NRM, Ag Intensification, and Improved Livelihoods in the OHV Zone of Mali

also known as

Is this what agricultural transformation is about?

Agricultural Transformation

*Why do we want it?*

To reduce poverty and hunger

To promote broad-based economic growth

To protect the environment
Agricultural Transformation

What are its characteristics?

- Farmers expand use of science-based input.
- Farmers market more of their output.
- Consumers (including farmers) rely more on markets.
- Agriculture becomes more specialized, productive, and profitable.
- Real prices of food decline.
- Agriculture is increasingly integrated into the world economy.

Agricultural Transformation

How does it come about?

From an ongoing stream of technological and institutional changes such as:

- Improved farm technology developed/adopted
- More efficient input/output markets
- Better tax systems
- Infrastructure that lowers transactions costs:
  - Roads, communications, markets
- Improved governance
Agricultural Transformation

What is its link with the OHVN in Mali?

It’s happening there!

OHVN

What is it? Office de la Haute Vallée du Niger
OHVN

Key Characteristics of the zone

OHVN is a relatively small but important and growing rural production zone.

About 520,000 people and 37,632 farms from total population of about 10 million people.

203,855 cultivated hectares in 1999.

- 5.5% national cotton production
- 2.3% coarse grain production
- 3.5% rice production

Area is characterized by serious erosion, soil degradation, and deforestation problems

OHVN

Key characteristics of farming system

Crops include: cotton, tobacco, peanuts, millet, sorghum, maize, cowpeas, rice, fonio

Input use is high for cotton (25% of area cultivated each year) but low for other crops

<table>
<thead>
<tr>
<th>Crop</th>
<th>Area 98/99</th>
<th>Fertilized</th>
<th>Manured</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>35,398 ha</td>
<td>93%</td>
<td>17%</td>
</tr>
<tr>
<td>Mil/sor</td>
<td>108,880 ha</td>
<td>6%</td>
<td>13%</td>
</tr>
<tr>
<td>Maize</td>
<td>14,950 ha</td>
<td>32%</td>
<td>46%</td>
</tr>
</tbody>
</table>

Plowing oxen/equipment units: 0.66/farm
OHVN and USAID Support

- Support began in 1978.
- Key components since 1990:
  - Restructuring of OHVN to...
    - Improve quality of extension services
    - Move credit/market activities to private sector
  - High priority given to NRM techniques.
  - Promotion of rural enterprises and institutions
  - Construction and maintenance of rural roads

OHVN and non-USAID inputs

What is happening in OHVN results from the convergence of many events and activities:

- Policy changes made by the Mali Government:
  - Democracy + Economic Liberalization + Structural Adjustment
- Support from other donors
- Activities of many NGOs

Impacts must, therefore, be attributed to full range of activities -- USAID inputs plus those of all others.
Why focus on NRM in the OHVN

- NRM is an important USAID activity in OHVN.
- Adoption of NRM appears to be a catalyst.
- NRM story illustrates the complexity of the OHVN transformation process.

What is the evidence for NRM linked ag transformation in the OHVN?

Analysis of **aggregate yield statistics** 1991-1998 does not show much growth for OHVN:

<table>
<thead>
<tr>
<th>Crop</th>
<th>Annual Change</th>
<th>Average (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>-3% *</td>
<td>1056</td>
</tr>
<tr>
<td>Sor/Mil</td>
<td>+1-2%</td>
<td>998 and 921</td>
</tr>
<tr>
<td>Maize/tobacco</td>
<td>no change</td>
<td>1137 and 1722</td>
</tr>
<tr>
<td>Rice</td>
<td>+2%</td>
<td>1035</td>
</tr>
<tr>
<td>Fonio</td>
<td>+8% *</td>
<td>477</td>
</tr>
<tr>
<td>Cowpeas</td>
<td>+52% *</td>
<td>363</td>
</tr>
</tbody>
</table>
BUT aggregate trends can’t accurately reflect NRM impacts because....

They compare before/after rather than with/without.
Also....
OHVN has changed physical boundaries and
Changes in cotton policies following the devaluation encouraged extensive practices rather than intensification.

More on the importance of the with/without point

Yields

With NRM + intensification
With NRM
Without NRM and/or intensification

Number of years after land first cleared....
Back to the evidence.

NRM adoption continues to grow:

<table>
<thead>
<tr>
<th>Technique</th>
<th>1991</th>
<th>1996</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rock lines (m)</td>
<td>1,711</td>
<td>79,400</td>
<td>101,291</td>
</tr>
<tr>
<td>Fascines (m)</td>
<td>2,375</td>
<td>18,500</td>
<td>22,865</td>
</tr>
<tr>
<td>Vegetative bands (m)</td>
<td>426</td>
<td>8,998</td>
<td>17,579</td>
</tr>
<tr>
<td>Living hedges (m)</td>
<td>21,305</td>
<td>127,022</td>
<td>160,162</td>
</tr>
<tr>
<td>Compost/manure pits</td>
<td>1,125</td>
<td>3,571</td>
<td>5,063</td>
</tr>
<tr>
<td>Parcels (ha)</td>
<td>572</td>
<td>1,098</td>
<td>3,087</td>
</tr>
<tr>
<td>Parc ameliores</td>
<td>44</td>
<td>146</td>
<td>154</td>
</tr>
<tr>
<td>Fire breaks (m)</td>
<td>47</td>
<td>5,250</td>
<td>7,771</td>
</tr>
<tr>
<td>Fosses deversoires</td>
<td>948</td>
<td>1,417</td>
<td>3,263</td>
</tr>
</tbody>
</table>

This is where several pictures from the rapid appraisal trip were inserted for the actual presentation.
Farm land is being recovered....

34,858 hectares have been restored to normal or superior yield performance from land that had been abandoned or was performing at very low levels.

This represents 17% of area cultivated in OHVN zone

Adoption of NRM is widespread

60% of OHVN villages and 52% of farms have tried at least 1 NRM technique.

20% of farms have been cultivating the same fields for at least 3 years – i.e., they are maintaining the fertility of their land and not clearing new land.
### Examples of NRM yield impacts: MILLET

<table>
<thead>
<tr>
<th>Years of NRM</th>
<th>Average NRM kg/ha</th>
<th>Average Annual Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>1039</td>
<td>147</td>
</tr>
<tr>
<td>8</td>
<td>990</td>
<td>75</td>
</tr>
<tr>
<td>5</td>
<td>1032</td>
<td>185</td>
</tr>
<tr>
<td>5</td>
<td>1170</td>
<td>100</td>
</tr>
<tr>
<td>6</td>
<td>921</td>
<td>83</td>
</tr>
<tr>
<td>6</td>
<td>1230</td>
<td>47</td>
</tr>
</tbody>
</table>

### Examples of NRM yield impacts: Sorghum

<table>
<thead>
<tr>
<th>Years of NRM</th>
<th>Average NRM kg/ha</th>
<th>Average Annual Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>983</td>
<td>135</td>
</tr>
<tr>
<td>9</td>
<td>1452</td>
<td>170</td>
</tr>
<tr>
<td>5</td>
<td>1162</td>
<td>115</td>
</tr>
<tr>
<td>5</td>
<td>1236</td>
<td>108</td>
</tr>
<tr>
<td>6</td>
<td>1082</td>
<td>43</td>
</tr>
<tr>
<td>6</td>
<td>1105</td>
<td>52</td>
</tr>
</tbody>
</table>
Examples of NRM yield impacts: Maize

<table>
<thead>
<tr>
<th>Years of NRM</th>
<th>Average kg/ha</th>
<th>Average Annual Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>1303</td>
<td>117</td>
</tr>
<tr>
<td>9</td>
<td>1742</td>
<td>193</td>
</tr>
<tr>
<td>5</td>
<td>1360</td>
<td>190</td>
</tr>
<tr>
<td>5</td>
<td>1472</td>
<td>142</td>
</tr>
</tbody>
</table>

Examples of NRM yield impacts: Cotton

<table>
<thead>
<tr>
<th>Years of NRM</th>
<th>Average kg/ha</th>
<th>Average Annual Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>1058</td>
<td>138</td>
</tr>
<tr>
<td>9</td>
<td>1588</td>
<td>60</td>
</tr>
<tr>
<td>5</td>
<td>1470</td>
<td>-9</td>
</tr>
<tr>
<td>5</td>
<td>1388</td>
<td>79</td>
</tr>
<tr>
<td>6</td>
<td>1121</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>1339</td>
<td>99</td>
</tr>
</tbody>
</table>
Qualitative indicators of positive income impacts

Life is better now than 10 years ago:
- Food security much less of a problem
- Diets are more varied
- Can buy new clothes more often
- Many riding mobylettes now rather than bikes
- Many have invested in ag equipment/animals
- Men are marrying younger and more often
- Much less out migration now

Key determinants of NRM stimulated productivity and income growth

- Good NRM technologies
- Cotton as a source of stable income
- Community approach to training/implementation
- Focus on youth
- Focus on those most likely to benefit
- Use of demonstration effect
- Incremental training (CLUDSA approach)
- Support services (roads, credit, transpt, mkt res.)
Is everything rosy?

**NO!**

- Over-reliance on cotton
- Markets remain a problem for cereals and contre-season export crops
- Distribution of adoption may be a problem
- Input markets still dominated by OHVN/CMDT.
- Yields ok, but not outstanding.
- Women not much involved in NRM; should they be?
- Don’t really have hard data on distribution of impacts.

Is NRM stimulating ag transformation?

There are positive signs:

Farmers are becoming entrepreneurs and experimenting with new options for increasing incomes.

Increases in input demand and farm income are stimulating demand for other goods and services.

Farmers are integrated into world economy.
Although NRM appears to be stimulating ag transformation more work lies ahead...

Food prices are still high and unstable.
Yields need to go higher (more external inputs needed now that NRM is in place).
Risk and uncertainty need to be reduced if farmers are to specialize – the tendency now is toward diversification.

Can we expect adoption and impacts to spread?

Yes, but with qualifications...

- OHVN needs a strategy for NRM expansion.
- NRM needs to be promoted as preventative as well as curative measure.
- CLUSA style training very effective but slow.
- Farm days and farmer exchanges important.
- Need a cash crop with stable demand/price.
- Need flexible approach for both training and support services.
To conclude we return to the beginning:

It’s happening there!

But it needs constant nurturing....