Administering Rural Development:
Have Goals Outreached Organizational Capacity.

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Introduction

In the Philippines an irrigation project charges fees farmers cannot pay for its water ... In Indonesia concrete and steel irrigation gates are unused while farmers dig cut-aways to reach channels ... In Sudan 400 million dollars is spent to irrigate land for export cotton while corporation-fixed prices paid tenants are insufficient for them to pay corporation-set cotton production costs ... In Senegal rural health posts systematically decapitalize themselves because medicines are incorrectly priced ... In Ghana a program in agricultural management requested by the Ministry of Agriculture withers because the Ministry's field personnel refuse to implement its program and demoralize its alumni ... Are these problems random and idiosyncratic to these projects, or are there underlying patterns which explain them? Why do those patterns exist? Can anything be done about them, or have rural development goals come to exceed organizational capacity?

I. Rural Development

During the 1970s most of the donor nations and international development institutions substantially shifted their development focus from urban-industrial strategies to a focus on rural dwellers, agriculture, and equitable growth. In the United States the "New Directions" Mandate from the Congress; in the World Bank, Robert McNamara's leadership; in the European Economic Community, North-South negotiations culminating in the Lome Conventions, all had these effects. Willy Brandt's work leading the "North-South" Commission and the writings of such exponents as Edgar Owens and Robert Shaw helped reformulate public opinion on these issues.

Today, the donor nations and institutions focus on expanding agricultural production and basic rural services, and increasing rural incomes as the basic strategy for "third" and "fourth" world economic growth. Reasoning that the

rural areas are the repositories of the bulk of less developed countries' natural and human resources, the rural development strategy emphasizes the need to expand food production and rural incomes to avoid costly food imports, to build basic production to undergird light industrialization, and to build rural markets to consume urban production. Small farmer, labor-intensive cropping patterns are emphasized because of their proven high productivity, because of excess labor availability, and because of the high cost of imported capital investments. Equitable growth is a priority to expand markets, broaden employment opportunities, slow over-urbanization and urban unemployment, and to strengthen integrated economies instead of "dual" or "enclave" economic "growth without development."

Certainly this strategy has been debated. "Dependency" theorists maintain that such strategies are trivial without radically redefining North-South relations. Urban-industrially focused theorists argue the "breakout" from peasant agriculture will never occur, and the "rural development" strategy condemns these countries to a future of agricultural subordination.

It is not the purpose of this paper to explore these issues, burning as they are. Instead, this paper will focus on the organizational feasibility of the rural development strategy. Simply put, can it be done? Where there are problems and what can be done to resolve them?

The paper is based on secondary analysis of fifteen internationally funded development projects. USAID was involved in all fifteen, though at varying levels. In some it was a relatively minor funder (less than 5%) while in others its involvement exceeded 50% of project cost. All but one project were implemented during the 1970s. The exception, the Comilla Project, was included because it was essentially a rural development project in its goals and strategies, because the very minor USAID involvement in it makes it a good control case, and because the long time period since its completion allows more perspective in its evaluation.

Information was, in eleven of the cases, gathered from a series of "Project Impact" evaluations performed by USAID between 1979-1982. These evaluations were unusual for the AID system because their explicit purpose was to gather reflective insights on what were usually completed projects, rather than to evaluate projects in progress and fulfill more diverse intra and inter-bureaucratic purposes. The latter include such concerns as pressuring host governments to support projects more fully, meeting AID routine requirements, protecting mission leadership or project officers from apparent "disaster" projects, criticizing contractors, affecting inter-bureau budgetary rivalries, and the like. These evaluations were instead part of a special, post hoc general evaluation program initiated by the Agency Administrator, and employing unusually strong AID-academic-foreign national (host country) personnel. The resulting evaluations were unusually comprehensive, critical and implicitly comparative in approach and analysis.

The other four projects are analyzed through other sources. One, Comilla, has been subject to substantial study, and three were routine AID evaluations which were unusually useful in content and analysis.

II. The Projects

All development projects are really working hypothesis; if certain actions are performed then a specified outcome is expected to occur. USAID is particularly self-conscious of this, employing a detailed algorythim which specifies inputs, output indicators, project purposes, and overall sectoral goals for each project,

the "Log Frame."

Almost without exception, however, the "hypotheses" have been incompletely fulfilled. Often the disjunction between model and reality could be regarded as tolerable: even if all outputs, purposes and goals are not achieved, some worthwhile ones are, and a retrospective analysis suggests the benefits often justify the costs.

Nonetheless, failure at varying levels is chronic, as this paper's opening paragraph illustrates. The paper seeks systematically to explore these failures, analyze their origins, and discuss remedial strategies.

TABLE ONE
The Projects

Project	Country	Type	Research Source	Funding
Small Scale Irrigation	Philippines	Infrastructure-Irrigation	USAID Impact Evaluation	USAID = 45% GOP = 49% Denmark = 4% Farmers = 2%
Farm Water	Pakistan	Infrastructure-Irrigation	USAID Impact Evaluation	USAID = 26% GOP = 74%
Sederhana-Small Scale Irrigation	Indonesia	Infrastructure-Irrigation	USAID Impact Evaluation	USAID = 39% GOI = 41%
Feeder Roads	Jamacia	Infrastructure-Roads	USAID Impact Evaluation	USAID = 53% GOJ = 47%
Rural Roads	Honduras	Infrastructure-Roads	USAID Impact Evaluation	USAID = 36% GOH = 64%
Rural Electricity	Bolivia	Infrastructure Electricity	USAID Impact Evaluation	USAID = 75% GOB = 25%
Sine Saloum Health Posts	Senegal	Rural Services-Health	USAID Impact Evaluation	USAID = 66% GOS = 34%
Provincial Development Assistance	Philippines	Institutional Development-sub national planning and management	USAID-Routine Evaluation (Outside Evaluators)	NA
Agricultural Management Development	Ghana	Institutional Development-Single Ministry Organization & Management	USAID-Routine Evaluation (outside evaluators)	NA
Agricultural Research in North East Thailand	Thailand	Institutional Development-Agricultural Research Institute	USAID Impact Evaluation	USAID = 47% GOT = 53%
Small Farmer Cropping Systems-Central America	Central American States	Institutional Development-Agricultural Research	USAID Impact Evaluation	NA

Project	Country	Type	Research Source	Funding
Rahad Irrigation	Sudan	Integrated Rural Development	USAID Impact Evaluation	USAID = 3% GOS = 59% Other = 38%
Eastern Ord Integrated Rural Development	Upper Volta	Integrated Rural Development	USAID Routine Evaluation (Aid personnel)	GOUV = 34% USAID = 45% Other = 21%
BICOL Integrated Area Development	Philippines	Integrated Rural Development	USAID Impact Evaluation	USAID = 28% GOP = 72%
Comilla Rural Development	Bangladesh	Integrated Rural Development	General Published Research Materials	NA

III. Problems of Project Implementation

Review of the fifteen case projects as presented in Table One suggests five general problem areas exist which consistently hampered achievement of project goals. These fall into the general categories of technical and managerial problems:

Technical: Project Economics

Design and Location of Infrastructure

Design of Project "Software" or Technical Outputs

Managerial: Adequacy of Support Services

Maintenance and Management of Infrastructure.

Table Two plots the fifteen projects by output problem areas:

TABLE TWO

Project Problem Patterns

	Economics	D&L of Infra-structure	Soft-Ware	Support Services	O&M of Infrastructure
Simple Infrastructure:					
Small Scale Irrigation	X			X	X
Sederhana Irrigation	X	X			X
On-Farm Water	X	X		X	X
Jamaica Feeder Roads	X	X		X	
Honduras Rural Roads		X		X	
Rural Electricity	X	X			
Rural Services:					
Sine Saloum Health	X	X			
Institutional Development:					
PIAT			X		
Agricultural Management			X		
Small Farmer Cropping			X		
Agricultural Research		X	X		
Integrated Rural Development:					
Talaf Irrigation	X	X	X	X	X
Western Dr [illegible]	X		X	X	
[illegible]	X	X			X
Comilla Rural Development				X	X

Project Economics:

The success of each project reviewed in this paper depended on "getting the prices right":on economics. For beneficiaries to utilize investments, whether they be in infrastructure or in technical packages ("software"), the price to them of participation. in,or utilization of the investment had to be feasible given the return they could expect to get. Furthermore, projects had to be internally sound, in that income generating components had to balance cost generating components were the project to survive.

Project economics go wrong in several ways. In some cases, project designers and managers either did not understand the economic systems in which the project participated, or their information as to costs and benefits of related inputs and outputs was inaccurate. Similar problems affected pricing of project's internal components. Finally, some projects misunderstood the nature of the local socio-economic systems, and how that would influence the flow of resources to various local target groups. Five projects were seriously compromised because of erroneous economic assumptions or decisions along these lines.

In several projects government-set charges for project investments and agricultural inputs could not be paid given officially-set prices for agricultural production. For example, the Rahad Irrigation Project of Sudan is a massive attempt to greatly expand cotton production (a cash-export crop) by a major investment (some 400 million dollars) in irrigation and planned settlements where thousands of tribesmen were to become essentially tenant farmers for a state corporation. Unfortunately, prices paid for cotton barely broke-even given charges for water, seed, fertilizer, pesticides, etc., and the increased production costs caused by the failure of the corporation to deliver specified inputs in required volumes at scheduled times. Thus production of cotton lagged well below estimates while investments of time and labor in groundnuts, garden plots, and livestock,

which could be sold on the open market, was heavy.[4]

There were similar problems in the Philippine Small Scale Irrigation Project. There, project assumptions about increased productivity were over optimistic. A large share of the project costs were to be born by local farmers. The project anticipated that the infrastructure would allow most farmers to double-crop, and thus be able to pay project costs and still increase net income. Unfortunately the project planners failed to factor in the other costs of double cropping: fuel, fertilizer, insect control, credit and management skills. As these costs increased dramatically during project lifetime, and as electrical costs for the system exceeded project expectations, most farmers appeared to have increased gross farm income, but have had a decline in net income. These economic problems threatened to spread from farmers to the "Irrigation Service Associations" which were responsible for amortizing the debts and maintaining the equipment, thus pulling the local organizational floor from under the project.

Similar problems of production yield increases versus project cost amortization and other production costs hindered the BICOL Integrated Area Development Project.[6] As its evaluation noted, "Under current price structures for agricultural inputs and sales of rice, and at present levels of productivity and project irrigation system cost, there is reason to doubt whether farmers will perceive sufficiently high economic incentives to risk extra capital on the inputs and farm management improvements required to raise their yields."[7] The evaluation concluded that if large numbers of farmers were not inspired to participate and share the costs of the project, even high production levels by a few farmers would not ensure system sustainability. One ought to note regarding these factors that nearly all key costs here are set by agencies of the host governments involved. The Eastern Ord Integrated Rural Development Project faced parallel problems, particularly in its goal of expanding animal plowing in selected areas.[9]

Finally in the Sederhana project, expected rice production yields did not materialize because other cash crops were more profitable to the farmers involved. Farmer income did improve, but insofar as the project was anticipated as a means to grow more rice, production economics led some farmers in other directionsIn the Jamaica Rural Roads Project, fallow land was not brought into production in spite of better market access because of the economic risk that would have entailed. Farmers feared so radical a change from conservative economics which had hitherto worked for them."[11]

Critical accounting and pricing problems nearly bankrupted the Sine Saloum Rural Health Project. By the time these problems were discovered by a project evaluation team, health posts had lost nearly 25% of their working capital in only a few months of operation. Furthermore they were often located so closely that they had an inadequate population base to pay salaries for posts' workers, and they were charging fees per visit to the posts which could not possibly pay salaries able to keep the literate and trained persons recruited to man the posts.[12] One third of the personnel left during the first nine months of project operation.

In at least three projects, infrastructure investments led to a decline in the well-being of tenant farmers. This is because in many landowner-tenant relationships, the distribution of input costs and crops leans heavily on the tenant. For example, in the On-Farm Water Project in the Sind area of Pakistan, landlords typically controlled decisions on inputs and assessed tenants some 75% of those costs while collecting 50% of the crops. As input costs rose with irrigation (in some cases even more than crop production), tenants were caught in a squeeze where their net income dropped.[13] In the Indonesian Sederhana irrigation project, irrigation dramatically enhanced land values. Rents charged tenants were proportionally increased, and even increased productivity left landlords far better off than tenants."[14] In the Philippines Small Scale Irrigation project, charges for building

and maintaining the infrastructure were carried by tenants, while the landlords reaped the benefits of increased land value and increased production .[15] In the BICOL project, increased land values led landlords to displace tenants and centralize management of land.16

To summarize, economic problems of these projects seem to fall in three areas. In one case, the rural service project, poorly thought through accounting and pricing policies nearly bankrupted the project. While we only have one case of this, we also have only one (because of the fairly recent start-up of these type projects) rural service project to evaluate. More frequently seen in these fifteen projects are unfortunate disjunctions between the actual and hoped-for increases in production brought by the project, and the actual and hoped-for increases in production costs associated with participation in the project. A weak understanding of the rural production system and goal conflict among host government institutions disrupted their economics. Particularly evident in the integrated rural area development projects, these problems have squeezed out economic incentives to participate, and threaten their very economic viability. Even when increased costs are not a key issue, limited understanding of the diverse economic decisions farmers make reflected in unidimensional interventions meant project production goals were often not met.

Finally, several projects suffered from their perhaps overoptimistic goal of increasing the economic well-being of all people in an area and an unfortunate pattern where some project rewards have reinforced the economic advantage land owners have had over tenants and the landless. This outcome may be unavoidable, but was certainly not anticipated (or at least admitted) in project goals, and again reflects limited understanding of the rural socio-economic system.

Design and Placement, of Infrastructure:

Optimal return from investment in project infrastructures was hampered by problems in design in six projects. In three cases, evaluators noted uninformed design led to projects poorly adapted to local conditions. In the Sederhana Irrigation Project, for example, up to 50% of the improved floodgate structures at some sites were not used by farmers, who diverted water to. their fields by cutting into the earthen channels. Farmers reported the structures were improperly located. Furthermore, the structures required a cumbersome unattached handle to operate, and farmers preferred simply to leave the gates open and regulate the flow by building earthen dams or using logs or rocks to block the water.[17] While the system worked under this approach, though less efficiently, the unused turnout structures represent a wasted, substantial investment.

In the Bolivian Rural Electricity Project, a poor understanding of the local economy led engineers to design a project with excessive generation and insufficient distribution capacity. Anticipating an industrial demand that did not exist, project designers designed an "upscale" generation system, and neglected to provide enough distribution capacity to reach the small-scale consumer demand that did exist. Furthermore, the significant underestimation of consumer interest meant that the early, sometimes well-off new connectors received power at overly subsidized rates, and later potential connectors were faced with a completely un-subsidized connect cost which they could not possibly afford (a. $120 downpayment vs. $4-8). Finally building a system at "upscale" standards added unnecessary costs to the utility's operation, which would burden rural consumers and limit

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the utility's long-term financial soundness.

Inflexible design parameters, noted several evaluations, also hindered the value of infrastructure investment. In Honduras, for example, the project design,

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"...assumed every model cooperative needed a road." In the field, though, the

team learned, however, "that groups often did not need or want roads as much as, for example, irrigation canals or drainage ditches ... it would have been more prifitable to tailor the project to the needs of the small farmers who were to benefit." [20]

Similar criticisms were raised in the On-Farm Water Project in Pakistan. These evaluators noted that different land tenure arrangements, varying average size of landholding, diverse soil and climate conditions, and varying socioeconomic conditions affected design success greatly. However, inflexible design parameters meant the project could not adjust to these varying circumstances.[21]

Unrealistic design, given the scale of the task and the projects resources, became a serious problem in the Rahad Irrigation Project. There the project planned to construct, in most cases starting with nothing, some forty-six villages to house 80,000-100,000 persons who were to labor in the mechanized-irrigated cotton growing corporation. This collapsed under the magnitude of the task. As villagers were recruited into the scheme from areas with some services, and settled in villages where promised facilities and services did not appear, popular discontent with the project naturally grew. As this labor was critical to project success, discontent

was a serious problem.

As well as design, poor site selection was a frequent and sometimes serious problem. In eight of the thirteen projects which made significant physical investments, this was the case. As in the case of project design, most problems with location appear associated with ignorance of local conditions and overly rigid project planning and administration. This was seen in the field in diverse ways.

Inappropriate location of investment given project goals is the most frequent (and perhaps least malignant) manifestation of this. In the Jamaica Roads Project, for example, high quality roads were built where there existed little need. Project evaluators noted one local dweller observed, "Many folks...came to this nice and

quiet road to learn how to drive. My children like to watch them."[23] Project administrators decided where to locate roads on the basis of assumed increases in production without any close study of the complex production inputs farmers would require to so expand. Lacking local knowledge or, apparently, an understanding of the complex agro-economic model involved in production, it was no wonder roads were located where they would remain idle and production would stay level. Finally, the evaluators found that most roads build followed existing roadways which already tended to benefit larger and better-off farmers. Thus the project goal, to reach to poorest farmers, largely failed.[24]

Honduras' Rural Roads Project had more mixed results than the Jamaica project. The "access roads" strategy was found sound, but evaluators believed overly rigid criteria for road location (i.e., access to a "progressive" cooperative) meant some fairly well-off areas received roads that brought marginal improvements, and other very poor areas were left out. Similarly, the focus on reaching selected cooperatives did not take into account the relative zones of influence of the various roads: "...some roads merely extended into a field along a major highway; others passed by a number of non-model cooperatives as well as through communities... if selection criteria had included the construction costs ... and zones of influence, the number of roads and beneficiaries would have increased..."[25]

Location can at times be a genuinely destructive problem. In the Sederhana Project, several sites appeared to be unsuitable for growing rice. Project evaluators cited one farmer in a prosperous coffee raising area as saying:

> "Since you have came here and since the government has already spent a lot of money for this dam, we are prepared to release our land for the irrigation system as long as we receive compensation. However, we swear we are not going to use one drop of water because we don't need it."

The project nonetheless continued. Similar problems were noted in the BICOL Project where existing, operating irrigation systems were destroyed to build larger systems.

"With the promise of irrigation the beneficiaries were assumed to be receptive and willing to shoulder monetary and institutional costs. The implementation ... ran roughshod over preexisting irrigation systems."[27] This happened to between twenty-seven and forty systems in one area, causing substantial alienation from the project as well as significant economic loss for many poor farmers.[28]

Flaws in location hampered several other projects as well. The Northeast Thailand Agricultural Research Project was located well away from Bangkok, Thailand's capitol and administrative center, to encourage work on the agricultural problems of Northeast Thailand. That decision, however, placed the project too far from the locus of administrative decision making for Thai agricultural personnel to willingly stay long. Those who did, and in fact the entire research station, were far from the "political orbit" which allocated resources. The station, as a result, never successfully captured enough resources and authority to fulfill its research task.[29]

Health posts, in Senegal's Sine Saloum Project, were too densely located to survive economically. Ironically, this occured not because of ignoring project beneficiances, but because local leaders were allowed fairly uncontrolled influence over post location. Seeing this as a benefit for their communities, they naturally competed to win a post for each village.[30] The lesson here, particularly given evidence from other areas, is that local information is crucial, but most not serve as the only consideration in project decisions.

Designing and locating infrastructure is in some respects always "suboptimal." There will always be debate on the best location of investments, and perfect information is ever elusive. In this respect, post hoc criticism ought to be carefully drawn. Still, there are consistent and disturbing patterns in this information on rural infrastructure. Farmers do not use it as designed, target groups are not reached, real local needs are passed by, facilities are built that

lie nearly unused, and existing infrastructure is destroyed without adequate explanation or compensation.

In some cases this may grow from project administrators' misunderstanding of the complexity of the rural production process, as perhaps in the case of the Jamaica and Honduras roads projects. In other cases, incomplete knowledge of rural social, economic and physical characteristics appears to explain the errors made. This may apply to the BICOL project as well as to Sine Saloum, Sederhana, the On-Farm Water Project, and the Bolivian Rural Electricity Project. The Rahad Project seriously misunderstood the magnitude of the task it was undertaking, and therefore it poorly distributed its resources. These diverse problems do manifest a consistent common denomenator: urban based officials who apparently poorly understand rural conditions are making critical decisions on rural projects, and either do not receive or ignore feedback on this. Why they do that will be reviewed in Part IV of this paper.

Design of Project "Software" (Technical Outputs):

Technical outputs or "software" are here considered to be information, instructions, specifications and routines transmitted to project beneficiaries on the effective use of tangible project outputs. The latter might include infrastructure; credit; improved seeds, fertilizer, and herbicides; medicines, etc. Software is the information and systems necessary to utilize these outputs, or other existing tangible investiments. Projects vary in the weight given the tangible or material outputs versus these intangible outputs. For example, the Honduras and Jamaica Rural Roads Projects offered virtually no intangible outputs; on the other hand, the Provincial Development Assistance Project of the Philippines produced a heavy proportion of intangible outputs in such areas as provincial

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planning, budgeting and management routines. Finally, the Agricultural Management Development Project of Ghana produced virtually no tangible or material outputs, but instead produced large amounts of instruction and training for existing field

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personnel to improve use of existing facilities and resources.

In six projects the technical outputs were flawed: in two seriously enough that the projects' ability to deliver any outputs was at risk, and in four with less serious consequences. Perhaps not surprisingly, in general, the more complex projects were those with these problems; and the most complex projects had the most serious problems.

Software, or these intangible outputs, seems to err because of two types of problems. It can be developed on the basis of faulty models of the world the project attempts to affect: critical actors are left out of the project; key environmental factors are ignored; and crucial relationships among actors, between them and local customs, and among activities people pursue and attitudes they hold are misunderstood or simply not considered at all. An inaccurate model of the natural environment can be equally disruptive to a project's technical outputs.

Similarly, project software can be hindered by simple lack of information on field conditions. Project personnel or project design may recognize important variables, but, for whatever reason, the information necessary properly to operationalize the model is missing. Each of these problems, model and information, can bedevil a project, particularly a complex one. Achieving a close natural or social fit between the project's activities and the environment is crucial and, as we shall see below, is not easy.

The Eastern Ord Integrated Rural Development Project and the Rahad Irrigation (area development) project have been stymied on several accounts. Several of their problems have already been reviewed in this paper. Still, it is arguable that each would have been halted by technical problems alone. We will briefly review these projects.

The Eastern Ord Project, in the opinion of the project evaluators, began with a fundamental "theoretical" or modeling contradiction that conditioned the entirety of software the project did (and did not) produce. While the project, at least in

the minds of USAID personnel, critically depended on appropriately "fitting" several, varied interventions into the region's social and economic systems, the Voltaic project director saw these aspects as secondary: "He [the administrator] indicated a general lack of interest in the 'sociological' aspects of development questions and practices, viewing them as something to be added on after other approaches had been tried, if such addition proved necessary."[33]

Because of this contradiction between the American and Voltaic "models" of reality, project strategy was inconsistent from the start. For example, in spite of the mutually agreed outline of activities, and the priority placed on gathering information to guide the project, right from the start gathering information was made secondary to supporting the on-going administration of the region, and the bulk of the project's American technical assistance team was swallowed up into that operational task. At the time of the evaluation, the team found that critical data necessary to operate the credit and marketing components of the project were lacking. There was a serious absence of, "microfarm data, especially on production and marketing... Without adequate farm models or prototypes it is impossible to assess the viability of credit for animal traction."[35] Nor could extension be "...targeted to meet the needs of farmers utilizing the new package of inputs."[36] Information was inadequate, the team found, to make informed choices on what to grant credit toward, where (geographically) it should be made available, at what rate it should be priced, and whether it should be granted to individuals, groups, or both.[37]

Marketing posed similar problems. Little was known about the location and storage of crops, and who are the major sellers and buyers. Even the major locations of market activity were not clear. Weakness in such information seriously hampered project goals.[38] The team, for example, noted evidence that debt collection on the project was becoming a serious problem. Marketing intervention had yet to

even begin at the time of the evaluation.[39]

Faulty project theory hampered other areas. The project's goal of increasing production in low-lying, recently irrigated areas was seriously compromised by a totally misunderstood system of local land tenure practices. These meant that areas the project saw as vacant and unused were that precisely because their title was unclear, and few farmers were willing to invest time and labor in land they might lose at any time.[40]

Adjusting production practices to increase productivity was hampered by the project's inadequate theory of gender, generation and social influence, and its misunderstanding of the crucial production role filled by women, in this area, of post-child-bearing age. These women, "...who have an important role to play as change agents, demonstrators of new cultivation practices, borrowers of credit, and leaders of women's groups...have clout in the community and are willing to use it."[41] The project, instead sought out, "the younger men and women to join groups and to be sensitized and animated and provided with psychological innovation." Since these traditional values and patterns were ignored, "...innovations are not well received, projects fail for lack of support from the local power structure..."[43] The evaluation team, in discussing this with local official personnel, found they neither well-understood the problem nor the options which could be pursued to remedy the situation.

Attempts to expand participation reflected similar theoretical conflict. AID personnel believed project goals required extensive, grass-roots based participation to develop credit, banking, marketing and rural enterprise activities; these would eventually become a means of independent decision-making by farmers. Eastern Ord officials, on the other hand, saw local-dwellers as primarily a top-down convenience, through which extension agents assembled farmers for demonstrations, and credit managers guaranteed credit granted to individuals. The project evaluation argued official policy had precluded numerous local activities which would have strongly supported project goals.[45]

Shortage of information on the natural environment also hampered project progress. Information on the actual impacts of animal traction-plowing on various soil types, crop yields, and labor needs was lacking. Questions of erosion, the compatibility between line seeding (necessary in animal traction plowing) and traditional hand methods of cultivation and spacing; the timing of planting, weeding, thinning and harvesting; the benefits of monocropping and interplanting, were all unanswered. Similarly, the correct amounts and mixtures of new fertilizers and the performance of improved varieties of grain were also unknown.[46] Nonetheless, large amounts of credit had been allocated for farmers to purchase draft animals, fertilizer and improved seeds. Production increases would appear to be uncertain under these circumstances. The viability of these farmers granted credit would seem to be even more questionable.[47]

The Rahad Irrigation (Area Development) Project was quite different from the Eastern Ord Project in nearly all operational respects. It was infrastructure-intensive while the Ord was "software" intensive; it was administered by a separate, para-statal organization, while the Ord was administered by a conventional bureaucracy; finally, it centralized and attempted to homogenize "beneficiary" activities as employees of a single hierarchy, while the Ord tried to expand farmers' ability to operate productively as individual entrepreneurs. Nonetheless, problems of information and theory damaged each.

In the Rahad Project, the corporation's failure to understand the complexity of its enterprise and the interdependence that lay between it and its work force seems related to nearly all of the project's subsequent problems:

> The Rahad Project area constitutes not only an agricultural system but a socio/cultural community. Agricultural pursuits account for only a segment of overall community objectives and needs. A diversified economy including sufficient off-farm employment, a range of individual skills which entail artisan, mercantile, and administrative functions, a rich religious, political and educational life will all be required to develop a psychological sense of belonging to Rahad as a community

> rather than as a wage employer. Sustainability refers not only to the production model and the making of a social class called "tenants", e.g., a group of cultivators who recognize common bonds and interests between themselves and with the Corporation whose interests might or might not be the same. Sustainability will also be a reflection of the permanency of the population, the attitudes of a second generation of tenants and non-tenants and the initiative shown in improving community welfare through the voluntary investment of community resources.[48]

It was the corporation's failure to understand this which led to discontented workers and to later problems in cotton production, use of mechanization versus hand labor, and the corporation's difficulty in mobilizing tenents to contribute toward improving overall community welfare. Instead of working with farmers as the co-producers they effectively were, the corporation asserted a strict managerial role for itself:

> From recruiting and settling tenants to their possible eviction due to failure to meet contract conditions, the Corporation maintains strict authority. It provides all agricultural inputs and markets and processes the cotton production. More than this, through controlled monitoring and sanctions it supervises what decision-making is to occur on each tenancy and assesses all costs against profits.[49]

Project evaluators questioned whether this was a viable approach to agricultural production, arguing that the farmer's minor role in cotton crop decision-making contributed to low production efficiency: "top-down farm management structures sacrifice the benefit of critical knowledge inputs from practicing husbandmen." Not only would the corporation lose useful information, the farmers' inability to translate their knowledge into increased cotton productivity meant farmers expended effort in raising crops where corporate control was not so strict. These other crops and livestock were the source of 30-40% of gross income for farmers, while the corporation was barely growing enough cotton to break even.[51]

The conflict between a theory which anticipated tenant-farmers would labor optimally in a strict hierarchical arrangement and the apparent reality of Rahad was also reflected in community organization. Production councils, the evaluators argued, were the primary organization farmers had to work with in Rahad.

Created by the corporation to act as two-way communication channels, effective corporate dominance of agricultural decision making "greatly diminished" their effectiveness. Both they and village councils, traditional local governments found in the Rahad area, were hampered by weak budgets and little authority.[52] Rahad retained most authority and financial resources, and paternalism was "...all encompassing."[53] Subsequently, viable tenant organizations which could help supplement short falls in corporate ability to provide social services and articulate farmer needs and economic interests to the corporation, did not generally exist.[54]

Poor models of reality which exaggerated the laborer-tenant role the farmers would fill, overemphasized the corporation's ability to provide all the employees' needs and to control employees' behavior, led to other production problems. Ignoring the fact that sorghum was a staple grain in the area, the corporation forbade growing it on corporate land. Sorghum prices went up, and farmers turned their attention even further from the low returns of cotton to their garden plots, to off-corporation labor, and to livestock. The last was a key source of income and economic stability for farmers, and the corporation made no provisions for herding nor for the efficient exploitation of the herds through development of dairying, etc. Indeed, one cannot help but wonder at the attempt to convert nearly overnight some 100,000 persons who had worked as traditional,independent farmers and nomadic herdsmen, into tenant-farmers governed by an all-encompassing corporate structure.[55]

There were other problems in Rahad. A system of mechanized labor was partially put in place without fully understanding the implications it had for farmers' costs, the economic survival of the landless, and the survival of those merchants and others who currently sell to the hand laborers. Also, the natural environment was neglected, with public health problems growing from massive use of agricultural chemicals ignored. Continued reliance on these chemicals was extremely expensive

(some 30% of production cost), and reflected another disjunction between produc-
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tion models and realities.

Rahad and the Eastern Ord are examples of how difficult it is to develop modes and procedures which effectively employ the concrete investiments made by development projects. They are striking in our sample because of the scale of software each project anticipated providing, and because their "modeling" problems made the software's failures unusually clear. In each project, clear disjunctions between reality as project designers/managers believed it to be, and reality (at least as the evaluators saw it) in the field, meant outputs were hindered or nearly stifled. In each project, furthermore, poor data, or the absence entirely of data, added to the problems. Because of the scale and "perishibility" of the tangible investiment, software errors were particularly costly.

Four other projects which experienced less spectacular software problems are also insightful. In the Provincial Development Assistance Project vast amounts of technical assistance and training were invested in upgrading the administrative capacity of provincial governments. Based on a technocratic image of "good" administration, the project emphasized formal and complex methods of budgeting, planning, personnel evaluation, decision making, and the like. Project evaluators found in the field, however, that the staff established to perform these "planning-programming-budgeting" functions regarded them as largely formalistic, and viewed their real role as serving as the provincial governors' personal staffs. The complex, cumbersome forms were completed primarily to qualify for development funds. The staff generally ignored the documents in making "real" decisions, and invested their energies in supporting the provincial executives efforts to capture national and donor resources for local development, and to manage national, ministry bureaucrats posted to the provinces.

Ironically in PDAP the anticipated project goals were largely reached, though not through the technocratic software the project had emphasized. Rather, the staffing resource the project catalyzed (to receive the training) was used by the governors in a more traditionally political way to improve their institutional capacity: to gather information, prepare arguments, capture control of

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local budgeting, and play-off Ministry field personnel.

Evaluation teams found some problems in the technical outputs produced by both the Small Farmer Cropping Projects of Central America and the Northeast Thailand Agricultural Research Project. In the Small Farmer Cropping Project, several otherwise excellent packages of specifications for farmers to improve productivity were somewhat hampered by their neglect of the social and economic

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variables that influence small farmer cropping decisions. In Thailand, political resistance by the Ministry of Agriculture to allocating significant resources for research programs at the station meant its software development was seriously limited.

Finally, in the Agricultural Management Development Project of Ghana, the utility of an otherwise excellent training program for agricultural extension personnel was hampered by institutional resistance to utilizing those skills in the field. Ironically, the same organization which resisted applying the training in the field originally requested, helped define, and supported the training in the classroom. What hindered the project was the different perspectives between headquarters' personnel of the Ministry and field supervisors. The latter would have had to change personnel, planning, budgeting, decision-making procedures to fit the software. Regardless of its apparent theoretical soundness,

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it was not acceptable on these grounds to key field personnel, and its accomplish-

The last four projects reviewed here were each software intensive. Each experienced some resistance to its technical outputs, two (PDAP and Small Farmer Cropping) because the software did not fully match the real world needs of project beneficiaries, and two (Agricultural Management and NE Thai Research), because other host government personnel found the project software inconsistent with their political interests. What is fascinating about these four, software-intensive projects, is that evaluators of each felt they nonetheless achieved significant outcomes. What was not useful was quietly discarded or modified. While elements of the projects were resisted, others were accepted and supported rural development in at times unexpected ways. Perhaps because no heavy or perishable investiments depended on their immediate, effective field operation, they had time and space to evolve beyond their initial paradigm problems.

Because of the limitations on human knowledge, producing good software will always be a difficult challenge. Inaccurate models of reality, as in Rahad, or contradictory models of reality, as in the Eastern Ord, will probably reoccur. However, project designs which build in highly centralized management systems with weak or absent feedback loops beg the unavoidable to become the disasterous. Similarly, while project participants will often disagree as to reality, final project design and implementation should reflect a consensus on one working model to avoid suicidal contradictions. The key insight which lies in analyzing software problems is that they are probably never completely soluable, but they can be contained with appropriate administrative strategies: time, consensus and openness to feedback.

Support Services: Our contemporary model of rural development emphasizes the diversity and complexity of factors hindering small-farmer production. Indeed, that has been well understood since the early 1970s. This model notes the need for complex and sustained interventions to- help small holders break through these

obstacles.[62] Nonetheless, in virtually every project where increased rural agricultural production was the goal there were inadequate support services. Their impact on the simple infrastructure projects was generally not disastrous: evaluators noted that production would have increased more had a multi-faceted approach been pursued, but the projects in most cases made progress regardless. It is in the integrated area projects where the shortfall in supporting services had, in two cases, critical consequences.

In the simple infrastructure projects, there are two patterns. First, nearly all evaluations observe that projects failed to comprehend the necessity of combining supplementary rural services to achieve maximum project impact, and did not design them into the project from the start. In the Philippine Small Scale Irrigation Evaluation for example, evaluators noted: "...There was an overemphasis on commodities and infrastructure and too little on the agricultural technical assistance necessary for improved farm system."[63] The evaluation noted, however, that these services may have been beyond the capacity of the Ministry of Agriculture. Similar observations were made on the Jamaican Feeder Roads Project: "If the strategy was to improve long-term rural income by raising income and services, improvement of existing roads was not a key constraint or priority. Programs to increase irrigation, credit for inputs, and marketing improvements would probably have been more to the point."[64] Similar observations were drawn in the Honduras Rural Roads Project as well.[65]

In both the Jamaica Roads and the Philippine water projects there is a second pattern, where evaluators found failures by <u>existing</u>, <u>anticipated</u> supporting services also hindered project goals. In Jamaica, crops were not evacuated per schedules, were graded below standard, and payments came to farmers late from the State.[66] In the Philippines similar problems, existed as well as inadequate support for irrigation machine maintenance.[67] That pattern takes an unexpected twist in the

On-Farm Water Project in Pakistan, where a substantial upgrading of agricultural-irrigation extension personnel was designed into the project. Even though Pakistan had, according to evaluators, a fairly strong agricultural extension service al-

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ready in existence, nothing was done to fulfill this design.

In two of the integrated rural or area development projects, severe shortfalls in supporting services seriously hampered project goals. In the Eastern Ord Project of Upper Volta, virtually every supporting service failed. Veterinary services were not provided to help train and support farmers who had purchased oxen for animal traction, nor was the equipment necessary provided for farmers to use the animals; agricultural personnel who were to' be trained for extension services in the target area were not nominated by the host government; and information to guide the entire project was not gathered. These failures require further discussion.69

Three factors appear to account for this pattern in Upper Volta. First, the evaluation team found that the Upper Voltaic regional administration never accepted the "intensive agricultural zone" concept that was a key feature of the project. These "intensive zones" were to receive extraordinary extension support, which was to backup the introduction of draft animals. "It is perfectly clear that the ORD has not given the highest priority to providing all the services to the intensive zones that are called for in the project agreement. In fact there is no indication that the ORD has made any special effort to achieve the desired level...."[70] The second problem, absence of progress in staff training, seems explained by the regional administrator's belief he could not afford to release employees from current duties for staff training.[71] Finally, project research stalled because the American technical assistance team was drafted into largely operational responsibilities in the regional administrative structure. The squeeze on research was intensified by an eighteen month delay in getting the American team into the field

to begin with.[72] At the time of this evaluation, the project was essentially stalled at all significant points.

Support services were also a severe problem for the farmer-tenants in the Rahad Project of Sudan. Village quality of life deteriorated when the national government withdrew social service and educational personnel which the corporation was supported to replace. However, corporate finances and/or management simply could not deliver the promised services. Furthermore, the corporation failed repeatedly to deliver to farmers crucial inputs of seed, fertilizer, water, mechanical support and credit in the volume and at the time they were needed. Finally, no effective technical assistance was provided to farmers, few of whom had any experience with this type of agriculture. Indeed, the project evaluators felt the corporation itself had insufficiently researched the agricultural system they had designed for this area, particularly in the usage of chemicals in the process. As a result, the labor force was unhappy, feeling betrayed by the corporation which had more-or-less forcibly removed them from hitherto private, subsistence agricultural patterns, and the production system was not working in

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a fashion which could sustain the project.

In the Eastern Ord, these problems in supporting services appear to grow from incomplete commitment to the project concept by all key Voltaic officials. While the national level accepted the project, concept, field personnel did not, and failed therefore to provide crucial support services. This incomplete agreement was complicated by severe field conditions which meant personnel decisions truly were zero-sum, and by overambitious and unrealistic project scheduling.

Unlike the Easter Ord, incomplete agreement did not seem to be a crucial problem in Rahad. Rather, the combination of the corporation's poor working model of irrigated-corporate agriculture; severe environmental conditions; and a general dearth of extra, floating resources to compensate for corporate shortfalls, meant

design flaws accelerated in impact over time and space. Severe disruption of the project was the result.

Development projects are extremely vulnerable to failure of support services. In a pattern entirely consistent with our knowledge of parallel projects in the United States, we find that coordination among diverse actors from different agencies simply breaks down. Communication failures (Rahad Irrigation, Jamaica Roads), differing priorities (Pakistan On-Farm Water, Philippine Small Scale Water, Eastern Ord), and limited resources (Eastern Ord, Rahad Irrigation) all intensify what is generally agreed to be a difficult task anywhere: coordinating independent actors with their own political agendas. The fact that LDC development projects work in areas where resources of all sorts are scarce and environments are severe only makes the problem worse. As the Eastern Ord evaluators noted:

> "It cannot be assumed that the various development interventions currently underway in the ORD are necessarily integrated or consistent with the AID project: Many are completely outside the control of the project or indeed the ORD plan for development. The AID project operates within a framework of continuously changing national, regional and local policies that also are not necessarily coordinated nor internally consistent." 74

Expanding rural production is a complex task. In some cases, project designers, working with a simple model of the rural production process, anticipated a relatively simple intervention such as building infrastructure would accomplish some measure of that goal. And while the projects reviewed here <u>did</u> accomplish something, every infrastructure project evaluation notes that neglect of support services limited project impact. The irony of this evidence is that in two of the projects where complex, multifaceted interventions were pursued, incomplete agreement as to project concept, inadequate administrative resources, or faulty understanding of the rural production system prevented <u>those</u> projects too from achieving significant results. One must wonder if there is a solution to this dilemma?

Maintenance and Management of Infrastructure:

Once project infrastructure is in place, it must be maintained and correctly managed. Most of these projects are relatively small in scale and do not establish bureaucracies to operate the projects. Most of the projects, therefore, depend on local persons and local organizations to maintain and manage the investment.

In six of the nine projects where infrastructure was a major component, maintenance and/or management were serious problems. In four of those six projects, inadequate organization of local dwellers was a key cause of those problems. The Sederhana Irrigation Project (Indonesia), is an insightful example, both of the necessity of involving local dwellers and of how that involvement fell short.

Small scale irrigation is local management intensive. Because it generally draws its water from river flows rather than reservoirs, the quantity of water available is neither constant or predictable. Furthermore, as river flow is dependent upon the same rainfall and run-off patterns farmers rely on to supplement irrigation, the seasonal demand for irrigation tends not to correspond to the supply. System capacity is also idiosyncratic to locality, and varies as well from season to season. Thus, a disjunctive pattern of supply and demand along with areal and seasonal variations requires find adjustment to allocate and balance supply with cropping patterns and needs; to avoid bankrupting and disillusioning farmers; and to avoid local social conflict. Finally, the system must be maintained as well: channels must be cleaned, equipment kept in repair and, often, funds managed to pay for loans and replacement equipment.[75] As the evaluators of Sederhana noted: "Given the above constraints, it is obvious that even though the irrigation system may be simple in all respects, the Water management system is not simple as any respects.[76]

Throughout these studies one finds local organization falling short of these tasks. For example, in Sederhana, even though the project included development of "Water User Associations" as a key activity, in only 38% of the first fifty-two systems were such associations even formed.[77] Even fewer were "functioning effectively." No one involved in project implementation, right from the start, systematically saw to assure farmer participation in general, nor to support these associations.[78]

The Sederhana local water associations, even when established, did not always have the authority to make key water management decisions. This made their effectiveness even more problematic. Decisions on where to plant crops and which crops to plant were often made by traditional village leadership, which tended not to be the same persons as those involved in water user associations.[79]

Time and experience appeared to be associated with association growth:

> Conversations with farmers indicated that their attitudes change as they gain experience with irrigation systems. Initially, water security is more important than water management. Later, when the reliability of the water supply becomes known, farmers are willing to invest time and labor in the construction of tertiary and quaternary channels, if they perceive that there is enough water in the dry season to make field channels worthwhile. After gaining some experience with field channels, farmers often become interested in water rotation. At this point, strong local leadership appears to be a critical factor for successful water management.

Thus an initial emphasis on top-down design and weak follow-through in project plans, traditional decision-making systems, and the need for time all have meant water user associations in Sederhana have fallen short of their functions. And, "Where farmer participation has not occurred, major problems exist. These include failure to adequately ration limited water supplies, failure to equitably distribute water within a small system or among villages in a larger system. The lack of a system for maintaining the physical works, and the inability to prevent illegal water use at unauthorized locations."[81] Evaluators noted similar, though less

serious, problems in the Pakistan On-Farm Water Project.[82]

In the BICOL Integrated Area Development Project farmer organizations were also poorly established. Here, too, they were important to long-term project goals because of their maintenance and management function, and because a cooperative structure was needed to help provide inputs, credit and marketing. However, the top-down, non-consultative approach followed in the BICOL seemed to preempt new, and at times destroy existing local organizations.[83]

The BICOL IAD was a massive project, intended radically to improve lives of rural dwellers in an area with frequent typhoon damage, erosion problems, inadequate transportation and below average incomes. The project set an agenda which included building irrigation and drainage systems and a new road system; improving private investment; improving land tenure arrangements; strengthening upland land use practices; and improving the sanitary environment and household water supplies. Decentralized decision-making, area planning, local participation and a multi-sectioral and integrated area approach were all to be part of the plan. Totaling nearly $100 million in cost, BICOL set major goals, and mobilized proportionate resources to those ends.[84]

Project evaluation documents suggest that the large physical scale of the project investment, the apparent dominance of the physical engineering in project management, and the substantial distance between key management decisions (Manila, in many cases), meant that input from the beneficiaries was limited right from the start.

The large scale of the system, although in theory possibly economically more efficient in the long run, disregarded existing land boundaries, displaced and destroyed existing smaller-scale systems, and allowed no room for a meaningful local role in major design issues.[86] The engineering orientation of the project often outweighed input from National Irrigation Authority representation who were to

articulate and represent local needs: "While in the project office, I get the feeling that the engineers do not see really any need for our work ... my sympathies are with the farmer: they are not getting any water; the designs are faulty; construction is delayed...," observed one NIA local representative.[87]

The outcome was a passive role for local farmers: "Although participation was widely heralded part of the plan, it is only recently that experimental efforts have begun to engage them [farmers] in activities beyond the various meetings to which they were summoned in the past to hear officials talk and exhort farmers to help."[88] As one farmer said: "When lawyers and other governmental officials speak, everyone applauds. When farmers speak, no one listens. This is what has been happening in BICOL."[89]

In the Philippine Small Scale Irrigation Project, by contrast, performance of. "Irrigators' Service Associations," was generally strong. Such "ISAs" are legal entities which borrow money from government to build the irrigation systems, repay debts, cover electricity costs, distribute water, provide voluntary construction labor, and maintain the system. Some have expanded beyond these roles to move into cooperative buying and selling, and into off-farm enterprises such as brick making.[90]

ISAs appear to be real, locally-controlled organizations. Unlike in Sederhana, ISAs must be organized <u>before</u> an irrigation scheme is begun, have the dominant role in all phases of the project, and receive sustained though limited technical assistance from the "Farm Systems Development Cooperatives" through their "Institutional Officers." The "IOs" explicit role is to provide organizational support for the ISAs and to advise farmers on the technical and organizational issues involved in running a small-scale irrigation system.[91]

While the participatory approach appears successful in achieving effective local organization and management, national pricing and cost recovery policies.

however, may threaten the long-term viability of the ISAs. Furthermore the fragmented and unintegrated approach to rural production of the Small Scale Irrigation Project was criticized by one AID evaluation team member as leading to sub-optimal production. In this respect the project's virtue (local orientation) may reduce in some measure its long term effectiveness.

Maintenance and management of the Rahad Irrigation Project suffered both from ineffective involvement of local dwellers and from a general breakdown in corporation and host government resources. As we have already noted, Rahad is a massive, 400 million dollar project which will relocate some 100,000 rural dwellers in a scheme of forty-six villages to work as tenant farmers growing cotton through mechanization and irrigation. Right from the start, however, project economics were problematic, support services from the government of Sudan and within the project ran short, and cotton production declined. Structured on a paternalistic model where management was assumed to be all-knowing and the labor supply was seen as passive and managerially peripheral, the corporation lacked the information to refine its policies in the field, a structure of rewards to offer labor to persuade it to continue producing cotton until the economics could be fixed, and a population willing to engage in voluntary labor and self-help to fill the shortfall of government and corporate resources.

The Comilla Integrated Rural Development Project provides an interesting contrast to the centralized, non-participatory approach of Rahad.[92] In Comilla, participationwas excellent, and emphasized by project management from the start:

> The Academy clearly identified three main constraints consisting of high risk of flood and drought, social anarchy, and impoverished small holdings. These constraints were at least partially removed by a sustained organizational effort in Comilla thana. The risk of flood was reduced by digging drains and building embankments. Irrigation was widely introduced. Local councils and cooperatives were made important and strong.[93]

The outcome was dramatic:

> There was little doubt about the response from the farmers. They quickly joined the cooperatives in large numbers, adopted improved methods, and used larger inputs. Both loans and savings grew in volume. In less than a decade Comilla thana showed a distinct advance in respect of production, employment, agricultural skill, and capital accumulation. It was a well-documented demonstration of how much rural works, local council and cooperatives, if properly managed, can change a previously destitute and backward region. 94

However, in Akhter Hameed Kahn's analysis, centrally-based and urban-oriented opponents of this approach eroded these organizations over time, in part by direct attack, and in part by tempting local farmers away with no-cost or "soft" programs:

> However, the model was surrounded by difficulties. There was the disapproval or rural autonomy by politicians and bureaucrats. They had more faith in their own paternal role than in village wisdom. There was a pervasive urban bias. Local councils and rural works were condemned and cooperatives held in contempt. All around programs of official guidance and quick assistance were promoted, and local organization and cooperative discipline were discounted. In Comilla a 'hard' program had to compete with 'soft' programs. Most of the time villagers were being tempted and confused. 95

When East Pakistan became Bangladesh, local councils were dismantled, and their critical roles in management and maintenance were interrupted. Cooperatives were "...attacked by radicals. They declared the Comilla cooperatives to be strongholds of 'large' farmers, mere Kulak clubs, useless or even harmful for the poor and landless." [96] In 1977, Kahn found much neglect of the rural public works build by Comilla and local "institutional decay" presaging their breakdown. [97]

Maintenance and management of infrastructure is vulnerable to several problems. Perhaps not fully understanding the need to involve rural dwellers from early in the life of the project, project designers and managers miss opportunities to build and strengthen rural organizations as the project is implemented. Indeed, in some cases, they design projects which weaken and destroy those organizations which already exist. Other official agencies, concerned over their goals, pursue policies which inadvertently threaten rural organizations. As in Comilla, officials who

oppose the project for theoretical or personal reasons can pursue policies which directly attack locally based organizations crucial to maintenance and management. Finally, as Kahn notes, participatory management itself is never simple:

> In addition to many kinds of external opposition, there were internal shortcomings. Management or training or member behavior was far from perfect. Examples of corruption or subversion were not unknown. Obviously the road to institutional development had many pitfalls. And then national politics created a climate of total uncertainty, discipline mostly lapsed and all organizations faltered.

Maintenance and management of infrastructure thus labors under the technical complexity of the task; the difficulty of organizing effective associations to perform it; the engineering and/or capital-intensive bias of these projects; and at times, the active, political opposition of others. It is no wonder it often performs less well than hoped.

IV. Conclusions

Can the rural development strategy be implemented? That was the question posed at the beginning of this paper. Certainly the evidence reviewed from these fifteen development projects casts some doubt on the feasibility of the strategy. Five consistent problem areas reappear throughout the projects; no project is a complete success, and several are virtually unmitigated disasters. Nonetheless, when problems are disaggregated they do not appear intractable.

Project economics are hindered by poor knowledge of the rural production system, by goal conflict among the various agencies working in rural areas, and by overoptimistic expectations. Location and design of infrastructure is hindered consistently by poor decisionmaking by personnel distant, in knowledge and/or space, from the conditions in the field. Software suffers from the perhaps unavoidable limitations on human knowing, both theoretical and informational; its problems are intensified by time pressures, by incomplete agreement on project "concept," and by weak feedback and learning systems.

Support Services have been hampered by incomplete knowledge of rural production economics, by the seemingly ubiquituous problem of coordinating actors with differing needs and goals, and by the severity of the LDC administrative environment. Finally, maintenance and management of infrastructure is handicapped by the technical complexity of the task, the paucity of organizations in rural areas, the engineering-capital bias of these projects and, occasionally, by political and ideological opposition. While these last four problems may appear overwhelming, the fact that effective rural maintenance-management organizations do exist suggests even they can be overcome.

This survey of project "gremlins" may appear less overwhelming if we pause to note the consistent patterns that crosscut these problem areas. For example, the disjunction between working models used by project managers and apparent realities in the field is a consistent source of problems. It causes errors in pricing, poor location and design of infrastructure, is related to the theoretical problems we found in software design, and led to weakness in support services. Arguably, the engineering-capital bias is related to this as well.

A second consistent problem is goal conflict. It disrupts project economics, is related to software errors in the Eastern Ord, is a consistent problem in "coordinating" support services, and caused overt political opposition to the Comilla Project.

Finally, there is the problem of simple technical complexity. Managing small-scale infrastructure, designing effective software, putting together the data to correctly set the prices is a technically complex task.

Reduced to these three themes, the problems administering these projects have a familiar and homely appearance. We have met them before, been defeated by them,

and, in time, overcome them. If we assume LDC project designers and administrators are neither malevolent nor incompetent, we must ask, why are these problems so

apparently intractible and overwhelming in the context of the international assistance project? The environment characteristic of the less developed countries and the donor institutions may help answer this question.

In a perceptive article, Martin Landau argued the virtues of "redundant" organizations.[100] Recognizing the persistence of human fallibility, the ambiguity of information and the unavoidable uncertainty as to the validity of working models of reality, Landau showed how organizational duplication, both internal and external, was a key to organizational effectiveness. As human beings can "goof-up," can misinterpret information, fail to carry out responsibilities, make mistakes, and so forth; as information is costly, always contains some error, is subject to judgement as to which information is gathered, and subject to varying interpretations; and as theories or paradigms used to interpret reality are always uncertain, influenced by training, position, perspective and experience, placing all one's bets on any single line of action, body of information or paradigm is virtually begging for disaster.

Yet in most cases this is precisely what the least developed countries are faced with, particularly in dealing with rural development. The network of redundant institutions common to the developed countries is thin in the LDC; indeed, in the poorest rural areas targeted for development assistance, it is nearly absent. Those cooperatives, unions, small businesses, secondary and technical schools, occupational associations, interest groups and local governments common to developed countries are few or, sometimes, completely absent. Thus the multiple and alternative sources and channels of information, the multiple structures through which action can be taken, and the multiple lenses through which the "real" world is interpreted, are not there to help avoid, correct and compensate for error. Not only is "external redundancy" absent, but the field representatives of service ministries are usually alone, overworked, and lack personnel, logistical and

intellectural support: those actors thus work without redundancy in their organizations as well as in their environments.

In the "real" world, thus, when a part breaks, there is no spare. When a person is ill, there is no substitute. When information is bad, irrelevant or lacking, there is no alternative source to compare, check or to turn. Finally, when paradigms in the field or the headquarters are not working, there exists no one to develop and articulate alternatives. Indeed, the paucity of internal (to bureaucracies) and external (in society) organizational resources may be such that no one in authority even knows the paradigm is lacking until too late!

These patterns can be seen throughout the projects reviewed in this paper. Simple lack of information nearly bankrupted the Sine Saloum project. The Bolivian Rural Electricity project was misdesigned because of lack of information about the rural demand structure. There were design problems in the Sederhana and On-Farm Irrigation projects for the same reason, while the Rahad, BICOL, and Eastern ORD Projects each made key strategic errors in economics because of lack of information as to farmer production cost and profitability figures.

In each of these cases, the projects themselves were responsible for gathering information, and there were neither competing channels within nor outside them to check, challenge and correct poor information. Information problems were in part caused by and intensified paradigm problems. Working with simplified models of rural production, the projects gathered no or limited information which in turn allowed poor models to continue unchecked. The same absence of redundancy, both internal and external, meant alternative models developed slowly if at all.

Finally, when project structures broke down under the weight of poor information and inaccurate models, no alternatives existed to carry on. When in the Eastern Ord, agricultural extension services failed to perform as designed, draft animals died and farmers were bankrupted. There were no alternative structures

to which they could turn.

Similarly, when project policies began to bankrupt farmers in Rahad, destroy existing irrigation systems in BICOL, and threaten the financial viability of User Organization in the Philippine Small Scale Irrigation project, no structure existed for "beneficiaries" to appeal through, either within or without the project. Mistakes once made, tended to ripple through the projects with intensifying impacts. USAID itself lacks redundancy, having faced in the last decade repeated cuts in personnel and management funds, while trying to supervise ever larger numbers of projects ever more distant from Mission headquarters. And in several project evaluations, USAID personnel were severely criticized for their failure to catch and solve emerging problems.

Bad information, paradigm problems, organizational breakdown and counter-productive policies are all therefore linked to absence of redundancy. One might hypothesize as well that this absence of redundancy, writ large, helps cause and intensify those goal conflicts which bedeviled several projects. Perceiving a zero-sum economic pie (possibly a shrinking pie), the Philippine Irrigation Authority was concerned with paying off loans, ignoring the possible impact of its policies on farmer productivity. While the Eastern Ord Project was trying to increase the capacity of extension personnel, the regional administrator felt so short of personnel that he apparently feared serious consequences from any personnel leaving active service, regardless of the long term value of the training. Design problems noted in Sederhara and On-Farm Water grow in part from the desire of engineers and project personnel to get the most infrastructure from the project's dollars: they traded off quality for quantity.101

Absence of redundancy affects the entire life of development projects: models, information, field design, implementation, pricing, technical skill, etc., are compromised from the start, have less chance to recoup field mistakes, are more

likely to founder on random problems, and are more likely to be caught by goal conflict among agencies. Add to this the fact that rural development projects are consciously chosen to work in the poorest, most severe, and least understood areas, the challenges to their non-redundant structures are large indeed.

Of course, not all projects are failures, and "outliers" are a source of insight. The most conspicuously successful of these projects was Comilla. And the striking characteristic of Comilla was its designed redundancy.

The Comilla Project grew out of the Comilla Rural Development Academy, established in the late 1950s with an open-ended charge to do research and training in support of rural and village development. Staffed with diverse professionals (social scientists, economists, sociologists, psychologists, statisticians, public administration specialists and educators) and supported by additional personnel from Michigan State University, the Academy was allowed to define for itself a rural development strategy to fit the surrounding area.[102] Under little time pressure, the academy "...adopted, as a laboratory, the administrative unit in which it was located - the Thana of Comilla. We, the instructors, began to study our area with
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unparalleled thoroughness." They observed Thana officers to evaluate administrative capacity; investigated in detail the economic and social conditions such as land tenure, credit, crop production, marketing, diffusion of ideas, the status of women, and more. They then established several experimental projects from which they developed consensus on an explicit, interrelated, rural development program
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which they proceeded to implement themselves.

What is unique about Comilla? They had redundant intellectual resources. They had time together and reflect on the information they gathered. They had time to experiment and learn from those experiments. Finally, they were committed, as the permanent faculty of the academy, to an indefinite time frame. Finally, although they later came under attack from outsiders, they had some freedom to

define themselves and in an evolutionary way, what ought to be done.

Resources, time, personnel commitment and freedom to experiment and evolve apart from outside pressures. These appear to have been the keys to Comilla's success, and ways of building in redundancy in even the most severe environments. The lesson is instructive.

Unidimensional models are, at least in the social sciences, always limited. These projects suffered from a bias toward large-scale, capital intensive engineering, Western, high-technical, high-cost approaches to agricultural development; lack of theoretical certainty as to the causes and solutions to third world, rural poverty; serious technical problems; and severe goal conflict among strong political actors. While each of these characteristics is independent of organizational and social poverty, each is intensified by absence of redundancy. Either in information gathering and flow, in paradigm development and discussion, or in feedback on project performance, it is social and organizational weakness which encourages these errors, allows them to continue, and slows learning.

Projects must be designed to learn from and use their own experience. A longer time frame; resources and rewards to learn and redesign; personnel slack to permit organizations to respond to emergent problems; multiple channels of information from the field, and a conscious strategy to strengthen local organizations appear absolutely critical to rural development.

Rural development goals have <u>not</u> outstripped organizational <u>potential</u>. They <u>have</u> outstripped existing organizational <u>capacity</u>.

END NOTES

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