DEPARTMENT FOR INTERNATIONAL DEVELOPMENT

NATURAL RESOURCES SYSTEMS PROGRAMME

HILLSIDES SYSTEMS

GUIDELINES FOR RESEARCH ON HILLSIDE FARMS: PARTICIPATORY TECHNOLOGY DEVELOPMENT OF SOIL AND WATER CONSERVATION TECHNOLOGIES

Compiled by
Brian Sims, Robert Walle and Jim Ellis-Jones

1999
4 EXPERIMENTAL PROTOCOLS

4.1 Choosing an area
4.2 Identifying local experimenters
4.3 Basic equipment
4.4 What to measure?
   - Basic environmental data
   - Rainfall
   - Soil classification
   - Simple things that can be seen
   - Adequate comparison
   - Pests, diseases, weed and earthworm incidence
4.5 Sampling
   - Selecting treatments
     - Basal treatments
     - Experimental plots
     - Finding uniformity
     - Plot design
     - Paired plots
   - Simple statistical concepts for collaborative research
     - Harvest
     - Involving the farmer
     - Representing the mean
     - Representing the confidence interval
4.6 Resource Material

5 EVALUATION OF CONSERVATION PRACTICES

5.1 BIOPHYSICAL EVALUATION OF SOIL CONSERVATION PRACTICES

5.1.1 Evaluating the conservation practice on-farm
5.1.2 The soil between the barriers
5.1.3 The soil surface
5.1.4 The soil profile
5.1.5 Soil properties
5.1.6 Texture
5.1.7 Depth
5.1.8 Organic matter
5.1.9 Colour
5.1.10 Life

5.1.11 A sample worksheet

5.2 SOCIO-ECONOMIC EVALUATION OF SOIL AND WATER CONSERVATION PROJECTS

5.2.1 Identification and quantification of the effects of conservation and degradation
5.2.2 Benefits of conservation
5.2.3 Costs of conservation
5.2.4 Appraisal methodologies
5.2.5 Partial budgeting
5.2.6 Cost-benefit analysis
5.2.7 Time horizons
5.2.8 Time value of money and discount rates
5.2.9 Estimating future productivity

5.2.10 Variability, risk and sensitivity analysis

Resource Material
ACKNOWLEDGMENTS

These Guidelines have been prepared as part of a research project (R5681), which was funded by the Natural Resources Systems Programme (NRSP) of the United Kingdom’s Department for International Development (DFID). The NRSP is one of twelve programmes funded under DFID’s Natural Resources Research Department. Together they form DFID’s Renewable Natural Resources Research strategy (RNNRS), directed towards problems of poverty alleviation in developing countries.

The Hillside System component of NRSP aims to increase the productivity of hillside systems through control of soil erosion and deforestation as well as increasing soil fertility through systems-based approaches. Priority is given to making research relevant to the needs of targeted beneficiaries (small farmers and intermediate users). As such the research is expected to meet both development and scientific objectives that will lead to better uptake and impact of research outputs.

DFID can accept no responsibility for any information provided or views expressed.

CONTRIBUTORS

These Guidelines result from a collaborative effort involving research and development agencies based in Honduras, the UK and USA. While the report has been compiled by Brian Sims, Robert Walle and Jim Ellis-Jones the following have been closely involved with providing the material contained in the Guidelines:

CIDICCO
Milton Flores

COSECHA
Rolando Bunch

PAN-AMERICAN AGRICULTURAL SCHOOL, ZAMORANO, HONDURAS
Dr Abellino Pitty
Victor Gutiérrez
Jofiel Jirón

HONDURAN FARMERS
Israel Andrade
Hector Colindres
Jonathan Flores
René Gamez

LUPE
Miguel Vázquez

SHILOH RESEARCH INSTITUTE
Brian Sims
Jim Ellis-Jones
UNIVERSITY OF FLORIDA
Robert Wille

UNIVERSITY OF LOUGHBOROUGH
Ignacio Ariévalo Méndez

ABBREVIATIONS

CBA Cost benefit analysis
C:B Cost:benefit ratio
CIAT Centro Internacional de Agricultura Tropical, Colombia
CIDICCO Centro de Información sobre Cultivos de Cobertura, Honduras
COSECHA Asociación de Consejeros para una Agricultura Sostenible, Ecológica y Humana, Honduras
EAP Escuela Agrícola Panamericana, Honduras
IK Indigenous knowledge
IRR Internal rate of return
LUPE Land use and productivity enhancement project, Honduras
mz Manzana (0.7 ha)
NGO Non-governmental Organization
NPV Net present value
PRA Participatory rural appraisal
PIDD Participatory technology development
qq Quintal (100 lbs = 45.45 kg)
SUMMARY

These Guidelines are intended to support research and development institutions in developing participatory research and development approaches in soil management technologies. The stages in farmer participatory research are discussed in relation to soil and water conservation. Details are given of: the processes involved in stakeholder analysis; participatory rural appraisals; implementing the research on-farm and sustaining the farmer-driven research process. Low-cost, farmer-adoptable conservation practices are described including physical works (live-barriers, stone walls, terraces and hillslope ditches), and agronomic practices (contour cultivation, soil cover, mulching and cover-cropping). The question of "why do research?" is put and addressed before details of on-farm experimental methodologies are examined. The experimental approach covers: choice of area; identification of collaborating farmers; basic field measurements and the associated equipment; experimental design and appropriate participatory statistical analysis. Evaluation of conservation technologies from both biophysical and socio-economic perspectives constitutes the second part of the Guidelines. Biophysical evaluation deals with the effect of different measures on soil conditions, what to look for and what to measure for comparison between alternatives. The principle parameters are: soil loss and retention; fertility changes; pests, diseases and beneficial fauna; yields and quality. The socio-economic methods discussed include: the identification and quantification of costs and benefits; and appraisal methodologies including partial budgeting, cost-benefit analysis and sensitivity analysis. The Guidelines are not intended to be a manual on participatory approaches or soil and water conservation and resource references are included for further insight into specific aspects.