Farming systems analysis: socio-economic modelling with OLYMPE

A global approach and an integrated tool

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Farming Systems characterization

- **Use of a systemic approach:**

  Definition of the various *sub-systems*: cropping and live stock systems, transformation system (cheese, jam...)

- Farming systems survey

- Farming system evolution: *trajectories and strategies*

- **Monitoring** Farming System evolution and impact (farming system network of reference),

- **comparison** analysis,

- **Prospective** analysis trough modelling

- Study level = Activity system = 1 farm + 1 household

- **Total income** = net agricultural income + off farm income

- → **cash balance** = what remains after all expenses (farm expenses and household/family expenses) = cash flow
Why modelling farming systems?

* A model has two main roles:
  
  a *figurative role of representation* of systems
  a demonstrative role (possibilities and strategies).

Objectives:

To *assess impact of farmers decisions.*

to *provide orientations for policy makers* by testing potential scenarios.

To take into *account individual vs collective decisions* and constraints (water management)
Olympe display at opening
5 languages are available
In the context of a sustainable development

- Taking into account Externalities
  Identification of positive and negative externalities
  Merchand/market and non-merchand/market goods and services
- The concept of multi-functionnality of agriculture
  (multiple roles of agriculture)
- Resilience and robustness analysis (tests with climatic or economic hazards)
- Prospective analysis for the next 10 or 20 years, scenarios:
- Common tool for a common understanding: team approach
- Moving from static vision (survey at a particular time)… to a dynamic vision (past, present and very next future..)…..
Working on real price series to define the scenarios: an exemple with the rubber prices.
Starting with a farming systems typology example on clove in Madagascar! Based on 3 factors:
1. Rice sufficiency
2. Contribution of clove products on agricultural income
3. Situation compared to poverty line
Impact of different clove management strategies on agricultural income and cumulated balance

Modélisation économique et analyse prospective de la contribution des girofliers à la sécurité alimentaire
Income evolution of selected rubber farmers in Indonesia

Evolution des soldes sur 10 ans

Solde (K roupies)

Années

Embaong mono
Embaong SRAP
Embaong palmier
Embaong palmier SRAP
Kopar palmier
Kopar palmier monosendiri
Kopar palmier SRAP
Kopar palmier SRAP RAS sendiri
Trimulia palmier
Trimulia SRAP
Olympe as a prospective tool to assess the resilience of systems in the face of hazards.

- From a farmer’s perspective, the objective:
  
  to assess potential risks to identify potentially profitable farming pathways among the range of possibilities in order to secure income

- From a developer’s perspective:
  - a better knowledge of the economic impact of decisions
  - define better farm counseling and also measures the potential impact of extension and recommendations
Comparison of the same farmers’ incomes with and without an increase of 30% in household’ expenses: INDONESIA

Years

Capital accumulation
No capital building

Solde (K roupies)

Embaong SRAP
Embaong palmier SRAP
Engkayu SRAP poivre
Kopar palmier SRAP RAS sendiri
Trimulia palmier

Embaong SRAP 30%
Embaong palmier SRAP 30%
Engkayu SRAP poivre 30%
Kopar palmier SRAP RAS sendiri 30%
Trimulia palmier 30%
Effect of commodity prices volatility on net annual income: INDONESIA

Scenarios in Olympe integrate price dynamic

net income comparison diversified Kopar farm type

Year

Rubber price in 2003
Increase 50% oil palm price

Rubber price in 2003

rubber price in 2001

Kopar_palmier_SRAP_RASsendiri 121

alea realite 2001_2003 Kopar_palmier_SRAP_RASsendiri 1212

alea hausse oil palm Kopar_palmier_SRAP_RASsendiri 1213

x 1000 Rp

0 5000 10000 15000 20000 25000 30000 35000

0 1 2 3 4 5 6 7 8 9 10
Net margin/Ha prospective evolution for various rubber agroforestry systems in Kalimantan, Indonesia, 2007.

Figure 5: Profit margin over twenty years of different rubber systems
Return to labour:

- per cropping system
- of familial labour

an essential component of farmers' strategies

objective: monitor the return to labour evolution according to price volatility.
Total family labour requirement for diversified Kopar type farm

Available farm labour = 2

Need of external temporary labour
Impact on return to labour for family labour

Return to labour of diversified kopar farm

H1 = rubber price 2001 (0.5 US $= 121
H2 = Rubber price 2003 (1.5 US $) 1212
H3 = rubber price 2003 + oil palm price increase of 50 % 1213
Rubber farmers’ income for 10 different types of farming systems with various crops for a period of 20 years

Cambodia

Evolution of farmers’ income for 10 different types of farming systems with various crops, above twenty years

-900
100
1100
2100
3100
4100


Years

Farmer's income (US$/year)

With Rubber and Durian
With Durian
Less diversified farming systems without Durian or Rubber
Comparison of farmers’ cumulated income for 10 different types of farming systems with various crops, above twenty years

With Rubber and Durian
With Durian
Less diversified farming systems without Durian or Rubber
Conclusion

- Understanding the dynamics of farming systems is key in our ability to deal with changes in a very rapidly changing world.

- Economic and very pragmatic approach combined with a detailed socio-economic approach:

- Understanding of how rural people learn and share experiences and evaluate their actions.
A prospective tool to build scenarios & define agricultural policies

- Stakeholders can negotiate from a position of symmetric information with other stakeholders.
- In possession of the potential advantages and disadvantages features for each decision
- For both individual farms and for the region as a whole.
- Coupled with a detailed analysis of history and social processes,
- Social change can then be more satisfactorily
- Analyzed in the context of technical change and innovation processes.
- Economic quantification become relevant when being contextualized with socio economic factors.
Bienvenue sur le site d'Olympe international !

Le logiciel Olympe est un outil de modélisation permettant l'analyse des stratégies paysannes, la prise de décision et l'analyse prospective. Il possède aussi un module d'agrégation permettant une approche régionale.

Le logiciel Olympe fonctionne comme une base de données et un calculateur (type tableur). Sa particularité est de pouvoir intégrer toutes les caractéristiques de l'exploitation agricole, lui permettant de répondre facilement à toute analyse micro-économique, et prospective via un module aléas sur les prix ou les quantités.

Il possède :

- des fonctions automatisées qui permettent de calculer rapidement marges et bilans.
- des fonctions manuelles qui lui donnent la souplesse.

On peut ainsi reconstruire la réalité d'une exploitation existante (ou la reconstruire à partir d'une typologie existante) et yindre les changements en cours (la diversification par exemple).

Son objectif est de permettre aux utilisateurs la maîtrise d'un outil commun de modélisation des exploitations agricoles.

Olympe existe grâce à une collaboration entre les chercheurs de plusieurs organismes

Demarche formation :
Madagascar, février 2006
- [23/01/2008 ]

Nouvelle version de Olympe
- [18/01/2008 ]

Toutes les actualités RSS
Next step with the new tool: OMEGA

- To Integrate a map base tool: mapvillage (from Gembloux)
- to be rewritten in a modern and open language
- Possibility of further evolution by anyone from the user community?
- In full open access

- Still to be completed in marche 2019.