Towards a multidimensional assessment grid of smallholders’ oil palm holdings


A preliminary proposal from SPOP Project:
ANR SPOP research project
Sustainable Palm Oil Production

• **Context**
  Guidelines for sustainable production (RSPO, ISPO)
  + need tools to assess the impacts locally
  + need to account for the diversity of the systems

• **SPOP strategy**
  - Scientific knowledge on the 3D-performances of the systems (social, economic, environmental)
  - Trans-disciplinary approach
  - Identification of bottlenecks and positive drivers towards sustainability

• **SPOP partners**

http://spop.cirad.fr/
Conceptual framework

- Based on the **World Agriculture Watch** (FAO, 2012) methodology applied to the specific context of oil palm smallholders

- Relying on an adaptation of the **Sustainable Rural Livelihoods** (Chambers and Conway, 1992) framework with two expected outputs:
  - Productive structures
  - 3 D performances: economic, social and environmental
Material & Methods

• A dual approach
  – At household and holding level (rationale of decision making regarding oil palm in a wider context)
  – At plot level (rationale of the technical choices linked to those at holding level)

• Field survey
  – Sumatra, Riau province: diversity and history
  – 43 oil palm growers => 33 complete questionnaires on 33 holdings and 40 oil palm plots (independent and semi-managed plasma)
  – Analysis with Sphinx software (preliminary results)
Core questions

• First observations confirm the need to go beyond an uniform view of smallholders’ systems
  – Wide range of palm oil holding sizes (2-110 ha) and income generated
  – Combination of plasma and independent plots in most holdings
  – Existence of diverse activities within the household

• Can we better understand the rationale of this differentiation process to characterise types of holdings?

• Can we link this diversity to a diversity in performances for oil palm production?
Dynamics of oil palm plot accumulation

- 5 observed trajectories
- 2 examples

**Plasma based expansion**
- Plasma income as a basis for fast independent expansion

**Fast plasma Expansion**
- Fast plasma expansion combined with independent surfaces completing the income

*Graphs showing the relationship between cumulated oil palm area and income over time with different trajectories.*

**Independent surfaces evolution**
- Total PO income evolution

**Potential level variations**

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Potential strategic pathways for the holdings

**Human assets**
- Social assets

**Financial assets**
- Natural assets

**Physical assets**

**Inputs bought in shops**
- Application according to both economic means and climate conditions
- Low input level due to high prices
- High variability in nutrients applied (quantity & quality)
- Family manpower

**Small independent (indpt)**
- (Young specialising indpt)

**Small plasma**
- (Mixed)

**Medium Indpt**

**Large indpt**

**Medium ISI**

**Large plasma**

**Large mixed**

**Flexibility**

**Profitability**

**Inputs bought to KUD**
- Application according to availability or climate conditions
- Recommendations applied
- Variability in some nutrients: applications, manure, KUD/paid workers

**Medium indpt/plasma**

**Ibid upper indpt except for:**
- paid workers, potential increase in expenses for field inputs

**Ibid upper plasma except for:**
- higher input level in indpt plots, and higher activity diversification with important income
Potential strategic pathways for the holdings

Probable trajectory of holding n°1

Plasma based expansion
plasma income as a basis for
Fast Independent expansion

Cumulated oil palm area and income

Time

- Independent surfaces evolution
- Plasma surfaces evolution
- Total PO Income evolution
- Potential level variations

- Human assets
- Social assets
- Financial assets
- Natural assets
- Physical assets

Small plasma (Mixed)

Profitability

Medium ISI

Flexibility

Medium indpt/plasma

Large mixed

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Potential strategic pathways for the holdings

Probable trajectory of holding n°9

Fast plasma Expansion
slow indep expansion

Cumulated oil palm area and income

Time

Independent surfaces evolution
Plasma surfaces evolution
Total PO Income evolution
Potential level variations

Human assets
Social assets
Financial assets
Natural assets
Physical assets

Small plasma
(Mixed)

Profitability

Medium ISI

Medium indpt/plasma

Flexibility

Large mixed

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Structural indicators

- 14 indicators based on the assets analysis in order to delineate the holding types without the whole strategic analysis

- 4 discriminating (significant with the current sample size)

<table>
<thead>
<tr>
<th>Tested indicators</th>
<th>Type of Holdings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Large holdings</td>
</tr>
<tr>
<td>Total OP surface (ha)</td>
<td>65</td>
</tr>
<tr>
<td>Plasma surface (ha)</td>
<td>6.5</td>
</tr>
<tr>
<td>Palm trees averaged age</td>
<td>9.5</td>
</tr>
</tbody>
</table>

Significantly lower than average (pink) higher than average (blue)

- No robust thresholds yet!
Performances indicators

<table>
<thead>
<tr>
<th>Holding &amp; Social</th>
<th>Economic</th>
<th>Environmental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total income/average expense</td>
<td>OP income/average expense</td>
<td>Total costs*/incomes</td>
</tr>
<tr>
<td>Azote price ($ per kg), Phosphate price</td>
<td>}</td>
<td></td>
</tr>
<tr>
<td>Average aggregated yields (including not planted or immature area)</td>
<td>Time for new plasma acquisition (average price of 25000$ per kapling=2ha) (in years)</td>
<td></td>
</tr>
<tr>
<td>Housing conditions (from 0 to 6)</td>
<td>Access to and quality of care services (both health center and hospital)</td>
<td>Social protection</td>
</tr>
<tr>
<td>Planta (data per ha)</td>
<td>Independent (data per ha)</td>
<td></td>
</tr>
<tr>
<td>OP C total* plasma/plasma net margin</td>
<td>OP C total*/indep net margin</td>
<td></td>
</tr>
<tr>
<td>% of fertilisation cost/total costs</td>
<td>% of fertilisation cost/total costs</td>
<td></td>
</tr>
<tr>
<td>% herbicides cost/total costs</td>
<td>% herbicides cost/total costs</td>
<td></td>
</tr>
<tr>
<td>Income/workforce costs</td>
<td>Income/workforce costs</td>
<td></td>
</tr>
<tr>
<td>Average yield (t/ha.year)</td>
<td>Average yield (t/ha.year)</td>
<td></td>
</tr>
<tr>
<td>Net margin ($)</td>
<td>Net margin ($)</td>
<td></td>
</tr>
<tr>
<td>Azote fertilisation balance</td>
<td>Azote fertilisation balance</td>
<td></td>
</tr>
<tr>
<td>Phosphate fertilisation balance</td>
<td>Phosphate fertilisation balance</td>
<td></td>
</tr>
<tr>
<td>Quantity of active substances used (pesticides)/recommendations</td>
<td>Quantity of active substances used (pesticides)/recommendations</td>
<td></td>
</tr>
<tr>
<td>Selective weed control Yes/No</td>
<td>Selective weed control Yes/No</td>
<td></td>
</tr>
</tbody>
</table>

*Total costs include inputs costs, workforce costs, weighing and transportation costs and other costs relative to KUD functioning (for plasma only). OP: Oil Palm

- On the 3 dimensions of sustainability
- At both holding and plot levels
- Both quantitative and qualitative
- Not all could be calculated yet due to some incomplete data
Preliminary results on the 3D-performances

• At holding levels
  – 2 significant (Student-t, 5%) discriminating indicators in terms of socio-economic performances (Oil palm income/total expense, Time for plasma acquisition)
  – Large holdings performed better on these 2 indicators

• At plots levels
  – Results for independent plots were more heterogeneous
  – Socio-eco: no efficiency difference between plasma and young independent
  – Env: across the holding types, most differentiated performances for pesticides treatment (more than for fertilisation ones)

⇒ Need further assessments (more data and statistical tests)
Conclusions

• We proposed a method to characterise the diversity of oil palm holdings and their 3D-performances

• The 5 types of holding must be further investigated and preliminary results consolidated (the goal was to test the method and tools)
  – Increasing the number holdings/plots surveyed
  – 1-2 plots surveyed when some holding reach 110 ha
    => need to be more exhaustive for each holding
  – Consolidating statistical analyses
  – Widening the area to cover more strategic pathways

• Consolidating/validating the tools with the stakeholders
  (workshop Friday 14. Feb. pm)
To deepen the analysis

• Establishing a linkage with agricultural statistics to widen the representativeness of the results

• Deepening the knowledge on agricultural practices and impacts based on the typology and permanent follow-up of some selected cases

• Developing a territorial approach
  – Cumulated/antagonist impacts
  – Influence of plot localisation
  – Oil palm spatial distribution model: workshop Friday 14. Feb. pm
Thank you for your attention!

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Current situation of the holdings based on areas

- Exploitations more likely to combine extensification in palm oil and complementary activities
- Exploitations more likely to intensify and specialize their production systems
- Exploitations about to retire

- Stage of installation
- ISI (Integration, specialization, intensification)
- EDA (Extensification, Diversification, autonomy)
- Potential change of strategy

Medium ISI holdings

Medium EDA holdings

Mixed holdings

Young Specialising holdings

Large holdings

Plasma area (ha)

Independent area (ha)
The sustainable rural livelihoods framework
(adapted from Scoones 2009)

Context and trends
- National and international trends and context.
- Local trends and context
- Shocks

Structure
- Social relations
- Institutions
- Organisations

Capabilities and functionnings
- Natural capital
- Physical capital
- Human capital
- Financial capital
- Social capital

Activities and strategies
- Naturel ressources based activities
  - Cultivation, cattering, livestock
  - Others NR based non farm activities
- Non naturel ressources based activities
  - Wages, trade, services, manufacture, etc.

Livelihood Strategies
- Specialization, Diversification, Intensification, extensification, migration, rental, combined, etc.

Performance / sustainability
- Social and human sustainability
- Economical sustainability
- Environmental sustainability

Capabilities and functionality:
- Natural capital
- Physical capital
- Human capital
- Financial capital
- Social capital

Performance / sustainability:
- Social and human sustainability
- Economical sustainability
- Environmental sustainability