PN-AAP-446
ISN 33783

INSTITUTIONAL ASSESSMENT FOR IMPLEMENTING A SYSTEMS APPROACH TO AGRICULTURAL RESEARCH AND EXTENSION

WP 101

A WORKING PAPER

Farming Systems Support Project

International Programs
Institute of Food and Agricultural Sciences
University of Florida
Gainesville, Florida 32611

Office of Agriculture *and*
Office of Multisectoral Development
Bureau for Science and Technology
Agency for International Development
Washington, D.C. 20523

R. K. Waugh
J. Meiman
J. K. McDermott

PNAAP446

INSTITUTIONAL ASSESSMENT FOR IMPLEMENTING A SYSTEMS APPROACH TO AGRICULTURAL RESEARCH AND EXTENSION

WP 101

A WORKING PAPER

R. K. Waugh
J. Meiman
J. K. McDermott

INSTITUTIONAL ASSESSMENT FOR IMPLEMENTING FARMING A SYSTEMS APPROACH TO RESEARCH AND EXTENSION

R. K. Waugh
J. Meiman
J. K. McDermott

Part I

INSTITUTIONAL ASSESSMENT

INTRODUCTION

Characterization and analysis of existing national programs and institutions is useful in determining the potential for implementing a systems approach to agricultural research and extension (R/E). The purpose is not to evaluate existing institutions in the usual sense, but to inventory a given situation in such a way that maximum use can be made of existing structures, resources and other organizational conditions, as well as to identify changes and modifications that might make research and extension more effective. Such assessment cannot be entirely objective. Qualitative criteria must be used, and no one set of criteria will be adequate for all situations. The following guidelines are meant to direct and assist institutional assessment.

These guidelines are presented in two parts: Part I, INSTITUTIONAL ASSESSMENT, is oriented to determine what organizational infrastructure exists within a given country for agricultural research and development and (b) Part II, TOWARD IMPLEMENTATION, is meant to give some ideas on what might be the function of what already exists or what might be added.

The criteria for assessment (Part I) are embodied in three sets of questions to describe the present institution or institutions in a country. This checklist is directed toward (a) the general conditions of an institution and its environment, (b) management and operational aspects and (c) the nature of the technological functions and methodologies of research and extension.

It is not expected that all questions can be answered for all situations. Furthermore additional observations should be made when the reviewer believes that they are important.

GENERAL INSTITUTIONAL CONDITIONS AND ENVIRONMENT
(Checklist, Part I)

1. How is national planning organized?

2. What organizations conduct research and extension?

   (a) What are the mandates of each?

   (b) How are these mandates funded?

3. What is the national policy regarding agricultural research and extension?

   (a) Is there an identifiable policy?

   (b) To what extent is policy written?

   (c) Does the policy contain incongruencies that make it difficult to determine the mandate of research and extension?

   (d) How does policy for credit, prices, trade, land tenure, etc., hinder or complement research and extension?

   (e) How does research contribute to policy formulation?

4. What is the general image of research and extension as viewed by government?

   (a) How is research and extension viewed by farmers?

   (b) What common beliefs do the employees have about their organization and their jobs?

5. What is the organizational structure for research and extension? [Use diagrams when possible.]

   (a) How does this structure fit within the overall government structure?

   (b) Are there structured linkages between R/E and other government agencies such as marketing, planning, credit etc.?

6. What are the current facilities: land, buildings, equipment?

7. What is the total staff by employee categories, by location and by educational levels?

8. What is the background and experience of leadership in

R/E?

9. What is the salary structure for personnel in research and extension?

   (a) What are the ranges of salaries for different categories of personnel?

   (b) What is the policy about salaries?

EMENT AND OPERATIONAL SITUATION OF RESEARCH AND EXTENSION (Checklist, Part II)

1. Does management manage or just supervise and control, based on a set of administrative rules and regulations?

2. What are the channels of authority?
   (a) Are these understood?

3. To what extent does management define and delegate responsibility, authority and the assignment of resources?

4. What are the major points of internal policy?

   (a) How is policy communicated within the research and extension organization?

   (b) Do the professional personnel largely ignore internal policy?

   (c) Is internal policy elaborated by management or management and technical personnel together?

   (d) Is internal policy based largely upon long standing tradition?

5. What kind of technical information system is used for collection, storage and dissemination of information?

   (a) What are the mechanisms for linking to external sources of information such as the International Agricultural Research Centers (IARC's), universities and worldwide science?

   (b) What are the major sources of external technical information?

6. How is planning conducted within the research and extension organizations?

   (a) How are research priorities set?

(b) How are current experiences and results used to modify plans?

(c) Are research results from the immediately prior harvest used as a basis for developing the work plan for the subsequent season?

(d) Who participates in research and extension planning?

(e) How are work plans reconciled with available resources?

(f) What provisions are made for scheduling the use of equipment and facilities?

7. What provisions are made for continual monitoring of operations?

8. Are the administrative services, such as purchasing viewed more as a control or as a service function conducted in support of research and extension?

9. How do communications flow within the organization?

(a) How is feedback of information managed ie. is there a feedback mechanism and how does it function?

(b) How are the various facets of the research and extension system linked to assure adequate communication, technical interchange and technical support?

10. How are personnel selected?

(a) What are the programs for personnel development?

(b) How does the incentive/award system function?

11. Budget for Research and Extension

(a) How are government resources allocated?

(b) Are there 5 year plans? What is the essence of these plans over the last decade?

(c) What is the percentage of the gross national product that is allocated to research and extension?

(d) How do budgets originate?

(e) When are budgets requested?

(f) What is the budget period?

(g) Are budgeted funds received at the beginning of the budget period?

(h) How does the receipt of budgeted funds relate in time to the principal agricultural activities in which research and extension are involved?

(i) Are budget requests based on need or is more than needed requested with the hope that minimum requirements will be met?

(j) How are budgets spent?

(k) Does each operating unit or group have an assigned budget, in which case are the budgets respected or does management or administration use the funds without knowledge or those to whom they are assigned? Does the allocation of funds and execution of budget allow cost accounting?

(m) What is the distribution of funds among different programs?

(n) Do heads of programs have a felt responsibility for efficient and effective use of budget?

12. What major development projects are operating or are planned for the future? What are the amounts and sources of financing?

FUNCTIONS AND METHODOLOGIES OF RESEARCH AND EXTENSION
(Checklist, Part 3)

1. Describe the research program (set of activities) for each entity doing research.

(a) How many projects?

(b) How are they classified? What commodities? What kind of research (breeding, agronomic, other) seems to be emphasized?

(c) Where do research ideas come from?

(d) How are research topics selected?

(e) What proportion of the research is done on farms? What topics does it address? Who does it? How?

(f) What contacts does the research entity have with farmers? List.

(g) What are the nature and character of these contacts?

(h) How are farmer problems identified and evaluated for relative importance?

(i) If there is a farming system group, how does it relate to conventional researchers?

(j) How does the research entity work with the extension service or any other entities dealing with farmers?

(k) What linkages does the research entity have with other technology sources? (IARC's, foreign universities, national entities)

2. Describe the Extension-diffusion program(s) of the country.

(a) What are the entities doing extension or extension-type work? List.

(b) What is the organizing concept of each one? (commodity, service, geographic, supply, market)

(c) How do these entities work with national research entity(ties)?

(d) Where else do they look for technological information?

(e) How does each mobilize, organize, and handle information for its own purpose?

(f) What services or functions other than technology do they perform?

(g) What testing does each do to verify or validate technology?

(h) What is the importance of the result demonstration as an extension method?

(i) What other methods are significant?

(j) In what forms do these entities state their annual goals?

(k) How do extension workers perceive their role?

3. Describe the technical services available.

(a) What is the seed supply situation for farmers? How do new or tested varieties get to farmers? How much time does it take?

(b) Characterize the farm input situation with respect to availability, quality, appropriateness, timeliness, price and service for such inputs as seeds, fertilizer, pesticides, machinery, tools.

(c) What kind of linkages does research have with the seed industry? With other input suppliers?

(d) What linkages does extension have with input suppliers?

(e) To what extent are laboratory services (soil testing, plant and animal disease diagnosis, etc.) available to farmers? To extension? To research?

(f) How do regulatory functions operate? What kinds of regulations are enforced? Do research and extension have responsibility for some regulatory functions?

Part II

TOWARD IMPLEMENTATION

After making an assessment of the institutional situation using the checklist format in Part I, the reviewer has gained information describing the institutional conditions that exist for agricultural research and development and how they function. It remains to determine the various elements under these conditions that should be continued, and what changes could be made, to implement a systems approach to research and extension. A major question is how to best use available resources, and what additional inputs are needed, in order to meet the requirements of an effective technological system to serve farmers.

What, in total, is it going to take to make the system workable, with the best opportunities for success? What are the greatest constraints or most readily identifiable constraints? What is conceivably the best format so that technology will make a favorable impact on agriculture?

As we prepare to implement a systems approach to agricultural research and extension, we must keep in mind that the constraints in the present system will not

automatically be removed with the introduction of a systems approach. In fact the multidisciplinary, and more disperse nature of the systems focus might acerbate administrative problems.

WHAT IS THE SYSTEMS APPROACH TO RESEARCH AND EXTENSION?

The concept of the farming systems approach held by different people varies considerably. Some view it as a drastic change; others view it simply as a new dimension and approach. Hildebrand and Waugh state farming systems research and extension (FSR/E) is applied, farmer oriented, agro-biological research, supported by the socio-economic sciences in a team effort which includes extension responsibilities. The principal product is technology. The primary clients are farmers.

There is no magic formula to determine the scope and style of systems approach. It is logical that not all farmers need the same support system, and thus the system developed to understand the farmers' situation and to generate and deliver relevant technology should be varied according to conditions.

Existing institutional structure and mandate may also influence the scope of farming systems programs. What is logical or feasible in one instance may not be in another.

A GENERALIZATION ABOUT ORGANIZATIONAL UNITS

The principal organizational groups needed to implement a systems approach to agricultural research and extension would consist of something similar to the following (which probably are minimal for successful sustained operation):

1. Management
2. Administrative services
3. Component (discipline and commodity) research groups
4. On-farm research teams assigned to farming areas.
5. Extension agents assigned to farming area
6. Technical services

These groups or units do not necessarily need to be included within one institution. For example it may be expedient to have research and extension in different organizations. While it may be desirable to have one organization with both a research and extension mandate

there is basis to believe that they can both function in a systems mode with common objectives when in different organizations.

Another important group that should be integrated into the system is farmers who should play an important role in the selection, generation, integration, evaluation and transfer of technologies. Although farmers are not, per se, integrated into the research/extension institution they are basic to a system approach to research and extension. Therefore, when structuring institutions or developing projects, it is important to be cognizant of the role of farmers in order that programs can be developed from the farm level upward rather than strictly from top down.

FARMER ORIENTED RESEARCH AND EXTENSION

The accompanying diagram I is more illustrative of systems function rather than organization. These functions, schematically presented, help to visualize the activities of the organizational groups needed to implement a systems approach to agricultural research and extension.

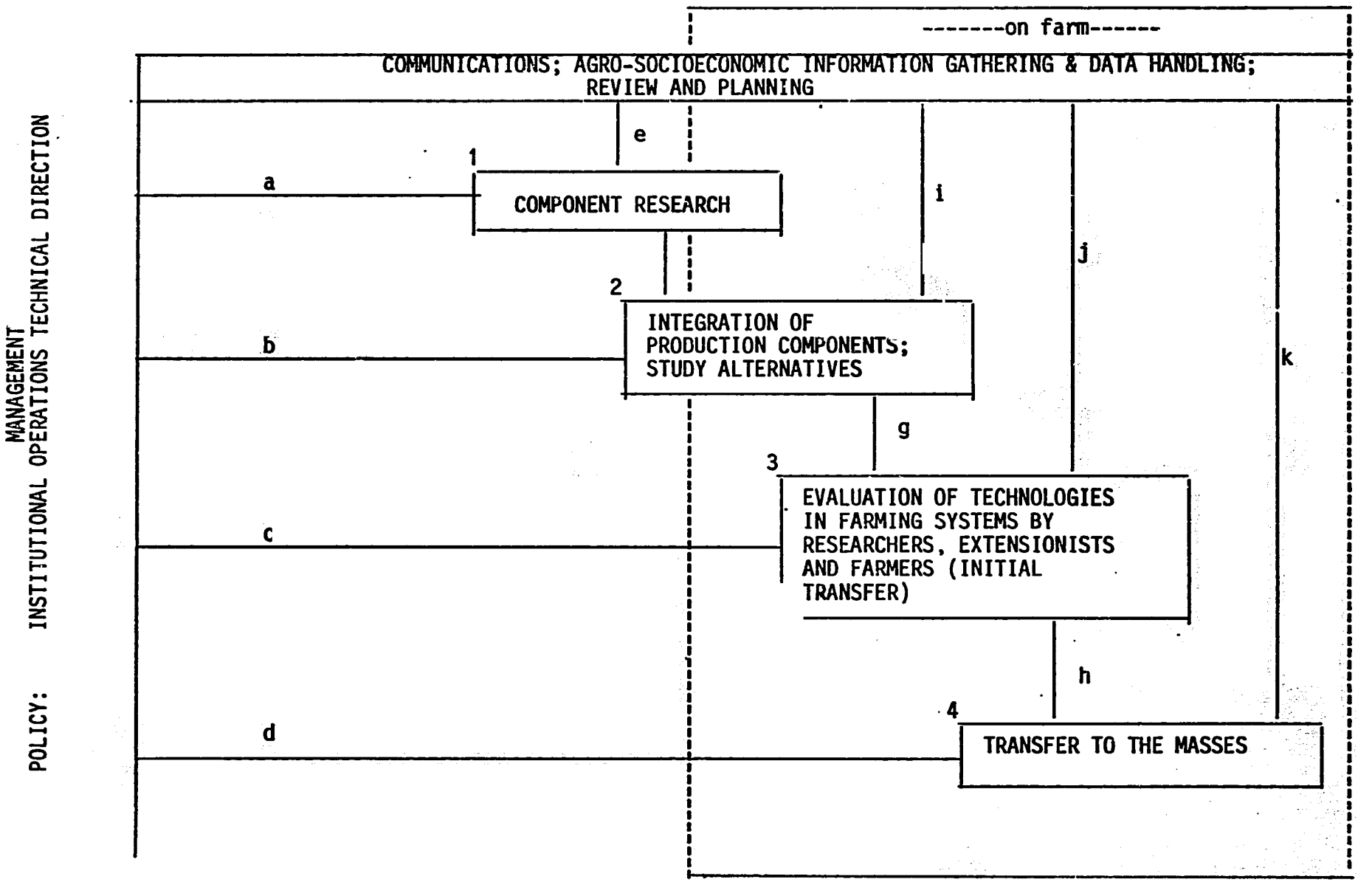
Component research is represented by block 1, on-farm teams by blocks 2 and 3, and extension by block 4.

There are two aspects of the functions as conceptualized in this diagram that may not be quickly recognized: (a) There is overlap in most of the principal functions as performed by groups and (b) there are more functions than organizational groups. Thus the organizational groups not only overlap in a collaborative manner with other groups (for example component research collaborates with the on-farm teams in the integration of components) but in other important activities there is joint action, such as in the case of gathering agro-socioeconomic information needed for characterization of farming areas and in review and planning.

The following is a brief summary of these functions which include some administrative and technical services not indicated in the diagram:

1. Managerial functions: There is top management for interpretation of national policy, the definition of research and extension policy that gives direction and orientation to institutional activities. Top management must accept the overall responsibilities and give leadership and guidance.

DIAGRAM I. SCHEMATIC OUTLINE FOR THE GENERATION AND TRANSFER OF CLIENT ORIENTED RESEARCH AND EXTENSION



However, each hierarchical layer within an institution has managerial responsibilities; not all of the decisions can be made by top management. One of the major responsibilities of top management is getting lower levels of management to make the right decisions--decisions that are correct within the institutional norms and that are effective from the standpoint of institutional objectives.

2. Administrative services: Administrative procedures should develop the framework which guides the operational functions of the institute in support of institutional objectives. Administration should be a service.

3. Information gathering and data handling (an information system): Characterization of farming areas, updating characterization and technical information, data and information handling, data and information storage and retrieval, and feedback and feed-forward of information.

4. Planning: Planning takes on more importance in FSR/E than in traditional research. Planning should be done in a coordinated manner by all groups and not unilaterally by individuals or small groups. This planning requires interpretation of policy, review of updated research results and cultural-economic information for the elaboration of strategies and work plans. It also requires information of resources because work plans must be reconciled with resources available.

5. Component and discipline research: Biological research is focused on commodities and is national in scope. (A country, usually, needs only one maize program). Research by biological disciplines such as plant pathology might well be integrated into commodity programs (The IARC's have used this system.), while the socio-economic disciplines focus upon specific farming areas in collaboration with on-farm teams.

6. Farm level research: This is both biological and economic-cultural. It integrates production components into farming systems, studies alternatives and validates technologies under farming conditions with farmer participation which in part is researcher - managed and in part is farmer - managed with supervision by research and extension. This validation (evaluation) is both biological and economic. Acceptability of technologies to farmers is evaluated. Micro-economic studies may be conducted to collect information on farmers' practises, production costs, and estimate farm yields. These farm level activities initiate transfer. The on-farm teams are the most

immediate technological back-stop for extension.

Transfer (extension): Transfer of proven technology to the masses is the major responsibility of extension but extension should always work with researchers and farmers in the evaluation of new technologies and the identification of farmers' problems.

Services functions: Service functions should be developed as needed. Some of these would be experiment stations, warehousing, administrative services, publications, etc. Other services might be biological services such as soil analysis and seed.

ORGANIZATIONAL UNITS AND THEIR FUNCTIONS

Organizational units are clearly needed for implementing farming systems research and extension. Their functions should be clearly identified. Once these are identified, a comparison can be made between what exists and what is needed as well as what functions are presently being carried out in comparison with needs.

Table 1. Organizational groups usually found and not found in national research and extension programs that are important to implement a systems approach.

Usually Identifiable	Usually not Found
Institutional systems and facilities	
Management	
Administration	
Component research	
	Integrative farm level research teams
Extension	
Technical support services	

A theoretical comparison between what might and might not exist is shown in Table 1. In fact this represents a common situation. Frequently all of the functional units needed for implementing farming systems research and extension are already present with the exception of the on-farm research teams. Of course simply organizing all of the needed units does not mean that the units are functioning in a systems mode. The units need to be managed so that they function in a coordinated manner compatible with and supportive of the systems approach to research and extension.

Table 2. Functions conducted by organizational group that are usually found or not found in national agricultural research and extension programs that are important to implement a systems approach

Functions usually found to be structured and organized*	Functions usually not well organized and planned
Management	
Administrative services	
	Information and data handling systems; characterization and analysis of farming areas
	Review and planning
Commodity and discipline research	
	Integrative research at farm level and study of alternatives
	Farm level evaluation by researchers, extensionists and farmers
Transfer mechanisms (extension)	
Technical services such as experiment stations	

*The fact that these functions are listed as "usually found to be structured" is not intended to imply that they are functioning well; modifications may be key to the successful implementation of the new approach to research and extension.

In Table 2, two list of functions are presented: one lists those that are commonly found in many countries; the other lists functions that will probably need be added.

Ideally, the farming systems approach would be implemented as a new approach to research, which involves current resources, including manpower, in a new dimension rather than make total, radical changes or establish special farming systems units or projects.

It is unlikely that research would already be in a systems mode, especially if there have been no on-farm teams that have been functioning. It is likely then that the organizational functions will need more change or modification than the organizational groups. Component research is very likely being conducted which emphasizes a component approach, planning is probably not well organized and if the behavorial and economic sciences are present they very likely are functioning rather independently from component research.

Good component research is important in systems research. The implementation of systems research does not necessarily require major changes in component research. The changes usually needed are twofold:. (a) an orientation to focus the component research to specific problems in identified target areas and (b) collaboration with field research teams and extension agents in the integration and evaluation of component research in farming systems acceptable to farmers. This applies to all component research, not just the biological component research.

In the farming system approach more collaboration is needed among groups than usually occurs, especially between research and extension, but the presence of on-farm research teams should facilitate this collaboration.

REFERENCES

1) Hildebrand, P. E. and R. K. Waugh. 1983.Farming Systems Research and Development, Farming Systems Support Project Newsletter vol. 1, no. 1,Institute of Food and Agricultural Sciences, University of Florida.