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Report No. 39843

PROJECT PERFORMANCE ASSESSMENT REPORT

INDONESIA

SECOND AGRICULTURAL RESEARCH MANAGEMENT PROJECT
(CPL-38860; SCL-38866; SCPD-3886S)

DECENTRALIZED AGRICULTURAL AND FORESTRY EXTENSION PROJECT
(IDA-32800; TF-26727; SCL-45100)

June 1, 2007

"Every farm is an experiment station, and every farmer is the Director thereof."
George Warren, Cornell, 1905

"To teach a dog a new trick, you first have to know more than the dog."
Heavy Kohlmeyer, Purdue University, 1957

Sector, Thematic and Global Evaluation Division
Independent Evaluation Group

Currency Equivalents (annual averages)

Currency Unit = Indonesian Rupiah (Rp)

1995	US$1.00	Rp. 2,249
1996	US$1.00	Rp. 2,342
1997	US$1.00	Rp. 2,909
1998	US$1.00	Rp. 10,014
1999	US$1.00	Rp. 7,855
2000	US$1.00	Rp. 8,422
2001	US$1.00	Rp. 10,261
2002	US$1.00	Rp. 9,311
2003	US$1.00	Rp. 8,577
2004	US$1.00	Rp. 8,939
2005	US$1.00	Rp. 9,705

Fiscal Year

Government: April 1 – March 31

Director-General Evaluation	:	Mr.Vinod Thomas
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IEG Mission: Enhancing development effectiveness through excellence and independence in evaluation.

About this Report

The Independent Evaluation Group assesses the programs and activities of the World Bank for two purposes: first, to ensure the integrity of the Bank's self-evaluation process and to verify that the Bank's work is producing the expected results, and second, to help develop improved directions, policies, and procedures through the dissemination of lessons drawn from experience. As part of this work, IEG annually assesses about 25 percent of the Bank's lending operations. In selecting operations for assessment, preference is given to those that are innovative, large, or complex; those that are relevant to upcoming studies or country evaluations; those for which Executive Directors or Bank management have requested assessments; and those that are likely to generate important lessons. The projects, topics, and analytical approaches selected for assessment support larger evaluation studies.

A Project Performance Assessment Report (PPAR) is based on a review of the Implementation Completion Report (a self-evaluation by the responsible Bank department) and fieldwork conducted by IEG. To prepare PPARs, IEG staff examine project files and other documents, interview operational staff, and in most cases visit the borrowing country for onsite discussions with project staff and beneficiaries. The PPAR thereby seeks to validate and augment the information provided in the ICR, as well as examine issues of special interest to broader IEG studies.

Each PPAR is subject to a peer review process and IEG management approval. Once cleared internally, the PPAR is reviewed by the responsible Bank department and amended as necessary. The completed PPAR is then sent to the borrower for review; the borrowers' comments are attached to the document that is sent to the Bank's Board of Executive Directors. After an assessment report has been sent to the Board, it is disclosed to the public.

About the IEG Rating System

The time-tested evaluation methods used by IEG are suited to the broad range of the World Bank's work. The methods offer both rigor and a necessary level of flexibility to adapt to lending instrument, project design, or sectoral approach. IEG evaluators all apply the same basic method to arrive at their project ratings. Following is the definition and rating scale used for each evaluation criterion (more information is available on the IEG website: http://worldbank.org/oed/eta-mainpage.html).

Relevance of Objectives: The extent to which the project's objectives are consistent with the country's current development priorities and with current Bank country and sectoral assistance strategies and corporate goals (expressed in Poverty Reduction Strategy Papers, Country Assistance Strategies, Sector Strategy Papers, Operational Policies). *Possible ratings:* High, Substantial, Modest, Negligible.

Efficacy: The extent to which the project's objectives were achieved, or expected to be achieved, taking into account their relative importance. *Possible ratings:* High, Substantial, Modest, Negligible.

Efficiency: The extent to which the project achieved, or is expected to achieve, a return higher than the opportunity cost of capital and benefits at least cost compared to alternatives. *Possible ratings:* High, Substantial, Modest, Negligible. This rating is not generally applied to adjustment operations.

Sustainability: The resilience to risk of net benefits flows over time. *Possible ratings:* Highly Likely, Likely, Unlikely, Highly Unlikely, Not Evaluable.

Institutional Development Impact: The extent to which a project improves the ability of a country or region to make more efficient, equitable and sustainable use of its human, financial, and natural resources through: (a) better definition, stability, transparency, enforceability, and predictability of institutional arrangements and/or (b) better alignment of the mission and capacity of an organization with its mandate, which derives from these institutional arrangements. Institutional Development Impact includes both intended and unintended effects of a project. *Possible ratings:* High, Substantial, Modest, Negligible.

Outcome: The extent to which the project's major relevant objectives were achieved, or are expected to be achieved, efficiently. *Possible ratings:* Highly Satisfactory, Satisfactory, Moderately Satisfactory, Moderately Unsatisfactory, Unsatisfactory, Highly Unsatisfactory.

Bank Performance: The extent to which services provided by the Bank ensured quality at entry and supported implementation through appropriate supervision (including ensuring adequate transition arrangements for regular operation of the project). *Possible ratings:* Highly Satisfactory, Satisfactory, Unsatisfactory, Highly Unsatisfactory.

Borrower Performance: The extent to which the borrower assumed ownership and responsibility to ensure quality of preparation and implementation, and complied with covenants and agreements, towards the achievement of development objectives and sustainability. Possible ratings: Highly Satisfactory, Satisfactory, Unsatisfactory, Highly Unsatisfactory.

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Principal Ratings

SECOND AGRICULTURAL RESEARCH MANAGEMENT PROJECT (LOAN NO. 38860)

	*ICR**	*ICR Review**	*PPAR*
Outcome	Satisfactory	Satisfactory	Satisfactory
Sustainability	Likely	Likely	Likely
Institutional Development Impact	Substantial	Substantial	Substantial
Bank Performance	Satisfactory	Satisfactory	Satisfactory
Borrower Performance	Satisfactory	Satisfactory	Satisfactory

DECENTRALIZED AGRICULTURAL AND FORESTRY EXTENSION PROJECT (LOAN NO. 45100)

	*ICR**	*ICR Review**	*PPAR*
Outcome	Satisfactory	Moderately Unsatisfactory	Moderately Satisfactory
Sustainability	Likely	Non-evaluable	Likely
Institutional Development Impact	Modest	Modest	Substantial
Bank Performance	Satisfactory	Unsatisfactory	Unsatisfactory
Borrower Performance	Satisfactory	Unsatisfactory	Unsatisfactory

* The Implementation Completion Report (ICR) is a self-evaluation by the responsible operational division of the Bank. The ICR Review is an intermediate Independent Evaluation Group (IEG) product that seeks to independently verify the findings of the ICR.

Key Staff Responsible

SECOND AGRICULTURAL RESEARCH MANAGEMENT PROJECT (LOAN NO. 38860)

Project	*Task Manager/Leader*	*Division Chief/ Sector Director*	*Country Director*
Appraisal	Dirk Leeuwrik	Anthony P. Cole	Marianne Haug
Completion	Dely Gapasin	Mark D. Wilson	Andrew D. Steer

DECENTRALIZED AGRICULTURAL AND FORESTRY EXTENSION PROJECT (LOAN NO. 45100)

Project	*Task Manager/Leader*	*Division Chief/ Sector Director*	*Country Director*
Appraisal	Dely Gapasin	Geoffrey B. Fox	Mark Baird
Completion	Shobha Shetty	Mark D. Wilson	Andrew D. Steer

Abbreviations and Acronyms

AIAT	Assessment Institutes for Agricultural Technology, recently renamed BPTP.
ARMP II	Second Agricultural Research Management Project
BIPP	District Agency for Agricultural and Extension Services
BPP	Sub-District Rural Extension Center
BPTP	See AIAT
CAS	Country Assistance Strategy
CGIAR	Consultative Group for International Agricultural Research
DAFEP	Decentralized Agricultural and Forestry Extension Project
DEC	District Extension Committee
ERR	Internal Economic Rate of Return
FAO/CP	Food and Agriculture Organization's Cooperative Program with the Bank
FEATI	Farmer Empowerment through Agricultural Technology and Information
FET	Field Extension Team
FMA	Farmer-Managed Activity
GDP	Gross Domestic Product
IAARD	Indonesian Agency for Agricultural Research and Development
ICR	Implementation Completion Report
IEG	Independent Evaluation Group
IRRI	International Rice Research Institute.
M&E	Monitoring and Evaluation
MIS	Management Information System
NCAE	National Center for Agricultural Extension
NCFE	National Committee on Forestry Extension
PAD	Project Appraisal Document
PRA	Participatory Rural Appraisal
PPAR	Project Performance Assessment Report
R&D	Research and Development
RAC	Regional Advisory Committee
RPO	Rural Producers' Organization
SAR	Staff Appraisal Report
T&V	Training and Visit System
VAP	Village Action Plan
WATSAL	Water Resource Structural Adjustment Loan

Preface

This is the Project Performance Assessment Report (PPAR) of two projects in Indonesia: the Second Agricultural Research Management Project and the Decentralized Agricultural Forestry and Extension Project.

The Second Agricultural Research Management Project (ARMP II) was approved in May 1995 for an IBRD Loan of US$63.0 million (Loan 38860). US$22.9 million was cancelled at the Borrower's request during the Asian Economic Crisis 1998-99. At project closure, 99 percent of the uncancelled portion of the Loan was disbursed. The project was closed in December 2002, twenty months behind schedule.

The Decentralized Agricultural and Forestry Extension Project (DAFEP) was approved in August 1999 for an IDA Credit of US$18.0 million equivalent (Credit 30040). At project closure, 92 percent of the Credit was disbursed. The project was closed in March 2005, three months behind schedule.

This report is based upon a review of the projects' appraisal reports, implementation completion reports (ICRs), legal documents, sector reports, and project files, as well as the findings of an IEG mission to Indonesia from May 7–22, 2006. The IEG mission spent one week in Jakarta meeting government officials, project directors, and staff involved with the implementation of ARMP II and DAFED in the Indonesian Agency for Agricultural Research and Development (IAARD), the central Assessment Institute for Agricultural Technology (AIAT) in Bogor, and the National Committee on Forestry Extension (NCFE). The IEG mission spent the second week visiting project sites in Yogyakarta and South Sulawesi provinces, which included meetings with senior government officials responsible for the implementation of ARMP II, with the Director and staff of the AIATs, and physically in the fields with farmer beneficiaries, extension and research staff, and others involved in the implementation of DAFED. The collaboration of all persons met is gratefully acknowledged.

The visit to Yogyakarta permitted the IEG mission to talk with the "rich" orchid growers, and the visit to South Sulawesi provided an "off-Java" site, an especially successful AIAT, and fish-farming activities for export. These sites were chosen in part to allow the IEG mission to conveniently visit both DAFEP villages and an AIAT supported by ARMP II. Farmers, formal extension workers and researchers were very open and pleased to talk about (and show the IEG mission) what had been achieved.

In addition to verifying the outcome, institutional development impact and sustainability ratings of the project in the context of the Bank's assistance to agriculture and rural development in Indonesia, the IEG mission focused on three key issues that had emerged from the ICRs. The first was the plausibility of the high benefit/cost ratios reported in the DAFEP project, the second was the extent to which AIATs were continuing to be adequately funded and appropriately focused, and the third was the effectiveness of the formal and informal extension systems. The findings of this assessment have also contributed to the background review of agriculture and rural development for IEG's current Country Assistance Evaluation of Indonesia.

Following standard IEG procedures, copies of the draft PPAR was sent to government officials and agencies for their review and comments. No Comments were received from the Government.

Summary

This is a Project Performance Assessment Report (PPAR) of two projects financed by the World Bank in the Republic of Indonesia: The Second Agricultural Research Management Project (ARMP II) and the Decentralized Agricultural and Forestry Extension Project (DAFEP).

The principal objectives of the Second Agricultural Research Management Project (ARMP II), approved in 1995, were to strengthen agricultural research and development in Indonesia's regions by establishing a network of regional Assessment Institutes for Agricultural Technology (AIATs), as well as some strengthening of commodity-specific research. The first national agricultural research system, headed by the Indonesian Agency for Agricultural Research and Development (IAARD), had been created in 1974 by amalgamating a disparate range of commodity-oriented research stations previously administered by the Directorates-General of Food Crops, Estate Crops, Forestry, Fisheries, Animal Husbandry and other agencies. By 1990 IAARD had expanded to about 2,400 employees (including 240 Ph.D.s and 650 M.Sc.s) and strong commodity and discipline-oriented research programs. Even so, research spending in Indonesia as a whole represented only 0.21 percent of agricultural GDP, which was well below that of comparable Asian countries such as India, Pakistan, and China (0.41 to 0.51 percent), and even further behind developed countries (2.0 percent). The AIATs established by the project are located in diverse agro-ecological zones, and are farmer-oriented. Additional AIATs have been established since the project closed, one for each of the 30 provinces. These are designed to produce and test technological packages for release to the agricultural extension system and to farmers.

The principal objectives of the Decentralized Agricultural and Forestry Extension Project (DAFEP), approved in 1999, were to enhance farmers' capacity to participate in extension activities and to strengthen the capacity of the district-level integrated agricultural and foresty extension system in order to improve farming practices and increase farmers' incomes. This was in effect (although not in name) a pilot project to introduce and demonstrate a decentralized, village and farmer-oriented extension service. The project design recognized that the diversity of farmers' needs precluded effective top-down extension. The country having achieved self-sufficiency in rice production in 1985, it was now evident that higher agricultural incomes would have to come from a variety of non-traditional crops attuned both to agro-ecological zones and to individual farm situations such as size, labor and capital availability, age and experience of the farmer. DAFEP was an innovative project with a portfolio of Farmer-Managed Activities (FMAs) including farmer field investigations, formation of farmer study groups and marketing groups, field and inter-village trips, farmer-requested training and the like. An advisory and support, but not leadership, role was reserved for extension field staff.

The overall outcome of ARMP II was **satisfactory**. Its objectives meshed directly with the Government's emerging policy of decentralization, the need to add (or at least reorient) a farming systems element to the IAARD's research portfolio, and to provide the research underpinnings for a regionalized, farmer-oriented extension service. A huge and necessary change has been made in the physical plant and psychology of IAARD. Both have

been re-directed outwards towards farmers. Ten AIATs were established and staffed and 421 people received long-term training, including 21 to the Ph.D. level and 341 for M.Sc. degrees. At the same time, 800 distinct studies were supported within the existing commodity and discipline-oriented research institutes, thus providing results for evaluation and demonstration by the AIATs.

The overall outcome of DAFEP was **moderately satisfactory**. Several stated objectives with respect to support of the extension service were only partially achieved. In spite of this, increases in farm income appear to have been achieved, which was the key impact objective. The objective of bringing about a paradigm shift from top-down to bottom-up extension was achieved on the small scale of this *de facto* pilot project. The project demonstrated the feasibility of a village and farmer-based extension service. A diverse spectrum of innovations was implemented with the aid of village-level grants. Ex post evaluation of a sample of their choices showed high benefit/cost ratios through this innovative approach to extension, which is now on its way to being adopted nationwide. However, the early closure of the project resulted in the cancellation of the intended impact assessment survey that could have provided more systematic evidence of project outcomes, and that might have justified a "satisfactory" rating.

Sustainability is rated **likely** for both projects**.** Both the AIATs and district-level integrated extension activities continued to be financed by the central and district governments, respectively, even before the follow-on project (Farmer Empowerment through Agricultural Technology and Information) was discussed and prepared.

Institutional Development Impact is rated **substantial** for both projects as well. The more positive assessment for DAFEP compared to that in the ICR rests on the Government having extended the FMA-based extension model from 20 to another 200 districts. A further 53 districts are planned to adopt the FMA-based extension model under the follow-on project that was approved by the Bank's Executive Board in February 2007.

Both Bank and Borrower performance are rated as **satisfactory** for ARMP II. Careful Bank and Borrower project preparation resulted in a very "operational" SAR that was coupled with regular and constructive supervision missions. Indonesian researchers achieved a paradigm shift from a disciplinary to a "whole farm" orientation. The Bank and Borrower successfully negotiated a downsizing of the project after the 1997 Asian financial crisis that was consistent with reduced resource availability, while minimizing adverse project effects.

Both Bank and Borrower performance are rated as **unsatisfactory** for DAFEP**.** Project preparation was "mixed" with an ambiguous attitude toward the existing public extension system. Bank supervision missions appear not to have recognized the high rates of return being obtained in some farmer-managed activities, and the Borrower's sudden cancellation of the project minimized the opportunity to learn lessons. The latter was particularly harmful in what was a *de facto* pilot project.

These two projects have demonstrated the potential for high returns to innovation in agriculture, which has the potential to become one of the more dynamic sectors within the economy, with much of this dynamism based on production for export. A strong program of

sector work would appear to be called for, covering recent innovations within the sector, export market potential and services, and most importantly the future of the research and extension system. Under the present circumstances, the long-term vision contained in the DAFEP appraisal document of a minimalist public sector extension service — which would only assist the poorest farmers who could not obtain extension services from any other source — seems questionable. That changes are needed in how extension is delivered is certainly right, but the analysis of the needed changes should be from the widest possible perspective. This will require substantial and serious sector work on the role of public and private extension. Private firms cannot be relied on to extend technologies that do not contribute to their bottom line, and poor farmers cannot be relied on to pay for advice, no matter how high the (social) benefit.

Several lessons of both a substantive and procedural nature have emerged from this review:

- **Extension projects with grant-funded Farmer-Managed Activities should provide for *early recognition* of highly profitable farm-level innovations and for dissemination to other farmers.** Such projects should facilitate the timely identification and dissemination of both farmer-managed and research station innovations that are profitable.

- **Research and extension projects should directly address rather than bypass the problem of an ineffective public sector extension service**. Project preparation should include sector work that specifically addresses what is wrong with the existing system and how it can be improved.

- **If a project is *de facto* a pilot, then designate it a pilot project.** The expected outcomes for the DAFEP project would not have been as high if it had been designated a pilot. Monitoring and evaluation would have had a larger profile, and alternative approaches to the financing of FMAs might have been used in different districts.

- **Project appraisal documents should describe not only *what* activities are proposed, but also *why* they are proposed**. The problems that the components of both projects were expected to resolve were hardly addressed in either appraisal document. What was particularly missing was a discussion of farmers' needs.

- **Projects should provide early intensive training to local project staff on the application of Bank procurement guidelines in order to prevent procurement deficiencies.** The use of two procurement systems led to major delays in the financing of the Farmer-Managed Activities in the DAFEP project.

Vinod Thomas
Director-General
Evaluation

1. Agricultural Research and Extension in Indonesia

1.1 Agriculture is a key, but low productivity sector of the Indonesian economy — providing 45 percent of Indonesia's jobs, but only 17 percent of GDP, The huge increases in rice yields that characterized the Green Revolution are now twenty years in the past. Future productivity growth is more likely to come from labor leaving agriculture and from diversifying crops and products rather than producing traditional crops more efficiently. Between 1993 and 2003, the proportion of farm households producing horticultural crops almost doubled to 38 percent.

1.2 This poses major issues for the future of the formal research and extension system. To begin with, farmers are now seeking information not only on how to grow their grain or horticultural crops more efficiently, but also on what crops to grow in the first place. In addition, the very diversity of possible horticultural crops means that research on any one crop is likely to be relatively shallow (if it exists at all) compared to grain crops, particularly rice. Together, these necessitate a whole change in the approach to delivering extension.

1.3 A top-down research and extension system such as the Training and Visit system may be able to answer the "how" question reasonably well since an innovation that raises yields without significantly raising costs generally increases farmers' profits. The Green Revolution was basically implemented in such a "top down" fashion. High-yielding varieties of rice and wheat that had been developed at internationally funded CGIAR centers were transferred to and further developed by national research stations for regional evaluation, and then the best varieties were released and introduced to farmers with the support of the Indonesian extension service. This can be described as the *extension as teaching* paradigm.

1.4 A top-down research and extension system is less able to answer the "what" question. As the flow of yield-increasing varieties from the CGIAR and national research stations has declined, and as consumer demand for agricultural products has diversified away from staple food crops, continued agricultural growth now relies more on *improved management of the farm as a whole*, including an appropriate mixture of crops and integrated with livestock production. In this situation — traditionally known as the "whole farm" and more recently as the "farming systems" approach — the formal extension service needs to switch its focus to helping the farmer to learn, since every farm differs, and since the farmer knows more about his farm than an extension field worker can ever know. This can be described as the *extension as learning* paradigm, which includes not only helping farmers to learn but also learning *from* farmers.

1.5 Under the *extension as teaching* paradigm, extension field workers relied on research stations or the central administration of the extension service to provide the lessons that they should teach to farmers. Under the *extension as learning* paradigm, extension field workers are expected to learn both from the research system and from their interaction with farmers. In addition, farmers' needs are expected to help determine the work program of the extension worker, and the expressed needs of farmers and extension workers are expected to help set priorities within the research system.

1.6 Thus, the *extension as learning* paradigm is also expected to change the conduct of the research system as well as the extension system. Like the extension system, the research system needs to move closer to the farmer, both physically in terms of establishing regional research stations, and psychologically in terms of the "whole farm" or "farming systems" approach to agricultural research.

1.7 The formulation of an extension strategy under the *extension as learning* paradigm also needs to address the quality, terms of employment and training of field staff. Should extension be their sole occupation, or should they be specially appointed (and paid) farmers? Should they have more academic education, or real-life experience than the farmers with whom they work? Should they design their own work programs? To what extent should they have a budget to travel and organize events? How should they relate to other extension workers? To what extent should they be able to call on subject matter specialists? To what extent should there be an institutionalized training system, and an in-service training program, etc.?

1.8 There is also a potential role for the commercial private sector in research and extension in buying products and in selling seeds, fertilizers, equipment, and other inputs. The extent of the private sector role vis-à-vis that of the public sector is determined largely by the ability of the private sector to appropriate or capture the extra value which they provide. There is less scope for the private sector in improving the yields of open and self-pollinated varieties, where the farmer can save his own seed from season to season without experiencing a decline in yields. There is more scope for the private sector in the case of hybrid seeds — where farmers have to purchase a new supply of seeds each season. The profits to be realized from annual seed sales provide the motivation for private companies to develop higher yielding varieties and to make sure that farmers know of the availability of these varieties.

1.9 The objectives and the design of the two projects assessed in this PPAR were based on the research and *extension as learning* paradigm. Both ARMP II and DAFEP were intended to radically change the orientation of the research and extension systems, respectively. ARMP II was intended to decentralize agricultural research by establishing a network of regional Assessment Institutes for Agricultural Technology (AIATs).[1] DAFEP was intended to empower farmers to decide what and how they would learn by grant-financing "farmer-managed activities" (FMAs).

1. AIATs have recently been renamed BPTPs. The old terminology is used in this report, to maintain consistency with the Staff Appraisal Report and the Implementation Completion Report.

2. Project Objectives, Components, and Design

Project Objectives and Components

2.1 The main objective of the ARMP II project was "to strengthen regional agricultural R&D, based on local human and natural resources, by collaboratively developing and transferring location-specific technology which is market-oriented and client-driven to support agribusiness and agro-industry development. This would be achieved through the establishment of a network of regional AIATs, improvement of regional research management, expansion of research in priority areas, and strengthened linkages to local, national, and international institutions, thereby facilitating the delivery of research results to end-users."[2]

2.2 The objective of the DAFEP project was "to assist the Borrower in enhancing farmers' capacity to participate in extension activities and in strengthening the capacity of the district-level integrated agricultural and forestry extension system which would promote economically feasible, environmentally sustainable, and socially acceptable farming practices and increased farmers' income."[3]

2.3 Thus both projects aimed to strengthen the capacity of agricultural research and extension systems to deliver appropriate location-specific technologies to farmers in order to improve their productivity. ARMP II aimed to strengthen regional research and development and facilitate the delivery of research results to farmers by establishing a network of regional AIATs, while DAFEP aimed to strengthen the capacity of the district-level agricultural and forestry extension system and to enhance the capacity of farmers to participate in extension activities.

2.4 ARMP II had four components:

(a) **Regionalization of Agricultural R&D** (US$53.8 million at appraisal, $25.5 million actual): Supporting the establishment and operation of eight AIATs in 12 provinces in a new regional network of 17 AIATs that were expected to develop strong linkages to all segments of the agricultural community.[4]

(b) **Institutionalization of R&D Management at the Regional Level** (US$17.8 million at appraisal, $5.6 million actual): Introducing administrative and management

2. Staff Appraisal Report, page 9.

3. Project Appraisal Document, page 2.

4. The AIAT network is very much a "work in progress." Originally (in the SAR), the Bank was to help support 8 AIATs in a regional system of 17 AIATs. Later two additional AIATs were transferred to ARMP II from another Bank project. Then the concept of regional AIATs was replaced by the more political objective of one for each of the 26 provinces. Then the number of provinces to receive AIATs was increased to 30, resulting in 30 AIATs at project closing (10 supported by the Bank loan), 12 supported by the Asian Development Bank, and the balance by the central government.

procedures in the AIATs to incorporate bottom-up planning, to develop regional R&D master plans, and to improve priority setting.

(c) **Support to Priority Commodity and Discipline-Oriented Research** (US$22.2 million at appraisal, $19.3 million actual): Supporting priority commodity and discipline-oriented research that would be carried out by commodity research institutes in support of the regional R&D program.

(d) **Strengthening R&D Collaboration** (US$8.0 million at appraisal, $1.9 million actual): Improving the collaboration of Indonesian scientists with Asia-Pacific and international research centers, and strengthening collaboration with local agricultural stakeholders, farmers, extension staffs, agro-business interests and universities.

2.5 DAFEP had three components:

(a) **Enhancing Farmers' Capacity to Participate in and Lead Extension Activities** (US$6.19 million at appraisal, $7.4 million actual): Supporting the revitalization of Rural Producers Organizations (RPOs), providing grants for farmer-managed activities (FMAs), and promoting other participatory activities.

(b) **Strengthening the District Extension System** (US$8.2 million at appraisal, $7.8 million actual): Introducing institutional and managerial reforms at the district level, and building the capacity of extension staff in participating districts. Integrating agricultural extension with forestry and estate crop extension — estate crop extension having recently been moved to the Ministry of Forests.

(c) **Supporting Project Management and the Improvement of Central Extension Policy** (US$3.6 million at appraisal, $4.6 million actual): Conducting special studies to improve extension policy, in-service training, and providing technical assistance.

Project Design and Implementation

2.6 ARMP II was designed to extend the reach of the national agricultural research system by establishing regional applied research stations, known as Assessment Institutes for Agricultural Technology (AIATs). This was an extension, down to the local level, of the global agricultural research system which supports a few CGIAR (Consultative Group on International Agricultural Research) centers that conduct fundamental genetic research and provide improved genetic materials and training[5] for national agricultural research systems, which in ecologically diverse countries (such as Indonesia) then feed into regional research groups attuned to their local environment and dominant farming systems. The AIATs were designed to fulfill this latter function and demonstrate profitable technological packages as a basis for extension to farmers.

5. Over 500 Indonesian rice researchers have been trained in IRRI (the CGIAR funded International Rice Research Institute in the Philippines) giving Indonesia a very strong cadre of rice researchers. Since 1980 Indonesia has had the highest rice yields in tropical Asia.

2.7 In spite of the apparent simplicity of its components, this was in fact an extremely complex project. ARMP II involved not only setting up new "technology assessment institutes" in different provinces (and hence different "administrative cultures"), but also undertaking activities to support elements of virtually all the ongoing research of IAARD (the Indonesian Agency for Agricultural Research and Development). Moreover, it was crucial that the AIATs be outward-looking — seeking input and providing feedback from as wide a spectrum of agricultural stakeholders as possible. This was to be facilitated by the appointment of a Regional Advisory Committee (RAC) for each AIAT.

2.8 DAFEP was designed (a) to devolve decision making to the field and (b) to integrate and reduce by attrition the agricultural and forestry extension efforts in the field. Together, these objectives involved a major change in the whole culture of extension,[6] and shifted the role of the central Ministry of Agriculture from controlling the extension program to monitoring it: "Policy at the center, implementation at the periphery." Just as the AIATs were the key innovation for ARMP II, Farmer-Managed Activities (FMAs) were the key innovation for DAFEP. The project provided a total of Rp 75 million to each of about 20 participating villages for Farmer-Managed Activities (Rp 30 million in years 1 and 2, and Rp 15 million in year 3).[7] Thus, there was no competition between villages for FMA funds, but there was competition *within* villages. As finally implemented, farmers or groups of farmers who wished an activity to be supported from an FMA grant[8] had to register themselves within a village. Then a village action plan (VAP) would be formulated by interested villagers with the assistance of the field extension worker, which would in turn be forwarded to the district BPP (sub-district extension center) for vetting and approval.

2.9 These farmer-based experiments and technology assessments could be based on or adapted from husbandries demonstrated at AIATs or any other part of the formal agricultural system. But they did not have to be. FMAs could be the idea of any farmer (or extension representative or agribusiness salesman). The activities could even involve a crop never previously grown in the region (and not grown by the regional AIAT). Thus the potential existed for FMAs to experiment and innovate beyond the parameters of the technologies provided by the national and regional research/extension system. Ideally, there would also be active feedback to the AIATs (and hence to the national system) in cases where farmers found particular new technologies attractive.

2.10 From one perspective, FMAs could be seen as the logical completion of the chain from the CGIAR to the National Research System to the regional AIATs and to the farmer's field, with technology generated at each stage being adapted to local conditions. This perspective implies that knowledge flows primarily from the researcher to the extension

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6. The IEG mission was told by an extension worker that prior to DAFEP there was one recommendation for fertilization of rice, "150 Kg/ha" Indonesia wide.

7. This represented $3,000 to $3,500 per village during the first two years, and $1,500 to $1,750 in the third year.

8. A wide range of activities could be supported as FMAs: "(a) village assessments, (b) farmer group and village planning, (c) farmers' field investigations, (d) village inter-group meetings and visits, (e) farmer media materials preparation and dissemination, (f) farmer technical and business meetings, (g) farmer-to-farmer training and technology dissemination". (PAD, page 53)

representative to the farmer. But FMAs also embodied another perspective that information flows from farmers to extension representatives and from them to other farmers as well as "upwards" to researchers. From this point of view, "a good extension officer listens, as well as talks."

2.11 DAFEP was *de facto*, but not explicitly a pilot project which only covered 20 pilot districts. The idea of empowering village committees to oversee the allocation and implementation of block grants was similar to the Bank-supported Kecamatan Development Program in Indonesia[9] and the idea of empowering farmers played a key role in the Water Resources Structural Adjustment Project (WATSAL), in which the control of field canals was transferred to water users' associations.[10] The follow-on Farmers Empowerment Through Agricultural Technology and Information project (FEATI) intends to expand the coverage of the DAFEP extension strategy from 20 districts to 53 districts in 16 provinces covering 3,000 villages.[11]

2.12 In spite of an intended reduction in extension field staff associated with the piloting of FMAs, the second and third components of DAFED provided for strengthening and integrating district and national level extension. It thus appears that a shrinking role for public sector extension at the field level was felt to be compatible with an expansion of senior extension staff. These extra staff were to be used primarily to strengthen policy making and the monitoring of the field activities.

2.13 The two projects were intended to support research, ***informal*** extension and their linkages: there is little evidence in the project appraisal documents of an expected intermediation function for the formal extension service field staff. For instance, the objective of ARMP II is curiously worded: "to strengthen regional agricultural R&D … by collaboratively developing and transferring location-specific technology which is market-oriented and client-driven to support agro-business and agro-industry." This statement lacks any reference to either farmers or extension, unless these are understood to be included in the undefined term "clients". A simple reading of this statement would suggest that agro-business and agro-industry were regarded as the main "clients" and that the project was intended to bypass the existing formal extension service and field staff.[12]

2.14 Thus, in assessing the outcomes of ARMP II and DAFEP, it is important to distinguish between the *formal extension system* comprising both senior staff and field staff

9. Started in 1998 and based on previous Bank-supported community-based rural infrastructure projects, the Kecamatan Development Program is now the largest community development program funded by the Bank in the developing world**.** However, project files and staff interviews suggest that the WATSAL project played a larger role than Kecamatan in influencing the project's design.

10. PAD, page 5. The WATSAL project was approved in 1999 and closed in 2004.

11. This follow-on project was approved by the Bank's Board on February 13, 2007. It did not include a separate forestry component.

12. Annex 5 of the Final Supervision and ICR Mission explicitly says that extension was *not* used by the AIATs to spread awareness of approved technologies. "ARMP II does not have a component focusing on extension (as opposed to dissemination). The spread of the technology is likely to be largely by word of mouth and the initial efforts of AIAT staff in assessing the technologies on selected farms."

responsible for direct communication with farmers, and *informal extension* that informs the world about agricultural and forestry technologies, including private sector "sales" and "advertising". It is also important to distinguish between *public extension* — positively regarded throughout this PPAR — and the *extension field staff,* which the appraisal documents generally regarded as out of their depth in the post-Green Revolution extension environment.

2.15 For both projects, the poor quality of the agricultural field staff was felt to pose an intractable problem. While their training was adequate for a top-down approach, the Ministry of Agriculture felt that many field staff had neither the humility, flexibility nor knowledge to operate effectively under the new paradigm.[13] The Ministry felt that the agricultural field staff were not well equipped for "farming in a post-Green Revolution world," to the point that the DAFEP appraisal document explicitly states that "the overall number of extension staff could be reduced by attrition. …. Having fewer extension workers would improve the conditions for the remaining staff."[14]

2.16 So several approaches were incorporated in the design of the two projects to deal with the perceived weaknesses of the agricultural field staff. The number of field staff was expected to be reduced by "attrition." Research would be brought physically closer to the farmer with the creation of the AIATs. The AIATs were charged with a modest "dissemination" function and were to report directly on the number of farmers adapting AIAT-approved technologies. FMAs were designed to allow (but not require) villages to bypass their extension field officer. Public sector extension was to be decentralized to the district level and removed from central control. District (and national) level support services to field extension staff were to be strengthened, and training in the FMA approach was to be provided to 5,000 extension workers. (In fact training was provided to almost 4,000 extension workers, this target having been revised in June 2002.)

2.17 In short, while skeptical as to the suitability of the staff in place to implement the new paradigm, DAFEP did the best with what it had. There was a clear vision in the appraisal documents of a minimalist public sector extension service that was not expected to be used by progressive farmers. Public extension was expected to assist only the poorest farmers who could not obtain extension services from any other source.[15]

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13. The Forestry Department expressed no such doubts about the quality of its field staff, who have long been trained in agro-forestry and social-forestry. It was proud of its field staff, along with their initial and in-service training.

14. PAD, page 7.

15. *"Public extension service being withdrawn where it is not needed,* or where the private sector and other providers could fill in. … the ultimate goal … would be for a bare minimum extension service for a portion of the poor section of farmers, whereas those well-off would have access – like all farmers – to mass media and to extension for a fee." (italics added) PAD, page 6.

3. Project Ratings: Overall Outcome

3.1 The overall outcome of ARMP II was **satisfactory** (Table 1). Its objectives meshed directly with the Government's emerging policy of decentralization, the need to add (or at least reorient) a "farming systems" or "whole farm" element to the IAARD's research portfolio, and to provide the research underpinnings for a regionalized, farmer-oriented extension service. A huge and necessary change has been made in the physical plant and psychology of IAARD. Both have been re-directed outwards towards farmers. Ten AIATs were established and staffed, and 421 people received long-term training, including 21 to the Ph.D. level and 341 for M.Sc. degrees. At the same time 800 distinct studies were supported within the existing commodity and discipline-oriented research institutes, thus providing results for evaluation and demonstration by the AIATs.

Table 1. Development Objectives and Outcome of ARMP II

Development Objectives	Relevance	Efficacy	Efficiency
(1) To strengthen regional agricultural R&D, based on local human and natural resources, by collaboratively developing and transferring location-specific technology which is market-oriented and client-driven to support agribusiness and agro-industry development.	Substantial	Substantial	Substantial
(2) To establish a network of regional AIATs, improvement of regional research management, expansion of research in priority areas, and strengthened linkages to local, national, and international institutions, thereby facilitating the delivery of research results to end-users.	Substantial	Substantial	Substantial
Overall Project	Substantial	Substantial	Substantial
Overall Project Outcome		**Satisfactory**	

3.2 The overall outcome of DAFEP was **moderately satisfactory** (Table 2). Several stated objectives relating to support of the extension service were only partially achieved. Despite this, farmers interviewed by the IEG mission and case studies reported in the ICR suggest that some increases in farm income were achieved, which was the key impact objective. The objective of bringing about a paradigm shift from top-down to bottom-up extension was achieved on the small scale of this *de facto* pilot project. The project demonstrated the feasibility of a village and farmer-based extension service. A diverse spectrum of innovations was implemented with the aid of village-level grants. Ex post evaluation of a sample of their choices showed high benefit/cost ratios through this innovative approach to extension, which is now on its way to being adopted nationwide. However, the early closure of the project resulted in the cancellation of the intended impact assessment that could have provided systematic evidence of project outcomes, and that might have justified a "satisfactory" rating.[16]

16. The project's original closing date was March 31, 2004. The Government requested an extension to December 31, 2004, and later to December 31, 2005. However, a new Minister of Agriculture, elected in November 2004, decided to close the project on March 31, 2005. IEG understands that this impact assessment of the DAFEP project has now been completed (in 2007), but has not yet received a copy of the final report.

Table 2. Development Objectives and Outcome of DAFEP

Development Objectives	Relevance	Efficacy	Efficiency
(1) To enhance farmers' capacity to participate in extension activities	Substantial	Substantial	Substantial
(2) To strengthen **and integrate** the capacity of the district-level agricultural and forestry extension system	Modest	Modest	Modest
(3) To promote economically feasible, environmentally sustainable, and socially acceptable farming practices and increase farmers' income	Modest	Substantial	Substantial
Overall Project	Modest	Substantial	Substantial
Overall Project Outcome	**Moderately Satisfactory**		

Relevance: Were the Projects' Objectives and Design Appropriate?

SECOND AGRICULTURAL RESEARCH MANAGEMENT PROJECT

3.3 The relevance of the objectives and the design of the project was **substantial**. The objectives were consistent with the 1995 Country Assistance Strategy (CAS) which emphasized inter-regional equity and enhanced competitiveness, greater decentralization of responsibility, and improved delivery of public services, especially to the poor. The objectives were also consistent with the most recent 2003 CAS, which specifically identifies the importance of agricultural research and extension under the strategy of *Making Service Delivery Responsive to the Needs of the Poor.* There remains the need to make the agricultural research system more reflective of the climatic and ecological diversity of Indonesia, and to increase expenditures on agricultural research which, at 0.21 percent of agricultural GDP, were well below those of comparable Asian countries such as India, Pakistan, and China (0.41 to 0.51 percent), and even further behind developed countries (2.0 percent).

3.4 However, the stated objective of the project — "to strengthen regional agricultural R&D … by collaboratively developing and transferring location-specific technology, which is market-oriented and client driven to support agribusiness and agro-industry development" — raises questions about the expected orientation of the expanded public sector research system and the way in which its research results would be transmitted to farmers. While the word "client" presumably refers to farmers, the implicit reliance on the private sector to carry research messages to farmers undermines to some extent the rationale for publicly funded research. As discussed earlier (in paragraph 1.8), the private sector can only be expected to provide research and extension services to the extent that it can profitably appropriate or capture the extra value that it produces. But much agricultural research is a "public good," the benefits of which cannot be appropriated by any one person or organization. Thus, there remains a need for public provision (or at least public funding) of the dissemination and extension of the results of publicly funded research, even after the private sector has been encouraged to invest in those areas in which it can realize a profit. The project objectives seem to have overlooked this need.

3.5 The establishment of new technology assessment institutes in different provinces and the increasing focus on the "whole farm" or "farming systems" approach to research were clearly timely, given the increasing diversity of Indonesian agriculture. But the design of the project reflected the view that the agricultural extension field staff were not up to the job, nor capable of being brought up to the job of giving "whole farm" advice. *The project viewed them as part of the problem, not the solution.* This issue is not discussed explicitly in the appraisal document, nor supported by significant sector work. Both projects were designed to work around the problem of an ineffective extension service, rather than reinvigorate it. This left Indonesia with the dead-weight loss of paying for an ineffective public extension service. Future projects should be based on sector work that analyses the problems of the extension service, and what can be done about it. Again, relying mainly on "private extension" that is based on the profit motive is likely to exacerbate rather than solve the problem.

DECENTRALIZED AGRICULTURAL AND FORESTRY EXTENSION PROJECT

3.6 The relevance of the first objective "to enhance farmer capacity to participate in extension" was **substantial**. This objective was consistent with both the 1997 and 2003 CASs. Providing village-administered grants for Farmer-Managed Activities and otherwise enhancing farmers' capacity to participate in extension activities in order to improve farming practices and increase farmers' income is particularly relevant in the presence of a failing or failed extension service.

3.7 The relevance of the second objective of "strengthening and integrating the district-level extension service" was **modest** due to weaknesses in the design. The project design was ambiguous with respect to the role of the formal extension service. On the one hand the project aimed to allow both the number of extension field workers and the range of farmers served to decline, but on the other hand it sought to improve support services at the district and national levels. FMAs provided a channel for farmers to bypass the village field worker, if he was ineffective. Clearly, the *extension as learning* paradigm required a wrenching shift in the mind-set of extension field workers, from repeating extension messages developed in Jakarta to being set loose to develop one's own extension messages. However, there is no discussion or data in the appraisal document on the proportion of field workers likely to be effective under the new decentralized system, how effectiveness could be increased, and what to do about ineffective field workers. Nonetheless, the project was to upgrade central and district-level policy staff and provide training to some 12,700 field assistants in extension support and FMAs. The appraisal document was not clear whether these were the same or different field assistants who were to be run down by attrition, and whose services were expected to be used by only those with no other access to information**.**

3.8 The relevance of the third objective of "promoting economically feasible, environmentally sustainable, and socially acceptable farming practices and increasing farmers' income" was also **modest**. There is no reason *a priori* to expect economically feasible, environmentally sustainable and socially acceptable practices to be correlated with increased farmers' incomes. And there was also no provision in the project design to exclude economically, environmentally and socially damaging activities. Indeed empowering farmers might well liberate them to pursue profitable, but environmentally damaging practices (such as over-pumping groundwater from aquifers).

3.9 While the appraisal documents for both projects were clear as to what the projects were intended to do, the problems that both projects were expected to resolve were hardly addressed. Perhaps these were felt to be so widely known that it was not necessary to address them? The projects supported the Government's policy of decentralization, increased local autonomy, increased support for the private sector, and a shift from providing physical infrastructure to support services such as research and extension. However, what was missing was a discussion of farmers' needs. Were farmers held back by lack of knowledge, insecure title, lack of capital, lack of social organization, lack of physical infrastructure (roads, communications), or lack of ambition? What were the problems that decentralization and an increased role for the private sector were expected to address? Both appraisal documents would have benefited from an explicit discussion of these issues, and a consideration of the retraining possibilities for existing staff and the incentive structure for field staff. Perhaps direct early retirement bonuses should have been considered?

3.10 Taking all these factors into account, the overall relevance of the objectives and design of DAFEP was **modest**.

Efficacy: Did the Projects Achieve their Stated Objectives?

SECOND AGRICULTURAL RESEARCH MANAGEMENT PROJECT

3.11 Efficacy was **substantial**. The regional Assessment Institutes for Agricultural Technology (AIATs) were established and staffed almost exactly as projected. And the AIATs which the IEG mission visited were adequately funded and the staffs were was clearly applications-oriented. By 2002, each AIAT had developed on average nineteen location-specific research/assessments. Illustrative examples of these assessments include seed potatoes in West Java, North Sumatra and West Sumatra, mangosteen seedlings in Riau, virus-free citrus in Central Java, and virus-free banana seedlings in North Sumatra. IAARD also established a privately managed Intellectual Property and Technology Commercialization Office in 1999. While weaknesses in MIS and M&E are acknowledged, management reforms, training, and a study of incentives are other successful project results. Over 800 studies were funded in IAARD's traditional areas of commodity and discipline-oriented research.

3.12 In field visits, the AIAT staff were on good terms with villagers and carried out trials in farmers' fields, thus providing an element of demonstration along with their research. The IEG mission observed this was a two-way relationship, in that FMA farmers were confident enough to visit AIAT stations in person. In South Sulawesi, the AIAT demonstrated direct seeding of rice, thus eliminating the labor-intensive transplanting process. Rough calculations suggest that the benefits from this direct planting innovation, already adopted by 60 percent of farmers in the province, might be able to justify the entire project. To the IEG mission, relations between the AIATs and field extension staff seemed cordial, but not close.

DECENTRALIZED AGRICULTURAL AND FORESTRY EXTENSION PROJECT

3.13 Efficacy was **substantial.** The key project innovation was village-administered FMA grants to empower farmers to select what and from whom they would learn. And the major justification for this rating is the positive outcomes associated with the FMA component in

terms of numbers of farmers benefiting from the project, net benefits received and increases in income experienced (Table 3). For those activities only requiring operating expenses (i.e., working capital) the ratio of net benefits to incremental operating costs ranged from 1.3 to 15.7, and for those activities requiring both capital investment and operating expenses, the ratio of net benefits to incremental costs was 1.4 to 33.1. The IEG mission interviewed orchid growers, vegetable growers, fish farmers, and rice growers who had managed to irrigate a third crop, and found substantial evidence of benefits in line with these benefit/cost ratios. IEG mission observations were also consistent with the increases in income reported in the ICR of 5 percent to 80 percent in a sample of selected villages over the life of the project.

3.14 The early closure of the project in March 2005 in relation to the previously agreed-upon extension to December 31, 2005, unfortunately aborted the intended impact assessment in relation to the baseline survey that had been completed at the start of the project.[17] In spite of this, the FAO/CP and Bank team which prepared the ICR undertook this quantitative assessment of the project's impacts based on field visit interviews and focus group discussions. This was a substantial effort to model (or "budget") representative FMAs and to compensate for weak project M&E. The ICR mission "covered more than 25 villages in six participating districts from four provinces to interact with project beneficiaries. In addition ex post valuation of selected FMA activities covering 221 respondents in 25 villages (3 districts) was also carried out in 2005 that provided data for the analysis of financial benefits. Focus group discussions with FMA beneficiaries helped generate the data for the impact of 16 FMA-based interventions."

3.15 From the perspective of the IEG mission, the DAFEP represented an interesting variation on Participatory Rural Appraisal (PRA) in that the FMA grant gave the village a concrete sum of money to be allocated. In the absence of grant funding, it would have been more difficult to attract interest in a village planning activity. A good plan would be of little more use than a bad plan, or no plan at all, if the plan could not be financed. Once the village agreed on a plan, the FMA grant meant that the village training and information priorities could be funded, at least up to the limit of the grant. Having real money to allocate animated the villages in a way that would not have occurred in the absence of the grant. Moreover, "empowered" by this seed money, villagers have discovered how cheap it is to gather information, and the dynamic unleashed by the initial grant continues even in its absence. Villagers interviewed by the IEG mission were insistent that FMA grants have been used only for information gathering, and the cost of meetings, and not to subsidize on farm demonstrations.

3.16 The project was less successful with the subsidiary objective of strengthening the capacity of the district-level extension system. Areas where outcome-type objectives were not fully achieved included the district extension committees. Intended to have representatives from all stakeholders (agri-business, elected representatives, NGOs, FMAs and officials), these were implemented, but often with weak non-government participation. Mass-media extension was also weak. However, "mass-media extension" is more associated with the former top-down *extension as teaching* paradigm, so that this "failure" may have

17. IEG understands that this impact assessment has now been completed (in 2007), but IEG has not yet received a copy of the final report.

Table 3. Financial Analysis of Sample FMA Interventions in DAFEP villages

Name of the activity	Benefits provided under FMA	Farmers benefited as percent of village farmers	Training budget for activity as percent of FMA budget	Net benefit to operating cost ratio	Net benefit to annualized investment ratio /1
Cat fish raising	Technology transfer; Farmer trainings for nursery raising and cat fish raising	17	3.5	0.73	2.5
Gurmi fish raising	Technology transfer; Apprenticeship; Potential assessment; Business meeting, and tour	12	24	2.1	8.6
Duck raising	Technology transfer; Study tour; Networking for duck raising & golden snail pest as feed	16	7	2.9	4.2
Orchid cultivation	Technology transfer; Apprenticeship; Tour; Comparative study; Field school meeting	3.4	28.5	1.0	7.7
Cultivation of bittergourd	Field school and technology transfer	27	4.7	3.0	7.5
Coconut jelly processing	Technology transfer; Apprenticeship and Study tour	0.4	6.4	1.3	12.5
Citrus cultivation	Technology transfer; and training organized in collaboration with pest management school	31	3.1	6.8	33.1
Paddy thrashers	Apprenticeship program for technology transfer to make indigenous wooden thrasher	9.2	4.1	15.0	1.4
Partnership building	External expertise provided training on partnership activities	100	3.1	NA	NA
Cattle fattening	Training for technology transfer-faster growth and weight gain-enabling two cycles in 2 years	27	4.7	2.2	NA
Improved paddy technology	Rainfed paddy field school	8	3.1	2.2	NA
Bamboo handcraft for youth	Demonstration and supervision by invited artisan	15	NA	15.7	NA
Improved cattle by breeding/ ration formulation	Technology transfer and training	100	NA	2.8	1.9
Local chicken	Technology transfer for better rearing - increased stocking and production	More than 50	4	9.0	9.0
Processing of spices for value addition	Technology transfer for spices processing in 2002 and field meeting for spice crops cultivation in 2003	Less than 1	14.5	2.1	NA
Rambutan selection, budding and production	Technology transfer and training	75	13	NA	NA

1/ Annualized investment cost is estimated based on 10 percent interest rate and 3 to 5 years of repayment period wherever appropriate. NA: Not available/applicable.

Source: ICR, Annex 3 on “Economic Costs and Benefits,” pages 34-35.

been a “blessing in disguise.” Certainly both projects were successful in bringing about a major and desirable paradigm shift as to how the public sector should support farmers under the *extension as learning* paradigm.

Efficiency

SECOND AGRICULTURAL RESEARCH MANAGEMENT PROJECT

3.17 Efficiency was **substantial**. The ICR calculated a project ERR of 14.5 percent. This PPAR finds the assumptions used to calculate this ERR to be inherently plausible. First, the analysis rested on “case studies” of 6 out of 41 identified technologies. The estimated financial rates of return for individual farmers who adopted each of the six technologies ranged from 11.5 to 89.0 percent and averaged 20 percent.[18] Then the project ERR was based on (a) the number of new technologies introduced, (b) the number of adopting farmers, and (c) the number of years before the technology would have been adopted in the absence of the project, project costs being given. Based on 40 new technologies a year and 2,466 adopting farmers per technology, the estimated project ERR was 14.5 percent. This project ERR includes all ARMP II project expenses in the calculation, but no others. Given a project design which had no explicit role for public extension, and in which the role of public extension in disseminating new technologies was modest at best, this is probably appropriate. It could also be argued that public extension was a “fixed cost”.

DECENTRALIZED AGRICULTURAL AND FORESTRY EXTENSION PROJECT

3.18 Efficiency was **substantial**. As shown in Table 3 above, the ICR reported net benefit ratios of 1.4 to 33.1. Excluding citrus, the range of net benefit ratios is a more reasonable, but still an impressive 1.4 to 12.5. These calculations assume a 10 percent interest rate and 3 to 5 year repayment period. The discussions which the IEG mission had with farmers confirmed attractive returns in a cost-conscious framework. But these estimated returns are so high, that they should be regarded with caution in the absence of an impact study.

3.19 That the early closing of the project aborted the planned impact study was real loss. This was particularly unfortunate since the project had completed a rigorous baseline study at the beginning. Thought should be given to how such studies can be protected in the event of early closing. Government officials agree that many potential lessons will not be learned in the absence of this impact study.

3.20 Numerical estimates of project outputs suggest that some targets were exceeded while other fell short. For instance, the offices of 16 District Centers for Information and Extension (BIPP) were operational versus 20 originally projected, and 436 extension managers were trained versus 240 projected. The actual project cost was 16 percent less than projected. The lower project cost and good returns to farmers also indicates a substantial efficiency.

3.21 In terms of cost-effectiveness, it is possible that a triage approach to existing staff — making some effort to separate them into those given early retirement and those to be retrained — would have been less costly and identified those best able to benefit from training. But the

18. ICR, page 23, and Annex 5, Final Supervision and ICR Mission, November 04-22, 2002.

political feasibility of such an approach and its likely effect on morale (positive or negative) are beyond the scope of this PPAR. Apart from this modest implementation alternative, it is hard to envisage one that could have been more cost-effective.

3.22 In discussing the efficiency of the DAFEP project, the ICR makes the curious statement that "no financial rates of return for the project will be estimated as it is likely there will be no financial payments to the Government as a result of project activities,"[19] because small farmers (agricultural incomes under Rp 15 million) are tax-exempt. This is an unusual use of the term "financial rate of return" since the term usually refers to the private profitability of project components that are expected to be implemented by the private sector, such as the financial rates of return estimated for farmers adopting new technologies introduced by the ARMP II project. In the absence of direct farmer taxation, increased economic activity should at some point increase tax revenues from some parts of the economy.

4. Institutional Development Impact and Sustainability

Institutional Development Impact

SECOND AGRICULTURAL RESEARCH MANAGEMENT PROJECT

4.1 The establishment of a network of AIATs that is changing the way in which agricultural research is being conducted in Indonesia to a *research as learning* paradigm represents **substantial** institutional development. Staffing and staff training for the AIATs have also represented a substantial human resource investment for Indonesia. At the same time the project has supported the core commodity and discipline research stations, thus providing key results for adaptation and testing by the AIATs.

DECENTRALIZED AGRICULTURAL AND FORESTRY EXTENSION PROJECT

4.2 The institutional impact of the project has been **substantial**. The IEG mission found that the new approach to extension that was piloted by the project — based on the *extension as learning* paradigm and involving village-administered grants for Farmer-Managed Activities — has now been extended from the 20 districts directly involved in the project to 220 districts nationwide, albeit with smaller FMA grants. That the new approach to extension embodied by the project has now been scaled up explains the higher rating compared to the ICR rating of modest. This is not to say that a new paradigm is always better than the old. In an agriculture with a clearly dominant (usually mono-crop) farming system, with a new technology that improves yields at minimum cost, and with poorly trained extension field staff, a top-down "teaching" model for extension (such as T&V) might be appropriate. But at the present time in Indonesia, and looking at the wide range of profitable innovations identified under FMA, it is clear that *extension as learning* is likely to be more effective in quickly spreading innovations among farmers, than in trying to fit them all into a preconceived strait-jacket.

19. Annex 5 of the Final Supervision and ICR Mission, November 04-22, page 17.

Sustainability

SECOND AGRICULTURAL RESEARCH MANAGEMENT PROJECT

4.3 Sustainability is **likely**. The IEG mission found that the AIATs were receiving adequate financial support (predominantly from the central government), and that staff morale and productivity appeared good. The appraisal document for the follow-on project (Farmer Empowerment through Agricultural Technology and Information) provides for continued linkages in both directions between AIATs and Farmer-Managed Activities. The project establishes a system of competitive grants for research, and intends to encourage and monitor the number of technology packages developed by AIATs that are used in FMAs.

DECENTRALIZED AGRICULTURAL AND FORESTRY EXTENSION

4.4 Sustainability is **likely**. Farmer-led extension has demonstrated impressive returns, and there is a rapid expansion of interest in FMAs in other districts and about 20,000 existing extension workers trained in the methodology.[20] Sustainability is likely to be accompanied by a reduction in the village grants. Already the grant element has had to be reduced — showing that the generous grant support characteristic of DAFEP seems unlikely to be continued. However, the profitability of the FMAs and the diversity of projects shown to be profitable is likely to ensure that this decentralized approach to extension continues. The follow-on FEATI project provides substantial support of US$40.3 million for a component to strengthen farmer-driven extension, which includes grants for FMAs in 3,000 villages.

5. Borrower and Bank Performance

Borrower Performance

SECOND AGRICULTURAL RESEARCH MANAGEMENT PROJECT

5.1 The performance of both the Government and the implementing agency were **satisfactory**. The Government provided a full-time high-level team which worked closely with the Bank to add the planned-for regional dimension to government-sponsored agricultural research. An implementation plan was prepared that survived almost unchanged over the life of the project. When the Asian financial crisis hit in 1997, the Government worked closely with the Bank to see how much foreign exchange could be saved by cancelling parts of the project, while at the same time maintaining full funding as required in local currency. At the same time, the Government allowed limited essential recruitment for AIATs, despite a general ban on new hirings. The Asian crisis provided a good test of the Government's commitment to the project, which proved to be high.

5.2 The implementing agency, IAARD, operated an effective central Project Management Unit. Opening and staffing ten new assessment institutes with properly trained

20. This training of extension workers provides an element of "conceptual dissonance". The project design documents call for "attrition" of the public extension service (in part based on the implicit assumption that they could not be retrained) but project resources have been used to train the remaining front-line extension field staff.

staff was a major administrative undertaking. Along with the establishment of the new AIATs came the need to develop "whole farm" research programs, while paying due attention to farmers' profitability. Understandably, the quality and timeliness of reporting suffered when "something had to give" in the wake of the Asian crisis. However, financial reporting and auditing were timely, and all audit reports were unqualified. The biggest weakness was in monitoring and evaluation.

DECENTRALIZED AGRICULTURAL AND FORESTRY EXTENSION PROJECT

5.3 The performance of the Government was **unsatisfactory,** primarily due to shortcomings during implementation. Learning from the positive experience of transferring control of field canals to water users' association during the Water Resources Structural Adjustment Loan, the Government used the project to pilot farmer-led extension. The Government and the national agricultural and forestry extension services collaborated on project preparation, while also involving district officials, BIPP staff, and representative farmers. This ensured good project ownership even before Board approval.

5.4 But there was considerable confusion after project effectiveness as to how FMA funds were to be transferred to farmer groups.[21] This led to substantial delays in the first 30 months, which in turn resulted in the requested extension of 21 months (indicating an element of catch-up).[22]

5.5 The closing of the project was initially extended nine months from March 31 to December 31, 2004. When a new Minister of Agriculture was appointed in October 2004, he signed the long-negotiated further extension to December 31, 2005, in early March 2005. But later the same month, he cancelled the project.[23] This action alone — cancelling a project within days of extending it — can only be described as highly unsatisfactory. Moreover, the sudden cancellation directly resulted in the loss of the planned impact assessment. (Negotiations with the firm that had undertaken the initial baseline survey were already well advanced.) In spite of good performance during preparation, the early delays after project approval, the surprise cancellation, and their combined effects yields an unsatisfactory rating for Government performance.

5.6 The performance of the implementing agencies was **satisfactory**. The National Center for Agricultural Extension (NCAE) was the lead implementation agency in

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21. The key problem was that FMAs were to be funded 80:20 by the Bank and the Government. Government procedures required specification of exactly what the money would be used for, while for the Bank it was sufficient to know the purpose. Since it was left to the villagers to decide exactly how the grant would be used, it was difficult to impossible to meet the government requirement. In the event the Bank took over 100 percent financing of the FMAs.

22. Absent the delay, it can be hypothesized that the project would have been completed before the Minister of Agriculture decided to cancel the project. Under this hypothesis, the impact of the delay was substantial, especially since early cancellation has resulted in no impact assessment to follow up the existing baseline survey.

23. Reportedly, the Minister's decision was not based on any dissatisfaction with DAFEP *per se*. Rather his decision was based on the belief that Indonesia already owed enough to the multilateral Banks, and that these loans and credits violated *Sharia* requirements for sharing risks between borrowers and lenders.

collaboration with the National Center for Forestry and Estate Crops Extension for the forestry-related activities. While there was a central Project Management Unit located in NCAE, much of the implementation that was crucial to achieving the project's objectives occurred at the district level due to the decentralized nature of the project. The participating districts were generally successful in creating a large number of decentralized administrative structures — District Extension Committees (DECs), multi-disciplinary Field Extension Teams (FETs), farmer groups, and village committees — to evaluate and consolidate village proposals for FMA support. Annual reports were prepared for 2000 to 2004, as well as the Final Evaluation Report covering the entire period from Jan 1, 2000 to December 31, 2004. This satisfactory assessment of the performance of the implementing agencies assigns the responsibility for the abrupt cancellation of the project solely to the Government.

5.7 Taking all factors into account, the overall performance of the Borrower is rated **unsatisfactory**.

Bank Performance

SECOND AGRICULTURAL RESEARCH MANAGEMENT PROJECT

5.8 Quality at entry, quality of supervision, and overall Bank performance were **satisfactory.** Administratively, this was a very smoothly run project. The SAR is suitably specific as to what was proposed, including the list of 12 areas within the commodity and discipline research component that needed strengthening in support of the new regional research stations. No major surprises arose during negotiations. Bank supervision was both regular and constructive. Supervision missions helped Borrower staff make the transition from technical, disciplinary, and commodity research to the "whole farm" approach in the context of the ecological characteristics of each region being served. During the Asian financial crisis, the Bank agreed to cancel $22.9 million from the loan at the Borrower's request, while minimizing the negative impact on the project. The substitution of local funds still allowed local training to substantially exceed project projections.[24]

DECENTRALIZED AGRICULTURAL AND FORESTRY EXTENSION PROJECT

5.9 Quality at entry, quality of supervision, and overall Bank performance were **unsatisfactory.** The project attempted to address the two problems of (a) the need to decentralize the extension service and (b) the weakness of the existing extension field staff in the context of the *extension as learning* paradigm. But the design of the project only made provision for the reduction in field staff "by attrition". The PAD's vision for public sector extension in Indonesia was a very long-term vision that did not provide operational guidance for a five-year project. The extension service would evolve first toward public financing and private sector provision, and ultimately toward private financing and private provision. The ultimate goal would be a bare minimum public extension service for a portion of the poor section of farmers.[25]

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24. Although $22.9 million (36%) of the $63 million loan was cancelled, overall project cost was only 52% (measured in dollars) of the appraised estimate due to decline in the value of the Rupiah.

25. PAD, page 6.

5.10 The PAD also provided no field-level evidence — only estimated growth rates of agricultural production in the affected districts for the project to break even. The IEG mission agrees with the ICR that "the analysis adopted by the PAD is simplistic in approach and unrealistic in terms of the assumptions made. Detailed worksheets of the economic and financial analysis used for the appraisal were not available for the ICR mission, so that it is not known what crops or other activities (such as livestock) may have been considered in the analysis."[26]

5.11 The way in which the FMAs were expected to work was not by "raising district wide yields" as the PAD suggests, but by introducing specific innovations (often products not previously produced, or existing products using very different technologies) that were expected to be profitable (such as benefit/cost ratios of 1.2 to 1.4 on a good day). The PAD made no effort to identify what the innovations might be, and therefore did not establish that much higher benefit/cost ratios might be available, as turned out to the case. This low level of appraisal rigor is less than the Board and the Borrower have a right to expect.

5.12 The conflict between the Bank and the Borrower in the administrative procedures for disbursement of funds led to major delays in the financing of FMAs, and eventually to a necessary amendment of the cost-sharing of FMA grants from 80/20 for Bank/Borrower to 100/0. Although large (7 or 8-person) supervision teams were regularly in the field every 5 or 6 months for a total of 8 supervision missions, only 20 percent of supervising staff had technical qualifications. No one seems to have noticed until the time of the ICR that the FMAs had identified a number of highly profitable opportunities with high benefit/cost ratios. This lack of recognition of the high rates of return being earned by FMA activities until the ICR contributes to the unsatisfactory rating of Bank performance.

6. Monitoring and Evaluation (M&E)

Second Agricultural Research Management Project

6.1 The SAR for ARMP II called for the implementing agency, IAARD, to monitor all major inputs, outputs, and outcomes even down to the "number and type of equipment, journals and books procured," as well as information on the "number and type of technology or technology packages generated, tested and verified by AIATs and farmers, rate of diffusion." However the SAR is silent on evaluation, or how the monitored data were to be utilized.

6.2 At the time of the ICR, the Borrower was "still in the process of establishing an effective M&E system." Bank supervision missions were effective in getting AIATs to report on their most promising and successful innovations, and a review by an external Impact Study Team provided an independent (and critical) evaluation of AIAT assessments. But these intermittent reports cannot be described as an MIS or M&E *system*.

26. ICR, page 30.

Decentralized Agricultural and Forestry Extension Project

6.3 By contrast the PAD for DAFEP presented detailed and ambitious plans for monitoring and evaluation. This was motivated by the perception of the project as a grass roots-oriented project which emphasized testing, piloting and promotion of innovative participatory extension approaches that would require an efficient M&E system. The project design included an impressive range of M&E activities from benchmark surveys during the first year to collect baseline data on the key performance indicators to strengthening the central MIS and M&E systems.[27]

6.4 Unfortunately, after this encouraging start, M&E implementation was disappointingly deficient. In short, the M&E system reported adequately on inputs, produced *some* pertinent information on outputs, but was ineffective in measuring outcomes. The surprise cancellation of the project prevented the impact assessment study scheduled for completion in the last year of the project being carried out. IEG understands that this impact assessment has now been carried out, but IEG has not yet received a copy of the final study.

7. Lessons

7.1 Several lessons of both a substantive and procedural nature have emerged from this review:

- **Extension projects with grant-funded Farmer-Managed Activities should provide for *early recognition* of highly profitable farm-level innovations and for dissemination to other farmers.** Such projects should facilitate the timely identification and dissemination of both farmer-managed and research station innovations that are profitable. The failure to make other farmers aware of profitable innovations arising from FMAs will of course limit the impact of the grants and the FMAs that the grants supported.

- **Research and extension projects should directly address rather than bypass the problem of an ineffective public sector extension service**. Allowing the existing public extension service simply to be reduced by attrition is neither an intuitively appealing nor efficient solution. Project preparation should include sector work that specifically addresses what is wrong with the existing system and how it can be reinvigorated.

- **If a project is *de facto* a pilot, then designate it a pilot project.** The DAFEP project would have benefited from being explicitly designated as a pilot project. Its expected outcomes would not have been as high. Monitoring and evaluation would have had a larger profile during implementation, and alternative approaches to the financing of FMAs might have been used in different districts.

27. PAD, page 11.

- **Project appraisal documents should describe not only *what* activities are proposed, but also *why* they are proposed**. The documents for these projects were much stronger on the "what" than the "why". The problems that the components of both projects were expected to resolve were hardly addressed in either document. What was particularly missing was a discussion of farmers' needs.

- **Projects should provide early intensive training to local project staff on the application of Bank procurement guidelines in order to prevent procurement deficiencies.** The use of two procurement systems — both the Bank guidelines and the government guidelines — led to major delays in the financing of the Farmer-Managed Activities in the DAFEP project. Weaknesses in the English proficiency of the project staff also caused misinterpretations of the Bank guidelines. Although this is a well known lesson, it is reiterated once again because it has not been fully absorbed.

Annex A. Basic Data Sheet

SECOND AGRICULTURAL RESEARCH MANAGEMENT PROJECT (LOAN NO. 38860)

Key Project Data (*amounts in US$ millions*)

	Appraisal estimate	*Actual or current estimate*	*Actual as % of appraisal estimate*
IDA Credit	63.0	37.8	60.0
Government	38.8	14.5	37.4
Total project costs	101.8	52.3	51.4

Cumulative Estimated and Actual Disbursements

	FY95	*FY96*	*FY97*	*FY98*	*FY99*	*FY00*	*FY01*	*FY02*	*FY03*
Appraisal estimate (US$M)	0.0	7.0	21.0	36.0	50.0	57.0	63.0	63.0	63.0
Actual (US$M)	0.0	2.0	5.0	10.2	13.7	22.6	29.6	35.5	37.8
Actual as % of appraisal	0.0	28.6	23.8	28.3	27.4	39.6	46.9	56.3	60.0
Date of final disbursement:									

Project Dates

	Original	*Actual*
Initiating memorandum		05/20/1994
Appraisal		11/04/1994
Board approval		05/16/1995
Effectiveness	07/09/1995	07/09/1995
Mid Term Review	10/24/1998	10/24/1998
Closing date	04/30/2001	12/31/2002

Staff Inputs

	No. of Staff Weeks	*US$'000*
Identification/ Preparation	53.6	142.7
Appraisal/Negotiations	27.9	76.4
Supervision	99.2	241.6
ICR	15.5	47.0
Total	196.2	507.7

**(FAO-CP)

Mission Data

	Date (month/year)	*No. of persons*	*Specializations represented*	*Implementation progress*	*Development objectives*
Identification/ Preparation	06/09 – 08/21/95	2	Task Team Leader, Agriculturalist		
Appraisal/ Negotiations	11/4/94 – 04/14/95	5	Task Team Leader, Lawyer, Financial Analyst, Disbursement Officer, Agriculturalist	S	S
Supervision 1	08/01/1995	2	Research Management, Agriculturalist/Task Team Leader	HS	S
Supervision 2	04/29/1996	3	Research Management, Agriculturalist, Financial Analyst	S	S
Supervision 3	12/12/1996	4	Agriculturalist, Financial Analyst, M&E Specialist, Research Management Specialist	S	S
Supervision 4	07/02/1997	3	Agriculturalist, Research Management, Financial Analyst	S	S
Supervision 5	04/27/1998	4	Research Management Specialist, Agriculturalist, Anthropologist, Research/ Extension Specialist	S	S
Supervision 6	05/01/1999	4	Agriculturalist, Jr. Prof. Officer, Consultant, Procurement Specialist	S	S
Supervision 7	10/15/1999	6	Task Team Leader, Consultant, Sector Coordinator, Operations Officer, Procurement Specialist	S	S
Supervision 8	04/28/2000	3	Task Team Leader, Procurement Specialist, HRD Specialist	S	S
Supervision 9	04/28/2000	5	Team Leader, Mission Members (4)	S	S
Supervision 10	05/04/2001	7	Team Leader, Operations Officer, Procurement Specialist, Financial Management Officer, Gender Consultant, Livestock Specialist, Program Coordinator	S	S
Supervision 11	10/12/2001	5	Task Team Leader, Operations Officer, Program Coordinator, Financial Management Officer, Procurement Specialist	S	S
Supervision 12	05/22/2002	6	Task Team Leader, Operations Officer, Soil Scientist, Biotechnology Specialist, R&E Specialist, Financial Management Specialist	S	S
ICR	11/22/2003	8	Task Team Leader, Operations Officer, Procurement Specialist, Financial Management Officer, Agricultural Support Services, Economist, Management Specialist, Program Assistant	S	S

DECENTRALIZED AGRICULTURAL AND FORESTRY EXTENSION PROJECT (LOAN NO. 4510)

Key Project Data (*amounts in US$ millions*)

	Appraisal estimate	*Actual or current estimate*	*Actual as % of appraisal estimate*
IDA Credit	18.0	16.5	91.0
Government	5.6	3.3	60.0
Total project costs	23.6	19.8	83.9

Cumulative Estimated and Actual Disbursements

	FY00	*FY01*	*FY02*	*FY03*	*FY04*	*FY05*	*FY06*
Appraisal estimate (US$M)	1.5	6.0	11.5	11.5	16.1	18.0	18.0
Actual (US$M)	0.9	1.4	3.7	8.7	13.1	16.6	16.7
Actual as % of appraisal	60.0	23.3	32.1	75.7	81.4	92.8	53.6
Date of final disbursement							

Project Dates

	Original	*Actual*
Initiating memorandum		05/15/1997
Appraisal		04/15/1999
Board approval		08/31/1999
Effectiveness	11/01/1999	02/22/2000
Mid Term Review	07/01/2002	03/06/2003
Closing date	12/31/2004	03/31/2005

Staff Inputs

	No. of Staff Weeks	*US$'000*
Identification/ Preparation	n.a.	n.a.
Appraisal/Negotiations	n.a.	n.a.
Supervision	n.a.	n.a.
ICR	11.6	63.8

Staff weeks not available

Mission Data

	Date (month/year)	No. of persons	Specializations represented	Implementation Progress	Development Objectives
Identification/ Preparation	06/27/1996	3	Task Team Leader, Operations Specialist, Extension Specialist		
	10/02/1996	2	Task Team Leader, Operations Specialist		
	10/15/1997	9	Task Team Leader, Economist, Agricultural Specialist, Financial Specialist, Sociologist, Extension Specialist (2), Agroforestry Specialist		
Appraisal/ Negotiations	04/15/1999	7	Task Team Leader, Lead Rural Development Specialist, Legal Specialist, Disbursement Specialist, Agricultural Specialist, Operations Specialist, Agricultural Extension Specialist		
	07/09/1999	7	Task Team Leader, Legal Specialist, Economist, Financial Specialists (3), Procurement Specialist		
Supervision 1	08/11/2000	7	Team Leader, Operations Officer, Procurement Specialist, Financial Management Officer, Agriculturalist, Agroforestry Specialist	S	S
Supervision 2	09/08/2000	7	Team Leader, Operations Officer, Procurement Specialist, Financial Management Specialist, Agriculturalist, Agroforestry Specialist, Operations Officer Alternate	S	S
Supervision 3	02/22/2001	7	Task Manager, Operations Officer (2) Program Assistant, Forestry Extension Specialist, Gender Specialist, Lead Rural Development Specialist	S	S
Supervision 4	08/24/2001	8	Task Team Leader, Operations Officer (2), Procurement Officer, Financial Management Specialist, Extension Specialist, Gender/HRM Specialist, Gender/Extension Specialist	S	S
Supervision 5	02/08/2002	8	Sr. Agriculturalist, Lead Rural Development Specialist, Consultant, Operations Officer, Procurement Officer, Financial Management Specialist, Gender Consultant (2)	S	S
Supervision 6	07/08/2002	7	Task Team Leader, Sr. Agriculturalist, Operations Officer, Procurement Officer, Financial Management Specialist, Agricultural Consultant, Community and Training Consultant, Agro Economist	S	S

	Date (month/year)	***No. of persons***	***Specializations represented***	***Implementation Progress***	***Development Objectives***
Supervision 7	02/21/2003	7	Economist/Task Team Leader, Extension, Research, Gender, Agriculture, Forestry, Financial Management, Procurement	S	S
Supervision 8	02/23/2003	6	Extension, Research, Operations, Procurement, Financial Management, Economics/Task Team Leader	S	S
ICR		3	Mission Leader, Participatory Extension, Economics	S	S