

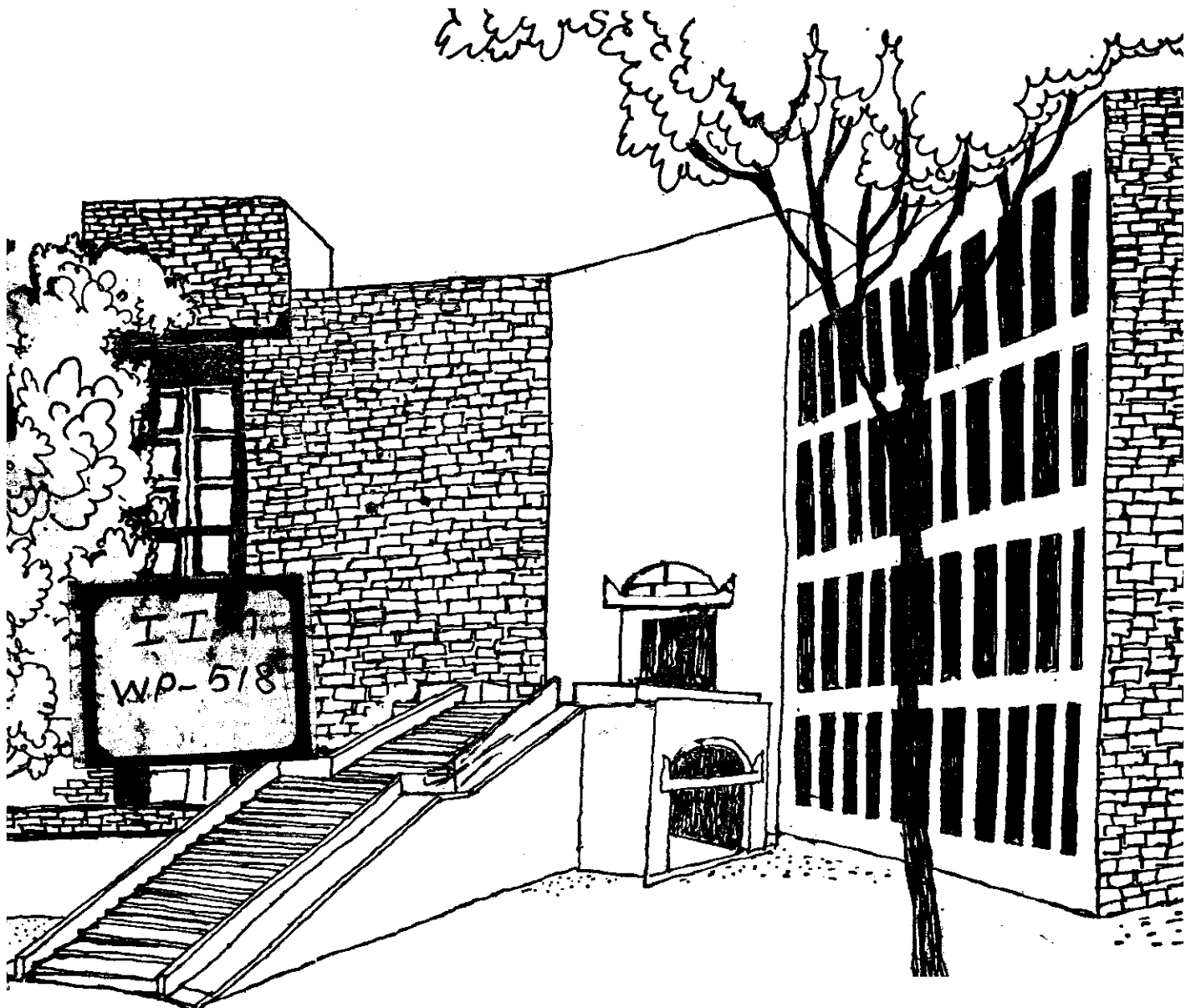


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Working Paper



THE ART AND SCIENCE OF IDENTIFICATION
OF AGRICULTURAL RESEARCH PROJECTS
OF THE ICAR: SOME OBSERVATIONS

By

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THE ART AND SCIENCE OF IDENTIFICATION OF AGRICULTURAL RESEARCH
PROJECTS OF THE ICAR: SOME OBSERVATIONS

Tirath Gupta

The agricultural research sub-system is described in a three dimensional form. Two of these dimensions deal with fields and people which make the setting. This setting differentiates management of agricultural research from management of other agricultural sub-systems. It has also been emphasized that agricultural research management belongs to the non-enterprise sub-sector of the agricultural system as it primarily deals with creation of public goods and services without any profit motive (Desai and Patel, 1984, p.1).

It must be noted that, while profit motive is not important for research scientists or the sponsors of research projects, it is most important for the cultivators. Moreover, the cultivators may not always measure profit only in terms of financial gains. Social and psychological variables may be equally relevant. For these reasons, an understanding of the setting in which the research sub-system operates is of crucial importance. This, in turn, should emphasize that appropriate identification of an agricultural research project and its area of operation could be of crucial significance if the effort is to result in natural and human resources development: two of the three important dimensions of agricultural research sub-systems stated earlier.

Projects have been defined as the cutting edge of development (Gittinger, 1982, p.3). This is true not only because resources are utilized for implementing projects in the hope of getting (tangibles and intangibles) more than what is spent, but also because failure of one project can lead to a chain reaction leading to slackening of the overall developmental process. In the case of agriculture, the process can be damaged much more severely if the expectations of the farmers with low risk bearing ability are not met within a reasonable time span.

Identification is the first stage in a project cycle and a crucial one because there are likely to be many sources from which suggestions or ideas and even temptations may originate. Well informed technicians and the local people can be the best parties to identify a project "objectively". Objectivity is important because most people have many ideas including researchable ones. All of these cannot be handled simultaneously or at a given point in time, for want of sufficient financial and technical resources. Objective identification of projects and project areas is also important to ensure that a project by project approach does not lead to retardation of the pace of overall agricultural development.

The main objective of this paper would be to assess the extent to which ORPs of ICAR have been appropriately identified. Three of the six available cases studies have been chosen for this purpose (Desai and Patel, 1984).

1. ORP for Increasing Pulse Production in Mohindergarh District;
2. ORP for Stepping up Oilseeds and Animal Husbandry Production in Bhilwara District; and
3. ORP for Integrated Milk and Crop Production for Increased Productivity, Employment and Farm Income in Karnal District

A common feature of these projects is their implementation by ~~agricultural universities~~ agricultural universities/research institutions, respectively, by Haryana Agricultural University, University of Udaipur, and National Dairy Research Institute.

Even at the cost of repetition it must be noted at this stage that transfer of technology from experimental stations to cultivator fields is one of the major objectives of the ICAR. To facilitate this transfer, the ICAR has been following a policy of sponsoring projects to encourage research scientists to come in direct contact with the farmers. In this process, a predecessor to the ORPs has been the All India Coordinated Project on National Demonstrations (CPND). Based on the experiences gained in CPND, the ORPs emphasized the concept of the transfer of technology in a compact area/a village/a group of villages/watersheds. The strategy aimed at encouraging group endeavour among the farmers with the basic objective of introducing ecologically sound and socio-economically compatible technologies for scientific management of natural resource systems, and for upgrading the technological infrastructure for sustained agricultural growth.

This may serve to highlight the importance of systematic identification of a project area and to show that the task is not easy.

Project For Increasing Pulse Production In Mohindergarh District, Haryana

An ORP for enhanced pulse production has been implemented by the Haryana Agricultural University, Hissar(HAU) since 1974. The ICAR selected the project in the context of shortage of pulses in the country and their importance towards meeting the protein requirements of the people. The HAU was chosen to implement it as a technology for increased pulse production in dry farming areas had been developed at its research stations(Ibid, p.21) Three specific objectives of the project were stated to be to:

- i) popularize the short duration high yielding varieties of pulses: red gram(Arher), green gram(Moong), black gram(Udad), Cowpeas(Chola), and gram;
- ii) popularize the package of management practices consistent with the limited resources of the farmers; and
- iii) improve the overall economy of the farmers by increasing production of pulses(Ibid, p.22).

It may be observed that the stated objectives clearly exhibit a confidence on the part of both the ICAR and HAU that:

- i) improvement in production of pulses was the key variable in increasing the farmers' income in the selected cluster of villages;
- ii) necessary technology for that had been developed at the research stations, and it was only a question of its transfer to the cultivators' fields; and

iii) the ORP would make it possible to study the bottlenecks in the transfer of technology so that they could be removed (Ibid, p.22).

An implicit assumption is that the technology packages were equally well developed for all the five pulses. This is supported by the fact that these were specifically mentioned in the objectives of the ORP.

A cluster of five villages in Bawal block of Mohindergarh District was selected. This area was located near the Dry Farming Research Centre of HAU at Bawal town.

One question at the outset is whether the project area was identified on the basis of its closeness to an existing infrastructural facility. There could be nothing wrong with this if other considerations for identification were met in the context of the stated objectives.

This however, did not appear to be the case for a number of reasons. First, while the project was started in 1974, a benchmark survey of the selected villages was conducted in 1977. If the accepted norms for identification of the project area were to be followed, the surveys should have been conducted and results analysed latest in 1974, if not earlier. A rigorous approach would, in fact, call for such surveys throughout the state to identify the most appropriate project area.

An alternative could be an experience-based positive statement by the concerned scientists that it was "the most suitable" or "one of the most suitable" areas for the ORP. But

that did not appear to be the case either.

Second, the results of the survey revealed that

i) in four out of the five selected villages, 40 to 64 percent of the farmers owned less than 2 hectares of land, and ii) that the predominant soil texture in the selected villages was sandy loam with low fertility status (Ibid, pp.24, 34-35).

Are these the most favourable characteristics for popularizing intensive cultivation of pulses? If yes, why did the cropping pattern without the project presented a different picture? The survey indicated that bajra and jowar were the most important crops during kharif; and wheat, gram and mustard were prominent during rabi. In three of the five villages, pulses did not occupy more than 25 per cent of the total area under crops (Ibid, pp.24 and 38).

A major strategy was to lay out demonstration plots of improved pulse varieties on cultivators' fields. Two of the criteria for identification of farmers for demonstration plots were that

- i) the farmer should be enthusiastic to allow demonstration on his fields and should bear the cost of labour and other expenditure, and
- ii) the farmer should spare one acre of land for demonstration purposes: half for the demonstration plot and half for control.

Do these criteria not necessitate that a cultivator's land holding should be, say, at least four acres to enable him to respond comfortably to the ORP? If yes, at least 41 to 64 per cent of the farmers in four of the five villages would not be

selected for demonstration plots.

One of the five villages selected in 1974 was dropped in 1979-80 for want of cooperation and was replaced by another. The reasons for this change have not been documented (Ibid, p.25). Could it not be hypothesized that lack of cooperation was a direct outcome of unsuitability of the natural resource endowments for pulse crops?

The second phase of the ORP started in 1980-81 when only two villages from the previous set of five were retained and another set of five villages was brought in. During both phases, the demonstration plots emphasized on varietal trials and management practices. Excepting black gram and gram, the number of varieties tried for the other three pulse crops varied from 4 to 10 with an average at 7 (Ibid, pp.238-244).

This raises a question whether it was an ORP or a research project in the usual sense. The answer would indicate whether the project area was objectively and scientifically identified.

It has been further reported that during the years 1977-78 to 1981-82 there was no increase in the area under red gram, green gram, black gram, and cowpea in any of the selected villages. The area under gram showed a decline in all but two villages. On the whole, the changes in cropping patterns in the ORP villages during the five year period were not substantially different from those in a non-ORP village (Ibid, pp.27-28 and 245-250).

These make it difficult to avoid a conclusion that enough thought was not given to identifying the area to suit the main objective of the ORP. Moreover, it appeared that a "tested" technology was not identified. The same conclusions emerged from the qualitative responses of the local people which show that the project has had minimal or no impact (Ibid, p.41) in spite of the fact that the expenditure per acre of demonstration plots varied from Rs.3,300 to Rs.5,060.

It may also be noted that a review team towards the end of 1981 observed that water was the greatest constraint on large scale pulse cultivation in the ORP area. This was considered all the more relevant because the monsoon was restricted and erratic (Ibid, p.252). It should need no emphasis to say that this was a basic non-removable constraint for which the pulse technology had supposedly been developed. Had the project area been identified with an eye on such basic features, some of the problems could have been avoided.

Project for Improving Oilseeds, Cereals and Animal Husbandry Production in Bhilwara District, Rajasthan

Another ORP aimed at stepping up production of oilseeds, cereals, and livestock in Chittorgarh district of Rajasthan. It was sanctioned in 1974 for implementation by the University of Udaipur. In June 1981, with the beginning of its second phase, the project was shifted to Bhilwara district. Documentation of

the experiences of the first phase on the reasons for shifting the location during the second phase were not available, and may be non-existent. Its stated objectives were to:

- i) demonstrate and adapt new agricultural technology on cultivators' fields in a cluster of 3 to 4 villages;
- ii) significantly increase the production of groundnut in the area (emphasis added);
- iii) find out the profitability of new technology for crops and animal husbandry; and
- iv) identify the technological and socio-economic constraints in the process (Ibid, p.43)

A difference between the title of the ORP and the statement of its specific objectives must be noted. The former included oilseeds in general while the latter specified only groundnut. On the other hand, animal husbandry did not even find a mention in the statement of objectives.

During its second phase, 19 villages distributed over five panchayat samities were selected. These villages formed seven clusters of two to three villages each. A benchmark survey of the area was conducted in 1981.

A question raised in the preceding section whether the benchmark surveys be conducted prior to or following the selection of an ORP area continues to be relevant. Moreover, the criteria for selection of the villages did not seem to have been specified.

The survey results, however, showed the ORP area was relatively better placed in terms of infrastructural facilities

and agricultural development/farming practices(Ibid. pp.45-46). The survey further showed that maize and sesamum with 62 per cent and 9 per cent of the cropped area were the most important kharif crops. During rabi, wheat was the most important crop and accounted for 46 per cent share in the cropped area. This was followed by gram, barley and taramira(Ibid, pp.46 and 55-56). In this situation, the reasons for identifying groundnut as the "major" crop could be difficult to understand.

The benchmark survey did not cover the livestock population, but recalled the findings of the 1977 census. The relevant data have been summarized below:

Sl.Number and Description*	Numbers*	Equivalent Adult Cattle units(ACUs)
1. Cows	7,225(17)**	9,395
2. Bullocks	7,450(18)	7,450
3. Buffaloes	5,760(14)	5,760
4. Goats	9,570(23)	1,435
5. Sheep	11,390(27)	1,710
6. Others	275(1)	275
7. Total	41,670(100)	26,205

*Derived from Desai and Patel, 1984, p.57.

**Figures in parantheses are percentages to the total

The livestock population was almost equally divided between sheep and goats on the one hand, and cows, bullocks, and buffaloes on the other. Given the land use data in the ORP area(Ibid,p.54), the density of livestock population worked out at 3.6 heads per hectare of geographical area. For computing ACUs, the FAO conversion factors were used(Yang, 1971, pp.59-60). The number of

ACUs per hectare of permanent pastures and grazing lands, net sown area, and gross cropped area were 11.7, 6.0, and 4.0, respectively.

The ORP's basic objective of integrated development of crop and livestock enterprises is welcome. One of the essential considerations, however, has to be complementarity amongst the identified activities. One question in this context is whether the efforts at enhanced production of groundnut could or did help in enhanced livestock productivity.

As in the previous case, the activity of varietal trials on demonstration plots was the most important in this case also. Crops for the trials included maize, sorghum, groundnut, sesamum, wheat, barley, mustard, gram, and safflower(Ibid, p.47). Should one think that:

- i) this was also a research project in the normal sense of the term and not an ORP; and/or
- ii) the concerned scientists had done equally good work on improved varieties of all of the above mentioned crops such that the situation was ripe to identify the socio-economic constraints for transferring the technologies from research stations to the field situations; and/or
- iii) the identified project area was not found suitable for specialization in the specific farm enterprises: groundnut and livestock.

Though the process of identification of organizations to implement the ORPs is not strictly within the scope of this paper, yet it could be noted in this case that the animal husbandry component was taken up in collaboration with the Bhartiya Agro Industries Foundation(BAIF) and the concerned Department at local

level. It emphasized artificial insemination. In addition, three exotic bulls, two murrah buffaloes bulls, and seven bucks for goats were placed in the ORP area. These were maintained by the progressive farmers.

The farmers were advised to grow green fodder, especially berseem and lucerne, and feed their animals with concentrates made from locally available ingredients. Berseem and lucerne seeds were distributed among farmers. About 200 plants of Leucaena leucocephala (Subabul) were also distributed (Ibid, pp.48-49). A few thoughts that emerged from this situation pertained the reasons for

- i) identifying the BAIF's role in this ORP when Udaipur University implemented the project and its scientists could handle the livestock development programme effectively, and could possibly do a better job for sheep and goat development which accounted for 50 percent of the livestock population; and/or
- ii) not identifying the role of the Central sheep and Wool Research Institute located near the ORP area once a decision to involve organizations other than the one mainly responsible for implementing the project had been taken, and sheep accounted for 27 percent of the total livestock population in the ORP area; and/or
- iii) not specifically identifying the land area which could be developed as pastures for the sheep; and/or
- iv) not including berseem and lucerne in the experimental trials but merely advising the farmers to grow green fodders when livestock development was covered by the ORP; and/or
- v) not identifying a package of practices for stallfed goat rearing; and/or
- vi) distributing only 200 seedings of subabul i.e. one for every 60 hectares of the geographical area and 32 hectares of gross cropped area?

Measures to improve upon the performance of this and such other ORPs can be taken after these and many other related issues

are analysed. It can still be observed that the results could have been significantly better than those observed (Ibid, p.50) if the ORP area and activities to be covered were identified with the deserved care and thought. At least one observation of a review team in early 1981 that the pulses which covered 16 percent of the cropped area had been relegated to the background due to the emphasis on groundnut (Ibid, pp.255-256) could further support this conclusion. It could therefore be said that it was not a project to identify the socio-economic constraints for introducing a technology or technologies appropriately tested at research stations, or the identified area was not suitable for what the scientists had to offer, or vice versa.

Project for Integrated Milk and Crop Production in Karnal District Haryana

A project for enhanced milk and crop production and productivity on integrated basis in Karnal was launched in 1975 by the National Dairy Research Institute, Karnal (NDRI). The NDRI specifically stated the criteria for identification of the ORP villages. These were:

- i) proximity to the headquarters of the Institute at Karnal;
- ii) not covered by the ongoing Intensive Cattle Development Programme (ICDP);
- iii) availability of assured irrigation facilities, and suitability of land for intensive cropping and dairy farming;
- iv) Interest of the local people in cooperative systems;
- v) large proportion of landless labourers, and marginal and small farmers; and

- vi) presence of responsive farmers willing to extend physical facilities for artificial insemination, fertilizer and seed store, and office space for the ORP personnel (Patel, 1982, p.5 cited by Desai and Patel, 1984, p.131).

The ORP was started in one cluster of four villages in 1975, and by 1979 there were four clusters with 5-10 villages and the total at 30 (Ibid. pp.292-93). The objectives of the project were to:

- i) demonstrate the optimum management in feeding and breeding practices for high yielding crossbred cows together with cultivation of nutritious green fodder to lower the cost of milk production, and to test the applicability of the package of dairy farming practices on varying farm sizes;
- ii) demonstrate the multiple cropping system: raising three or more crops a year including grain, vegetables and fodder;
- iii) determine the optimum levels of profitable dairy enterprise commensurate with crop production; and
- iv) provide the scientists with an insight of the problems involved in the application of recommended practices under field conditions and to ascertain the modifications, if any, needed, in the same (Ibid, pp.131-132)

This was the first in the series of three cases covered in this paper where the criteria for identification of the ORP area were specifically stated. The main issue, therefore, could pertain to appropriateness of these criteria in the context of the stated objectives.

Prior to that, it could be noted that a benchmark survey was conducted to estimate the existing level of employment, per capita income, irrigation potential, land use pattern, crop productivity, the status of dairy and other livestock industry, roads, communications, education and training, health services, drinking water facilities, village cooperative organizations, and the

aspirations of the villagers in the ORP area (Ibid, pp.135-136, emphasis added). The survey results have been used to assess the performance of the project.

It may once again be pertinent to raise the issue whether the main objectives of benchmark surveys should continue to be to enable an assessment of changes "with" the project or the surveys should also have a role in identification of the ORP area.

At the same time, the NDRI must be complemented for measuring variables such as aspirations of the local people even if it is not known whether and how this variable influenced the process of identifying the ORP area.

Returning to the criteria for identifying the ORP villages, at least some of them appeared to be logical. It was, for instance, found that in 1974-75 fodder crops occupied 18 per cent of the gross cropped area. This was significantly higher than about 5 per cent for the country as a whole (Ibid, pp.137 and 168). The ORP was, thus, located where fodder cultivation was already practised. This should have resulted in speedier transfer of new technology package and appropriate identification of socio-economic constraints in the process.

On the contrary, stocking rate in terms of bovine units per 100 hectares was much higher on marginal and small holdings than medium and large holdings. This meant that relatively more burden of excess animals vis-a-vis the size of land holdings was carried by small and marginal farmers. This group naturally depended on

community pastures and other common property land resource to perpetuate a low level equilibrium of livestock economy. It was also observed that landless labourers had a much higher proportion of local cows compared with any other category of farmers (Ibid. pp. 137 and 166-167). Could this group rear the improved cattle on a sustained basis?

The relevance of the criteria that the ORP area should be close to the NDRI headquarters and that the people should be "responsive" can be seen in the context of the emphasis on artificial insemination and crossbreeding of animals. Supply and use of the material and equipment to such situations should be better manageable. Natural service was also resorted to for cows which did not settle despite three successive inseminations. Once again, successive inseminations, identification of failures in spite of that, and providing for an alternative could have been considerably more difficult if the area was not easily accessible. This could also be valid for special attention paid to rearing of newly born crossbred calves, removal of scrub bulls through persuasion to minimize the role of psychological barriers, and prevention and cure of animal diseases (Ibid. pp.141-42).

It can, thus, be thought that, by and large, the NDRI made appropriate efforts to identify the ORP area. An issue, however, is whether or not the technology package extended through the ORP was most appropriate. This arises from a number of observations.

First, buffaloes accounted for 70 per cent of the total milch animals in the area (Ibid, p.177) whereas the project concentrated on improving the productivity of cows, and buffaloes were not even mentioned in the statement of objectives.

Second, there appeared to be a definite incentive "with" the ORP for rearing crossbred cows for sale rather than for enhanced milk production in the area. Some 46 per cent of the crossbred animals were sold during the years 1975-1981 and nearly 61 per cent of them were cows, pregnant heifers, and heifers, and female calves (Ibid, p.190). Landless labourers and marginal and small farmers i.e. the most preferred target groups effected 62 per cent of these sales.

Third, the percentage of cow milk sold through organised channels in the ORP declined from 48 per cent in 1975-76 to 26 per cent in 1980-81 whereas that of buffalo milk increased from 52 per cent to 74 per cent (Ibid, p.154). One somewhat discomfoting conclusion could be that a supply-based technology was pushed without considering the consumers' preferences, buffalo milk in this case. There has also been an apprehension in some quarters that cow milk may assume the status of a by-product whereas the project's objective was to enhance milk production at a lower cost.

Some General Observations

The main objective of this section would be to make a few general but related observations. First, it has been observed that

the process of formulation of research policies cannot be discerned through the feedback from the ORPs (Ibid p.200). At the same time, it could be argued that there has been no systematic effort at evolving a long term policy for agricultural research in India. The overall socio-political dynamics emphasizes "tension management". Generally, persons other than scientists and research administrators occasionally emphasize the "need" for certain actions. In an atmosphere of tension management, such identification of actions may not be based on most relevant signals. These statements, in turn, appear to serve as signals for the scientists to identify the sources of funds for carrying out research projects. There could be nothing wrong with this system if the projects, including the ORPs, the area of their location, and their scope, were appropriately identified.

The process can be made to work if desired level of financial resources for openended and/or time consuming research projects were available with "dignity" to the concerned scientists to enable them to develop a pool of technologies. This would, in general, require testing technologies at experiment stations for a reasonably long time to assess the impact of changes in a multiple of variables including weather. During the last one decade or so, the search for financial resources for research could have been relatively easy through specific schemes including ORPs. The responsibility to bring about the necessary change must lie with

the policymakers, the ICAR, and the administration of the agricultural universities and research institutions. Another culprit could be the heavy premium placed on the "number" of publications.

Second, it must be ensured that most agricultural research projects in general and the ORPs in particular must draw on a multidisciplinary team right from the stage of drawing proposals. This should not be confused with multitier responsibility for implementation of ORPs. Within the multidisciplinary approach, the role of social scientists (economists, sociologists, and psychologists) must be specifically recognized for identifying projects, project areas, and the socio-economic constraints in the transfer of technologies. They may also have a comparative advantage in communicating with development administrators who are not directly involved in research but must use the results. It is a fortunate situation that most agricultural universities and research institutions have multiple disciplines within them. The issue of harnessing resources rests with professionals as much as with administrators.

Third, it must be recognized that jobs such as natural and human resource mapping would generally not be accomplished satisfactorily in the context of an ORP. The ICAR or another appropriate body may, therefore, consider and sponsor this task independently. The whole job would not have to be done afresh in most cases as a wealth of data exist with agricultural

universities, other research organizations, and governmental departments. But these have not been documented and collated to facilitate retrieval and ready use. Have we not been thinking of a national information system for too long without any serious expression of doubts on its technical, financial, economic, and managerial feasibilities?

One tends to think that these and other problems have been recognized, may be unconsciously. If that was not the case, the logic behind continuing at least two of the three ORPs studied here through their second phases would be very difficult to appreciate.

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