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FACULTY OF AGRICULTURAL SCIENCES AND ALLIED INDUSTRIES

BASIC PRINCIPLES & PROCEDURES and DIAGNOSTIC STAGE

I. BASIC PRINCIPLES AND PROCEDURES

Step 1. Planning of study

- Identify objectives
- Specify area to be covered
- Identify collaborating institutions and staff
- Select and adapt D&D methods to be used

Step 2. Regional Reconnaissance

- Identify, map and describe major land units and population distribution

Step 3. Identification and preliminary description of land use system

- Differentiate and describe important land use systems
- Make a preliminary assessment of their constraints and problems
- Make a preliminary assessment of their agroforestry potential

Step 4. Site selection

- Select land use systems for priority attention based on:

- Severity of problems
- Agroforestry potential
- Regional representativeness

- Select sites representative of the chosen systems for in depth D&D

II. DIAGNOSTIC STAGE

Step 5. Diagnostic survey

- Conduct field survey of representative management units to identify common land use strategies and problems
- Troubleshoot the production systems to identify causal factors and constraints
- Investigate interactions between and within management units and processes in the general landscape

Step 6. Diagnostic analysis

- Analyze field data to identify key constraints and intervention points for development of system potential
- Assess sustainability problems

Step 7. Specifications for appropriate interventions

- List system specifications
  - Functional specification for interventions
  - Design constraints
  - Desirable attributes of new technology
  - Overall development strategy for the system

TECHNOLOGY DESIGN and EVALUATION & REDESIGN STAGES

III. TECHNOLOGY DESIGN STAGE

Step 8. Identification of candidate technologies

- List feasible technologies which meet the system specifications
- Select and prioritize the most promising technologies and combinations

Step9.Detailedtechnologyspecifications

- Make a detailed list of desirable attributes of each of the selected technologies (component characteristics, management. considerations, etc.)
- Prioritize the attributes on this list in the light of the total knowledge of the diagnosed system

Step10.Technologydesign

- For each specific technology, give detailed answers to each of the following questions:
  - What functions should each intervention address?
  - At what location within the farm or general landscape should these functions be performed?
  - What component or combination of components (plant/animal species and varieties) are the best choices for performing these functions?
  - How many of each component are required to meet production targets?
  - What precise arrangement of components is envisaged?
  - What management practices are required to achieve the desired performance characteristics?
- Take note of all design questions to which the D&D team is presently unable to give satisfactory answers (these are topics for further consultation or research).
- Synthesize all of the above into an integrated design for an agroforestry system which best answers the needs and potentials of the existing land use system (consider stepwise introduction of component technologies if the full system is likely to be too much for local farmers to adopt all at once).

IV. EVALUATION AND REDESIGN STAGE

Step 11. Ex-ante evaluation and redesign

- Check land user's response to the design proposal (optional D&D verification survey)
- Conduct a preliminary evaluation of the agroforestry design, compare with present land use and non-agroforestry alternatives in terms of:
  - Productivity (biological potential, economic efficiency and diversity of

production
- Sustainability (Environment impact, resource conservation)
- Adoptability (fulfillment of felt needs, cultural comparability, social distribution of benefits)

- Return to design stage activities to make modifications suggested by the preliminary evaluation

Step12.Suitability classification

- Summarize system evaluations for each of the design agroforestry systems and develop classification of suitability for wider application
- Combine this classification into suitability maps and tables for the study area/region as a whole (define preliminary recommendation domain)

V. PLANNING STAGE

Step 13. State of knowledge review and assessment of research needs

- Assess readiness of each of the designed technologies for direct extension and/or need for further research
- Compile integrated list of research needs, including:
  - Need for further D&D (pre-project follow up and/or monitoring of field trials during project implementation
  - On-farm trials of candidate technologies
- Farmer managed trials to assess adoptability and elicit farmer's own design ideas
- Researcher managed trials to evaluate experimental variables under:
  - On-station investigations under controlled conditions to obtain detailed information on component interactions, response to management, germplasm screening, etc.

Step 14. Research and extension plan

- Develop overall plan of action, detailing:
  - Individual research investigations
  - Extension activities
  - Integration of research and extension goals and activities
  - Collaboration in research and extension networks

VI. IMPLEMENTATION STAGE

Step 15. Implementation of R&D and extension activities

- Continue to apply the iterative D&D process to refine prototype agroforestry systems on the basis of feedback from research and extension experience (re-diagnosis and re-design)

- Institutionalize communication channels between different programme components (hold periodic meetings to pool experience, assess new developments and modify the plan of action in the light of new experience)

Comparison of D&D with similar methodologies

Several methodologies that endeavour to design improved and appropriate land-use systems are currently in use, and at least two of them, the FSR/E and Land Evaluation, have been in use for the longer period than the D&D. Comparisons have been made between D&D and these other longer-established methods . With regard to procedural aspects, D&D is more closely related to the FSR/E (sometimes D&D is even portrayed as a form of FSR/E). According to Raintree, D&D is, however, different from FSR/E in the following aspects:

- It possesses a broader diagnostic scope, giving specific attention to the role of trees within the farming system;
- It has a more elaborate technology design step, which is needed to visualize the more complex landscape intervention typical of agroforestry;
- It may be applied at variable-scales; and
- It places a greater emphasis on the iterative nature of a diagnostic and design process.
- A detailed comparison of D&D with Land Evaluation has been made by Young. He argues that if Land Evaluation is applied to agroforestry, then the wrong methodologies are attempting to accomplish virtually the same task: to find out the best system of improved land use for a given site. One of the main differences, however, appears to be a stronger treatment of environmental aspects in Land Evaluation, and a stronger treatment of social aspects in D&D.
- Another relatively new methodology of similar nature is the agro-ecosystem analysis. This is a conceptually simpler methodology for rapid rural appraisals. Although no systematic comparison has been made between D&D and agro-ecosystems analysis, the two approaches share the same philosophy. Another recent holistic approach to land management that has originated from the rangeland management perspective places a greater emphasis on design as opposed to diagnosis.
- It will thus appear that all these methodologies have the same essential features; each, however, has specific merits for specific situations. The D&D because of its agroforestry orientation is more popular in agroforestry circles. Nonetheless, if agroforestry itself is considered as a subset of farming systems (as Farming Systems experts sometimes claim) and FSR/E becomes broader and visualizes tree on farms as essential components of farming systems, the remaining differences, if any, between FSR/E and D&D will be of purely academic interest.
- But the fact remains that these are only methodologies for logically addressing land-use problems; they are not substitutes for action, i.e., testing, refining, and disseminating interventions. Additionally, a sound grasp of biological and social problems, as well as knowledge of possible interventions and a creative approach, are required of the multidisciplinary teams. The suitability of the diagnosis and the design will be a function of their knowledge and creativity; similarly, the success of the action depends on the merits of the available

technologies. Furthermore the methodologies can, at best, only identify the problems and suggest the solutions; the solutions themselves depend on how the knowledge is advanced and applied.