

Computer-based information systems for decentralized rural development administration: a case study in India

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Administrative reform currently being undertaken in a number of developing countries is focusing on the introduction of microcomputers as a tool for the decentralization of rural development administration. Experience to date concerning these efforts reveals that the key determinants of successful implementation of the technology are associated with organizational factors rather than hardware and software. However, these factors have been inadequately addressed in the literature on information technology in developing countries and empirical research drawing on experience of individual projects in developing countries is needed.

To this end, this paper describes the case of the Computerized Rural Information Systems Project (CRISP) which is a government initiative to promote decentralization of rural development management in India. The interaction between formal, government-approved guidelines for rural development management and informal practice at the local level is examined. The findings reveal that the diffusion of technology has not been accompanied with changes to local work, decision and administrative processes.

Introduction

The importance of the rural economy for the overall development of India has been recognized since independence. However, in the 1970s, it was realized that significant sections of the population were not gaining via growth. Those left behind tended to be the rural poor without any income-generating asset or saleable skill. The Indian government felt that apart from general programmes for overall growth, special programmes were needed to enable the rural poor to earn a minimum income to meet their basic requirements.

Since 1978, the Integrated Rural Development Programme (IRDP) has been the major initiative in this direction. As its name implies, the programme visualized an integrated approach to total development of the rural areas. However, the rather hurried expansion of the programme to cover the entire rural area in the country at the beginning of the 1980s meant that in practice there has been little effort to integrate the demand and supply of rural resources. The focus of IRDP has been on alleviating poverty by providing sustained self-employment to selected families in rural areas through the provision of subsidy and credit for the purchase of an asset (Government of India, 1988a).

The validity of IRDP as an instrument for poverty alleviation has been widely debated. Many researchers have highlighted specific weaknesses in IRDP implementation and serious flaws in the IRDP strategy (Hirway, 1985; Pulley, 1989; Dreze, 1990).

In the mid-1980s, the Government of India realized that a massive amount of data had been collected for managing IRDP but that not much of it had been used effectively. Simply the very large dimensions of the programme meant that data compilation was often delayed because of shortages in skilled manpower. Moreover, the vast amount of data maintained in the records of local level offices was not easily retrievable and could therefore not be used for further analysis for micro-level planning. Consequently, there was little interface between progress as reported upwards and progress as witnessed in reality (Das Gupta, 1989). It was recognized that computer-based information systems offered the possibility of providing a local level of decision support for IRDP management. This led to the genesis of the Computerized Rural Information Systems Project (CRISP).

CRISP was based on the experience of an enterprising experiment in the Karwar district of Karnataka in Southern India in which the project director of the District Rural Development Agency (DRDA) introduced a microcomputer-based information system to improve the local level of decision-support. Systems design and development involved the active participation of the staff. All the clerks in the DRDA were given adequate training and education about how the computer could be used to help them in their work (Banerji and Ghosh, 1989). The project resulted in a marked increase in the district's performance in terms of the following (Patel, 1987):

- (1) Access to accurate base data about households

requirements, past performance and local resources increased the ability to make better planning decisions at the district level;

- (2) Access to timely data meant that there was improved coordination between banks and the DRDA. This led to joint efforts by the DRDA and banks at streamlining paperwork procedures and at improving other administrative arrangements;
- (3) The availability of data meant that political leaders and social workers were more informed about the progress and problems on projects in their areas. This led to pressure for expediting held-up work;
- (4) The speed of the computer and the introduction of improved administrative procedures meant that officials had more time for field visits.

Based on the experiences gained in Karwar, the Department of Rural Development extended the project to 10 districts throughout the country on an experimental basis. In October 1987, sanction was given to all DRDAs in India to purchase a PC/AT microcomputer and the requisite peripherals as per specifications laid down by the Department of Electronics (Das Gupta, 1989).

The software comprises a menu-driven application called CRISP developed by the National Informatics Centre, and several tools such as Wordstar, Lotus 1-2-3 and dBase 3+. CRISP is basically a report-generating application. Its specific objectives are

- (1) To provide an easy method of generating various reports prescribed by the Centre and State;
- (2) To create a basic record of beneficiaries and projects;
- (3) To collect information about villages for planning in preparation for CRISP Version 2.0 which has recently been launched (Government of India, 1988b).

This paper aims to assess the validity of the CRISP initiative as a tool for the decentralization of IRDP management. The next section describes the research methodology employed in the study.

Research methodology

This study adopts a sociological perspective of information systems (Kling and Scacchi, 1982; Walsham *et al.*, 1988). It is maintained that successful integration of technology with administrative functions does not just hinge on the installation of the technical system in an organization. In addition, it requires that the technology is institutionalized in the ongoing context of formal and informal work and decision-making processes. The importance of organizational and socio-political variables

has been recognized in the general literature on information technology in developing countries (Eres, 1981). However, case studies have tended to focus on more general issues regarding data collection and analysis techniques rather than on describing the context within which the information system is implemented. This point can be illustrated by reference to a book of published case studies on information technology applications in various government departments in South and South-East Asia (APDC, 1987). The case studies contain little discussion about the organizational and socio-political factors at a detailed level in particular planning situations in order to identify information requirements, administrative obstacles and factors related to managing the technological resource.

The sociological perspective of information systems brings with it added complexity of social structure, greater imprecision of identifying and measuring variables and the possibility of conflicting interpretations of the same phenomena. Taylor (1971) notes that in the social sciences, the interpretive nature of the objects studied means that knowledge can only be acquired by understanding and interpreting the process of interaction between people in a particular social setting. Taylor's line of argument can be extended to the study of information systems in organizations. Examples of such process studies include Zmud's (1982) model of information systems diffusion and innovation, and Markus's (1983) model of information systems impact on organizations.

The next two sections are devoted to describing the interaction between the formal and informal processes involved in the management of IRDP and the role of CRISP. The description relates to two districts in the state of Gujarat, namely Surat and Surendranagar, where the author has spent several months of fieldwork. The formal processes of IRDP planning, implementation and monitoring are described using secondary data sources, mainly government publications, and are shown diagrammatically with the aid of data-flow diagrams. The description of the formal processes is then used as a point of reference from which to consider distortions that were found to occur in reality. The final part of the paper discusses the impact of the CRISP initiative and draws some conclusions.

IRDP planning and implementation – model and reality

This section describes the interaction between the formal and informal processes of IRDP planning and implementation. These processes are currently performed manually and so the description below contains little explicit mention of CRISP since version 1.0 is primarily a monitoring and report-generating tool. Nonetheless, the

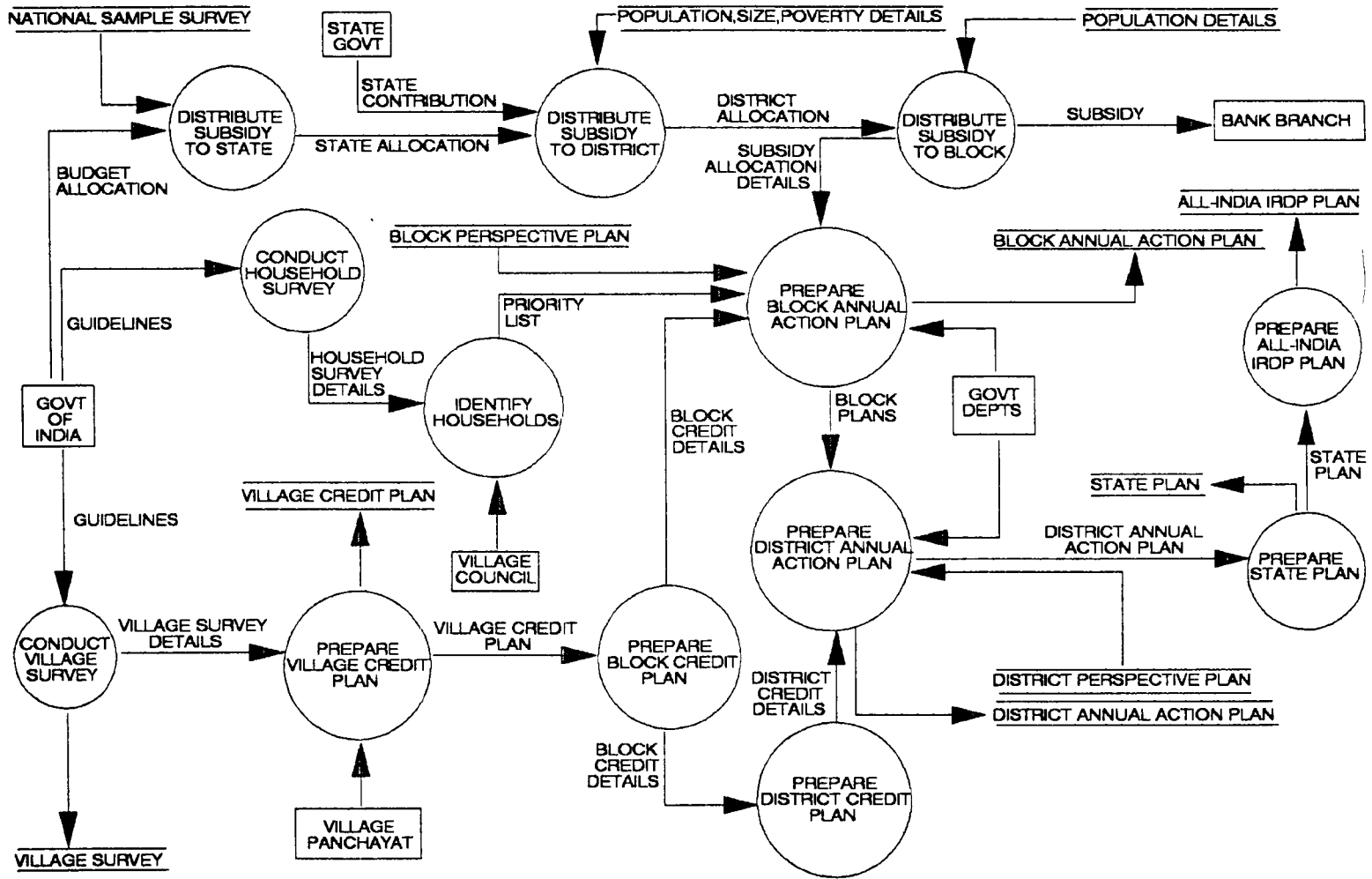


Figure 1 Plan IRDP

description is considered relevant because it provides insights into how decisions are taken at the local level which ultimately affects the validity of data in the monitoring system.

IRDP planning – the formal process

The formal process of planning for IRDP according to Government of India guidelines is shown in Figure 1. The diagram depicts the process by which funds are allocated and plans are prepared.

According to these guidelines, criteria based on population, size and the incidence of poverty of the various administrative units are used to distribute funds from Central Government down to blocks (the lowest unit of administration in India).

Each year, a household survey should be conducted and used to identify eligible beneficiaries for IRDP assistance. The criteria for eligibility should be based on the annual income of the household. At present, the cut-off line for assistance is made at incomes exceeding Rs. 4800 per year. The process of beneficiary selection should be democratic in that it should be conducted in the presence of a village council which comprises all persons residing in the village. The final list of chosen beneficiaries is meant to serve as an input to the preparation of the block annual plan. Alongside the process of IRDP beneficiary selection, each bank branch should conduct surveys each year in a group of around 15 to 25 villages. The village survey details are supposed to be used to formulate the village credit plan which is then to be consolidated into a block credit plan and finally into a district credit plan.

The information derived from the household and village surveys should serve as inputs for the preparation of the block and district annual action plans. Plan formulation at block and district levels should involve the coordination of government departments who are responsible for providing and servicing IRDP assets and who offer similar asset-based schemes for rural poor households. The district annual plans are consolidated into state plans and eventually into an All-India plan. The preparation of annual plans at all levels is supposed to be an iterative process with each plan critically analysing the implementation and impact of the previous year's plan on the economy of the area.

IRDP planning – the informal process

In reality, the household survey is conducted on an *ad hoc* basis – the last comprehensive survey was reported to have been carried out in 1983/4 in all the blocks visited. Villagers and workers alike reported that the village council does not take place. The selection of beneficiaries

occurs invariably via a random relationship between the block development officer, the village panchayat president and the village level worker. The incidence of ineligible persons being put on the priority list is high since there is no real way of knowing who are potentially eligible. This situation has lent itself to opportunities for the promotion of vested interests, corruption and nepotism of which numerous examples were quoted.

The problems of misidentification of beneficiaries are further aggravated by the fact that duplication of entries for one person may also occur since there is no unique identifier for each person or household. Under the present system, the beneficiary's name is the only means of identification.

As with the household survey, the village survey is also conducted on an *ad hoc* basis. There is, therefore, a shortage of up-to-date micro-level data for the setting of targets. In fact, none of the blocks visited actually prepare a block plan themselves. Instead, block targets are prepared by the district DRDA often without adequate information about local requirements. In all cases, plan preparation is not seen as an iterative process and there is very little feedback from previous years' progress being used as input for planning. Once prepared, the plans are seldom referred to and often destroyed. Due to the lack of accurate data concerning how many genuine potential IRDP households exist, planning tends to consist of somehow getting together enough names each year for IRDP assistance.

In reality, there is poor horizontal coordination between departments and banks for the setting of appropriate targets for the local area. Each unit is trying to achieve its own targets with little information exchange. In addition to the wastage of administrative effort incurred due to the lack of coordination, there is the problem of frequent mismatch between local demand and supply. Examples quoted to me by extension officers from Surendranagar district were as follows:

- (1) Last year, a target for providing 100 buffalos was set although the animals were unavailable locally;
- (2) A target for sponsoring 300 loan cases was set, but due to migration, the potential number of people eligible for IRDP assistance was less;
- (3) A village target for providing 5 sewing machines was set although no person in the village was able or willing to take up this activity;
- (4) Targets for providing dairy cow assets were set although there were inadequate milk marketing outlets available;
- (5) A target for providing sewing machines in a particular village was set under IRDP, but also under other schemes. With the supply of sewing machines greater than demand, this resulted in an overabundance of machines in the village.

IRDP implementation – the formal process

The process of IRDP implementation according to Government of India guidelines is shown in Figure 2. The diagram depicts how applications are sanctioned and assets are provided to the rural poor.

The bank branch should be responsible for processing the loan application sponsored by the block office within 15 days of its receipt. The loan application should be either sanctioned or rejected. In the case of rejection, the bank is supposed to state the reasons for the rejection and the application should be returned to the sponsoring authority for information and further action. If the loan application is sanctioned, then the asset should be procured for the beneficiary as soon as possible. Insurance cover for animals should be provided straight away. The assistance of cooperative societies should be actively sought to strengthen the organization of the rural poor. Moreover, in the Seventh Five Year Plan (1985–90), full public participation and awareness has been actively encouraged and voluntary agencies have been identified as being instrumental in bringing this about (Government of India, 1985).

IRDP implementation – the informal process

Insufficient information on the technical and economic viability of schemes is available to bankers for them to make information decisions. The problem is further compounded by the fact that the transfer turnover of staff at the bank branch is high with each officer only having

about 2 to 3 years in one particular location. This short tenure in office means that the bank official often has insufficient familiarity with the local environment to assess the economic and technical viability of a particular scheme and may be obliged to rely on information provided to him by village officials and non-officials. Due to the poor availability of reliable micro-level data, the tendency amongst risk-averse bankers is to reject all but tried and tested schemes involving applicants with a greater capacity to repay. This necessarily tends to exclude the very section of the population intended to be served by IRDP and who are most in need of assistance, i.e. the poorest of the poor and defaulters.

The lack of information concerning the viability of schemes means that the process of loan sanctioning is very much a political process. In Surendranagar district, one block office reported cases of collusion between bank officials and non-officials whereby some 30–40% of diary cow schemes were rejected last year even though the applicants were located on a good milk-marketing route. When a bank rejects a loan application, no reasons for rejection are provided. This means that follow-up or cross-checking the banker’s decision by the sponsoring agency is often not carried out.

Just as viable schemes were reported to be rejected unfairly, there was also a high prevalence of inviable schemes being sanctioned in order to achieve targets. In Surat district, cases were reported of the sanctioning of animal husbandry schemes in remote areas where marketing and after-care support of veterinary officers was lacking. Such occurrences were recorded to have

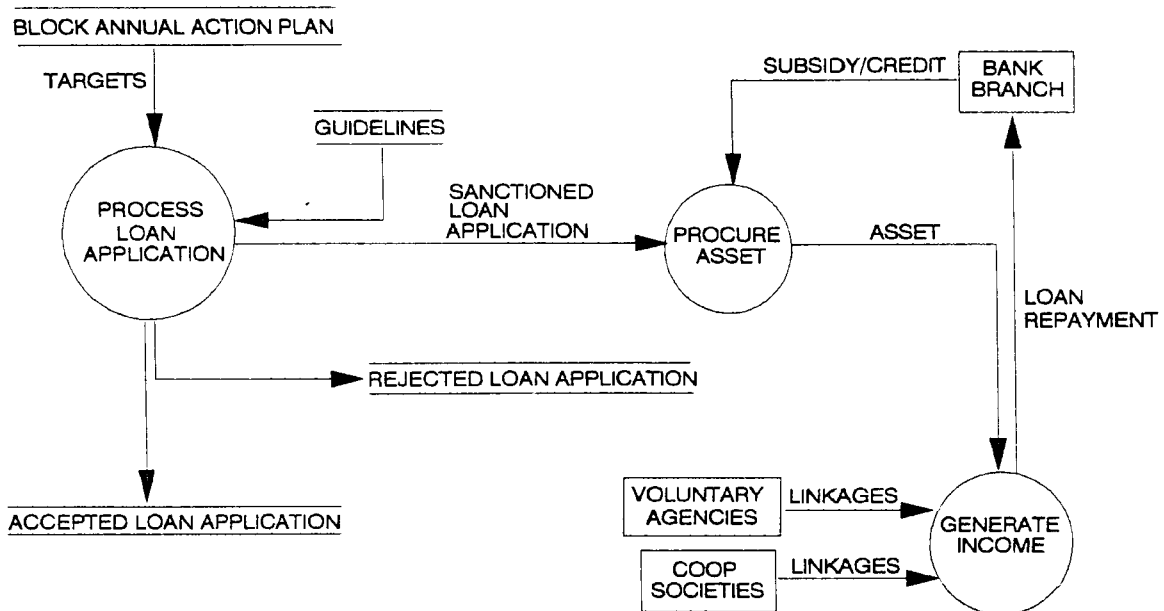


Figure 2 Implement IRDP

occurred especially in tribal pockets where the Government only requires a 10% recovery rate from banks to guarantee refinancing. This has encouraged bankers to sanction schemes without incurring administrative overheads or checking their viability. As far as the beneficiary is concerned, the consequences of such actions are severe since the probability of non-generation of income and defaulting increases substantially.

After the loan has been sanctioned, asset dispersal itself is often not promptly carried out and cases were reported in which beneficiaries had to pay bribes to receive their asset on time. According to extension officers, their argument was that they had insufficient information available about the supply of the asset, its location and price, so that the distribution of the asset was often done in an *ad hoc* manner according to whatever was available at the time.

Even after the loan has been sanctioned and the asset dispersed, many reasons were reported as to why a beneficiary may still be unable to generate income for himself and his family. Some of these reasons are listed below:

- (1) Beneficiaries and bank staff reported that the primary reason for beneficiaries defaulting on their loan repayments was due to misappropriation of funds by the milk cooperative society members;
- (2) Beneficiaries and functionaries reported that non-officials actively encouraged beneficiaries not to repay their loans in order to gain popularity amongst the rural poor electorate. The long-term consequence of such action has been to perpetuate dependence of the rural poor on the state instead of promoting their self-reliance;
- (3) Suboptimal productivity of an asset is often not conveyed promptly to the concerned sponsoring agency. In particular, information concerning the status of animal health from veterinary officers is not forthcoming. Consequently, close monitoring as to why the beneficiary may be lagging behind in his repayments is not carried out until the beneficiary has fallen badly into debt. The bank automatically classes him as a defaulter and the household is excluded from applying for further credit;
- (4) In Surendranagar district last year, extension officers reported that dairy cows had been sanctioned even though there were inadequate marketing outlets. In order to be able to generate income, beneficiaries resorted to the preparation and selling of ghee for which there was a demand in the village. When this came to the attention of the banks, instead of amending the plan in the light of feedback provided by the monitoring system, the bank refused to finance the scheme which meant

that the only income-generating possibility for the beneficiaries concerned was curtailed;

- (5) Voluntary agents seemed uninformed about the various programmes on offer, their aims and procedures. Moreover, voluntary agents send progress reports only to their trustees and there is very little coordination and information exchange with other functionaries involved with grassroots level implementation of schemes;
- (6) The DRDA at Surat reported that rabbit and goat rearing schemes had to be abandoned last year because tribal beneficiaries would consume the animal at the time of religious festivals such as Holi. In many tribal communities, a semi-monetized economy prevails and the concept of credit appears alien. The DRDA condemned the tribals for their backwardness instead of using the information to trigger off further investigations as to how to educate the tribal population about the IRDP programme or to examine what sort of assistance would be more appropriate to uplift a particular tribe given their culture.

The distortions discussed above often result in the beneficiary being unable to generate income from his asset. He consequently falls further into debt and deprivation as his family incurs the opportunity cost of the effort and time they have invested. As a result, they may actually end up being worse off than they were before they had received the IRDP asset.

IRDP monitoring and the role of CRISP

This section describes the formal and informal process of IRDP monitoring and the specific role intended for CRISP Version 1.0.

IRDP monitoring – the formal process

The formal process of IRDP monitoring according to Government of India guidelines is shown in Figure 3. The diagram depicts how information regarding the progress of IRDP is generated.

At the village level, reports should be prepared by the village level worker using information obtained from the IRDP beneficiaries, from the local bank branch and from other local workers. These village reports are consolidated into block level, district level, state level and eventually All-India IRDP reports. The main forums for facilitating coordination between the different administrative units involved in IRDP implementation are the Consultative Committees.

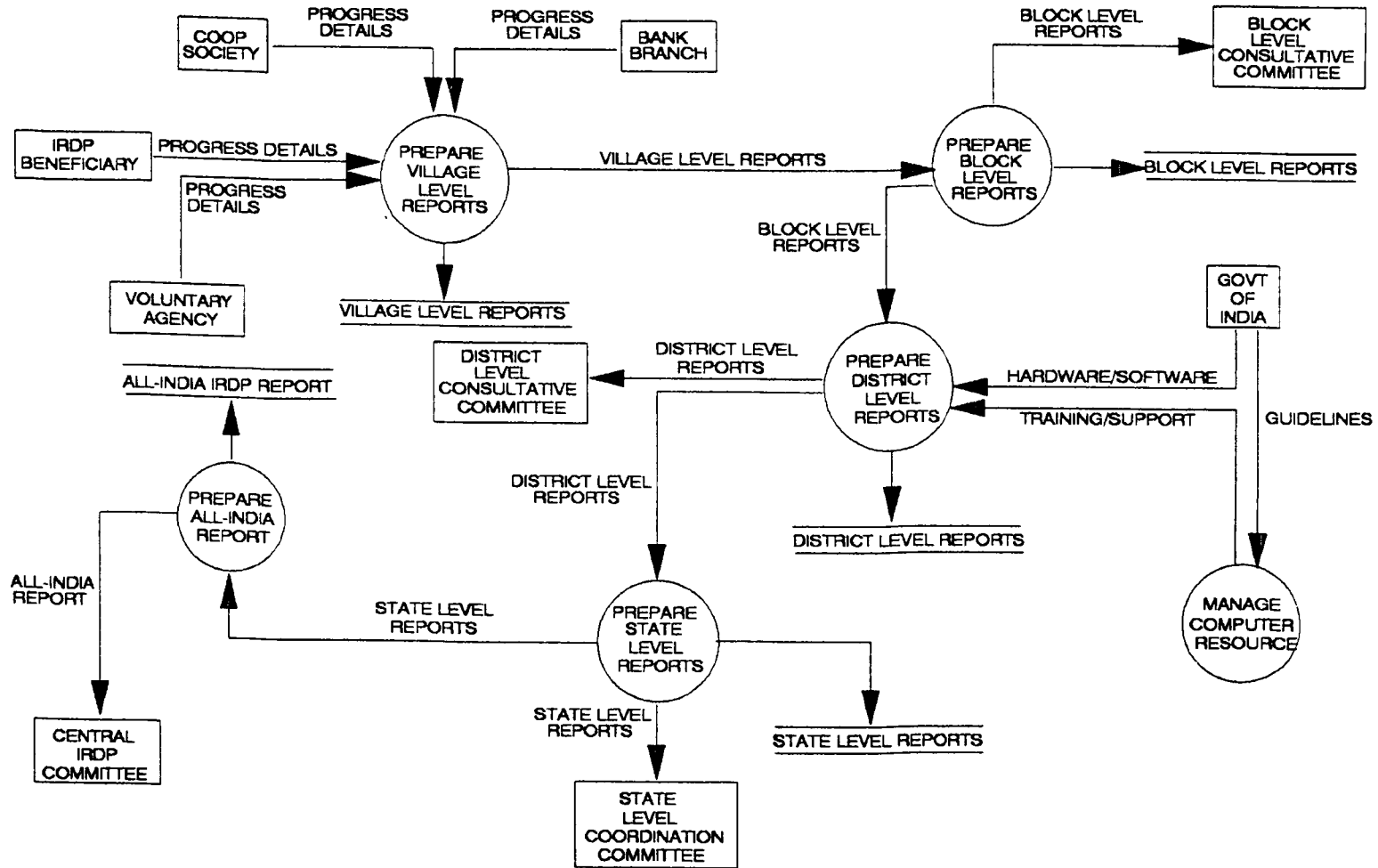


Figure 3 Monitor IRDP

Each state government is responsible for selecting appropriate institutions to provide computer training for staff and support services for all its districts.

IRDP monitoring – the informal process

Due to their heavy workload and the pressure on them to achieve targets for the different schemes operating at grassroots level, village level workers are often unable to devote sufficient time for follow-up and close monitoring of the progress of beneficiaries after they have received the asset. The frequency of visits in the blocks studied ranged from once every 3 weeks to once in 6 months.

The consequence of poor monitoring is that in case of difficulty, the beneficiary is unable to communicate his problem to anyone so that remedial action can be taken promptly. Moreover, rural banks have little incentive to supervise credit properly because of the inadequate fixed margin they receive to cater for the high transaction costs associated with lending small amounts to large number of scattered borrowers. Therefore, the village level reports concerning the progress of existing beneficiaries are invariably delayed and contain incomplete information. The poor quality of information at base level means that the compilation of village level reports into block level and district level reports is also distorted.

Going through the minutes of previous Consultative Committee Meetings at block and district levels, the agenda seems to narrowly focus on the achievement of IRDP and bank targets with little mention of discussing coordination between agencies, or the adequacy of backward and forward linkages for projects. The attendance of Government departments at these meetings is virtually non-existent.

In all 19 districts of Gujarat, the manual monitoring system still prevails and the CRISP system is not currently used for report generation. The reasons are as follows:

- (1) The DRDA simply does not have enough adequately-trained staff to operate the system. Computer training for DRDA staff in Gujarat has been carried out at the state-appointed Sardar Patel Institute of Public Administration (SPIPA) since 1987. The training courses are of insufficient duration to enable novice users to grasp the concepts and to be able to retain the knowledge they have gained. The problem is further compounded because the CRISP user interface is in English, while the main language of communication at local level is Gujarati. Moreover, after trainees receive a few days training on CRISP, they are often unable to put their training into practice because the computer is invariably out of action;
- (2) There is a serious mismatch between the reports generated by CRISP and the reports required to be

prepared by the DRDA for the Government of Gujarat. District administrators reported that there had been no prior consultation with them regarding their information requirements. Consequently, district staff feel that they have no motivation or incentive to undergo training and use the computer system since the vast majority of their reports still need to be produced manually. DRDA directors feel that they have little incentive to send their staff for computer training since all the staff at the agency are on deputation and may be transferred at short notice;

- (3) The CRISP system requires individual beneficiary details (around 100 000 records per district) to be recorded by each DRDA. However, the DRDA has neither the technical capacity nor the human resources to store, input and maintain such a database at district level. It was interesting to find that seven districts in Gujarat were using the microcomputer to generate their own reports for IRDP using Lotus 1-2-3 and dBase 3+. In all these seven districts, the director himself was enthusiastic about computers and was able to influence speedier adoption and acceptance of the system by the staff. This reinforces the critical role of the 'leader' or 'father-figure' in Indian culture which seems to permeate working life;
- (4) The physical location of the computer system has prevented its optimal usage. To date, in 2 out of the 19 districts in Gujarat, the DRDA office does not yet have adequate provision to house the machine. In the majority of districts, the popular choice of computer location at the DRDA office has been the director's cabin with the director himself capitalizing on the air-conditioning and improved furniture he is able to acquire for his office. However, the computer causes a distraction for both the director and the user. The director himself is often too busy to use the machine, and the user feels intimidated to use the machine in his presence. Consequently, in all cases where the computer is located in the director's cabin, the system has been underutilized;
- (5) Power failures, technical problems and poor support have prevented efficient utilization of the computer. On many occasions, DRDAs complained that they had to wait for up to 6 months for somebody from the maintenance company to turn up. For this reason, most DRDAs in Gujarat have not renewed their contracts with them and have instead contacted local companies for assistance. DRDAs also reported poor support from the CRISP Monitoring Cell which is a unit set up in 1987 by the Gujarat State Rural Development Department in order to provide assistance to

DRDAs. Poor support has grounded efforts made by the DRDA to computerize. This has created a negative attitude amongst DRDA staff towards the CRISP initiative.

The impact of the CRISP initiative

It was envisaged that the CRISP initiative would increase the efficiency of report generation and facilitate the availability and analysis of micro-level data for planning. However, a visit to any one of the DRDAs in Gujarat today reveals that the manual system still predominates and that the CRISP system is largely redundant. This section identifies four major barriers which have contributed to CRISP's lack of success.

Poor support and maintenance

A major barrier has been inadequate provision of support and maintenance for the computer equipment. The process of computer acquisition was decentralized to the extent that purchase for the machines was made by individual state governments floating their own tenders. Subsequently, maintenance contracts had been taken out between the state level support agency and DRDAs. However, the research findings in the previous section suggest that there has been a total lack of accountability on the part of the support agencies. This has jeopardized usage of the computer in the majority of DRDAs in Gujarat for long periods of time.

Lack of training and education

Effective diffusion of technology has been hampered by the unfamiliarity of administrators at local level of the potential of microcomputers. As the findings indicated, training courses have narrowly focused on how to operate CRISP rather than creating an awareness of information technology concepts for trainees who had no previous exposure to or rudimentary knowledge of computers.

More recently, however, there has been a noticeable change of approach with the emphasis of training shifting towards end-user computing. Computer training courses at SPIPA are beginning to focus on demonstrating to trainees how computers can be harnessed to improve the functioning of their work. Visits are made to other government departments which have already been computerized in order to demonstrate the practical benefits gained. A typical training course for DRDA directors now involves teaching how to operate basic spreadsheet and database packages and encouraging trainees to experiment with building potentially useful applications. Already these courses seem to have generated enthusiasm amongst directors and clerks.

Lack of user involvement in requirements analysis

The manual system predominates in the state of Gujarat because of the mismatch between reporting requirements of districts and the reporting capacity of CRISP. Information technology appears to have been introduced in a top-down manner without adequate consultation with the administrators who play a leading role in the decentralization process.

The CRISP design strategy

When the CRISP project was conceived, there was already in existence an ongoing manual system which had crystallized into a particular work culture. The research findings presented earlier revealed many manifestations of this work culture. In many cases it was found that the real motives or informal subsystem has tended to subvert the stated or original objectives of IRDP. For example, the formal democratic process of beneficiary selection in the presence of a village council has been subverted by an informal process of collusion between functionaries. Dominance of the informal subsystem seems to have given way to a situation in which the whole IRDP monitoring mechanism has restabilized itself such that the performance indicators in the existing monitoring system have little relation to the desired output of IRDP, i.e. poverty alleviation of rural poor households. With the prevalence of this work culture, the project team were faced with a dilemma when it came to adopting a design strategy for CRISP. On the one hand, they felt that the manual system was obsolete and outmoded and that a new management approach was needed to bring about a transformation of administration with the support of technology. On the other hand, such an approach seemed too radical and threatened the risk of failure through resistance by administrators. In order to increase chances of greater acceptability of the system, a deliberate design decision was therefore taken to introduce only marginal changes in the existing manual system (Das Gupta, 1989). To that extent, CRISP Version 1.0 represents a tool for the modernization rather than the transformation of the administration.

Computer-based information systems in development administration are often conceived of as a means of modernizing traditional bureaucracies by providing more efficient means for data processing through the automation of manual rule-based procedures (Mann, 1986). However, the danger of adopting this approach is that it serves to reinforce the endemic inefficiencies and biases of the existing manual system rendering the intervention both wasteful and dysfunctional.

The success of the initial Karwar experiment stemmed from the fact that systems design and development had involved the active participation and feedback of the

administrators and was combined with an effort to reorganize work processes within the organization. However, when the project was replicated on a nationwide level, the same degree of commitment towards integrating technology with administrative functions which lay at the heart of the initial experiment was lost.

Inevitably, successful implementation of CRISP depends on a crisis which calls into question the quality of the existing administrative machinery. The introduction of technology needs to be accompanied with efforts to review objectives, redefine and simplify structures, and modify attitudes within the organization. Such an approach may imply the possibility of resistance. Nonetheless, in terms of the general outcomes desired by the government initiative, it may provide useful clues as to what is going wrong in the organization and what could be done about it.

Conclusion

Decentralized information systems provide an equity-enhancing possibility of high potential for rural development. However, technology is not neutral in its social, economic and political effects. It can promote equality of opportunity, or it can be used to reinforce existing biases in the system.

In order to accelerate the trend towards decentralization, understanding must necessarily begin with an analysis of the biases, vested interests and attitudes of the actors within the organization to be served by the information system. Only then would the introduction of the technology serve as an opportunity for institutional innovation to reorganize work and decision processes. Although the research findings presented in this paper are based on a study of selected blocks in Gujarat, they may be generalizable to other developing countries undertaking decentralization of development administration.

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