

NRM Practices and Limitations

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- Project models: lessons learned
- NRM practices: what they are and lessons learned
- Case studies
- Recommendations
 - Helpful studies
 - Project model
 - Watershed approach
 - Technical interventions
 - Scaling up



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Haiti is mainly mountainous, 60% rural

Farms are small and complex

- 3 to 4 plots, avg. total area 1.7 ha
- Land held under several modes of access (own ~75%)
- Plots are located in different ecological zones

Farmers are market directed, not subsistence directed

Agriculture is not the only domain of economic activity

An aerial photograph of a hillside with terraced agricultural plots. Some areas are green with crops, while others are brown, suggesting soil erosion or degradation. A few small buildings and a dirt road are visible on the lower slopes. The sky is blue with some clouds.

Long term: intensive hillside agriculture is not the future

- **It is too expensive and risky on such a degraded resource base**
- **Farmers will always want to do some annual cropping**
- **Population is increasing and plot size is decreasing**
- **Acute poverty: 82% of rural population below \$2/day**
- **Rural families have other objectives**

Short and medium term: lessons learned can be applied

- **It is worthwhile to do projects in watersheds**
 - **Speeds up landscape restoration**
 - **Restore ecosystem function**
 - **Mitigate poverty**
 - **Slow anarchic growth in cities**
- **Some of the old project models have had successes**
- **There appears to be a convergence of development ideas**
- **Market forces can lead development, but other support is needed**
- **Animals and tree crops are the most important on-farm revenue**

Project Models: Types

- *Équipement du territoire*
- Jobs creation civic infrastructure
- Plot-based
- Watershed-based
- Cross border
- New mutual-interest coalitions
- Participatory local community development
- Mixed models and the convergence of ideas

Project Models: Lessons

- No project has covered entire watersheds
- Long-term relationships build trust
- Working through local NGOs, CBOs, work groups can be effective
- Must build in a method for getting and using input from farmers and field staff
- To maximize coverage in a watershed, a mixed project model will be needed
- Regional infrastructure projects using paid rural labor need to consider how other on-farm projects operate
- Social scientists working with technicians is effective

Linear structures:

Rock walls, Hedgerows, *Bann manje*, *Tram*



Economics drives technology evolution



- Leucaena hedgerows protected by adjacent row of cassava
- Cotton hedgerows in response to Saut d'Eau lantern market
- Bann manje evolve from hedgerows in response to markets for high-value perennials



Soil conservation, ravines



Hardwood tree planting

- Farmers always planted fruit trees and living fences
- Trees are a store of value
- Tree tenure can be separate from land tenure
- Farmers rarely planted trees for fuel, timber, or soil conservation; or top-grafted fruit trees before 1981



DCCH rootrainer nursery, Laborde



Planting neem on Morne Zephyr, 1982

Fruit trees



Mango and aki nursery, delivery to coop in Gros Morne



Mangos being harvested in Ti Lacombe

Top-grafted mango



Water



Water storage on farm is an environmental buffer and facilitates marketing high value crops—but the threshold cost is high

Technologies

Estimated relative costs, benefits, and risk of agroforestry practices

AF practice	Cost of installation	Cost of management	Amount of benefits	Timing of benefits	Risk of loss
Hedgerows	varies	med.- high	varies	med.- long	med.- high
Crop bands	med.- high	med.- high	high	short	med.
Rock walls	high	low-med.	low-med.	short	med.
Gully plugs	med.- high	low-med.	high	short-med.	low-med.
PLUS trees	low	low	med.-high	med.-long	low-med.
Grafted trees	low-med.	low-med.	med.-high	short-med.	low-med.

Technologies: Lessons

- Technologies evolve over time-no recipes
- Farmer motivation is economic, minimize risk, build social capital
- Trees and ravines appear to be the most cost effective to farmers
- Local micro-environments can be changed by soil conservation if enough resources are brought to bear
- Some practices have been widely adopted: hardwood tree planting, fruit tree top-grafting, gully plugs
- Constraints to adoption include: threshold cost, insecure access to land, long time until pay back, lack of technical assistance and training, project support period too short
- Animals influence management of soil conservation structures

Case Studies

Fond des Blancs: Value added



Tree distribution



Woodlots in the landscape



Harvest



Saw mill



Furniture making

Perche-Acul Samedi: hardwood tree management



Charcoal next to coppicing
Eucalyptus near Perche



Acacia auriculiformis poles being
harvested near Perche



Acacia integrated into multi-crop gardens in Acul
Samedi

- Trees are very evident over large areas between Terrier Rouge and Acul Samedi
- Agricultural practices have been modified to include hardwood trees
- Most charcoal in this area made from project trees, charcoal exports increased substantially
- Trees coppice—multiple harvests
- Active market for acacia poles

Ti Lacombe:

Local area transformation



Wangari Maathai visits 1995



Ti Lacombe plot transformed into a tree garden

- 15 farmers, 9 hectares
- Early 90s treeless, weedy
- PLUS project demonstration site
- Emphasis on gully plugs (>50), bann manje, training
- Project **invested \$665/ha** over 5 yrs

- 2 ravines stabilized, running water, no damage to road, micro-climate changed
- Trees cover plot, few annuals grown, linear structures gone, gully plugs maintained
- Est. 2005 **income \$221/ha** from 5 ha plot, 80% from tree products
- Social capital increased, farmer donates poles

Recommendations

Studies

- Do a tree inventory and charcoal production and market study in areas where project tree coverage appears to be significant (e.g. Fond des Blancs, Perche/Acul Samedi)
- Look at the cost/benefit and cash flow of areas where contiguous soil conservation and tree planting appear to have succeeded (Ti Lacombe, Champaigne, Maissade)
- Do a charcoal consumption study in Port au Prince and other large cities to support energy production strategy

Recommendations: The Model

- Select the watershed region based on previous studies
- Select farmer groups and NGOs
- Develop a regional watershed management plan
- A mixed model should be adopted
 - Grants to umbrella NGOs who contract with local groups
 - Project supported plot based activities: trees, grafting, soil conservation concentrated in home gardens and ravines, home garden cisterns, group and institution strengthening
 - Consider getting Veterimed involved in the region to address animals, complement with browse from trees
 - Support MARNDR regional stations and Haitian universities to do tree seed improvement and research on *Jatropha*
 - Support mutual interest coalitions based on regional economic engines
 - Public works to repair infrastructure, diminish downstream risk
 - Marketing

Recommendations: general

- The overall idea is to encourage a shift from annual cropping to perennial cropping on hillsides
- Agroforestry interventions should be promoted as money-making ventures, not conservation practices
- USAID should have a 20-year commitment in watersheds
- Consult with and complement other donors' development projects where possible
- Umbrella NGOs: social scientist with decision-making authority, knowledge of Haiti, empathy for farmers, horizontal management style

Dry areas

- Energy and essential oil plantations (Portnoff presentation)
- Silvopastoral systems (animals-forage-trees)
- Fruit trees and top grafting, orchards where appropriate
- Ravine treatments, both on farm and in larger ravines as public works
- Tree planting for charcoal production

Humid areas

- Soil and water conservation and soil fertility practices
- Perennial crops (coffee, cacao, yams, fruit trees)
- Vegetable market gardens
- Animal improvement
- Production of forage plants
- Ravine protection both on-farm and in larger ravines as public works
- Tree planting

Recommendations: Hardwood trees

- Establish NGO-operated small-container nurseries and distribute hardwood trees at no charge
 - Focus on areas needing protection, such as springs
 - Focus on groups engaged in soil conservation
 - But also do widespread distribution to the extent possible
 - Gather and use feedback from farmers
- Policy support to explicitly allow wood harvest from managed plots
- Work with farmers on woodlot management and with nurseries to ensure better seed
- Tree seed improvement



One-off solutions needed, such as community forests, taungya with absentee landlords, co-management

Recommendations: Fruit trees

- Promote both community and on-farm fruit tree nurseries, and direct seeding where appropriate
- Concentrate on fruit having an existing market (e.g. mango Fransique), but also look at niche export crops (e.g. quenepe)
- Teach top grafting, facilitate access to improved budwood
- Establish a seed improvement component, e.g., embryo selection in mangos
- Look into situations where orchards can be established instead of individual trees (e.g., Jose Sylvain)
- Encourage the creations of companies and coops for fruit transformation in watersheds having good production potential
- Assist women's organizations already active in fruit processing to grow their market share
- Link all fruit tree activities to the market

Recommendations:

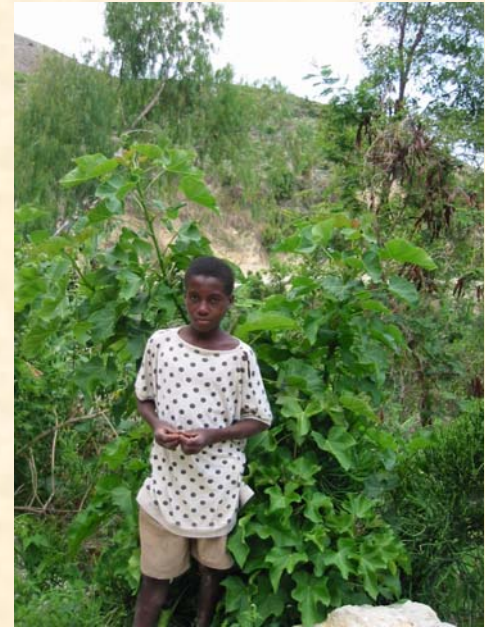
Soil conservation structures

- Proposed practices should be appropriate for the productive potential of the site
- Analyze the threshold and maintenance costs of a practice before widespread recommendation
- Emphasize gully plugs and link those to markets for high-value crops
- Emphasize practices that supply raw material to value added activities

Recommendations: Water

- Access to home cistern credit can be used to encourage soil conservation
- Link the cisterns to vegetable production, marketing, and to nearby public health programs
- Support construction of small irrigation systems if there are promising water sources in the region
- Consider developing hillside irrigation ponds and community cisterns associated with high-value crops
- Rehabilitate irrigation systems in the plains to encourage annual crop production there and diminish annual crop production on the hills
- Pump irrigation might be practical in some arid plains

Recommendations: Energy



- Use the charcoal market as an economic motor, do not prohibit it but look for positive ways to make it more efficient
- Work to improve charcoal production efficiency: management & kilns
- Encourage the formation and strengthening of charcoal & wood coops
- Promote the Recho Mirak: publicity, training, loans, tax policy
- Expand plantation of bio-energy crops: wood, *Jatropha*
- MARNDR carry out *Jatropha* production and selection with donor support
- Policy changes: make tree harvesting of managed woodlots legal

Marketing

- Marketing efforts must fit in to the total watershed model, strengthening the farming systems in the targeted area
- Facilitate development exchanges between watersheds and in those having high potential for NRM improvement
- Promote environmentally friendly (perennial, tree-based) products to DR, Antilles, North America
- Develop marketing campaign connecting Diaspora to Haitian products
- Encourage development of organic certification and marketing for tree crops
- Charcoal “branding” for managed plots



Recommendations: Animals



- Pig multiplication if needed
- Don't fight goats, take advantage of them
- Invite in Veterimed where possible
- Link animals to trees and marketing; introduce more productive varieties of cows and goats
- Introduce improved forage crops

