an assistant counterpart in soils and in hydrology for the CIDA-Crippen International survey team for 5 years, then as section head of agricultural irrigation in P2AT, as staff member of the P3SA hydrology and hydrometry division, and as of this month as staff member for agricultural extension and monitoring in P2AT.

Most of the week has been spent trying to overcome problems that developed with the Pukdale demplot over the past few months (during which time it has been neglected by P2AT). This is partly because: 1) P2AT has been understaffed since 10 people went to Canada for study programs; 2) Pak Basuki is serving as head of both P2AT and P3SA; and 3) until this week there was no agricultural staff available for the demplot project. Hari Suwito had not seen the site until our first visit to Pukdale on Tuesday, April 30. At that time we were confronted with what the kepala desa presented as a state of emergency: 1) the pump has not worked for at least a month; 2) there has been negligible rainfall since then; 3) no one from P2AT responded to their request for help when the pump stopped; and 4) the padi is dying (about 1½ months prior to harvest time).

We had a friendly meeting with the kepala desa and his father (former kepala desa and owner of some of the land in the demplot). They agreed to our administering a questionaire and visiting the village regularly for monitoring activities. Nonetheless, they clearly felt that our primary immediate responsibility was to get the pump fixed.

In fact, there is little possibility of our beginning to collect data in earnest until the pump begins operating again. Given the difficulty of coordinating vehicles, personnel, and materials, repairs are still not completed and it is not clear when everything will be accomplished. Pak Hari and I visited the site almost every day this week. We did so to check on the PU and Waskita Karya (contractors) personnel who are supposed to be doing the repairs and also to demonstrate to people in Pukdale that we are working on the pump problem so that they do not feel we have let them down (thereby jeopardizing the project's future).

Although overseeing repairs, etc. is not my job here, both Pak Hari and I felt that my presence could be used strategically - especially in the absence of Pak Basuki - to get the appropriate divisions within P2AT to do their job at the demplot as quickly as possible. Pak Hari has been trying to coordinate all of this himself, but occasionally he has asked me to make discreet inquiries about the progress of the repairs of Pak Abadi Putra (Equipment and Boring divisions) and Pak Totok Sudjito (Irrigation division) just to let them know that the foreign consultant is aware of the situation.

Summary of week's activities:

1) Rehabilitation of Pukdale demplot
There are 2 major immediate problems with the 7 ha. demplot: 1) Irrigation canals were dug hastily without proper supervision from agricultural personnel prior to the February visit of the USAID Director, WRD staff, et al. These canals are full of weeds, rocks, etc. The local farmers apparently received no instructions about canal maintenance. (They have not weeded the sawah either.)

2) Over 1 month ago the pump broke down. About the same time some employees of Waskita Karya (the firm that installed the pump) came out to conduct pumping tests there. When they left they took some of the external pipes and fittings between the generator and the pump to use in pumping tests at other under-equipped sites. Rather than return these parts to Pukdale, the Waskita Karya people took them back to Kupang and put them in storage. The kepala desa of Pukdale reported to P2AT that the demplot pump was inoperative but no one came out to inspect it.

The kepala desa was prepared to buy a new pump himself this week; but my counterpart convinced him that neither the village nor private individuals should spend any money on the demplot at this stage. By Thursday evening (May 2) the missing equipment had been replaced, but at that time we found that some of the PVC pipes for carrying water from the pump to the upper sawah were missing and some were badly cracked. Nonetheless, the pump ran for several hours that evening while we were there. It provided enough water to irrigate the lower-lying sawah (about half the demplot), though there was considerable water loss due to the poor condition of the irrigation canals. Before we left Pukdale, Pak Hari instructed the kepala desa's father to turn the pump off within a few hours when the diesel fuel supply began running low. We assured him that we would return the next day with permanent metal pipes so that all the sawah in the demplot could be irrigated.

Apparently, soon after we left the pump began making a loud, new noise and they shut it off. We learned of this when we returned the next afternoon (3 May) to wait (in vain, as it turned out) for a PU truck that was to have brought the metal pipes out to the site. The new problem is with a faulty fitting for the rubber belts that drive the pump. Today Pak Hari and Pak Totok tried to locate a replacement for this part and to arrange for the delivery and installation of the metal pipe. It may be several days to a week before this is accomplished.

II) Refinement of interview schedule
When we have not been occupied at P2AT and Pukdale with the rehabilitation of the demplot, Pak Hari and I have been discussing interviewing strategies and refining the instrument I prepared. The instrument (in bahasa Indonesia) is an adaptation of one used by Diana Putman that incorporates specific concerns of the Timor area and questions from other instruments used by HPSIS, the East Java Ground Water Development Survey, and a national village survey conducted by BPPSI. Our interview schedule will be quite long and comprehensive in order to collect as much baseline data as possible. Many of the questions may seem redundant, but they are designed to approach potentially difficult or complex issues from various perspectives in the hope of eliciting the most accurate and complete data possible. It is divided into 5 sections and it can be administered in 2 or 3 sittings. [Since most of the farmers involved in the demplot spend most of the daylight hours in their gardens or with their livestock (some as far as 10 km. from their homes), we must schedule appointments with them to assure that they will be available.]

I hope to have the completed draft of the instrument ready to send to WRD before the end of next week. Its contents are summarized below:

1) Respondent profile: to elicit basic information about household composition, educational background, occupation and skills of the respondent and household members; general information on property and livestock ownership and/or usufruct; experience (or not) outside of Oesau (for work, trading/marketing,

MEMO

To : Nancy M. Tumavick
Chief, WRD

Date : May 13, 1985

From : Suzanne E. Siskel
P2AT, Kupang, NTT

Subject : Weekly Log - May 6-12, 1985

Summary of week's activities:

1) Rehabilitation of Demplot

Technical problems with the pumping system are still not resolved. The past week involved a series of foiled attempts by my counterpart, Hari Suwito, to get the Demplot irrigated as quickly as possible. Each day one mechanical problem led to another. This was further complicated by difficulties Pak Hari experienced in obtaining authorization to purchase parts and in coordinating technical staff, vehicles, drivers, and the purchase of gasoline. Pak Hari and another P2AT staff member spent the entire week either at the site or in Kupang going from one P2AT division to another trying to organize necessary personnel and materiel. Most evenings they returned home from Pukdale after 9 pm and one night camped beside the pump shed to monitor the pump's operation. I accompanied them every other day to the field.

The following is a brief chronology of the week's developments at the site:

May
6 -New pulley (fitting on external part of pump for rubber belts that drive the machine) located and purchased in Kupang for rp.25,000.
7 -Pulley found to be too large for pump at the site.
8 -Original pump exchanged for a larger (used) one from P.U. storage.
9 Replacement pump with new pulley installed. The pump ran for 5 hours and then stopped on its own (about an hour after we had left the site for the night).
10 -New pulley found to be ruined in same way as previous one. This led to the discovery that the shed's foundation is slanted such that the generator is as much as several inches higher than the pump. This caused the pulley to wear unevenly. (The foundation was laid in January before the end of the rainy season.)
-Second pump removed from site. Single Yanmar pump and diesel engine unit borrowed from Waskita Karya.
11 -Yanmar pump installed temporarily outside pump shed. Engine failed to work despite a 12-hour effort by P2AT personnel and a local mechanic to repair it.
12 -Yanmar engine repaired by Waskita Karya mechanic recruited by Pak Hari. Submerged portion of pumping system inoperative due to a faulty or rusted clamp. Clamp repaired and pump ran for about 9 hours until the Yanmar engine broke down.

One major reason for this series of problems is that none of the equipment is new, though some parts have been replaced. P2AT staff frequently exchange or borrow parts from stored equipment or from one site to be used at another, and maintenance is inadequate.

In the meantime, Pak Hari encouraged the Kepala desa to organize a cooperative effort among children and young men to clean out and rebuild broken-down walls of the irrigation canals around the desplot with. This work is not completed yet.

The father of the kepala desa owns some of the land in the demplot and the land on which WHO has an artesian well for drinking water. He could not wait for the P2AT pump to work because he feared he would lose his entire rice crop. He bought a rp.500,000 Honda kerosene powered pump and installed it at the WHO well. (He has irrigated only his own land.)

2) Meeting with Ir. Basuki

Pak Basuki returned to the office on Thursday (May 9). Pak Hari and I met with him to clarify some issues that had caused difficulty for us in Pak Basuki's absence:

-P2AT covers expenses related to irrigation only. This includes installation and repairs to the pump, generator, shed, pipes, etc. (My counterpart had not received any orientation about this. He expected that this demplot, like others on which he has worked, would be financed completely by the department that set it up in order to maximize the chances of success.

-P2AT provides an agricultural extension specialist (my counterpart) to advise the farmers, but all costs of fertilizer, seed, insecticide, etc. must be born by the farmers themselves or provided by the department of agriculture.

-There is a P.U. colt pick-up truck that Pak Hari and I can use some of the time to go to Pukdale if it is not needed elsewhere. I will be expected to fill the tank with gasoline and to compensate the driver. [The difficulty of coordinating vehicles, drivers, and gas has been a daily impediment to the rehabilitation of the demplot over the past 2 weeks. My renting a vehicle, however, would have set an inappropriate and costly precedent (at least rp.50,000/day plus driver's fee and per diem). It would have meant that I was providing P.U. with a vehicle to transport mechanics and equipment which is not my responsibility here.]

3) Meeting with WHO consultants

I met Mr. M. Gupta who has been in charge of the WHO-UNDP drinking water project for NTT for about 5 years and a newly arrived junior associate, Mr. Ron Parker, to discuss their well in Pukdale. It was drilled in 1982 and then capped. According to Mr. Gupta, it is not to be used until 1986-7 when the GOI will provide funds to purchase a submersible electric pump, pipes, and other expenses with UNICEF implementing the project. Electric power will come from the main PLN-Kupang station as soon as the system reaches Pukdale. (At the moment there is a local generator that provides Pukdale with electricity at night only.) The WHO well is meant to serve 30 households who will get the water from a common line that will run along the nearby Pukdale road. The well may be used for supplementary irrigation when drinking water is not needed.

Comments: 1) Pak Basuki is critical of the type of pump planned for the WHO well because it is very expensive and parts and experienced repair people are not available in Kupang.

2) The kepala desa and others say that no one needs WHO's well for drinking water because every house has its own well for drinking and washing water.

3) According to the kepala desa and his father, people often siphon water from this well so it has been in intermittent use since it was drilled.

4) Refinement of interview schedule

There has been little opportunity to finish our revision of the instrument I prepared. About a third of it remains for Pak Hari to discuss with me. If the pump problems can be resolved soon we should have no trouble finishing this work by next week. I will send the draft of it to you as soon as we have completed it.

5) Collection of basic data about the village

I met with the village secretary on Saturday. He provided a map of the village and some general random background information. He does not keep neat complete records, but rather has information jotted down in various personal agendas and notebooks. Census charts were borrowed by BKKBN in Kupang in order to plasticize them and they have not been returned yet. The secretary does not have another copy of the information they contain. In addition, the Potensi Desa is missing. We will have to track down the BKKBN representative who has the charts, and will try the Kupang Timor camat and the regional BangDes offices for other data. The secretary is preparing a list of the 21 farmers included in the demplot project and some demographic information that I requested. These should be ready within a few days.

cc: Diana Putman, WRD
Al Newman, WRD

MEMO

To : Nancy M. Tumavick
Chief, WRO

Date :

From : Suzanne [illegible]
P2AT [illegible]

Subject : Weekly Log May [illegible] 198[illegible]

Summary of week's activities:

1) <u>Rehabilitation of demplot</u>

Regular pumping began on May 17 after another week [illegible] difficulties with the machinery. The P2AT staff gave up trying to operate the Waskita Karya pump they had borrowed the previous week. They replaced it with a new Mitsubishi motor "borrowed" from P2AT storage and then installed the used Ajax pump that had been at the site originally. This arrangement is temporary, however. The equipment has been placed outside the pump shed until the foundation is leveled off. In addition, the motor is slated to be installed at a different P2AT project site.

Hari Suwito, my counterpart, appointed a son of the owner of the largest percentage of the demplot to be the pump operator and caretaker. Pak Hari chose him because 1) he had been helpful with the equipment over the past few weeks and seemed responsible; 2) he has had a 3-month course in diesel mechanics in Kupang; and 3) his family has a vested interest in the success of the demplot (though they have not planted any of their land this season). P2AT will pay the pump operator about Rp.12-15,000 per month.

Pak Hari felt there was some urgency to appointing an operator because of 2 potentially serious problems that had developed earlier in the week: 1) There is a strong possibility that someone deliberately damaged the Waskita Karya pump. The P2AT staff suspects that a local man (landless son-in-law of a small landholder in the demplot) broke several small parts of the pump while he claimed to be helping to fix it. He tampered with it while the P2AT staff was at the site trying to get the engine to work and again after they had left one evening. 2) 40 liters of diesel fuel disappeared after the P2AT staff left it for safe keeping with the <u>kepala desa</u>'s father. The man later said he used it for his electric generator because he had given up all hope of P2AT's ever getting a pump to work at the site.

The head of the hamlet in which most of the demplot is located called a meeting to day to organize 2 cooperative community projects (<u>kerja bakti</u>) at the demplot this week. On Sunday they will construct a fence around it and on [illegible] day they will clean out the debris from the irrigation canals. P2AT eventually plans to line about [illegible] meters of these canals with cement to reduce water loss (it is very likely that individual landowners or the community will cement the rest eventually).

2) <u>Collection of basic data about the village</u>

The village secretary is organizing some demographic and [illegible] information for us. In the meantime we have been interviewing [illegible] farmers and others who gather to watch work on the pump. [illegible]

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have a list of 22 landowners involved in the demplot. According to the list, the holdings are:

1	owner	12	areal	(.12 ha.)
16	"	14	"	(.14 ha.)
1	"	15	"	(.15 ha.)
1	"	39	"	(.39 ha.)
1	"	44	"	(.44 ha.)
1	"	70	"	(.70 ha.)
1	"	230	"	(2.30 ha.)

Total: 6.25 ha.

We will compare this list with the official one provided by the village secretary when it is available.

So far we have had no luck with the camat's office. The Bangbes official who should have a copy of the Potensi Desa for Pukdale has not been in the office and no one else there has been able to help us.

3) General comments

1) P2AT is about to move from its present location on Jl. Lalamentik to a newly developing area called Kelapa Lima. (This is the area in which a large hotel and a new campus of Universitas Cendana are also being constructed.) Apparently more office space is needed to accomodate the 10 P2AT staff members who have been studying in Canada for the past year and will return to Kupang within the next 3 months. Members of the staff are somewhat concerned about the move. Moving to Kelapa Lima may create some problems for a number of people who do not have their own transportation. The area is not easily accessible by bemo and is quite far from their homes. Also, there is no phone service in that area.

The move will take place soon - just in time for the visit of the Chief of P2AT from Jakarta, Ir. Marzuki Saleh. He is expected sometime in early June.

2) There has been considerable pessimism among farmers in Pukdale about the demplot. This is due not only to the recent problems with the pump but also to at least one incident several years ago in which some P.U. irrigation staff were forced out of the area by armed villagers. Apparently there had been a plan to build a large dam in the hills behind the village with irrigation channels down to a large area of sawah. Considerable damage to buildings and sawah was done with little or no indemnification; and the project was never completed.

People at P2AT have not discussed this incident with me (and probably would not want to). I learned about it when my counterpart explained to several of the farmers at the site that the demplot is being managed by a completely different staff, none of whom had anything to do with the dam project. The fact that hamlet leaders have waited until now to organize fence building and cleaning of the irrigation canals suggests that they were testing P2AT - not willing to exert much effort at the site until they had some evidence that their labor would not be in vain.

MEMO

To : Ms. Nancy M. Tumavick
Chief, Water Resources Division

Date : May 26, 1985

From : Suzanne E. Siskel
P2AT - Kupang, NTT

Subject : Weekly Log - May 20-26, 1985

Summary of week's activities:

1) Rehabilitation of the demplot and pump operation

As planned, farmers cleaned out irrigation canals and built fences around the demplot this week. Now, both P2AT and the farmers are anxious to put in permanent (cement) canals since about 40% of the water pumped is being lost due to percolation and seepage. Work on the canals plus construction of a permanent pump shed will not begin until the Governor has signed an S.K. that covers this and other P2AT projects. (The necessary funds for Pukdale have been included in a larger drilling project budget totalling over Rp. 20 million. According to government regulations, for budgets over Rp. 20 million P2AT must solicit tenders from at least 10 private firms after P.U. and the Governor have signed the appropriate S.K. Pak Basuki delivered this letter to the Governor a week ago.)

The pumping rate is about 5 liters/second for a minimum of 4 hours each morning and evening. All of the planted areas (about 2 ha. of rice and 100 sq.m. of mung beans) are receiving adequate irrigation. Several plots of rice will be ready for harvesting within 2 weeks.

Pak Basuki plans to drill up to 7 more small tubewells within this demplot if pumping tests indicate that the existing well can supply only 5lps. Pak Hari, on the other hand, says all that is necessary are permanent irrigation canals to minimize water loss.

2) Plans for the next planting

We met with the kepala desa several times during the week to discuss the next stage in the development of the demplot. There is a major incentive to plant all of the demplot in palawija as soon as possible: the Minister of P.U. is due to come to NTT in August and will inspect the Pukdale site. The kepala desa said they will kill some cattle and have a "symbolic harvest" celebration in the Minister's honor.

Corn is the most common secondary crop in Pukdale. It is mainly grown for local consumption with any surplus being sold in the local Oesao market. Several years ago, under the administration of the previous bupati, farmers were encouraged to plant mung beans. They received seeds from the agriculture department and were guaranteed the opportunity to sell their harvest back to the government. The current bupati has not initiated agricultural incentives of this sort (yet).

There is an agricultural extension station in the adjacent village of Naibonat (about ½ km. from the demplot). There is regular contact between the resident extension workers and the farmers in Pukdale. My counterpart, Pak Hari, will contact the staff of the agricultural station soon to coordinate extension work. He hopes that they will supply the necessary seeds, fertilizers, etc. for the demplot, since this is not part of P2AT's responsibility.

3) Meeting with head of irrigation for NTT

Ir. Hartono returned this past week from a long stay in Jakarta. Pak Basuki introduced me to him and we reported on the current state of the demplot. Ir. Hartono seemed to have a general idea about the plans for this demplot, but little specific knowledge about it. Apparently he has entrusted Pak Basuki with most of the responsibility for the project.

4) Meeting with kecamatan official

We finally tracked down the kecamatan BangDes official. He loaned us the Potensi Desa for Pukdale. (There is not much information contained in this document and many of the demographic and property figures differ from those given to us by the village secretary.) He agreed to attend the organizational meeting of the P3A (water users' association) on May 25 to express kecamatan level interest in the demplot. He also expressed annoyance that P2AT had not informed the camat officially about this project. (Pak Basuki later informed us that P2AT has no administrative reason to contact the camat. All official communication goes through the bupati's office, and the bupati will be informed as soon as the preliminary work at the site is accomplished. At that time P2AT will ask him to visit and inaugurate the demplot.)

5) Organizational meeting for P3A

On May 25, 19 of the now 24 farmers in the demplot gathered at the village office for their first official meeting. The primary purpose was to form a P3A and choose its leadership. I told them about the socio-economic survey. I emphasized that we hoped they would answer all our questions accurately and not under-report their holdings, income, etc. for fear of taxation. (The official village figures for livestock holdings, for example, are clearly lower than actual numbers.)

Pak Hari's intention had been to appoint the leadership of the P3A himself after consultation with the kepala desa. Wisely, in my opinion, the kepala desa refused. He said this should be the responsibility of all members of the demplot (though he had a slate of officers in mind). In fact, the meeting involved heated and acrimonious discussions not only about the leadership of the P3A but about also about the division of the 7 ha. into smaller user groups (5 in all) and about the leadership of each of these groups. Pak Hari's strategy was to say "I think so-and-so should be head of the P3A, but of course we have to discuss it (musjawarah) first." The kepala desa allowed considerable debate before he offered his choices for each of the 4 positions. These were accepted after further discussion. (The head of the organization is the largest single land owner in the demplot and his son is the pump operator. Another son is head of one of the 5 user groups. The kepala desa's father, owner of one of the smaller plots, is also head of a group.)

Given the social dynamics of this meeting I foresee a stormy, but not necessarily unsuccessful future for this P3A. Virtually everyone in Pukdale is Rotinese. These people are regarded locally as independent thinkers, perhaps to the point of contentiousness, as yesterday's meeting demonstrated. Likewise, the Rotinese have a reputation for industriousness and initiative - witness their prominence in the local civil service and the relative success of their agriculture on Timor.

cc: Diana Putman, ARD/WRD
Al Newman ARD/WRD

MONTHLY REPORT - #1

May, 1985
Suzanne E. Siskel, P2AT - Kupang, NTT

Summary of principal activities

This consultancy at P2AT - Kupang effectively began on April 29, 1985. During this first month I have been involved in the following principal activities:

1) rehabilitation of the pumping unit at the P2AT demonstration plot;

2) encouragement of local farmers' interest and participation in the demplot; and

3) collection of basic demographic, socio-economic, agricultural, and other data regarding Pukdale.

Considerable progress has been made at the demplot over the past month:

1) The pump is now operating after over a month's hiatus when it was broken.

2) A Pukdale resident who has had some training in diesel mechanics was hired to operate, maintain, and guard the pump.

3) The farmers whose land is part of the demplot formed a water users' association and have participated in several cooperative labor efforts to clean out the irrigation ditches and put fences around the entire demplot area.

4) Rice planted on a small part of the demplot land is being harvested now and farmers are preparing to plant corn (to be harvested as green corn) on the entire 7 hectares of the demplot.

Procedural matters

The start of my work with P2AT was postponed for nearly a month. Ir. Basuki Hartono, head of P2AT - Kupang, sent my designated counterpart to Surabaya for a training program. The counterpart, Hari Suwito, did not return to the office in Kupang until late April.

Space has been provided for us at the P2AT office at Jl. Lalamentik. (These are temporary quarters until P2AT moves to its new offices in the Kelapa Lima section of Kupang.) We have spent most of our time during the month of May at the demplot, however. On most of the trips to Pukdale mechanics who were working on the pumping system accompanied us. We often transported parts and equipment as well. A small pick-up truck was available from P2AT for most of these trips to the site.

Status of the demplot

On our first visit to Pukdale on April 30, 1985, we discovered two major problems at the demplot: 1) the pump had not worked for over a month due to faulty and missing parts; and 2) the irrigation ditches around the demplot were full of debris. Thus, the primary focus of activity for the past month has been to rehabilitate the demplot.

There has been a series of parts replacements and repairs on the pumping system. At this time, a surface mounted centrifugal pump powered by a diesel motor is pumping water at the rate of about 9-10 liters per second. This pumping system has been installed temporarily outside of a small shed that is meant to house the pump and motor. The reason is that the shed's foundation has settled unevenly. Thus, the pulleys of the pump and motor cannot be aligned properly when this machinery is in place inside the shed. A permanent structure to house the pumping system is slated to be constructed within the next few months.

At the instigation of my counterpart, village officials organized several cooperative labor efforts to clean out the irrigation ditches around the demplot and to build fences all around the area to prevent animals from entering the fields. More than half of the irrigation ditches have been cleared. Nonetheless, there still is considerable water loss due to evaporation an percolation. According to Ir. Basuki, permanent (cement) irrigation canals will be laid at about the same time as housing for the pump is built.

About one-third of the demplot was planted in rice paddy in January - February, 1985. Because of a water shortage due to lack of rain and to early problems with the pump operation, a quarter or so of this rice crop was lost. The remaining crop is being harvested now. At the same time, many of the farmers are preparing land for planting in palawija. In most cases, this crop will be green corn, which should enable a net profit per hectare of at least Rp 450.000. This is a potential boon to the demplot farmers since their land would have lain fallow until the next rainy season.

Community response to the P2AT demplot

There was considerable sceptism about the demplot's chances for success on the part of demplot farmers and village officials in Pukdale. Indeed, initially there was no one from P2AT available to monitor the pumping system and to coordinate demplot administration and planting. The situation has improved significantly with the appointment of my counterpart as overseer of the demplot and since we began making almost daily trips to the site over the past month. Now that the pump is operating, the demplot farmers have begun showing more serious interest in investing their time and some funds in preparing their land and in planting palawija. A water users' association (P3A) has been formed, as have 5 demplot sub-groups for regulation of water use.

My counterpart and I held a meeting with locally based agricultural extension workers (from the Balai Penyuluhan Pertanian in Naibonat, adjacent to Pukdale). The administrator of the center (Penyuluh Pertanian Madya - PPM) and the extension worker for Pukdale (Penyuluh Pertanian Lapangan - PPL) both expressed their willingness to help instruct the demplot farmers in appropriate land preparation and planting techniques and in use of fertilizers and insecticides. The PPM also assured us that there would be no problem marketing green corn grown on the demplot since he has a reliable buyer who will purchase the corn directly from the BPP. Neither P2AT nor the BPP are able to supply seeds, fertilizer, or insecticide for the demplot, however. These must be purchased by the farmers themselves. Thus we will not know the full measure of farmer commitment to the demplot until we see the extent to which they invest their money as well as their labor in it.

Data collection

In order to collect general demographic, socio-economic, agricultural, and other background information about the Pukdale area, my counterpart and I have had at least one meeting with each of the following:

1) secretary of desa Pukdale - for village census and registration of property (land and livestock holdings);

2) BangDes official for Kecamatan Kupang Timur (in which Pukdale is located) - to get the Potensi Desa for Pukdale. There is not much information contained in this document and many of the demographic and property figures differ from those provided by the village secretary.

3) "rainfall observer" - a retired P.U. staff member who has collected rainfall measurements for the past 30 years in the same Oesao catchment area as Pukdale - to collect daily rainfall figures for the past 10 years;

4) administrator of the Kecamatan Kupang Timur Puskesmas - no records are kept on numbers of visits, incidence of disease, mortality, etc. by village, but we obtained information on the major health problems of the region as a whole; and

5) WHO-UNDP drinking water project consultants, Mr. M. Gupta and Mr. Ron Parker - to discuss the background and plans for the WHO well in Pukdale which is located within the demplot. (Their well was drilled in 1982 and then capped. WHO-UNDP plan to install a submersible electric pump in 1986-7. In fact, the demplot farmer on whose land the WHO well was drilled has purchased a kerosene powered pump and is using the well to supply irrigation water for his crops.)

Plans for next month

The primary focus of my attention during the coming month will be a comprehensive questionaire on socio-economic issues including household budgets and organization; livestock, land, and other property ownership and/or usufruct; agricultural practices; farm income and expenditures; marketing; labor allocation; irrigation experience; and participation in community, government and NGO programs.

At the demplot, farmers plan to prepare their land and plant palawija. In principle, all members of the P3A agree that 100% of the demplot should be planted. The largest single land owner (who has about 2.3 ha. in contrast to the majority with 10-15 are) has divided up his land to be worked by a number of individuals.

My counterpart, Hari Suwito, will continue to oversee all demplot activities. He also will accompany me to the farmers' households to help administer the questionaire.

MEMO

Best Available Document

Date : June 2, 1985

To : [illegible]
Chief, [illegible] Resources Division

From : [illegible]

Subject : [illegible] 27-June 1, 1985

Summary of [illegible] activities:

I. [illegible]

I have spent [illegible] over the past month trying to track down [illegible] agricultural, and other [illegible] data about [illegible] are not [illegible] accurate, but they [illegible] general [illegible] would be useful for comparison of Pakdale with [illegible] other parts of [illegible] this past week:

a.) Daily rainfall [illegible] from January, 1975 to the present - [illegible] Pakdale. This data was collected by a retired [illegible] has been a "rainfall observer" for over 30 years. His measurements are regarded as consistently reliable.

b.) Health records [illegible] Tiban [illegible] - No records are [illegible] of visits, incidence of disease, mortality, etc. by village. [illegible] only scanty documentation of family planning acceptors and immunization by village. We learned more in talking with the [illegible] of the health center who has been there since 1975. In rough terms, the percentage of daily visitors to the center from Pakdale is [illegible] than that of [illegible] village, despite the proximity and accessibility of the [illegible]. The health official offered [illegible]: 1) Pakdale villagers have been "spoiled" by having [illegible], officials, health practitioners, etc. come to them - even door-to-door - to offer their services and assistance. [illegible] 2) Pakdale have become lazy about [illegible] themselves elsewhere. [illegible] villagers are, in general, better off economically than others in the district. They [illegible] to treat themselves by buying medicine over the counter rather than travel to the center and wait for a consultation. 3) They often prefer traditional curers and midwives within the village to the trained health personnel.

II. [illegible] activity

The harvest on all currently planted [illegible] within the [illegible] should be completed within 2 weeks. My counterpart [illegible] wants to [illegible] the demplot planted in [illegible] immediately thereafter. In order to coordinate this we met:

1) [illegible] (Kepala Pertanian [illegible]) of the Agricultural Extension center [illegible] adjacent to [illegible]. [illegible] agricultural work [illegible] on the demplot without [illegible] agreed that [illegible] it can be planted and ready [illegible] to the Minister of P.U. in August. [illegible] at 10,000 [illegible]

The [illegible] spacing of 1 meter. The [illegible] yields one large [illegible] at the base of the [illegible]

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stalk used for home consumption. In fact, my counterpart hopes to increase that yield estimate by spacing the seed 50-60 cm. apart. Costs of production will be low. Most of the demplot parcels are small enough for the individual owner households to work themselves. The cost of fertilizer per hectare is about Rp30,000 and seeds will run about Rp10,000. This would enable a profit of Rp460,000. Apparently marketing is not a problem. The PPM has a buyer who will purchase the green corn directly from the BPP at the fixed price of Rp50 so the Pukdale farmers have a guaranteed market. (If the corn were harvested later and sold in dry bulk, the profit would drop sharply. The price/kg of dry mature corn is Rp125. 5-6 stalks = 1kg., enabling a profit (after expenses) of only Rp170,000-220,000. Note that in good years rain-fed rice yields are 3-5 tonnes/ha at Rp350/kg. Production costs cut significantly into the Rp1.2-2 million gross.)

On June 8 the PPM and my counterpart will hold a meeting of the full P3A in order to discuss land preparation, planting methods, etc. The PPM will secure an adequate supply of seeds and fertilizer that the farmers can buy at a fair price. It appeared that there was confusion again about responsibility for the P2AT demplot. My counterpart and the PPM decided - since this is not a specific Dinas Pertanian demplot - seeds, fertilizer, etc. cannot be supplied free by the agriculture department. On the other hand the PPM and the local extension worker (PPL) normally assigned to Pukdale will monitor and offer technical advice on a weekly basis.

My counterpart and the PPM tacitly agreed to arrange all demplot activities themselves. They suspect that coordination of their inter-sectoral work at the demplot would be delayed if left to be arranged by higher levels of their respective bureaucracies. When they have organized palawija planting at the demplot they will report on their activities and assume these will be approved. Note that if Pak Hari and the PPM had not been so eager to cooperate, a concerted effort by P2AT and this agricultural extension center would not have been organized so easily.

2) Newly chosen head of P3A. He assured us that necessary land preparation would be done cooperatively by demplot households. He also resolved our confusion about the membership and leadership of the P3A. There are 26 parcels of land in the demplot but only 25 listed P3A members. Two men have land included in more than one sub-group. In addition, three of the four officers of the association are sons of demplot land owners but are not themselves listed as members. The rationale given is that the fathers actually own the land but the sons do all the work and therefore should be entitled to positions of responsibility within the P3A. The head of the association is the son of the largest single demplot landowner, not the father as I reported last week. The confusion here arose because the son is also head of his sub-group. Also he and his father are know by a variety of names (as are many people in Pukdale). Indeed, in the village property census at least a third of the names of demplot owners recorded at the P3A meeting are not listed.

This meeting shed some light on village politics. The head of P3A ran unsuccessfully against the current kepala desa for that position in the last election. Apparently he lost by a small margin.

III. Preparation of the survey questionnaire

My counterpart finished his revisions of the questionnaire I prepared and we intend to begin administering it this coming week. We will interview first in two households with which we have become quite familiar in the course of our almost daily trips to Pukdale. If any further revisions are needed after these trials I will incorporate them and send the questionnaire on to you.

cc: D. Putman ARD/WRD
A. Newman ARD/WRD

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MEMO

To : Nancy M. Tumavick
Chief, Water Resources Division

Date : June 10, 1985

From : Suzanne E. Siskel
P2AT - Kupang

Subject : Weekly Log - June 2-8, 1985

Summary of week's activities:

1) Problems with the pump

The pump broke down again for several days this past week. The P.U. mechanic who went out to check it said that the motor oil needed to be changed and that the three one-week old fan belts were stretched and needed to be replaced. Fortuitously, one of the two VSOs (English volunteers), Steve Simpson, a trained farm mechanic who works at the PDP agricultural research station, Sukabitetek, happened to visit us. I discussed the pump problems with him and he offered to accompany my counterpart and me to the field to take a look at the equipment. He spotted the problem immediately. The fan belts that have been used to drive the motor and pump pulleys are about half the width and thickness that they should be. The P.U. mechanic found three replacement belts that were about one size smaller than the optimal size, but a major improvement over the previous ones. As soon as the new belts were in place the pump began operating at about twice the power that it ever had before (i.e. about 9-10 liters/second).

The P.U. mechanic also changed the oil in the diesel engine. Instead of using 30 strength oil that is recommended for diesel engines that have not been broken in yet, the mechanic provided 40 strength which is too heavy for a new engine and can cause overheating. My counterpart assures me that this mistake has been rectified.

Meeting with agricultural extension workers

A meeting for all demplot farmers with my counterpart and the locally-based agricultural extension workers had been scheduled for 8 a.m. on Saturday (June 8). The village administration and the P3A officers knew about the meeting and announced it to all concerned. By 12 p.m. only about 5 farmers had shown up at the building used for village meetings (located at one end of the demplot, within easy walking distance of all demplot farmer households). The desa secretary and head of P3A went to each house to call the farmers, but most of them were working on fields rather far from their homes or were transferring cattle from one grazing location to another. Eventually, between 2 and 3 p.m., most of the farmers had gathered for the meeting. The agricultural extension workers remained in Pukdale until they were able to hold the meeting. The PPL (extension worker) for Pukdale and my counterpart helped one of the farmers plant several are in corn, using a rope help by people at each end of the field to align the planted rows. In casual conversation with some of the farmers and with the PPL herself, we learned that the PPL has not visited Pukdale for some months, though the administrator of the local agricultural station, the PPI, told us that his extension workers make weekly rounds to all the villages in their bailivick.

At the meeting, the PPI and PPL discussed the relative merits of the crops that could be planted on the demplot. They explained that green corn would net the highest profit (i.e., approximate more closely than other crops the net yield of rice paddy). Other choices, such as watermelon and various

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vegetables, would be difficult and expensive to market. In the case of vegetables, there would be insurmountable competition from the village of Tarus which is located halfway between Kupang and Pukdale. A church-sponsored farmer/agricultural innovator has taught and encouraged local farmers to raise tomatoes, cabbage, greens, and other vegetables for the Kupang market and also to sell their produce by bicycle in the morning and evening in nearby villages. Several of the Pukdale farmers are going to plant small portions of their demplot land in vegetables and peanuts as an experiment anyway, but most will be in green corn. Contrary to what he told us in our initial meeting, the PPM has not found a supply of corn seeds that the farmers can purchase. Thus, my counterpart will visit the agriculture department in Kupang and try other potential sources next week.

Farmer interviews

We conducted our first interview with the father of the kepala desa. It lasted over 4 hours, both because the questionaire is long and because of the man's loquaciousness. The other farmer we had hoped to interview this week was too busy but we have arranged an appointment with him for next week. After completing these two interviews, my counterpart and I will make any final revisions that seem appropriate. Our first respondent was quite open, though he could not provide precise answers to many of our questions. For example, he will not know the number of cattle he owns until the month of October when he customarily goes out to brand calves born during the past year. He likes to keep his herd to about 300, which is a manageable number given grazing conditions and availability of labor. The cattle is kept as a form of savings, being sold off as cash is needed. In the past this farmer has bought a truck (now rented out to someone in Kupang), a bemo (which has been sold), and 3 tractors; financed a major operation for his wife; and built a Rp. 17 million house for his son. Recently he sold 3 head to buy the kerosene powered pump that he uses on the WHO well.

Upcoming activities at the demplot

Ir. Basuki informed us that construction of the permanent pump shed and the cement irrigation canals should begin next month. It is especially important that the shed be built as soon as possible because the pumping system is completely unprotected. The local operator stays at the pump site to guard it until late into the night, but the machinery is still left unguarded when the man has work or activities elsewhere.

Most of the paddy planted on the demplot has been harvested, and many of the farmers are now preparing thir land for corn planting. One incentive to plant is the planned visit to the site of the P.U. Minister and local dignitaries scheduled for August. In addition, the village administration has just announced that there will be a large number of military personnel moving into Pukdale for two months beginning on August 15 as part of the "ABRI Masuk Desa" program. The farmers will be able to sell much of their corn harvest to these men.

cc: D. Putman ARD/WRD
A. Newman ARD/WRD

MEMO

To : Nancy M. Tumavick
Chief, Water Resources Division

Date : June 15, 1985

From : Suzanne E. Siskel
P2AT - Kupang, NTT

Subject : Weekly Log - June 9-15, 1985

1. Preparation of the demplot for TVRI

TVRI-Jakarta sent a crew to Kupang this week to film various P.U. projects in NTT. Ir. Basuki informed us on Wednesday (June 12) that the crew would be in Pukdale on Saturday the 15th. This came as an unwelcome surprise to my counterpart who had been planning on possible TV coverage of the P.U. Minister's visit in August. By then, he hopes, the permanent irrigation canals and pump shed will have been constructed and the first green corn crop should be almost ready to harvest.

We spent most of Wednesday talking to people as they worked in the demplot fields. My counterpart answered their questions about agriculture and encouraged them to make their land look presentable for the TV filming. As it happened, a P3A meeting had been scheduled for Thursday the 13th. Pak Hari used this opportunity to organize a cooperative effort to clean out the remaining clogged irrigation canals. He strongly encouraged the farmers to weed and burn off the brush on their land so the demplot would look like a serious endeavor. The suggestion of cooperative labor angered several farmers who felt they have done more than their share already. Nevertheless, many of the farmers did work very hard for 2 days, including helping my counterpart and a P2AT mechanic install metal pipe to carry water to the highest section of the demplot.

The TV filming was an anti-climax for people in Pukdale. Pak Basuki and the film crew arrived about 3½ hours later than expected and they did not interview anyone at the site, though Pak Basuki had instructed my counterpart to have the heads of the village and water user's association ready to be interviewed. Apparently the film crew intended to have Ir. Sabbichis Rasjidi, Kekanwil P.U.-NTT, describe the demplot as one of many P.U. projects in the province. He and Ir. Hartono, Kepala Pengairan, P.U.-NTT, had come out to Pukdale in their own cars expecting to meet Pak Basuki with the film crew there. After waiting for them for 45 minutes, Ir. Sabbichis returned to Kupang. Though Ir. Hartono was in Pukdale for the filming, he played no active role in it.

It is not clear when this will be broadcast. There may be 2 segments: a short piece on the first evening news, Berita Nusantara, just before Lebaran and a longer feature report on Daerah Membangun sometime after the holiday. Since there was no commentary at the demplot, I do not think the footage will be particularly instructive. As far as I could tell, they took shots of the pump (still outside its shed), water flowing in an irrigation canal, people harvesting and threshing rice in one plot, a vegetable garden adjacent to the demplot, and fields in various stages of preparedness (unweeded, weeded, burned, and recently planted in corn). They also took some footage of the shed made by the kepala desa's father to house the kerosene pump he uses at the UNO well. It will be interesting to see how or if this is described, especially since the footage includes shots of Ir. Hartono walking beside this shed with the village secretary.

2. P3A meeting

A meeting was called for the 13th as a result of the apparent lack of interest in the meeting held on the previous Saturday. Not all the farmers appeared for that one and the majority of those who did attend were 4-5 hours

late. The kepala desa and, to a less vociferous extent, the head of the P3A were very angry about this.

The June 13 meeting started about 2 hours late, but by the time it had begun about 22 of the 25 farmers or their representatives had arrived. The kepala desa berated the assembled men about their lack of pride in the demplot and threatened them with punishment if they did not fulfil their responsibilities to prepare their land, keep their part of the irrigation system in good order, and to finish constructing the fence that surrounds the demplot. (Punishment probably would be compulsory labor on a village construction project.)

The agricultural extension worker (PPM) gave a longer version of the talk he presented at the previous meeting. He advocates a system of planting corn at fixed intervals of 1/2m. x 3/4 m. that follow the contour of the land rather than the local "matahari" system. The latter simply involves planting corn at intervals of 1m. x 1/2m. in lines running directly east to west. This method is thought to maximize the amount of sunlight that strikes the plants. According to the PPM and to Pak Hari, however, this method is unnecessary in an area of intense sunlight such as this part of Timor.

The PPM also discussed the benefits of planting corn rather than (other) vegetables. Several farmers balked at the idea of planting corn. My counterpart explained that P2AT wants them to plant cash crops that most closely approximate rice in profitability so that the pumping system can begin to pay for itself (theoretically, at least). Pak Hari has located a source in Kupang from which he can purchase seeds on behalf of the Pukdale farmers if they need to buy them. (Some people have seeds from previous corn crops or from previous years' purchases.) The price, Rp. 250/kg. is expensive but there seems to be no other alternative. One hectare takes about 20kg. of seeds - a Rp. 5000 investment.

3. Pump operation

Last week's repairs have helped but not eliminated problems with the pumping system. The new fan belts that were installed a week ago are nearly worn out. This is due, very likely, to the fact that the pulleys on the pump and motor are not the same size and that the fan belts, though larger than the original ones used, are still too small for this system. Apparently single-unit Kubota pumps ordered from Java for the demplot are on a boat in Kupang harbor that has not been unloaded yet.

I have asked a number of times for the measurement of the pump's output and of the water level in the well. The figure of 9-10 lps as the current output is only an estimate made by Pak Hari and another P2AT staff member. No formal measurements have been taken. On the other hand, they measured the water level this week for the first time since January. At that time - during the rainy season -- the SWL was 0. Now it is 2.35 m., dropping down to a stable 4.35 meters after 5 hours of pumping. Apparently P2AT is supposed to take soundings each month but there has been no one to oversee matters of this sort until now.

4. Registration with SosPol

On June 4, Pak Basuki informed my counterpart that I had to be registered with the SosPol chief for NTT and with the Governor's office. This process took 4 days of Pak Hari's time, though it was not necessary for me to go to these offices myself. Enclosed is a photocopy of the form letter that was issued by SosPol giving permission for me to live in Kupang as a consultant to P.U. (Pak Hari showed them the SosPol letter for my husband that lists me as his dependent, but this is no longer sufficient given my job here.)

5. Questionaire

Once again it was very difficult to track down demplot farmers to schedule interviews. I managed to do one with the former kepala desa but only because he was ill and unable to work in his fields. Given the pressure on the farmers to prepare the demplot for the filming on Saturday, it seemed inappropriate to ask them to sit for a long interview. I have lined up at least 2 interviews for the coming week, however.

cc: D. Putman, ARD/WRD
A. Newman, ARD/WRD

MEMO

To : Nancy M. Tumavick
Chief, Water Resources Division

Date : June 23, 1985

From : Suzanne E. Siskel
P2AT - Kupang, NTT

Subject : Weekly Log
June 16-22, 1985

Summary of week's activities:

1. Status of the demplot

The pump has been operating steadily for at least 6 hours a day since the P2AT staff installed larger fan belts between the pulleys of the pump and motor. These fan belts are a size smaller than they should be, however, and P2AT already has had to replace the first set that were installed 2 weeks ago. Apparently, the fan belts they are using are the largest ones available in Kupang right now, so P2AT will have to continue replacing them as needed to guarantee the continuous operation of the pump.

My counterpart obtained a drum of solar (diesel) fuel for the motor, and this fuel is being stored and used as needed by the local pump operator. He has begun noting the hours of pump operation and daily fuel consumption for P2AT and, as far as we can tell, is conscientious about maintaining and guarding the machinery. He has not been paid anything by P2AT yet, though a month ago my counterpart submitted all documents that are required in order to put him on P2AT's payroll. His salary will be Rp. 20.000/month.

All costs relating to the pumping system are supposed to be met by P2AT for the first two years of the demplot. Nonetheless, my counterpart encounters many bureaucratic obstacles almost every time he has to get money for diesel fuel, oil, and gasoline; obtain spare parts; enlist mechanics to work on the machinery; obtain his surat jalans for going to the field; etc. Our departure for the field is often delayed for several hours in the morning while Pak Hari tries to locate the people in various sub-divisions of P2AT who must approve and release the funds, supplies, documents, etc. necessary for the management and development of the demplot.

There is considerable activity in the demplot now. All but one farmer have (at least) begun preparing their fields to plant, and most of them have had their corn in for about a week. The one exception is head of his sub-group of the water users' association. The head of the P3A told him that he was setting a bad example and ordered him to begin working within 24 hours or risk forfeiting his leadership position. The head of the P3A also told this farmer that other people would be allowed to work his land if he did not begin to do so himself.

2. Use of the WHO well

The WHO drinking water well is being used continuously and exclusively by the kepala desa's father on whose land it is located. He built a temporary shed (reed walls, corrugated metal roof) to protect the kerosene pump he purchased for this well. He tells us regularly that anyone may use the well as long as they pay for the fuel required to pump water to their land. According to him, no one is willing to do so, however.

The kepala desa's father was the first in the demplot to plant corn. He also put in one are of peanuts as an experiment. Ironically, his corn yield probably will not be as high as it should be because he consistently ignores the extension workers' and my counterpart's advice on proper irrigation procedure. He has been watering his corn continuously rather than doing so once a week as he has been advised.

We have heard some grumbles (but no serious complaints) from other demplot farmers about the kepala desa's father using the WHO well. My counterpart continues to pressure me about arranging to switch this well for a P2AT bore elsewhere in Pukdale so that the demplot can have the benefit of two constant water sources. He believes that this is a legitimate proposal since most (if not all) demplot farmers already have adequate drinking water supplied by 2-4m. wells on land beside their homes. I have explained repeatedly to Pak Hari that negotiating with WHO is not my function and that such business should be handled by the P2AT staff. In fact, when Ir. Hartono (Kepala Pengairan) visited the site in connection with the TVRI filming, Pak Hari brought up his desire to switch wells. I do not know whether Ir. Hartono (or Ir. Basuki) is interested in pursuing this matter, especially since P2AT plans to drill as many as seven additional wells on the demplot if necessary.

The former kepala desa of Pukdale (also a demplot member) told me that the WHO well is necessary as a source of drinking water for people from the hamlet adjoining the one in which the well and the demplot are located. He is opposed to using this well for irrigation because WHO has not formally granted permission to do so. He said that the well should have been dug closer to the area in which water is most needed, but that there were no adequate aquifers there. WHO plans to pipe water from this well to other parts of Pukdale, but a pump and pipes will not be installed for at least another year.

3. Farmer interviews:

I conducted two more interviews with demplot farmers, including one with the head of the P3A. He is also head of a previously existing water users' association for his hamlet. This organization regulates water diverted from a local rain-fed river to supplement rainfall for irrigating ricefields during the wet season.

Other general information has emerged from the survey:

a) men control land and livestock

b) women control money

c) women (wives) and children are paid in the same way as hired laborers for working in a man's (husband's/father's) rice fields

To explain further - according to local custom, land and cattle are owned by the male head of household. His wife has rights in that property if the husband and his family have not paid off the full amount of the brideprice they agreed to provide her family prior to the couple's marriage. The government restricts brideprice to a maximum of 7 head of cattle or Rp. 350.000. Once the brideprice is fully paid, a wife and her family have no claims to her husband's property. (A man's sons inherit his property upon his death, but they may be given usufruct of their share when they reach adulthood. Widows and unmarried daughters generally do not hold property, but they are accorded a fixed share of their sons' or brothers' harvest and have de facto rights in a portion of the men's property.)

Wives and children usually help their husbands/fathers with rice farming, especially during the planting and harvest periods. They are given a portion (usually 1/3) of the yield from the land they work or the equivalent in cash. This is kept separate from the rest of the rice harvest, though women (wives) control rice storage, consumption, and sale anyway. Women may use the money from their share of the rice harvest for cosmetics, clothing, household decorations, etc. or for pressing household needs; but both men and women state explicitly that men have no claim to this money. Many women meet weekly household consumption needs by selling vegetables and fruit from house gardens in the local Oesao market. If there is a shortage of cash or marketable foodstuffs, some women also make coconut oil for local sale or bake little cakes that are sold house to house in Pukdale. All the men I have interviewed say that they give all money from livestock sales, payment for services, etc. to their wives; and they say they do not know how much money their wives hold. When they need money, even for cigarettes, they ask their wives for the amount necessary.

I have at least 5 interviews scheduled for next week. Many farmers have been too busy to be interviewed lately because of the pressure to plant corn on the demplot and also because of a village cooperative labor requirement. In preparation for the August arrival of about 100 "ABRI Masuk Desa" participants, the kepala desa has ordered the construction of a balai desa (village office/meeting hall).

cc: D. Putman ARD/WRD
A. Newman ARD/WRD