Experiences with the Monitoring and Evaluation of Training and Visit Extension in India

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WORLD BANK STAFF WORKING PAPERS
Number 595
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The World Bank
Washington, D.C., U.S.A.
ABSTRACT

The paper describes the recent experiences of implementing monitoring and evaluation systems in T&V extension projects in India. Operational problems relating both to administrative and methodological aspects are covered, and partial preliminary results from a detailed case study of extension operations and farmers' practices are reviewed. In the course of this review, the authors demonstrate how the results can be presented in a manner which is useful for monitoring and evaluation purposes. The paper concludes with some suggested lessons from experience gained so far.
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I. Introduction

The proper conduct of monitoring and evaluation is an important element contributing to the successful implementation of extension projects. The highly structured format of extension operations under the Training and Visit (T&V) system, offers opportunities for effective monitoring of several extension activities, and with a well defined set of impact points (improved practices), some aspects of evaluation can be addressed in a relatively straightforward manner. But the overall complexity of assessing eventual extension impact on farmers' yields and incomes poses a problem with no easy or simple solutions.

In the present paper we describe recent experiences with implementing monitoring and evaluation systems in T&V extension projects in India. Operational problems relating both to administrative and methodological aspects are covered, and partial preliminary results from a detailed case study (being undertaken by the authors) of extension operations and farmers' practices are reviewed. In the course of this review, we endeavour to demonstrate how the results can be presented in a manner which is useful for monitoring and evaluation purposes. The ultimate purpose of the data gathered within the framework of this case study is to serve as a basis for an econometric analysis of extension impact. Thus, the study will need to grapple with complicated methodological issues, but we expect to derive
insights with operational relevance both for extension management and M&E units.

The structure of the paper is as follows: the next section provides background on the implementation of monitoring and evaluation systems of extension projects in India. It is followed by a discussion of operational and methodological problems affecting the establishment of a functioning M&E system in the context of Indian extension projects. An in-depth study of extension impact is described in a subsequent section, and preliminary results are presented. The paper concludes with some suggested lessons from experience gained so far.

II. Background to and Outline of the Current M&E System

The T&V system is a hierarchically organized and time bound structure designed to deliver selected, timely and feasible technology to farmers with strict regularity. The technology is encapsulated in carefully formulated recommendations often termed impact points which extension agents convey to contact farmers and such other farmers who attend the fortnightly visits or who approach the agent on their own initiative at other times. Full details of the structure and operating procedures of T&V extension are set out in Benor and Harrison (1977).

The system is designed not only to deliver messages to the farming population but to identify and feed back to senior extension officers, and ultimately applied researchers, farm level problems. This feedback mechanism
is designed to ensure that the system remains responsive to farmers' needs and continues to deliver relevant technology. This reverse flow of information, however, is not sufficient for managers to monitor the system's efficiency in delivering information nor to form judgments about the extent to which impact points are adopted by farmers and the consequent effects on crop yields and productivity. Hence, at an early stage in the introduction of T&V extension in India, the need for monitoring and evaluation was identified and resources for such work were built into the projects. Subsequently, it was realized that the monitoring and evaluation function itself needed to be defined, structured and systematized. The first attempt at this, for Indian T&V projects, was made by Cernea and Tepping (1977) who, in World Bank Staff Working Paper 272, defined three zones of concentration for monitoring and evaluation: (i) the visits of the VEW to the contact farmers; (ii) the extent to which the recommended practices (impact points) conveyed by the VEW are adopted or not adopted; and (iii) the yields obtained by farmers in the project area.

The implementation of an effective M&E system in various projects, as recommended by the Bank, was unfortunately slow, for the simple reason that adequate M&E units, with proper staffing and resources were not established as planned. Project managers were often reluctant to establish M&E and accorded higher priority to staffing other operational activities. In the case of those projects where the commitment to M&E was stronger, the recommended systems started to be implemented and produced results, but this was not the general situation. In an effort to overcome this implementation
bottleneck, the procedures laid down by Cernea and Tepping were summarized by
Harrison (1979) and again recommended by the Bank for application in all
extension projects, but staffing resources for M&E were still inadequate.
Given the growing demands for information derived from monitoring and evalua-
tion, steps were taken to provide direct assistance to projects for estab-
lishing M&E systems, and resulted in the preparation in the World Bank of a
manual for survey-based monitoring and evaluation (Slade and Feder, 1981), as
well as a research project designed to produce, inter alia, improvements in
the M&E of extension projects. This manual also recommends that the surveys
be complemented by special in-depth and rapid case studies, the methodology
for which is formulated in detail in the 1977 study by Cernea and Tepping.

In 1981, in conjunction with the development of the manual, the
Government of India took the initiative to increase the priority accorded to
M&E by the states and to promote uniform methods on a national scale.
Accordingly, the Directorate of Extension organized two 'All India' workshops
for senior state level M&E staff. The first of these workshops was held in
Rajasthan in July 1981 and the second in Tamil Nadu in February 1982. 1/
Much of what follows is related to the experience of implementing the recom-
mandations contained in this manual which, in combination with the special
studies described in SWP 272, were suggested as a standard approach to
monitoring and evaluation in T&V systems in India. Extension in India, being

1/ M&E practitioners from Rajasthan, Haryana, Karnataka, Madhya Pradesh and
Gujarat were present at the first workshop and from Tamil Nadu, Kerala
Maharashtra, West Bengal, Bihar and Andhra Pradesh at the second.
a part of agriculture, is constitutionally a state prerogative and hence the
Union Government's role with regard to extension is essentially advisory.
Consequently, some diversity in the approach to monitoring and evaluation is
inevitable for this reason alone, apart from the more obvious differences
resulting from adaptations made at the initiative of individual projects, or
differences in local experiences, culture, climate and agricultural prac-
tices.

In many ways, the monitoring and evaluation system now under
widespread implementation in India focusses on monitoring rather than evalua-
tion. Apart from the routine and increasingly standardized reporting of
physical, financial and administrative progress of extension implementation
in each state, the thrust of the M&E system is to objectively measure and
report the extent and quality of agents contact with farmers and the degree
to which impact points are adopted. These activities are complemented by
yield measurements which act as an important, albeit crude, method of
evaluating system effects. This simple approach is the direct consequence of
the lack, at the project level, of computer technology for the processing and
analysis of field survey data. It also reflects the difficult methodological
problems that must be overcome in any attempt to attribute productivity
effects to extension.

Typically in India, the extension system is part (albeit a very large
one) of the State Department of Agriculture. At the head of this organiza-
tion is the Secretary for Agriculture (or frequently, the Agricultural
Production Commissioner) supported by the Director of Agriculture who, in
turn, has a number of Additional Directors at his command, one of whom normally heads the extension system. These senior officers collectively comprise the management of the system and are thus the primary audience for information flowing from the monitoring and evaluation system. Because of their decision making functions, they are the officers who must initiate actions to modify and improve extension operations on the basis of the available evidence. For these actions to be taken in the best interests of the extension organization and its clients they should be based on information which is as timely, objective and accurate as possible. In pursuit of these ends, the monitoring and evaluation cell should be located close to all of these senior officers but be directly responsible to an officer senior to the Additional Director responsible for extension. This will enhance the independence of operation and judgement which are crucial if the M&E cell is to successfully perform its duties.

These principles are well understood in India but established rules of bureaucratic precedence and seniority sometimes operate to make its implementation difficult. In some states for example, the organization is nominally as above but owing to the lower rank of the head of M&E cell (usually a Joint Director), the Additional Director for Extension is able to comment on (and, therefore, influence) M&E reports before they reach the Secretary for Agriculture. Elsewhere the Additional Director (Extension) in the face of weaker or more disinterested superiors has succeeded in formally establishing his control over monitoring and evaluation. In yet another case, a sensitive extension director has reacted adversely to M&E reports not
because they contained damaging findings but because they were first, and quite correctly, considered and cleared by the Secretary for Agriculture. These cases highlight the difficulties of guaranteeing objectivity whilst simultaneously ensuring harmonious working relationships. In the last analysis, it seems that formal structures are less important than sound judgement, integrity and a will to make the system work well on the part of all involved.

III. Some Operational Problems

Monitoring and evaluation is a technical activity requiring highly developed and specialized skills in the social sciences and statistics, combined with substantial knowledge of the T&V system and the constraints surrounding its development. It is a task which requires the full time attention of those engaged in it. This principle is well observed in many states but in some the M&E unit has inherited or been subsequently charged with other duties (usually, it should be added, of a monitoring or evaluative nature). These other duties may extend from assistance in preparing the departmental work plan and budget to conducting M&E studies of other departmental activities or simply undertaking urgent administrative tasks handed down by busy superiors. Such deviations are counterproductive and have led, where they occur, to lower quality work or to long delays in producing reports. This results in loss of topicality and hence credibility in the eyes of both the M&E unit's masters and the extension wing at large. Specialization and the exclusion of extraneous activity are as important for M&E as they are the T&V system proper.
Of equal importance to successful M&E is a sufficient number of staff. A suggested staffing structure for a cell in a state of fifteen districts is set out in Fig I. This 'model', however, has found little expression in reality. In part this is the result, in some early state projects, of staff allocations being made before the M&E system had been designed in detail, in others it is a result of staffing structures inherited from pre-T&V days. Elsewhere, it reflects the exigencies of recruitment. The most serious and frequently encountered weaknesses in staffing lie in the senior ranks. In some cases, insufficient professional and supervisory posts have been provided to ensure reasonable spans of command whilst in others posts have been created but remain unfilled owing to a lack of qualified staff or grading difficulties. This can have severe consequences on both data quality and work output. In one large state, extensive and apparently acceptable data have been collected and satisfactorily tabulated but remains unreported owing to a shortage (unfilled positions) of economists to interpret and summarize these results. In the aggregate, however, the position in early 1982 was not unmanageable as Table 1 makes clear:

| Table 1: STAFF POSITIONS IN M&E UNITS OF FIVE STATES /a |
| (March 1982) |
|-----------------|-----------------|-----------------|-----------------|
| Number of Sanctioned Posts | Vacant Positions Number | Percent |
| Senior posts | 23 | 8 | 35 |
| Middle and supervisory posts | 67 | 6 | 9 |
| Field and clerical posts | 275 | 57 /b | 21 |

/a Haryana, Gujarat, Rajasthan, Madhya Pradesh and Karnataka. /b Twenty-seven vacant posts in one state.
Figure 1
Structure and Size of a Representative Monitoring and Evaluation Cell for a State or Project With Fifteen Districts

<table>
<thead>
<tr>
<th>Role</th>
<th>Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>1</td>
</tr>
<tr>
<td>Sr. Ag. Econ.</td>
<td>1</td>
</tr>
<tr>
<td>Ag. Econ.</td>
<td>3</td>
</tr>
<tr>
<td>Statistician</td>
<td>1</td>
</tr>
<tr>
<td>Field Supervisors</td>
<td>6</td>
</tr>
<tr>
<td>Clerks</td>
<td>12</td>
</tr>
<tr>
<td>Investigators</td>
<td>30</td>
</tr>
<tr>
<td><strong>Total Staff</strong></td>
<td>54</td>
</tr>
</tbody>
</table>
Numerical sufficiency is only one method of determining staff adequacy. Quality, means of control and turnover are also of importance.

In general, staff turnover is not a serious problem except in one or two states where entry qualifications, especially for field investigators have been set high (degrees in statistics), but the salaries are not commensurate with positions requiring similar qualifications elsewhere in government. Under these circumstances, highly qualified staff, often with mainly urban backgrounds, become disgruntled, and unwilling to work in rural areas and hence seek other positions.

At more senior levels, and partly as a result of promotion being largely dependent on seniority, there is a tendency for inappropriately qualified staff to be appointed to senior and specialized M&E positions. The consequent dilution of professionalism has deleterious effects on the overall quality of M&E work.

Work quality is also much influenced by the efficiency of supervision and the directness of lines of command, especially for field staff who are commonly stationed throughout the state. We note two common problems.

First, administrative convenience requires that M&E field investigators at the district and sub-district level be attached to the district agricultural office, controlled by the District Agricultural Officer (DAO). This creates the possibility that the M&E unit losses some control over its
field staff and in practice, depends crucially on the good will of the DAO's in maintaining speedy lines of communication and disinterested supervision.

Second, and of greater importance, is the ability of senior M&E staff stationed at headquarters to regularly visit their far-flung charges in the field partly to check on their work and partly to keep themselves abreast of current farming conditions. This ability hinges crucially on the availability of suitable transport facilities. Such facilities are not everywhere available (despite adequate provision at the time of project design) either because vehicles have not been procured or have been procured and allocated to other uses. In some cases, vehicles are available only from a departmental pool whilst elsewhere government restrictions on mileage and number of occupants materially hinder effective field supervision.

The need for M&E information to be efficiently collected and speedily tabulated and reported requires that the M&E unit use simple but effective methods of work planning. Each season requires a detailed plan of campaign to be drawn up and diligently executed. One season passes inexorably to another and early slippage becomes cumulative to the point where control and order is lost. Figure 2 sets out, for hypothetical rabi (dry) and kharif (rainy) seasons, the primary steps involved in executing monitoring and evaluation surveys.
Such timetables are now in use in most states in India but several have failed to allow enough time 1/ for critical activities and serious slippage has ensued. Experience will rectify this weakness but in the shorter run it gives rise to backlogs of work that are not easily removed.

In the light of these difficulties, it is clear that M&E survey samples should not only be statistically efficient, but should also minimize resources necessary for their execution. Additionally, experience in India shows that it is rarely feasible to conduct more than two sample surveys in a season. Hence the manual (Slade and Feder, 1981) recommends two sample surveys each season. The first of these (the monitoring survey) is conducted during the growing period and the second (the monitoring cum evaluation survey) during the immediate post-harvest period. The monitoring survey is conducted on a specially designed random sample of farmers whilst the monitoring cum evaluation survey is conducted using the normal crop-cutting samples in the state concerned. Whilst sample sizes for the monitoring cum evaluation survey vary somewhat, mainly in relation to the particular state (and, by definition, district), the manual offers detailed guidance on the sample size for the monitoring survey. In general, the emphasis is on minimizing the sample size while maintaining acceptable levels of precision at the district level. 2/

1/ Often because of a failure to allow for the effects of existing staff shortages.

2/ Whilst the number of farm families in a district is variable, districts containing 200,000 farm families are not uncommon.
The manual also recommends that the monitoring survey be undertaken exclusively by the M&E unit. On the other hand, the monitoring evaluation survey should be coordinated with the yield surveys conducted each season in each state.

India has a well developed system for estimating crop yields and production which is centrally directed but executed by a suitable agency in each state. This system is designed to produce, for a given crop, statistically efficient estimates of crop yields for each state which are then applied to separately developed estimates of cropped area to calculate production. Typically, the yield, or objective crop cutting, experiments are planned by the state Board of Revenue using their own staff and/or staff of other departments such as the Department of Agriculture.

As a method for estimating crop yields for the state, this system functions well enough but if the results are to be used for the evaluation of extension and are to be meaningful to extension management, they should be statistically significant at the state level and where possible at district level. 1/ Hence in most states the M&E unit may need to augment (with the concur-

1/ This eventually boils down to having an acceptably low estimated standard error.
rence and assistance of the crop cutting organization) the 'normal' sample.1/ This should be done in a manner fully consistent with the procedures of the crop cutting organization (see Slade and Feder, 1981). But achieving, in practice, the high degree of coordination required is difficult, quite apart from basic staffing, and sometimes funding, problems that might be involved. These difficulties have, in a number of states, given rise to two important problems.

The first involves both the extension organization as a whole as well as the M&E unit. In states where the crop cutting organization has traditionally relied wholly or partially on the Department of Agriculture for field staff with which to undertake these yield assessments, they continue to require such assistance and this usually involves not only the M&E unit investigators and supervisors (as it should) but also extension workers (as it should not). The use of these two groups of staff has two important consequences. VEW's involved in such a work are not only departing from the principle of exclusive devotion to extension but are, in effect, evaluating themselves. Serious bias in the results can ensue. The use of the M&E unit staff has a different result: preventing them from conducting the additional crop cuts necessary to augment the normal sample and hence insufficiency of data with which to calculate suitably diaggregated results according to, for

1/ Such augmentation can be extensive, for example in Madhya Pradesh in 1979/80, in the 15 project districts, the normal crop cutting sample of the State Board of Revenue involved 1,114 experiments on some ten crops. Augmentation by the M&E unit increased this to 2,880 experiments.
example, contact and non-contact farmer status or the presence or absence of irrigation.

In some ways the second problem is a more serious case of the first. In some states, the work of the crop cutting organization is held in such low esteem by the Department of Agriculture that they have established (again using extension workers and M&E unit staff) a separate yield estimation procedure which, while producing district level results, provides a second and usually conflicting set of estimates. 1/

Apart from providing guidance on sample design and selection, the manual also provides extensive precepts on other matters related to the monitoring and evaluation of T&V extension covering, inter alia, necessary resources and their availability, types and level of staffing, staff training, organization and supervision, data processing, the purpose and timing of reports and work planning.

Particular attention is given to questionnaire design and the analysis of the resulting data. In the questionnaire brevity is emphasized as far as this is consistent with the collection of sufficient data to permit meaningful analyses. A model integrated questionnaire covering both the monitoring and the monitoring cum evaluation surveys is provided. The key elements emphasized in the questionnaire concern the regularity and frequency

1/ In one state, at least, a third series produced by the States' Evaluation Organization also exists.
of extension agent visits, cropping patterns, the uptake of recommended practices, reasons for non-adoption, use of key inputs and crop yields. The model questionnaire also contains detailed instructions for investigators on how questions should be presented and responses elicited.

Similar detailed attention is given to the analysis of data assuming that computarization is impractical. Specifically model tabulations are set out which emphasize the need to compare results between different farmer subgroups (e.g., contact, non-contact) and the presence or absence of irrigation. Suggestions are also provided on how to systematically assess the degree of adoption of any given practice. Emphasis is also laid on the need to examine results in alternative ways in order to ensure that conclusions are sensibly inferred. Moreover, the recommended tabulations are designed to provide a clear picture of the results so that the need for management actions is clearly signalled.

The manual, however, does not pay explicit attention to the role and nature of special studies that can be undertaken outside of the routine surveys, although such work is allowed for in the guidance provided on work planning. As emphasized by Cernea and Tepping (1977), such studies are both

1/ A realistic assumption. Few projects have the resources (and as yet the skills) to embark on computerized data processing.
flexible and versatile, and are easy to carry out since they focus on a well defined topic and a small social or geographic unit. In-depth studies should constitute a continuous component of the monitoring and evaluation effort, since they complement the routine monitoring and evaluation work by focussing on key linkages in the chain of T&V extension operations. Six areas for special studies are suggested by Cernea and Tepping (1977, pp. 59-69). These include: (i) the selection of contact farmers; (ii) sociological village case studies; (iii) studies focussing on village extension workers and their supervisors; (iv) the quality of training sessions; (v) detailed studies of the adoption (or lack of it) of specific farm practices; (vi) farm budget studies to establish incremental costs and benefits of various cultivation practices.

Despite the implementation problems discussed above, the precepts of the manual are increasing well understood, mainly as a result of the workshops mentioned in Section II. M&E units are now producing increasingly standardized M&E reports, suitable for comparative analysis at the 'All India' level, a task which is shortly expected to be undertaken by the Directorate of Extension in the Government of India.

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1/ They are, however, relatively intensive users of higher level professional skills.

2/ Some of these studies may require collaboration with other organizations such as agronomic research stations or universities.
The implementation of M&E work along the lines outlined above has not yet settled into a uniformly smooth pattern of operation. But there are examples of positive M&E and management interaction. In one state, M&E results have led to increased concentration on the place where agent/farmer meetings take place (to the extent possible, it should be in the farmers' fields) and in another to plans to reevaluate the profitability of some recommendations. Beyond these specific examples, however, there is an important gradualist effect. Managers are able to see empirical evidence on the progress of extension operations season by season and allocate staff, improve training or step up supervision wherever operations appear to be flagging. Indeed, such adjustments are the daily diet of extension management but the availability of monitoring data allow these judgements and actions to be better informed and less subjective.

IV. An In-depth Study of the Impact of T&V Extension

Even though the present M&E system in India is developing apace, the need for speedy information and the lack of sophisticated analytical facilities and well developed methodologies will prevent the production of firm answers to many important questions concerning the impact of the T&V system, and the inter-relationships between extension and other factors affecting farmer performance. Moreover, the emphasis given in operational monitoring and evaluation to speed and relative simplicity prevents the collection of the more detailed data needed for rigorous evaluation, although well designed studies by M&E units could cover some specialized topics.
These considerations led to the launching in late 1981 of an intensive case study of the impact of the T&V extension in Haryana, India. This study is being undertaken by the World Bank in collaboration with the Haryana Agricultural University at Hissar.

This study has the following main objectives:

1. To evaluate, in quantitative terms, the role of the T&V extension system in facilitating the adoption of improved practices by different classes of farmers, and the inter-relationships between extension and other factors which affect farmers' decisions (farmer characteristics, farm level constraints and endowments, learning behavior and location of adopters).

2. To assess the impact of extension on the use of various inputs (e.g., fertilizers, pesticides), both through direct recommendations and through its effect on other farming practices.

3. To evaluate the ex-post farm level impact of extension efforts on cropping patterns and yields.

4. Point out the types of information required for proper monitoring and evaluation work by identifying the key variables for assessing extension impact. Additional insights on M&E issues such as sample design and questionnaire design are also expected.

Most of the empirical evidence for this study will be derived from a large sample survey of farm households in two districts (Jind and Karnal) who will be interviewed several times during the course of four agricultural seasons. This sample is designed to collect data from both contact and non-contact farmers covering inter alia farmer characteristics, exposure to extension, knowledge and adoption of recommended practices, input use and crop production. Additionally, comparative data will be collected from a small sample in a neighbouring state where T&V extension is not practiced but where the basic agroclimatic conditions are similar.
These data will be analyzed using a multivariate econometric framework appropriate for handling problems involving dichotomous variables and simultaneous decisions. Moreover, as the data gradually accumulate, the study is producing statistical tabulations and reports which have the twin objectives of aiding extension management in the study area and demonstrating the kind of analysis and its interpretation that M&E units could undertake. To date, field work for three of the four seasons planned to be covered by the study has been completed. Below we use some of these data (pertaining to kharif season, 1981) to exemplify how our preliminary analysis has been done and to illustrate the implications for extension management.

First, however, we briefly provide some necessary background details on extension in Haryana. The reorganization of the extension system in the state, according to the Training and Visit extension method, was formally started in late 1979. By August 1981, most village extension worker positions (95 percent) were filled as well as 79 percent of the subject matter specialist positions. However, as recent (March 1982) World Bank data show, 25 percent of AEO positions have been vacant since project inception. District Technical Committees (DTC), Zonal Workshops (ZW), and the State Technical Committee (STC) have either not been convened or have not functioned well over the same period. AEO's are key elements in the supervision and guidance of extension, as are DTC's, ZW's and STC in the generation of locally-specific and timely recommendations, as well as useful adaptive research activities.
We first consider the composition of the contact farmer groups in relation to non-contact farmers. The data (Table 2) suggest that contact farmers (who are expected to have regular interaction with extension workers) tend to be selected from among the larger, more educated and wealthier farmers. This bias may be appropriate since contact farmers should be fast adopters with opinion leadership potential. The data indicate, however, that contact farmer groups do include smaller farmers and that other farmers irrigate similar amounts of land to contact farmers (Table 3). For a more complete discussion of this matter, based on Logit analysis, see Feder and Slade (1982(f)).

<table>
<thead>
<tr>
<th></th>
<th>Jind District</th>
<th>Karnal District</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-contact</td>
<td>Non-contact</td>
</tr>
<tr>
<td>Own 10 acres or more</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>/a (%)</td>
<td>44</td>
<td>43</td>
</tr>
<tr>
<td>Member of village</td>
<td>22</td>
<td>27</td>
</tr>
<tr>
<td>institution /a (%)</td>
<td>13</td>
<td>15</td>
</tr>
<tr>
<td>Own or share tubewell</td>
<td>41</td>
<td>95</td>
</tr>
<tr>
<td>/a (%)</td>
<td>25</td>
<td>84</td>
</tr>
<tr>
<td>No formal education</td>
<td>67</td>
<td>51</td>
</tr>
<tr>
<td>/a (%)</td>
<td>78</td>
<td>63</td>
</tr>
<tr>
<td>Number of respondents</td>
<td>261</td>
<td>175</td>
</tr>
<tr>
<td></td>
<td>346</td>
<td>199</td>
</tr>
</tbody>
</table>

/a Differences between contact and non-contact farmers are statistically significant, on the basis of a 95 percent significance test.
Table 3: IRRIGATION AVAILABILITY BY DISTRICT AND BY CONTACT/NON-CONTACT FARMER STATUS

<table>
<thead>
<tr>
<th>Proportion of Cropped Land Irrigated</th>
<th>Jind District</th>
<th>Karnal District</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Contact Farmers</td>
<td>Non-contact Farmers</td>
</tr>
<tr>
<td>Less than 30%</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>30% - 60%</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td>More than 60%</td>
<td>60</td>
<td>58</td>
</tr>
<tr>
<td>Number of respondents</td>
<td>260</td>
<td>346</td>
</tr>
</tbody>
</table>

Whilst the differences between contact and non-contact farmers in the ownership of tubewells are not extreme, this characteristic should be carefully monitored by extension managements. This is because access to a tubewell, by providing greater water control, considerably reduces production risk. If, therefore, the ownership of tubewells is not widespread, a disproportionate representation of tubewell owners amongst contact farmers will reduce the probability of contact farmers being imitated by other farmers.

Next, we examine the frequency and regularity of extension agents visits to farmers. It is a cardinal principle of T&V extension in India that VEW’s should visit each of their farmer groups once every two weeks, when contact farmers and some other farmers are expected to be present. As Table 4 shows, about 80% of contact farmers and between 25 and 45 percent of non-contact farmers received at least one visit during the four week period preceeding the interview. 1/ Table 4 also provides a breakdown by

1/ The survey was conducted during the latter part of the growing season.
farm size, because extension management should be alert to any tendency for VEW's to visit larger (and wealthier) farmers more frequently than smaller farmers.

Regularity of VEW visits (i.e., always the same day of the week) is also of great importance as it contributes to sustaining farmers' interest and confidence in the extension agent. As Table 5 illustrates, a significant minority, about 30 percent, of contact farmers report that visits were irregular. 1/ This is a matter requiring management's attention and corrective action.

As expected, non-contact farmers in both districts report a much higher incidence of irregularity in visit dates (about 73 percent of those who had any visit in the reference period). This may reflect in part the lack of knowledge regarding availability of regular extension visits in the village as well as actual irregularities in visit schedules evident from the responses of contact farmers. Management should emphasize to extension staff that it is important that all farmers be made aware of the availability of a regular visit.

1/ It should be borne in mind, however, that on occasions the VEW has to make visits on weekends to make up for missed visit days. Similarly, if the VEW headquarters is located in the village, farmers may see him on days other than the visit day, although these encounters do not constitute a formal visit.
### Table 4: NUMBER OF VISITS TO FARMERS BY VEW DURING THE PAST FOUR WEEKS

<table>
<thead>
<tr>
<th>Owned Land (Acres)</th>
<th>Jind District</th>
<th>Karnal District</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Contact Farmers</td>
<td>Non-Contact Farmers</td>
</tr>
<tr>
<td></td>
<td>Sample Size</td>
<td>Number of Visits</td>
</tr>
<tr>
<td>0.0 - 4.9</td>
<td>41</td>
<td>32. 22. 46.</td>
</tr>
<tr>
<td>10.0 - 19.9</td>
<td>104</td>
<td>16. 9. 75.</td>
</tr>
<tr>
<td>20.0 plus</td>
<td>63</td>
<td>21. 11. 68.</td>
</tr>
</tbody>
</table>

### Table 5: REGULARITY OF VEW VISITS BY CONTACT AND NON-CONTACT FARMERS

<table>
<thead>
<tr>
<th>Holding Size (Acres)</th>
<th>Jind District</th>
<th>Karnal District</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Contact Farmers</td>
<td>Non-Contact Farmers</td>
</tr>
<tr>
<td>Sample Size</td>
<td>Regular Visit %</td>
<td>Irregular Visit %</td>
</tr>
<tr>
<td>0.0 - 9.9</td>
<td>65</td>
<td>65. 35.</td>
</tr>
<tr>
<td>10.0 plus</td>
<td>135</td>
<td>73. 27.</td>
</tr>
<tr>
<td>All</td>
<td>200</td>
<td>70. 30.</td>
</tr>
</tbody>
</table>
Other data contain information concerning the sources of knowledge for many practices and a general pattern emerges. For simple, cheap practices (see Table 6 as an example), contact farmers mainly learn from extension agents whilst non-contact farmers mainly learn from other farmers. For more complex and expensive practices (see Table 7 as an example), most knowledgeable farmers (both contact and non-contact) learn from extension agents or equivalently specialized sources. This may imply that when extension agents plan to discuss the more complex practices, they should endeavour to maximize the attendance of all classes of farmers at their visit to contact farmers.

The adoption of many practices has been studied and is exemplified by the following remarks related to the adoption of fertilizer in paddy.

<table>
<thead>
<tr>
<th>Table 6: SOURCES OF KNOWLEDGE REGARDING PLANT SPACING FOR PADDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source of Knowledge</td>
</tr>
<tr>
<td>Jind District</td>
</tr>
<tr>
<td>Contact Farmers</td>
</tr>
<tr>
<td>(N=80)</td>
</tr>
<tr>
<td>Department of Agricultural Extension</td>
</tr>
<tr>
<td>Other extension</td>
</tr>
<tr>
<td>Other farmers</td>
</tr>
<tr>
<td>Non-contact Farmers</td>
</tr>
<tr>
<td>(N=65)</td>
</tr>
<tr>
<td>Department of Agricultural Extension</td>
</tr>
<tr>
<td>Other extension</td>
</tr>
<tr>
<td>Other farmers</td>
</tr>
<tr>
<td>Kurnal District</td>
</tr>
<tr>
<td>Contact Farmers</td>
</tr>
<tr>
<td>(N=93)</td>
</tr>
<tr>
<td>Department of Agricultural Extension</td>
</tr>
<tr>
<td>Other extension</td>
</tr>
<tr>
<td>Other farmers</td>
</tr>
<tr>
<td>Non-contact Farmers</td>
</tr>
<tr>
<td>(N=110)</td>
</tr>
<tr>
<td>Department of Agricultural Extension</td>
</tr>
<tr>
<td>Other extension</td>
</tr>
<tr>
<td>Other farmers</td>
</tr>
</tbody>
</table>

/a Percentages may not sum to 100 because responses are not mutually exclusive.
Table 7: SOURCES OF KNOWLEDGE OF CHEMICAL PEST CONTROL
BY USERS OF PESTICIDES AND WEEDICIDES

<table>
<thead>
<tr>
<th>Proportion of Cropped Land Irrigated</th>
<th>Jind District</th>
<th>Karnal District</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Contact Farmers</td>
<td>Non-contact Farmers</td>
</tr>
<tr>
<td></td>
<td>(%)</td>
<td>(%)</td>
</tr>
<tr>
<td>Department of</td>
<td>86</td>
<td>71</td>
</tr>
<tr>
<td>Agricultural Extension</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>Other extension</td>
<td>7</td>
<td>17</td>
</tr>
<tr>
<td>Number of respondents</td>
<td>59</td>
<td>35</td>
</tr>
</tbody>
</table>

/a Percentages do not sum to 100 as responses are not mutually exclusive.

Paddy is an important kharif crop in the two districts covered by the study. Ninety-five percent of paddy cultivators in the sample grow high-yielding varieties. The realization of the full yield potential of these varieties greatly depends on the utilization of fertilizers, in particular nitrogenous fertilizers. The extension service recommends a nutrient equivalent basal dose of 24 kg each of Nitrogen (N), Phosphate (P) and Potash (K). An additional application of 24 kg of N is recommended after transplanting. The use of Zinc-sulphate is also advocated if it was not used on the previous rabi crop.

Table 8 records the use of the various nutrients by contact and non-contact farmers according to farm size classes. It is obvious that the advantages of using N are well known among farmers as overall the proportion of users exceeds 95 percent. There are practically no differences between smaller or larger farmers, or between contact and non-contact farmers. These results are not surprising as, in this area of India, the profitability of
nitrogenous fertilizers in HYV paddy has been known since the introduction of the "green revolution" in the late sixties.

The situation is different for other nutrients. Only 42 percent of contact farmers use phosphate on paddy, and the rate of adoption among larger contact farmers is significantly higher than the rate of adoption by smaller contact farmers. Adoption of phosphates by non-contact farmers, who are probably less knowledgeable, is significantly lower (only 23 percent). The difference between contact and non-contact farmers is statistically significant across farm size classes, lending some support to the contention that the lack of information is the main reason for non-adoption.

Table 8: USE OF NUTRIENTS BY PADDY GROWERS
JIND AND KARNAL DISTRICTS

<table>
<thead>
<tr>
<th>Size Class (acres)</th>
<th>Sample Size</th>
<th>Contact Farmers</th>
<th>Non-contact Farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sample Percent Using</td>
<td></td>
<td>Sample Percent Using</td>
</tr>
<tr>
<td>0 - 4.9</td>
<td>36</td>
<td>94 36 14 11</td>
<td>78 95 10 4 12</td>
</tr>
<tr>
<td>5.0 - 9.9</td>
<td>64</td>
<td>100 30 14 8</td>
<td>85 96 26 15 14</td>
</tr>
<tr>
<td>10.0 - 19.9</td>
<td>102</td>
<td>97 42 17 17</td>
<td>99 97 23 13 10</td>
</tr>
<tr>
<td>20.0 +</td>
<td>84</td>
<td>100 54 24 19</td>
<td>46 98 41 24 11</td>
</tr>
<tr>
<td>All</td>
<td>286</td>
<td>98 42 18 15</td>
<td>308 96 23 13 12</td>
</tr>
</tbody>
</table>

/a Owned land only.

The adoption rate for potash is quite low among all groups of farmers, but while there is a five percent difference between contact and non-contact farmers, it is not statistically significant. 1/

1/ It should be noted that not all soils in the area require repeated use of potash.
As shown in Table 9, a substantial number of farmers in Karnal district are aware of the usefulness of zinc sulphate in paddy cultivation but in Jind district such knowledge is not as widespread.

Table 9: KNOWLEDGE REGARDING THE USEFULNESS OF ZINC SULPHATE IN DWARF PADDY

<table>
<thead>
<tr>
<th></th>
<th>Jind District</th>
<th></th>
<th>Karnal District</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sample Size</td>
<td>Percentage</td>
<td>Sample Size</td>
<td>Percentage</td>
</tr>
<tr>
<td>Contact farmers</td>
<td>109</td>
<td>43</td>
<td>164</td>
<td>68</td>
</tr>
<tr>
<td>Non-contact farmers</td>
<td>108</td>
<td>22</td>
<td>170</td>
<td>64</td>
</tr>
</tbody>
</table>

A comparison of Tables 8 and 9 reveals that there is an appreciable gap between the proportion of farmers who are aware of the usefulness of zinc sulphate and the proportion who used it during the 1981 kharif season. A possible explanation is that it is required once a year rather than every season. Thus, if this nutrient was used on wheat in the earlier rabi season, it is unnecessary in kharif. However, data from Rabi 1981/82 (not presented) reveal that the use of zinc sulphate on wheat was minimal. Another possible explanation is that there were serious supply problems, but few farmers claimed to have experienced difficulties in obtaining fertilizers. 1/ Other data (not presented) show that prior to 1981, more than half of farmers in Karnal district have used zinc sulphate at least once. The resulting implication is that farmers may not be fully convinced of the value of using

1/ Our enquiries, however, were not detailed enough to establish whether supplies were interrupted only briefly but at a crucial time.
zinc sulphate or understand frequently they need to apply it. Hence, extension management may need to re-evaluate the profitability of recommendations related to zinc sulphate in paddy and wheat, and the frequency of use that is needed for best results.

The foregoing remarks have not referred to levels of fertilizer (nutrient) application. As Table 10 reveals, the average level of use of nitrogen is close to the recommended dose whilst average levels of use of phosphates and potash are considerably lower.

Table 10: AVERAGE USE OF FERTILIZERS BY PADDY GROWERS (HARYANA, INDIA)

<table>
<thead>
<tr>
<th>Fertilizer type</th>
<th>Recommended dose (kg/ac)</th>
<th>Average Quantity Applied (kg/acre)</th>
<th>Contact Farmers</th>
<th>Non-contact Farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Small /a</td>
<td>Large</td>
<td>Small</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>48</td>
<td>45.6</td>
<td>43.3</td>
<td>3.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(16.7) /b</td>
<td>(14.9)</td>
<td>(14.3)</td>
</tr>
<tr>
<td>Phosphate</td>
<td>24</td>
<td>15.1</td>
<td>14.2</td>
<td>14.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(4.6)</td>
<td>(6.4)</td>
<td>(10.0)</td>
</tr>
<tr>
<td>Potash</td>
<td>24</td>
<td>7.0</td>
<td>10.4</td>
<td>7.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.6)</td>
<td>(10.4)</td>
<td>(3.0)</td>
</tr>
</tbody>
</table>

/a Small farmers are defined as those who own less than 10 acres. Others are considered larger farmers.

/b Figures in parentheses are standard deviations.
The contrast between the extent of nitrogen use and the utilization of other fertilizers is somewhat puzzling. Our data suggest that supply problems were minor. Shortage of funds does not seem to be a serious constraint (it would affect the use of N as well). If then, a lack of information is the main cause of low adoption, it can be corrected by improved extension activity, but a further check on the economics of using P and K in paddy for different farm size classes would seem appropriate before intensifying diffusion efforts.

Another example concerning fertilizers deals with the timing of fertilizer application. Although the average level of nitrogen use is satisfactory and adoption is widespread, this nutrient is best applied in paddy as a split dose—about half as a basal application and the remainder after transplanting. As Table 11 demonstrates, only about half the farmers in Karnal and 20 percent in Jind have adopted this practice.

Table 11: ADOPTION OF RECOMMENDED TIMING FOR FERTILIZER IN DWARF PADDY

<table>
<thead>
<tr>
<th>Time of Fertilizer Application</th>
<th>Jind District</th>
<th>Karnal District</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Contact Farmers</td>
<td>Non-contact Farmers</td>
</tr>
<tr>
<td>Before puddling (%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>After puddling (%)</td>
<td>79</td>
<td>80</td>
</tr>
<tr>
<td>Both before and after puddling (%)</td>
<td>21</td>
<td>19</td>
</tr>
<tr>
<td>Number of respondents</td>
<td>107</td>
<td>108</td>
</tr>
</tbody>
</table>

This suggests that efforts to extend this practice should be intensified provided a split dose remains worthwhile.
Our final example concerns knowledge and adoption of wheat seed treatment. Extension recommends that dwarf wheat seeds be treated with fungicide to control the incidence of seed borne diseases. In addition, farmers can apply an aldrin solution to seeds in order to minimize termite damage, which may be serious in areas of light soils. Farmers were asked whether they are aware of such treatments in order to establish how well known these practices are. As demonstrated in Table 12, the rate of knowledge is fairly low at present, indicating that the diffusion process is still at an early phase. It is apparent that contact farmers are significantly more knowledgeable about termite treatment than non-contact farmers, perhaps due to their more intensive interaction with extension. The rate of knowledge regarding fungicide treatment is also higher among contact farmers, but differences in knowledge on these practices are statistically significant only among small farmers. The data also suggest that larger farmers are more knowledgeable than smaller farmers.
### Table 12

#### Knowledge Regarding Chemical Treatment of Wheat Seeds

<table>
<thead>
<tr>
<th>Size Group</th>
<th>Sample Size</th>
<th>% Know Termite Treatment</th>
<th>% Know Fungicide Treatment</th>
<th>Sample Size</th>
<th>% Know Termite Treatment</th>
<th>% Know Fungicide Treatment</th>
<th>Sample Size</th>
<th>% Know Termite Treatment</th>
<th>% Know Fungicide Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smaller Farmers</td>
<td>107</td>
<td>24</td>
<td>15</td>
<td>175</td>
<td>13</td>
<td>11</td>
<td>68</td>
<td>21</td>
<td>13</td>
</tr>
<tr>
<td>Larger Farmers</td>
<td>157</td>
<td>38</td>
<td>22</td>
<td>141</td>
<td>21</td>
<td>19</td>
<td>110</td>
<td>27</td>
<td>17</td>
</tr>
<tr>
<td>All</td>
<td>33</td>
<td>33</td>
<td>19</td>
<td>316</td>
<td>16</td>
<td>15</td>
<td>178</td>
<td>25</td>
<td>16</td>
</tr>
</tbody>
</table>

1/ Smaller farmers are defined as those who own less than 10 acres.
Having observed above that the knowledge of seed treatment practices is not yet widely diffused, it is not surprising that the adoption rate of these practices is at present quite low (less than 20% overall). As shown in Table 13, the adoption pattern of seed treatment follows quite closely the pattern of knowledge. Larger farmers have a higher rate of adoption than smaller farmers, and contact farmers demonstrate a rate of adoption higher than that of non-contact farmers. 1/ The rate of adoption in Jind district is significantly higher than that of Karnal district.

The above example demonstrates the importance of assessing farmers' awareness of recommended practices rather than only their rate of adoption. With the above result, it can be concluded with a reasonable degree of confidence that the major reasons for low adoption of chemical seed treatment in wheat is lack of information (rather than supply problems or lack of conviction regarding profitability). Management can, therefore, speed adoption by intensifying the diffusion of knowledge regarding this practice, provided that its economic viability remains unchanged.

V. Possible Improvements to the M&E System

As mentioned in Section 11 and more fully in Section IV, the evaluation of the effects of extension is methodologically complex and the detailed evaluation study now under way in Haryana has not yet progressed far enough

1/ Not all differences are statistically significant, but the consistency with knowledge patterns is quite striking.
to permit a definitive statement on the merits of the econometric procedures being utilized. Moreover, the application of advanced analytical methods to regular evaluation work in the context of M&E in India must not only await the widespread advent of computers and the skills to use them but more importantly a clearer definition of the variables that need to be studied. This latter point is an issue upon which our present study has yet to pronounce. What then, at this interim stage, and based on the available preliminary results from the research study can we say that is of benefit to current M&E work.

First, whilst the manual (Slade and Feder, 1981) lays out the basic approach to data analysis and tabulation that should be followed (e.g., comparisons between subgroups) and emphasizes the role that inference (largely statistical) must play, the early results (examples of which were provided in the preceding section) show this to be sound advice. Indeed, such simple comparative tabulations do not require sophisticated analysis and all are possible with the aid of a desk top calculator. Furthermore, it is not difficult to imagine the increased value of such analysis when presented in a time series framework whereby the current seasons results are set alongside those from previous seasons.

Second, the research study suggests that attention to farmers' knowledge of recommended practices (in addition to information on actual adoption) is useful both for extension management purposes and for overall evaluation of impact. Such information should cover not only the extent of knowledge but also its sources and the time it was acquired.
It would seem that at an early stage in the implementation of an extension project a stocktaking survey of knowledge of key practices may be worthwhile, to be followed by periodical (perhaps every two years) special studies. The comparison of knowledge rates with adoption rates allows a better assessment of the causes of slow adoption of specific practices. Another aspect related to the issue of adoption or lack of adoption and highlighted by the study is the need to explicitly investigate, wherever possible and in a subtle manner, the reasons for non-adoption of particular recommendations. It is of great importance for extension management to find out whether slow adoption of a recommendation stems from lack of awareness of its usefulness, or because supplies of crucial inputs are not available in time, or because farmers have experimented with it and found it non-profitable. The reaction of management would be different in each of these situations.

Our last point goes, in effect, to the heart of monitoring and evaluation, but has little to do with the niceties of sample or questionnaire design. Rather, it relates to the independence of judgement of M&E staff. Whilst it is possible to provide some organizational safeguards for this independence, it is not possible to guarantee that it will be used. We have endeavoured in the selected results presented above to show not only that conclusions can be derived from simple analysis but also that specific pointers for action logically follow. It is then, in demonstrating this relationship, that we see benefits for systematic monitoring and evaluation.
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   (d) "Adoption of Fertilizers in Two Districts in Haryana" RPO 672-29, Working Note No. 5, World Bank, Washington, D.C., September 1982.


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