PN-ABG-828
69473

WORKING PAPER No. 36

Problems and Solutions for "Decentralizing" National Agricultural Research Systems

by

S. Huntington Hobbs

isnar

International Service for National Agricultural Research

The International Service for National Agricultural Research (ISNAR) began operating at its headquarters in The Hague, the Netherlands, on September 1, 1980. It was established by the Consultative Group on International Agricultural Research (CGIAR), on the basis of recommendations from an international task force, for the purpose of assisting governments of developing countries to strengthen their agricultural research. It is a nonprofit autonomous agency, international in character, and nonpolitical in management, staffing, and operations.

Of the 13 centers in the CGIAR network, ISNAR is the only one that focuses primarily on national agricultural research issues. It provides advice to governments, upon request, on research policy, organization, and management issues, thus complementing the activities of other assistance agencies.

ISNAR has active advisory service, research, and training programs.

ISNAR is supported by a number of the members of CGIAR, an informal group of donors that includes countries, development banks, international organizations, and foundations.

WORKING PAPER No. 36

Problems and Solutions for "Decentralizing" National Agricultural Research Systems

by

S. Huntington Hobbs

October 1990

International Service for National Agricultural Research

The topic was suggested to the author by Howard Elliott, ISNAR Deputy Director for Research and Training. Particular thanks and credit must be extended to Matthew Dagg, ISNAR Senior Research Officer, for his extensive comments and discussions with the author on earlier drafts.

Citation:

Hobbs, S.H. 1990. Problems and Solutions for "Decentralizing" National Agricultural Research Systems. Working Paper No. 36. The Hague: International Service for National Agricultural Research.

AGROVOC Descriptors:

Government research; Management; Organization of research; Public research; Research; Research institutions; Decentralization

CABI Descriptors:

Agricultural research; Government research; Management; Organization of research; Research institutes

Problems and Solutions for
"Decentralizing"
National Agricultural Research Systems

	Page
Introduction	1
Definitions	1
CENTRALIZATION AND DECENTRALIZATION	2
The Decision-Making Process	2
CONCENTRATION AND DECONCENTRATION	4
Criteria for Organizing Work Groups	4
CENTRALIZATION AND DECENTRALIZATION OF A NARS	6
Decision-Making in Agricultural Research	6
The Decentralized Nature of NARS	7
Centralization and Decentralization at the Policy Level	10
Centralization and Decentralization at the Institutional Level	12
Centralization and Decentralization at the Operational Level	13
Achieving a Balance	14
CONCENTRATION AND DECONCENTRATION OF A NARS	15
Criteria for Organizing Work Groups in a NARS	15
Scale of Group in a NARS	17
Concentration and Deconcentration at the Agricultural Research Station	17
The Human Dimension: the Researchers as an Elite	18
Incentives for Promoting "Regionalization"	19
Some Pitfalls of "Regionalization"	20
CONCLUSION	20
BIBLIOGRAPHY	22

Problems and Solutions for "Decentralizing" National Agricultural Research Systems

by S. Huntington Hobbs

Introduction

All organizations, entities, and groups of people face the dilemma of centralization versus decentralization. Too much centralization will lead to overburdened decision makers at the top, and to a loss of initiative and capability at the operational level. Too much decentralization will lead to fragmented initiatives, duplication of effort, dispersal of resources, and loss of critical mass. Centralization and decentralization are actually opposite ends of a continuum, and each organization or group must find an appropriate balance along that continuum. Finding this balance, however, is complex, because different elements of an organization or group will require different levels of centralization/decentralization. For example, within the same hospital, a physician and an administrator will require different kinds of decision-making autonomy, and different kinds of decentralized or centralized support.

National agricultural research systems (NARS) face this dilemma. ISNAR's reviews of NARS in developing countries often find that research organizations are commonly "overly centralized" in some functions (e.g., staffing, administrative procedures) and "overly decentralized" in other functions (e.g. planning and coordination of research activities).

This paper seeks to provide some guidance for analyzing how "centralized" or "decentralized" a NARS should be. This paper will also suggest specific mechanisms and procedures for achieving the desired balance between "centralization" and "decentralization".

Definitions

The management specialist Henry Mintzberg writes that "the words *centralization* and *decentralization* have been used in so many different ways that they have almost ceased to have any useful meaning".[1]

---

(1) Mintzberg, Henry. The Structuring of Organizations. Prentice-Hall, New York. 1979.

Most management specialists define these concepts in terms of decision-making:

> "When decision-making rests at a single point in the organization--ultimately in the hands of a single individual--we shall call the structure centralized; to the extent that the power is dispersed among many individuals, we shall call the structure decentralized."[2]

> "An organization is centralized to the extent that decisions are made at relatively high levels in the organization; decentralized to the extent that discretion and authority to make important decisions are delegated by top management to lower levels of executive authority."[3]

But immediately the literature on this topic becomes confused, because "centralization" and "decentralization" are used not only in terms of decision-making, but also to refer to the grouping or physical dispersal of staff, facilities, and services (because of this ambiguity, "decentralizing" is placed in quotation marks in the title to this paper).

Thus, some management specialists define the "centralization" of staff, facilities, and services as "concentration", and the "decentralization" of these items as "dispersal", or "deconcentration". If dispersal takes place over broader geographic areas it is often called "regionalization".

These distinctions are useful, and therefore, for purposes of this paper, centralization and decentralization will refer to control over the decision-making process. Concentration and deconcentration will refer to the location of staff, facilities, and services.

Centralization and Decentralization

The Decision-Making Process

The management literature provides a useful framework for understanding how the decision-making process affects centralization and decentralization. The decision making process can be seen as a series of actions or steps:[4]

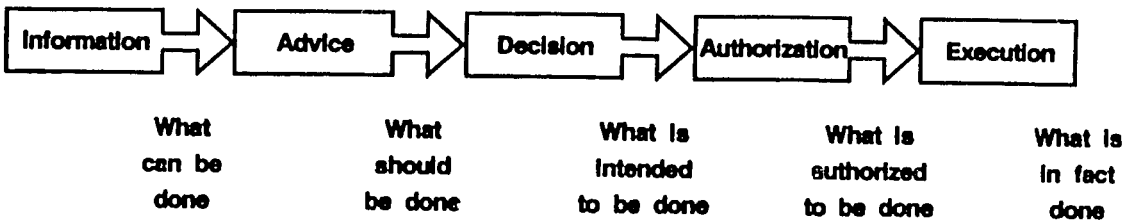
---

(2) Mintzberg, Henry. The Structuring of Organizations. Prentice-Hall, New York. 1979.

(3) Jennergren, Peter L. "Decentralization in Organizations" IN Handbook of Organizational Design. Oxford. 1981.

(4) Paterson, T. T. Management Theory. Business Publications. London. 1969.

Diagram 1: Stages of Control in the Decision Making Process



Thus, the decision-making process can be considered to be made up of five distinct stages:

1) collecting information for decision-making;

2) processing the information, to provide analysis and advice for decision-making;

3) making the decision;

4) authorizing the use of resources to proceed with the decision;

5) executing the decision.

The power of the individual depends on the level of control over these five steps. The power is maximized, and the decision fully centralized, when one individual controls all steps. To the extent that others gain greater influence, the decision-making process becomes decentralized.

Influence on the decision-making process can also be seen as becoming more decentralized over the following three levels:(5)

1. Power rests with a single individual, usually by virtue of the office that person occupies. Thus, a minister of agriculture, or a director of research will exert considerable influence by virtue of the position. This influence is usually exerted by the right of office to *make decisions* and *authorize* the use of resources.

2. Power can shift to "analysts" by virtue of the "systems of standardization" they control. Thus, a director of planning can gain significant influence on the decision-making process by helping define how the work is organized, defining what information is collected, and *analyzing* that information. Thus, in many research organizations, the director of planning can gain significant influence over the decision-making process, but rarely any real power over authorizing the use of resources.

---

(5) Mintzberg, Henry. The Structuring of Organizations. Prentice-Hall, New York. 1979.

3. Power can shift to the experts, particularly in organizations in which the operators are professionals (as in agricultural research), by virtue of their knowledge. Only the professionals can deliver the services the organization provides; the knowledge to provide these services is highly specialized, expensive to acquire, and difficult to replace. This power is anchored at the beginning of the decision-making process, because these professionals can best provide the *information* that is required, and it is anchored at the end of the process in the *execution* and delivery of services.

Thus, level 1 favors centralization, and level 3 leads toward decentralization.

Concentration and Deconcentration

Criteria for Organizing Work Groups

The management literature describes a number of criteria that affect the concentration and deconcentration of resources, particularly of human resources. The principal criteria for grouping and locating work units are:

Knowledge and skill. Groups are combined by similarity of knowledge. This is the dominant criterion for organizing groups into disciplinary teams: breeders, entomologists, economists, etc. Sometimes this grouping, based on specialized knowledge, is internally subdivided by skill levels: senior research officers, research officers, research assistants, etc.

Work process and function. This criterion is similar to knowledge and skill, but is somewhat more output related. This type of grouping is common in commercial organizations in which work is divided by "business function" (e.g., engineering, manufacturing, marketing, finance, sales, etc). A common example of this sort in agricultural development is separating research and extension.

Product. This grouping is totally based on outputs. This criterion becomes dominant when agricultural research groups are organized into commodity teams: rice, maize, milk production, etc.

Client. This grouping focuses on the needs of specific client groups. For example, this would be the rationale for organizing farming systems research teams.

Place. Geography often determines how groups are defined, and thus an organization may organize its work by regional groupings. Deconcentration based on place is usually called regionalization.

The reader will recognize that work in his or her organization is grouped by more than one, and possibly all, of the criteria outlined above. This is one of the reasons issues of concentration and deconcentration are so complicated; it is difficult to isolate the factor you seek to strengthen. "The question is not which criterion to use for grouping, but rather in which *priority* are the several criteria to be exercised."(6)

Organizations in which developing technical competence is a priority are best organized around knowledge and skill. A good illustration of this is the division into disciplinary departments of virtually all universities. Disciplinary groupings are well-suited for instilling information and specific skills to groups of students. This type of grouping may help strengthen technical competence, but the focus of the work will be on the technical dimension, on the "supply side", and considerations of demand and user needs will often be neglected.

Sequential activities are are often best organized by work process and function. Thus, it is common to separate research from extension. Grouping by work process and function is the easiest for planning the work of an organization; specific tasks are clearly assigned, and each has a predetermined sequential relationship. (Even with a "farmer-first and farmer-last" philosophy, and greater interaction and interdependence between research and extension, the research and extension tasks are usually planned as a sequence of steps.)

Organizing groups by product or client will bring a much stronger user orientation to the work. The focus of effort becomes the output or client of the organization. However, the ability to sustain or increase knowledge and skill may suffer. As the organization becomes more "demand driven", it may not be able keep up with the "supply side" of skills and knowledge it requires. Also, the planning and coordination of different work processes and functions becomes significantly more complex; it requires combining different disciplines, processes, and timetables.

Organizing by place can be done in two basic ways:

> by having *different* activities performed in *different* locations (e.g., planning is centered at headquarters, research is done at a station, extension is done at regional offices);
>
> by having *all or most* activities performed at *several* locations (e.g., regional offices of the ministry of agriculture that provide all ministry services).

The reader will again notice that it is extremely difficult to address each of these criteria in isolation. All are part of an organizational salad, and the task of management is to find the best balance among these criteria.

---

(6) Thompson, J.D. Organizations in Action. McGraw-Hill. New York. 1967.

Briefly, the management literature highlights two additional factors that influence how work should be organized. These are scale, and the human dimension.

Scale. A working group needs to have a *minimum critical mass*. This is the level at which the sum of the total effort is greater than the sum of the parts. Below that threshold, investments are being underutilized. At the other end of the scale, a working group can become too large to manage coherently (the top management of that group becomes overwhelmed with decision-making), and the large group is subdivided to seek a more streamlined performance.

The human dimension. This factor receives a multitude of names, and is the cornerstone of organizational behavior in management literature. The human dimension has also been called social interdependence,(7) social design,(8) social-technical management,(9) human management,(10) the H-factor,(11) and many others.

The human dimension states the obvious: groups are made of people. Organigrams may be conceived on paper, but they must function with flesh-and-blood human beings. Thus, all of the "objective" factors, such as work process or scale, will have to accomodate the "subjective" factors such as personality and social need. Later in this paper we will come to the topic of how to effect changes in decentralization and deconcentration of agricultural research, and we will see that as in most fields of human endeavor, the human dimension proves the most difficult to manage.

Centralization and Decentralization of a NARS

Decision-Making in Agricultural Research

The decision-making process in agricultural research has been very capably explained by Dagg and Haworth,(12) and in the introduction to their study on the subject, they write:

---

(7) Mintzberg, Henry. The Structuring of Organizations. Prentice-Hall, New York. 1979.

(8) Merton, R.K. Social Theory and Social Structure. Press. 1957.

(9) Emery, F.E. & Trist, E.L. "Social-Technical Systems", IN Management Science Models and Techniques. Pergamon. 1960.

(10) Drucker, Peter F. Management. Tasks, Responsibilities, Practices. Harper & Row. 1973

(11) De Bono, Edward. Atlas of Management Thinking. Penguin Books. 1981.

(12) Dagg, Matthew & Haworth, Fred. Program Formulation in National Agricultural Research. ISNAR Working Paper No. 17. 1983.

> "A national agricultural research system is concerned with determining a research program, implementing it, and communicating appropriately interpreted conclusions to users of the research outcome, i.e., information and materials. People, facilities, and funds are needed to carry out all parts, with their attendant management requirements. Many complex factors enter into deciding what to do and to make these decisions, groups of people are needed at different management levels."

Dagg and Haworth continue on to outline the process and levels for planning and reviewing the work of a NARS. This is presented in diagram 2. It is an "input-output" model, showing what groups should be involved in the planning and review of agricultural research, the inputs each group should receive, and the outputs they should produce. We say *should* because few NARS perform these activities as clearly as they are outlined in the diagram.

The planning and reviewing of agricultural research is a decision-making process. Thus, the outline presented by Dagg and Haworth can also be shown in terms of the decision-making process described on page 3 of this paper. Thus, diagram 3 shows the planning and review process, but highlighting the key functions of the decision-making process (gathering information, analyzing information for advice, making decisions, authorizing, executing) at each stage in the planning and review of agricultural research. Thus, for example, agriculture development plans become *information* for the research policy body. This information is routed to the technical staff group/committee for processing to provide *analysis and advice*. With this processed information, the research policy body then *decides* what national research policy should be, and *authorizes* the investment of resources by the definition of priorities and allocations. The *execution* of research activities is performed by the researchers.

The Decentralized Nature of NARS

A management specialist would say that the outline presented by Dagg and Haworth is a representation of a fairly *decentralized* system. Key decisions are made in at least three levels of the system, no group has a monopoly on information, no group has preponderant control over decisions and authorization, and no one group has commanding control over the different steps of the decision-making process. Furthermore, as was indicated earlier, power can shift to the experts, particularly in organizations where the operators are professionals (as in agricultural research), by virtue of their knowledge. In agricultural research, the researchers assemble the basic information and provide the vital skills for executing the work. Thus, the dynamism of NARS tends towards decentralization. A fairly decentralized system, with a core of highly specialized professionals, will make guidance and coordination of the system very difficult. To quote again from Dagg and Haworth *(with comments in italics by this author)*:

Diagram 2
Determining Agricultural Research Program: Planning and Review

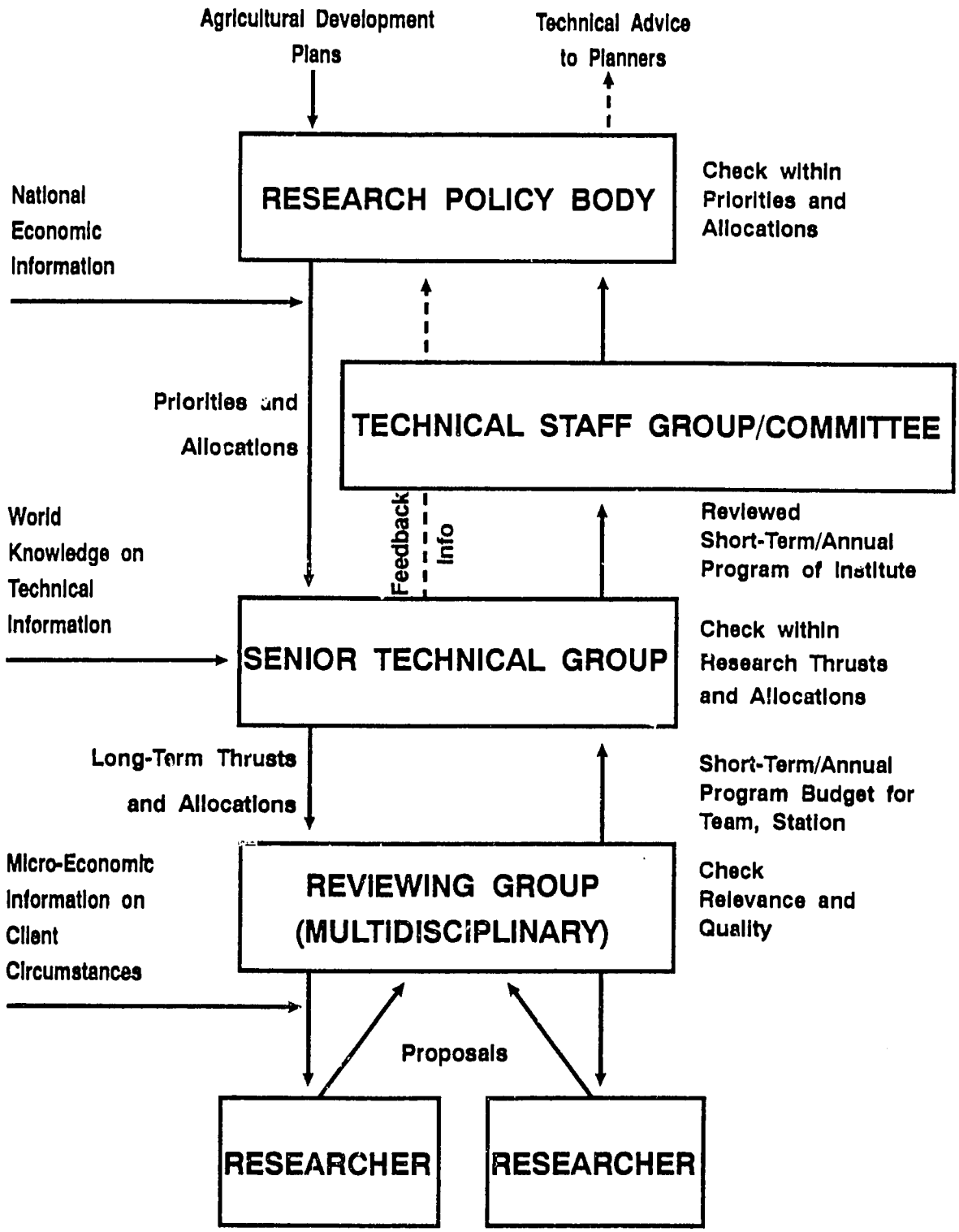
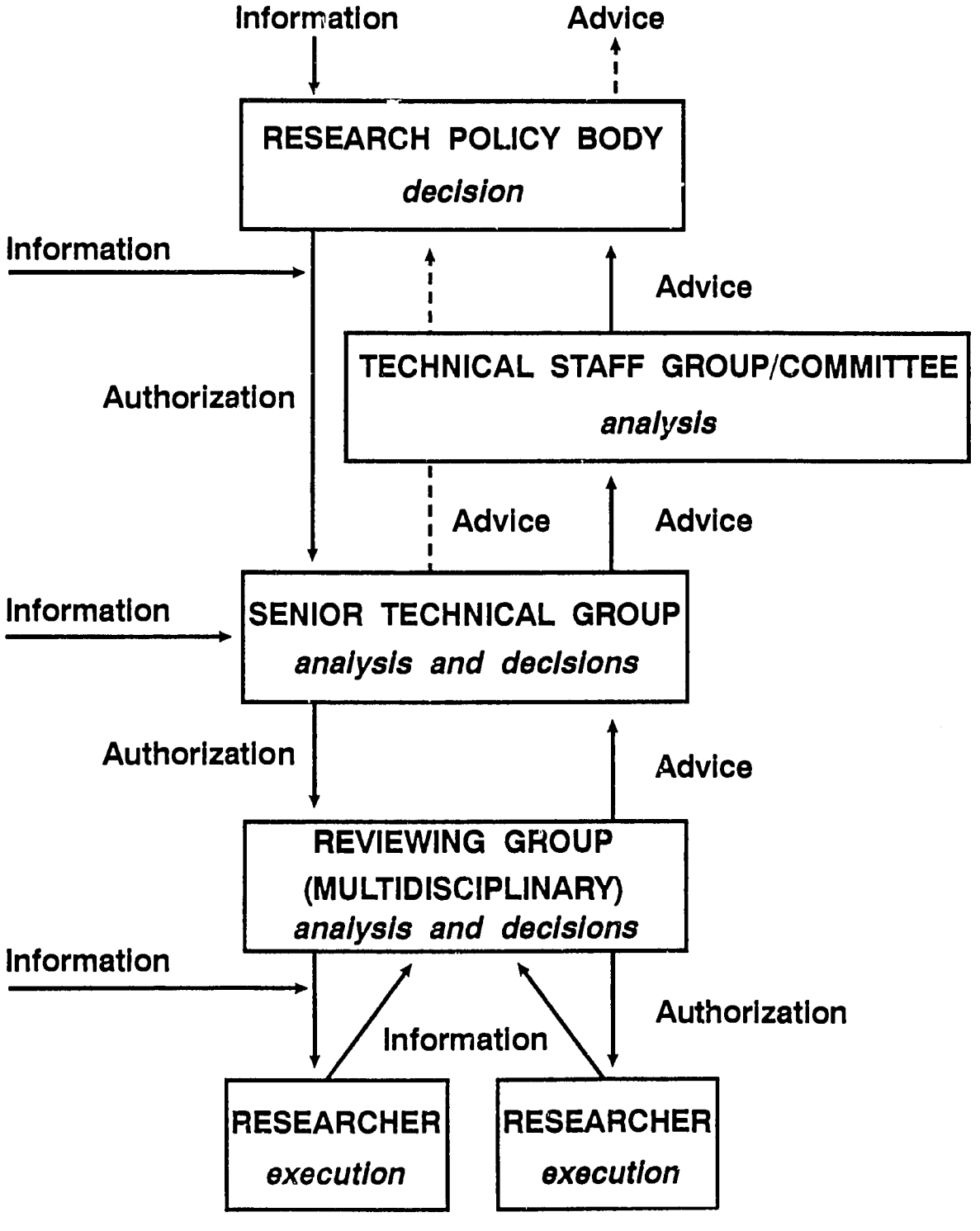


Diagram 3
Decision-Making Process for the Planning and Review of Agricultural Research (based on Dagg and Haworth)



> "It is important to recognize that in the final analysis, this growth of the research program is a bottom-up process (*the researchers hold the key knowledge*), and there will always be enough proposals to match the research resources available (*the researchers have greater control over information gathering, and over execution, but much less control over authorization of resource use*). Whether or not these proposals are the most relevant to national objectives depends critically on the top-down guidance given to researchers and team leaders on priority areas for research and criteria for choosing alternatives. These issues are extremely important in focusing choices with respect to highly relevant and sensitive experiments and studies, and it is unfortunate that such clear guidance from higher levels of management is often lacking (*emphasis added by this author*). In such circumstances it is difficult to ensure that the various research proposals, taken together, constitute a package that is even reasonably relevant to national objectives, even if the experiments are technically of a high quality."

Lack of clear guidance from higher levels, far too many proposals for the resources available, no coherent overall program; these are all symptoms of a system suffering from excessive decentralization. Indeed, a careful analysis of NARS reveals that they tend to perform poorly at the levels where centralization is required.

Centralization and Decentralization at the Policy Level

Most NARS do not have a viable body for formulating national agricultural research policy. This is usually because the numerous entities involved in agricultural research in a specific NARS do not want to surrender any autonomy to a centralized policy-making entity. Forming such a policy body usually requires a determined push, and the authority of a very senior official, such as a minister of agriculture. But the nature of the system is to disaggregate, to separate, so a constant effort is required to maintain the unity of such a research policy body.

Again, the entities involved are not going to be willing to surrender autonomy to a centralized policy body. These entities will cooperate to some extent, grudgingly, if forced or cajoled, but the instability and pull to separate remains. However, if a higher-level authority, such as a legislature or ministry of finance, surrenders some of its power of *authorization* on the use of resources to such a policy body, then the policy body can become institutionalized and can perform the desired functions on a more dependable basis. Thus, the entities that execute research in a NARS do not surrender control over the use of "their" resources to the policy body, but rather, gain some voice in the authorization of resources through participation in that policy body.

This is important enough to repeat. The nature of a NARS tends towards decentralization (recall the definitions; we are discussing the distribution of decision-making power, which is decentralization). To compensate for this decentralized pull, a NARS requires some centralized guidance. But to achieve this centralized guidance, the centralizing mechanism must be seen by the decentralized entities to add more control over resources than it subtracts.

This distinction is critical, because while creating a policy body that can give some *centralized* guidance, the NARS is actually *decentralizing* as decision-making authority is shifted from a legislature (or ministry of finance, etc.) down into lower levels of the system.

The NARS tend towards decentralization because of the nature of the work, and of the professionals who perform the work. It is within this decentralized format that centralizing mechanisms must be constructed to prevent the atomization of the NARS. Martinez Nogueira identifies this dichotomy quite clearly in a study on the organizational structure of research and extension linkages:[13]

> "... because of the heterogeneity and uncertainty of research and extension activities and of the policy context in which they operate, centralization is not a viable strategy. However, decentralization could make the various levels of the organizational structure more vulnerable to external pressures and thus have an adverse affect on overall coherence. Decentralization measures must therefore include the construction of mechanisms that will ensure control from above as well as facilitate regional and local integration." (Emphasis added by this author.)

Martinez Nogueira goes on to add:

> "The desire to achieve adequate control through centralized coordination mechanisms clashes with the ability of powerful interest groups to persuade high-level policymakers to meet their demands. Overloaded by detail, the state loses sight of strategic issues and becomes enmeshed in bureaucratic procedures. This weakens its administrative and information dissemination capabilities, inhibits regional and local adaptation of policies and restricts the capacity for mutual adjustment between the institutions implementing these policies. The institutions begin to compete with each other and to develop contradictory aims and interests. In such a situation, coordination mechanisms become inoperative."

For all of these reasons, a mechanism of centralized coordination that does not give the participating institutions in a NARS greater control over the *authorization* of resources will fail.

To summarize: An agricultural research policy body is critical to providing central guidance, and it can only be truly viable to the extent it succeeds in capturing power to make decisions and authorize allocation of resources from higher levels of the state.

This requires a delicate balance of centralization and decentralization. Nobody said it was easy.

---

(13) Martinez Nogueira, Roberto . The Effect of Changes in State Policy and Organization on Agricultural Research and Extension Links. A Latin American Perspective. ISNAR. Linkages Theme Paper No. 5. 1989.

Centralization and Decentralization at the Institutional Level

Centralization at the institutional level is relatively easy to achieve because the institution itself provides a "boundary" for decision-making. The institution has control over a finite and well-defined set of resources. Furthermore, the institution has legitimacy to use those resources. These are the two characteristics that make decision-making distinct at the institutional level: the assignment of a specific set of resources, and the *authorization* (from a legislature or ministry or other government body) to employ those resources as the institution sees fit.

Thus, the leaders of an institution have full authority to centralize the control of resources assigned to the institution. However, the centralizing power that an institution provides will be continually tested from above (from the policy level), and from below (from the operational level).

As stated in the previous section on the policy level, most NARS do not have a viable body for formulating national agricultural research policy. Without any clear or specific policy guidelines, the institution develops its own agenda, since it already has authorization to employ a specific set of resources. The clash between the policy and institutional levels arrives when the institution must request the policy level to replenish or increase the resources (usually financial) available to the institution.

The policy level has provided little guidance, yet will be reluctant to provide additional resources. This is a dilemma. The policy level has surrendered to the institution the authorization to employ resources, but will be reluctant to surrender additional resources to the institution.

At the policy level, the solution to this problem is the creation of a viable body to formulate national agricultural research policy. Thus, the policy level can give firm guidelines as to what research should be striving to achieve. At the institutional level, the leaders of the institution must prove to the policy level that the institution is capably meeting its mandate. Thus, the policy level develops the confidence to replenish the resources of the institution.

Another manifestation of the different perspectives between the policy and institutional levels is the interest of many institutions in developing their own sources of funding; for example, to have research stations become involved in commercial production of seeds or commodities. An independent source of funding would provide more power to the institution, and less power to the policy level. For this reason, most institutions seeking to establish an independent source of funding find numerous obstacles placed in their way by the policy level.

An exception to this conflict over additional funding is the pursuit of donor funding. The policy level often encourages institutions to seek and develop projects for external donor funding. To the policy level this kind of incremental funding is attractive because it increases the resources available (rather than having to choose among alternatives for

very scarce resources); it is attractive because it increases government access to foreign exchange, and because the policy level can still participate in deciding how those additional resources should be invested. At the institutional level, these projects are generally extremely attractive because they provide resources that would otherwise not be available.

From below, the centralizing power of the institution is eroded by the professional expertise of the operating level. As has been stated, it is the researchers who hold the vital knowledge the organization needs to perform. Thus, while the leadership of the institution will generally maintain control over the assignment/authorization of the use of resources within the institution, it will be the researchers who maintain the greater influence on programming the use of those resources. Or to put it another way: the operational level will select and propose what research activities to do, and the leadership of the institution will be basically limited to "yes/no" decisions on the proposals coming from below.

These pressures from "above" and from "below" are the main headaches of the leaders of agricultural research institutions. ISNAR experience would seem to indicate that these leaders spend most of their time on these two issues: how to capture more resources and how to gain more control over the activities of the research staff. The leaders of an agricultural research institution are truly caught in the middle, seeking that those "above" decentralize control of resources to them, and seeking that those "below" be somehow induced to surrender to more centralized control.

Centralization and Decentralization at the Operational Level

This dichotomy between centralization and decentralization is present as well in lower levels of a NARS. A very common example of a decentralized system that is falling apart at the operational level is the situation where each researcher is a "program" or where the number of experiments far exceeds the number of researchers. Under these circumstances, the centralized planning and review of agricultural research has effectively collapsed.

ISNAR experience would seem to indicate that adequate centralizing mechanisms at the operational level (or any level, for that matter) in NARS are a rarity. Many research stations or research programs do not have a technical committee ("reviewing group" in the Dagg/Haworth terminology) to perform this function, or if they have one, it performs poorly. Dagg and Haworth provide some guidance for the formation and operation of these reviewing groups:[14]

---

(14) Dagg, Matthew & Haworth, Fred. Program Formulation in National Agricultural Research. ISNAR Working Paper No. 17. 1988.

"The reviewing group in this sense should be bottom-level committees made up mainly of the researchers involved in the research on a commodity, group of commodities, or factors of production. The degree of specificity will depend on the size of the research service. Each committee should have a program leader (or coordinator) and about 7-20 members: less than seven members restricts the spread of disciplines possible, and more than 20 members is getting unwieldy for detailed interactive discussion. Each committee should have at least one or two members of senior staff to give experienced guidance in research design. (But they should be collegial members of the group, not exercising direction from a higher position in the hierarchy.) There should also be members acting on behalf of farmers and extension services. It is usually very difficult to find articulate and representative farmers for this particular task, and it may not be easy to arrange for attendance of suitable extension staff, but it is important that their viewpoint is brought into the decision-making process."

The key characteristic that distinguishes a researcher is knowledge; it is this specialized knowledge that makes the researcher of value to society. Researchers recognize this, and therefore, *peer review* is an effective mechanism for linking researchers. In a peer review researchers are "buying and selling" (transacting) that good or characteristic that makes them special knowledge. This knowledge, as has been stated here often, is power. This is why Dagg and Howarth state that the senior participants in the reviewing group should behave in a "collegial" manner and not by "exercising....a higher position in the hierarchy"; knowledge is the power that is being transacted, and to insert a different power, based on authority, would alter the relationship among researchers.

This is not unlike the relationship described for the policy body. The policy body will not succeed if the participating institutions must surrender autonomy, but can succeed if they can gain increased influence on the authorization of resources. Likewise, researchers will not want to sacrifice autonomy (and their knowledge is what allows them to establish autonomy). At the same time, they will be more willing to cooperate actively in a centralizing mechanism, like a reviewing group, if they perceive that participation helps capture influence on the decision-making process from higher levels.

Achieving a Balance

This paper has argued that the nature of NARS is towards decentralization. The reader may well question: then why is there so much concern about excessive centralization in NARS?

The answer is that while the nature of a NARS has a tendency towards decentralization, the process of public-sector authorization is highly centralized. Thus, the procedure of allocating and authorizing the use of resources in most NARS is not compatible with the decentralized nature of the work that must be done. So the situation seems to be:

too much decentralization, particularly at the operational level;

too much centralization in the authorization of resources.

The opportunity seems clear: centralize at the operational level (and at other levels where greater coordination is necessary), and decentralize the authorization of resources. The necessary centralization of NARS functions can be achieved by institutionalizing the coordinating (*i.e.*, *centralizing*) mechanisms proposed by Dagg and Howarth for the planning and review of agricultural research. The necessary decentralization of authorization can take place by shifting decision-making power from higher levels down towards the coordinating mechanisms.

The higher levels may agree to delegate authority (*i.e.*, *decentralize*), if they can be convinced that the result will be a more effective NARS. The entities at various levels of the NARS will agree to participate in centralizing mechanisms if these provide more influence on the decision-making process.

Drucker summarizes the dichotomy of centralization and decentralization in the following way:[15]

> "Decentralization must not create a weak center. On the contrary, one of the main purposes of decentralization is to *strengthen* top management and to make it capable of doing its work rather than be forced to supervise, coordinate, and prop up operating work."

Concentration and Deconcentration of a NARS

Criteria for Organizing Groups in a NARS

Concentration and deconcentration are opposite ends of a search to find the optimum division of labor. It is about placing the right group at the right place at the right time. The placing of a group depends on what the group needs to do best.

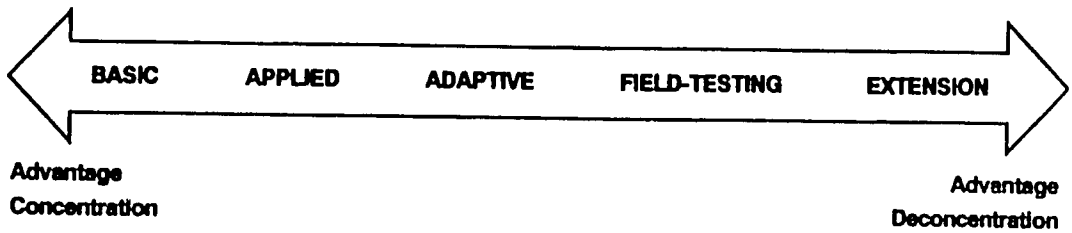
The need for concentration or deconcentration of agricultural research can be demonstrated quite simply, as seen in diagram 4. Agricultural research requires increasing amounts of "tailoring" as agricultural technology is made more suitable for transfer to farmers. The closer to the farmer the work must be, the greater is the level of *deconcentration* that is required. The ultimate level of deconcentration is extension, for the extension agents, by necessity, have to spread out to reach the clientele. The multitude of ecological conditions, socioeconomic characteristics, and systems of production of farmers *require* a multitude of answers which can only be delivered in a deconcentrated manner.

---

(15) Drucker, Peter. Management: Tasks, Responsibilities, Practices. Harper & Row. 1973.

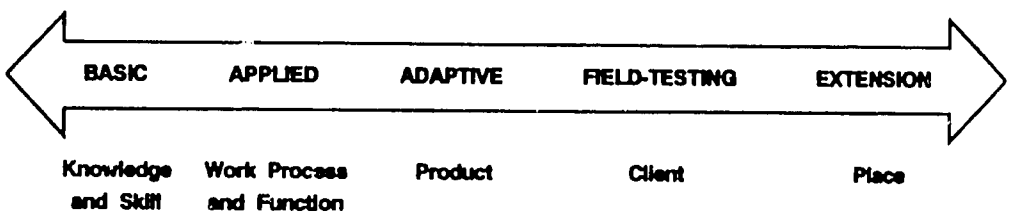
The further from the farmer the work can be performed, the greater is the advantage of the *concentration* of resources. Thus, a basic research unit that is working on a problem common to all plants (e.g., nitrogen uptake) is best grouped where the available resources can be concentrated for maximum output.

Diagram 4:
Relation of type of agricultural research to level of concentration of resources



Returning to the criteria for grouping and locating work units (presented on page 4), the more basic the research that is required, the greater priority must be accorded to grouping by knowledge and skill. The closer the tasks get to the farmer, the greater priority must be given to grouping by client and place. This relationship is demonstrated in diagram 5 (recall that all these criteria are present in organizing work groups: the issue is which criteria should have priority).

Diagram 5:
Relation of type of agricultural research to criteria for grouping and locating work units



Thus, it should be no surprise that extension systems are easily deconcentrated, and that basic research units are usually found in central locations.

The most difficult decision an organization faces in relation to concentration and deconcentration is: when should the organization "clone" itself and make copies of itself for improving delivery to dispersed clients? There are answers to this for a NARS. The first, as has been stated, is that minimum critical mass must be maintained. The second is that the kind of "copy" or "clone" it makes depends on the tasks that need to be performed. A basic research unit should not be "cloned". But it would make sense to increase the number of teams doing adaptive research and field testing, if resources permitted. Again, the key challenge to a research organization is to be concentrated enough to generate useful technology, and deconcentrated enough to serve a widely dispersed clientele.

Scale of Groups in a NARS

Concentrated and deconcentrated groups present very different problems related to the *scale* of the grouping. A concentrated group is seeking minimum critical mass; this is the level at which the sum of the total effort is greater than the sum of the parts. Thus, a concentrated group is seeking to locate a particular size of group in one specific place. A deconcentrated group is seeking as wide coverage as possible; minimum-size groups in as many locations as possible. Where concentration is required (e.g., basic research) the challenge is to maintain the size of group with the required expertise -- never a cheap proposition. Where deconcentration is required (e.g., extension) the challenge is to reach more users with the resources available.

NARS have problems concentrating resources for several reasons. One is that as the tasks to be performed get closer to the farmer, more deconcentration is required. The nature of the task requires a wider coverage: reaching more farmers, more areas, more crops. While maintaining minimum critical mass is still important, this is often sacrificed in seeking wider coverage.

Another reason has to do with the tendency of NARS for decentralization (as has been explained earlier). With a low capability to maintain centralizing mechanisms in the NARS, the power to force the concentration of resources is often absent.

One of the reasons that some commodity research organizations have been successful is because they have enough centralizing mechanisms (e.g. a one-crop focus, a strong board, user influence on allocations) that there is enough centralizing power to maintain a concentration of resources.

Concentration and Deconcentration at the Agricultural Research Station

Concentration versus deconcentration is a dilemma for all organizations. Concentration helps assure that the organization has the capability to respond, but it may distance the organization from its clientele. Deconcentration brings the organization into greater contact with the clientele, but possibly at the expense of losing the capability to produce the product or service that is required.

This dilemma is present at many agricultural research stations, because these stations require concentration (assembling and maintaining research teams), and deconcentration (serving a dispersed clientele in a given geographic region). One way to reduce the tension in this dilemma is to organize the research teams according to the type of research being performed, and the most suitable criteria for organizing that kind of work (as in diagram 4). Thus, a team conducting *basic research* should be organized by *knowledge and skill*, and a team conducting *adaptive research* or *field-testing* should be organized by *product* or *client*.

However the research groups are organized at the research station, it is usually preferable to favor concentration. First, a NARS has enough problems focusing its efforts, so anything that can help maintain a cohesion and strict focus to the work to be done must be welcomed. Second, a NARS must produce before it can deliver, and thus, concentrating resources will help insure that the information and technology are actually generated. Third, the physical presence of a research station, with a specific perimeter, is a useful vehicle for concentrating effort on specific tasks.

The inference that can be drawn from this is that agricultural research stations are *not* needed all over the country. What is needed is a few places to concentrate research resources, and one could almost say the fewer the better. Generating technology *requires* assembling minimum critical mass; this requires concentration. Indeed, ISNAR's experience is that many NARS have too many research stations for the level of resources available. In other words, the number of research stations may have to be *reduced* to allow a better concentration of resources. Field testing and extension can then be performed by deconcentrated resources.

Near-empty research stations are sometimes a sign that a NARS has too many research stations for the resources available. But many times near-empty research stations are a sign of *de facto* overconcentration of resources in the capital of the country, or in one or two favored research stations. ISNAR experience has demonstrated that while the number of research stations may be adequate, some of the research stations may be located in places where researchers do not want to be based. The results are no minimum critical mass at those stations, overabundance of researchers at favored locations, and much commuting and high levels of expense in transport and per diems. This is due, of course, to that other factor for organizing work, the human dimension.

The Human Dimension: the Researchers as an Elite

A study by Leonard[16] explains that *elites* ("a socially or powerful group, often within the government"[17]) may often change or abuse development efforts to suit their needs. Leonard generally applies the concept to elites among user groups, but it is also applicable to elites providing services. For all the reasons of knowledge and power that have been mentioned in this paper, research professionals are the elite of a NARS.

Elites will naturally prefer and achieve the most comfortable postings (usually the capital), or the places with the most extensive facilities (often the "principal" research station), which in many NARS are often close to the capital itself, or close to some other large urban center. This is a very natural aspect of the *human dimension*; people want comfort, access to the facilities of a large urban center, to work in the best-endowed facilities.

---

(16) Leonard, David K. Analyzing the Institutional Requirements. IN Institutions of Rural Development for the Poor; Decentralization and Organizational Linkages. University of California, Berkeley. 1983.

(17) Webster's Ninth New Collegiate Dictionary. Merriam-Webster. USA. 1983.

This problem is often compounded by an allowance system for travel or per diems which allows researchers to increase their income. While many research organizations are facing stringent limitations in financial resources, somehow there also seems to be fuel (and vehicles) to travel from the capital or central headquarters to the regional research stations. A research organization could probably get an easy reading of its level of concentration by counting the percentage of vehicles based in the capital or central headquarters.

This is not to say that researchers should be prevented from travelling, because there are excellent reasons for a researcher to travel. If research resources are appropriately concentrated, it will be cheaper for the researcher to travel from a central location to regional testing sites, rather than sustaining a network of substations that cannot maintain a minimum critical mass of researchers. More important, for the researcher there is no substitute for contact with farmers, and this requires travel.

The challenge is to find the mechanisms and procedures for encouraging researchers to concentrate where they are most needed.

Incentives for Promoting "Regionalization"

Deconcentration on a geographic basis is usually called "regionalization". A document prepared for ISNAR by Hernando Ureña[18] identifies a number of incentives to encourage researchers to accept regional postings:

Regional postings are designed into the career path:

advancing in the organization requires a record of regional postings.

Payment bonus is given for regional postings. This bonus can be

a one-time payment, which can also serve to cover the costs of transferring or an increase in salary for the duration of the regional posting.

Providing a vehicle. This can be done through:

providing regional staff with a vehicle from the organization;
providing regional staff with loans (often subsidized) for the personal purchase of a vehicle.

Providing housing. This can be done through:

providing a housing allowance for a regional posting;
providing the actual housing. (This is a common practice at research stations that have built family housing, and has proven quite popular because the housing is usually provided free, or at very low cost. However, problems sometimes arise over responsibility for maintenance and repairs).

---

(18) Ureña Brenes, Hernando. La Descentralización de la Investigación y Extensión Agropecuaria en el Ministerio de Agricultura y Ganadería. Evolución Histórica del Proceso en Costa Rica. ISNAR. 1989.

Offering study opportunities. This can be done through:

providing regional staff with a certain amount of free time on a part-time basis to further their studies;
giving preference to regional staff for grants to upgrade their professional qualifications.

All of these incentives can play a valuable role in encouraging staff to accept regional postings. They serve to meet the needs of the human dimension. As important as these incentives are, it is also necessary to use disincentives; the NARS leadership must be determined not to permit staff to overconcentrate in the favored locations, and not permit those staff to endlessly commute to the regions.

Some Pitfalls of "Regionalization"

The same study by Ureña identifies a number of situations that will create problems in attempting to "regionalize" research staff:

deconcentrating what is done poorly; (If planning is poor, it will be worse on a regional basis.)

regionalizing staff and facilities, but not regionalizing operating (financial) resources;

focusing the planning of regionalization on a *technical* basis, and neglecting the *administrative* adjustments that will be required;

maintaining regional staff reporting directly to central headquarters, instead of to a regional leader (who can in turn report to central headquarters);

providing insufficient incentives to encourage regionalization;

having poorly defined mandates for the regional groupings;

not pursuing a policy to promote establishing linkages with regional entities, and not developing a regional base of financial support.

Conclusion

Centralization and *decentralization* refer to control over the decision-making process. *Concentration* and *deconcentration* refer to the grouping and location of resources. In a NARS, much of the decision--making process is strongly influenced by research professionals because of the knowledge they possess, with the result that power is decentralized. This decentralization of power needs to be counterbalanced with centralizing mechanisms, or the activities of the NARS will become highly fragmented. Therefore, centralizing mechanisms are absolutely necessary for the NARS to function as an entity. However, the decentralized components of a NARS will generally only participate in centralizing mechanisms if higher levels of the system agree to delegate power to the centralizing mechanism.

Different types of research (and ultimately, transfer of technology) will require different levels of concentration and deconcentration. Basic research will require the most concentration, and as the task gets closer to the farmer (e.g., field testing, extension) greater deconcentration is required.

At the research station it is preferable to favor concentration. For any research to take place, a minimum critical mass must be maintained. Many NARS have too-few researchers at too-many research stations. These NARS require greater concentration of research resources. However, sometimes far too many research resources are concentrated near the capital, or in one or two highly favored research stations. Under this situation, a greater deconcentration ("regionalization") of research resources is required, and deconcentration has to be supported by appropriate policies and incentives.

Bibliography

Dagg, Matthew. Framework for Developing a National Agricultural Research Plan. Report to the Government of Ghana. ISNAR. 1990.

Dagg, Matthew & Haworth, Fred. Program Formulation in National Agricultural Research. ISNAR Working Paper No. 17. 1988.

De Bono, Edward. Atlas of Management Thinking. Penguin Books. 1981.

Drucker, Peter F. Management. Tasks, Responsibilities, Practices. Harper & Row. 1973.

Drucker, Peter F. The Practice of Management. Harper & Row. 1982.

Emery, F. E & Trist, E. L. Social-Technical Systems. IN *Management Science Models and Techniques*. Pergamon. 1960.

Jain, H. K. Organization and Structure in National Agricultural Research Systems. ISNAR Working Paper No. 21. 1989.

Jennergren, Peter L. Decentralization in Organizations. IN *Handbook of Organizational Design*. Oxford. 1981.

Leonard, David K. Analyzing the Institutional Requirements. IN *Institutions of Rural Development for the Poor; Decentralization and Organizational Linkages*. University of California, Berkeley. 1982.

Martinez N., Roberto. The Effect of Changes in State Policy and Organization on Agricultural Research and Extension Links. A Latin American Perspective. ISNAR Linkages Theme Paper No. 5. 1989.

Merton, R. K. Social Theory and Social Structure. Free Press. 1957.

Mintzberg, Henry. The Structuring of Organizations. Prentice-Hall, New York. 1979

Paterson, T. T. Management Theory. Business Publications, London. 1969.

Thompson, J.D. Organizations in Action. McGraw-Hill. New York. 1967.

Ureña B., Hernando. La Descentralización de la Investigación y Extensión Agropecuaria en el Ministerio de Agricultura y Ganadería. Evolución Histórica del Proceso en Costa Rica. ISNAR. 1989.