Agricultural economics and development with implications to the Central Highlands

Philippe LEBAILLY (GxABT-ULg)

Ban Me Thuot, 23th December 2016
Learning to serve, serving to learn

Looking forward to a dynamic future in:

- Crop production and protection
- Animal science
- Forestry and land management
- Environment and natural resources
- Rural engineering and water management
- Food science and biotechnology
- Rural economics
Rural economics is the study of rural economies, including:

- farm and non-farm activities;
- economic growth, development, and change in rural areas;
- size and spatial distribution of production and household units;
- regional and interregional trade;
- land use;
- migration and (de)population;
- finance;
- government policies;
- rural-urban income disparities.
GxABT/ULg

Department of Economics

&

Rural Development
**Staff**

- **Professors and Assistants**: 15
- **PhD Students**
  - graduated since 2000: 40
  - ongoing: 25
- **Graduate & Postgraduate Students**: 30/year

MC en Développement, Environnement et Sociétés;
MC en Economie et Sociologie rurales;
International Master in Rural Economic.
2. Teaching activities

Main topics

- Agricultural Markets and Policies
- Micro & Macro Economics
- Accounting and Management
- Marketing
- Econometrics
- Economics of Development
- PCM - Economic & Financial Analysis of Projects
- Rural and Environmental Economics
- Rural Sociology & Law
3. Research activities

Economics of development

- Rural Entrepreneurship
- Rural Development and Poverty Alleviation
- Agrarian Dynamics
- Value Chain Analysis
- Soft Commodities
- Market Liberalisation & Local Farming Systems
3. Research activities

Agricultural Economics
- Agricultural Accounting and Agricultural Income
- Evaluation of Projects and Policies
- Agriculture – Agro-processing – Food

Market analyses and agricultural food chains
- Agricultural Diversification and Specific Quality Products
- Transformation & Valorisation of Agricultural Products
- Promotion of International Trade
4. Our Website: http://www.fsagx.ac.be/eg/

**Formation**

L’Unité d’Économie et Développement rural assure la charge du cursus universitaire de la seconde à la cinquième année d'études conduisant au Master bioingénieur en sciences agronomiques. Parmi les cours enseignés figurent notamment les cours suivants :

- économie politique et sociale
- comptabilité générale et analyse des bilans
- gestion des entreprises
- économie internationale
- économie des filières alimentaires et agro-alimentaires
- politiques et stratégies agro-alimentaires
- économie du développement
- conception et évaluation de projets
- gestion des conflits, problématique foncière et environnement
- instabilité des marchés intégration régionale et gestion du risque ; application aux projets agricoles et agro-industriels
- séminaires d’économie et de sociologie rurales
- cycle du projet et économie des productions
- économie environnementale
- sociologie générale et rurale
- études de marché et marketing
- techniques de communication
- marchés tropicaux
- économie rurale
- politique agricole etc.
4. Our Website: http://www.fsagx.ac.be/eg/
New challenges in rural economics
GLOBAL OVERVIEW
Growing imbalance (structural & cyclical?)

Increase of demand:
- Population growth
- Increase of revenues
- Change on consumption model
- Different use of land → biofuel

Supply - side:
- Decrease of resources (water, desertification, climate change)
- Urbanisation
- Reduction of the yield growth

These factors can modify the prices of agricultural raw materials
Population growth

World Population 1950-2050

Developing countries

Developed countries
Growth of revenues
Change on meat consumption in link with revenues

Source: USDA
Growth of urbanization

33 millions of persons (4x New York) move every year to the asian big cities

Percentage of métropolitans vs total population

Biofuels

Growth of biofuels demand

Use of maize for ethanol - USA

Source: USDA, DB Global Markets Research
Water: «blue gold»

- 75% of the globe is covered with water
- 70% of the consumption ➔ agriculture
- 100 last years:
  - Consumption x 7 but:
    - population x 4
- Problems in the distribution ➔ big losses
- With climate change, the differences between North and South are highest

Urbanization
Extension of cities caused damage of environment and decrease of arable land

Example: Kuala Lumpur - 1974

Example: Kuala Lumpur - 2005

Avaibility of land
Decrease of the area of arable land.

Source: U.S. Census Bureau, FAOSTAT, CSFB estimates
Avaibility of land
Yield growth by hectare of arable land decreases progressively

Demand on agriculture, yield and area from 1960 to 2015.
Index 1960-100

Source: USDA, FAO, Goldman Sachs research estimate
Climate change probably in link with the growth of energy

Production
Millions of tons

Source: International Energy Administration (IEA)

Variation de °C depuis 1900

Source: Hadley Centre
Malthusianisme ?

[Image of a historical figure]

Diagram showing the relationship between population and resources, with a point of crisis.

Malthus' Basic Theory
Croissance de la production agricole (par habitant)

1993–2003

Percent (1992–1994 = 100)

< -20 0 20 50 > No data
Apports caloriques alimentaires

2000–2002

Calories per capita per day

< 1 800 2 000 2 200 2 400 2 600 2 800 3 000 3 200 3 400 > No data
<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Proportion of adults obesity (BMI&gt;30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>2001</td>
<td>3.2</td>
</tr>
<tr>
<td>Korea</td>
<td>2001</td>
<td>3.2</td>
</tr>
<tr>
<td>Norway</td>
<td>1998</td>
<td>6</td>
</tr>
<tr>
<td>Switzerland</td>
<td>1997</td>
<td>6.8</td>
</tr>
<tr>
<td>Italy</td>
<td>2000</td>
<td>8.6</td>
</tr>
<tr>
<td>France</td>
<td>2000</td>
<td>9</td>
</tr>
<tr>
<td>Austria</td>
<td>1999</td>
<td>9.1</td>
</tr>
<tr>
<td>Sweden</td>
<td>2001</td>
<td>9.2</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2001</td>
<td>9.3</td>
</tr>
<tr>
<td>Denmark</td>
<td>2000</td>
<td>9.5</td>
</tr>
<tr>
<td>Ireland</td>
<td>1999</td>
<td>10</td>
</tr>
<tr>
<td>Finland</td>
<td>2001</td>
<td>11.4</td>
</tr>
<tr>
<td>Poland</td>
<td>1996</td>
<td>11.4</td>
</tr>
<tr>
<td>Germany</td>
<td>1999</td>
<td>11.5</td>
</tr>
<tr>
<td>Belgium</td>
<td>2001</td>
<td>11.7</td>
</tr>
<tr>
<td>Iceland</td>
<td>2002</td>
<td>12.4</td>
</tr>
<tr>
<td>Spain</td>
<td>2001</td>
<td>12.6</td>
</tr>
<tr>
<td>Portugal</td>
<td>1999</td>
<td>12.8</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>2002</td>
<td>14.8</td>
</tr>
<tr>
<td>Canada</td>
<td>2001</td>
<td>14.9</td>
</tr>
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<td>Slovak Republic</td>
<td>1998</td>
<td>16.2</td>
</tr>
<tr>
<td>New Zealand</td>
<td>1997</td>
<td>17</td>
</tr>
<tr>
<td>Hungary</td>
<td>2000</td>
<td>19.4</td>
</tr>
<tr>
<td>Australia</td>
<td>1999</td>
<td>20.8</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>2001</td>
<td>22</td>
</tr>
<tr>
<td>Mexico</td>
<td>2000</td>
<td>24.2</td>
</tr>
<tr>
<td>United States</td>
<td>1999</td>
<td>30.9</td>
</tr>
</tbody>
</table>
Trade and development
Principals cycles of negociations

<table>
<thead>
<tr>
<th>Cycle</th>
<th>Pays</th>
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</thead>
<tbody>
<tr>
<td>Le cycle de Genève (1947)</td>
<td>23 pays</td>
</tr>
<tr>
<td>Les cycles d’Annecy, de Torquey et de Genève (1949 - 1956)</td>
<td>26 pays</td>
</tr>
<tr>
<td>Le cycle Dillon (1960 – 1962)</td>
<td>26 pays</td>
</tr>
<tr>
<td>Le cycle Kennedy (1963 – 1967)</td>
<td>62 pays</td>
</tr>
<tr>
<td>Accords multi-fibres (1974)</td>
<td></td>
</tr>
<tr>
<td>Le cycle de Tokyo (1974 – 1979)</td>
<td></td>
</tr>
<tr>
<td>Le cycle d’Uruguay (1986 – 1994)</td>
<td>123 pays</td>
</tr>
</tbody>
</table>

Page 30
Location: Geneva, Switzerland  
Established: 1 January 1995  
Created by: Uruguay Round negotiations (1986-94)  
Membership: 164 countries on 29 July 2016  
Budget: 197 million Swiss francs for 2014  
Secretariat staff: 634  
Head: Roberto Azevêdo (Director-General)
Ministerial Conferences

- Nairobi, 15-19 December 2015
- Bali, 3-6 December 2013
- Geneva, 15-17 December 2011
- Geneva, 30 November - 2 December 2009
- Hong Kong, 13-18 December 2005
- Cancún, 10-14 September 2003
- Doha, 9-13 November 2001
- Seattle, November 30 – December 3, 1999
- Geneva, 18-20 May 1998
- Singapore, 9-13 December 1996
Changing challenges
À BAS LE GATT!

ON LA REFAIT S'AVAIS "EN ANGLAIS"
# UE et USA : Deux modèles d'agriculture

<table>
<thead>
<tr>
<th>Production</th>
<th>UE (15)</th>
<th>Etats-Unis</th>
</tr>
</thead>
<tbody>
<tr>
<td>en milliards de dollars</td>
<td>197</td>
<td>190</td>
</tr>
</tbody>
</table>

| Nombre d'exploitations | 7,37    |
| en millions de fermes   | 2,06    |

| Surfaces de terres agricoles | 134     | 425       |
| en millions d'hectares      |         |           |

| Taille moyenne des exploitations | 18 | 207 |
| en hectares                     |    |    |

| Subventions (soutien à la production) | 90,2 | 49 |
| en milliards de dollars           |     |   |

| Subvention par agriculteur | 14 000 | 20 000 |
| en dollars                  |        |       |
CAIRNS

Afrique du Sud
Argentine
**Australie**
Bolivie
Brésil
**Canada**
Chili
Colombie
Costa Rica
Guatemala
Indonésie
Malaisie
**Nouvelle Zélande**
Paraguay
Philippines
Thaïlande
Uruguay

G 20

Afrique du Sud
Argentine
**Bolivie**
Brésil
Chili
**Chine**
Cuba
Egypte
Guatemala
**Inde**
Indonésie
Mexique
Nigéria
Pakistan
Paraguay
Philippines
Tanzanie
Thaïlande
Venezuela
Zimbabwe
<table>
<thead>
<tr>
<th></th>
<th>TOTAL GDP</th>
<th>GDP AGRIC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>G-20</td>
<td>12.6 %</td>
<td>20.9 %</td>
</tr>
<tr>
<td>US</td>
<td>32.3 %</td>
<td>6.8 %</td>
</tr>
<tr>
<td>EC-15</td>
<td>25.4 %</td>
<td>7.4 %</td>
</tr>
<tr>
<td>CAIRNS</td>
<td>8.0 %</td>
<td>7.5 %</td>
</tr>
<tr>
<td>2001</td>
<td>Pop. Total</td>
<td>Pop. Agric.</td>
</tr>
<tr>
<td>------</td>
<td>------------</td>
<td>-------------</td>
</tr>
<tr>
<td>G-20</td>
<td>56.8 %</td>
<td>70.0 %</td>
</tr>
<tr>
<td>US</td>
<td>4.7 %</td>
<td>0.2 %</td>
</tr>
<tr>
<td>EC-15</td>
<td>6.1 %</td>
<td>0.6 %</td>
</tr>
<tr>
<td>CAIRNS</td>
<td>9.2 %</td>
<td>4.9 %</td>
</tr>
<tr>
<td>2001</td>
<td>EXPORT(^1) AGRIC.</td>
<td>IMPORT(^1) AGRIC.</td>
</tr>
<tr>
<td>-------</td>
<td>---------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>G-20</td>
<td>26.2 %</td>
<td>18.2 %</td>
</tr>
<tr>
<td>US</td>
<td>18.9 %</td>
<td>14.1 %</td>
</tr>
<tr>
<td>EC-15</td>
<td>18.9 %</td>
<td>17.2 %</td>
</tr>
<tr>
<td>CAIRNS</td>
<td>31.4 %</td>
<td>11.3 %</td>
</tr>
</tbody>
</table>

1. Ormis le commerce intra-EU agricole
Figure: Producer Support Estimate by country, 2014 and 2015

Percentage of gross farm receipts

Prices and declining terms of trade
Total world agricultural exports and their share in merchandise exports

Share of agriculture in total merchandise exports
Total agricultural exports
Declining terms of trade

Example: coffee

incomes of coffee producers countries

<table>
<thead>
<tr>
<th>Beginning of years 90</th>
<th>Today</th>
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<tbody>
<tr>
<td>10 à 12 billions USD</td>
<td>5 à 6 billions USD</td>
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</table>

Retail Sales

<table>
<thead>
<tr>
<th>Beginning of years 90</th>
<th>Today</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 billions USD</td>
<td>70 billions USD</td>
</tr>
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</table>
The volatility of world markets for agricultural products

KING effect

« Any change in agricultural supply, resulting deficit or surplus, determines a further change in the price »
Comparison between wheat prices (Argentine Trigo Pan FOB & USA Hard Red Winter (FOB) Mexico Golf) from 1960 to 2005, USD/tons
THE MARKETS FUTURES FOR AGRICULTURAL PRODUCTS:

THE INSURANCE OF A PRICE BUT NOT A GUARANTEE OF A REMUNERATIVE PRICE
<table>
<thead>
<tr>
<th></th>
<th>Open</th>
<th>High</th>
<th>Lowt</th>
<th>Last</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec'16</td>
<td>138.85</td>
<td>139.00</td>
<td>138.20</td>
<td>138.20</td>
</tr>
<tr>
<td>Mar'17</td>
<td>142.85</td>
<td>143.20</td>
<td>140.80</td>
<td>142.45</td>
</tr>
<tr>
<td>May'17</td>
<td>144.85</td>
<td>145.50</td>
<td>143.10</td>
<td>144.80</td>
</tr>
<tr>
<td>Jul'17</td>
<td>147.70</td>
<td>147.70</td>
<td>145.50</td>
<td>147.00</td>
</tr>
<tr>
<td>Sep'17</td>
<td>149.65</td>
<td>149.65</td>
<td>147.25</td>
<td>148.80</td>
</tr>
<tr>
<td>Dec'17</td>
<td>152.15</td>
<td>152.20</td>
<td>150.05</td>
<td>151.65</td>
</tr>
<tr>
<td>Mar'18</td>
<td>152.70</td>
<td>154.25</td>
<td>152.70</td>
<td>154.25</td>
</tr>
</tbody>
</table>
CENTRAL HIGHLANDS SPECIFICITIES
Demography

THE CENTRAL HIGHLANDS TOTAL POPULATION:

5,460,400 (GSP, 2013)

WITH NEARLY 20 ETHNIC GROUPS, OF WHICH:

- KINH (3,310,000),
- GIA RAI (409,000),
- EDE (304,000).
Demography

A LARGE NUMBER OF KINH PEOPLE MIGRATED TO THE REGION FROM THE NORTHERN AND CENTRAL PROVINCES OF VIETNAM SINCE THE 1990S RESULTING IN A REMARKABLE POPULATION GROWTH OF 485% IN 1999.
Population growth has since resulted during the same period, intensifying resource use, including water.

Much of the increased agricultural production has been based on cropping, with deforestation providing cropping land and increasing water use.
Vietnam is the second largest coffee producer in the world, and approximately forty percent of national coffee output originates from Dak Lak Province.

In recent years coffee production in Dak Lak has been significantly constrained by dry season water shortages, and the sustainability of smallholder coffee production in the region has been questioned.
“Coffee smallholders in the Dak Lak Plateau are technically and allocatively inefficient irrigators, meaning they can both reduce the amount of irrigation water input use per tree per season, and can also reschedule irrigations to achieve higher output using the same amount of water input”.

Reforestation should be promoted in specific areas

Proposed changes would make specific farmers efficient forest managers
Typical monocultures in the Central Highlands could be replaced with diversified cropping systems, which vary agricultural products (both cultivation and livestock).

These diversified systems engender multiple sources of household income and promote resilience to climate change and extreme weather events.
Farmers have already developed effective adaptation practices with their accumulated experience and knowledge against the effects of drought.

For instance, a common practice among farmers in the province of Dak Lak is integrating trees (e.g. fruit and timber trees) with agriculture crops.
However, no standard guidelines are in place for such practices since intercropping designs vary from farm to farm.

So, excellent research question for Phan Thi Thi Thuy, PhD Student!
Other research topic:

Vietnam National University of Agriculture (VNUA) is currently working with USSEC to research and development of a new fish production model.
The intensive pond aquaculture (IPA) technology enhances management control to yield greater fish production at lower per-unit cost through improved fish survival and feed conversion.

The zero exchange system captures nutrients for use as a crop fertilizer and requires minimal use of drugs and chemicals to ensure food safety (Cremer, M. and al., 2014).

New Aquaculture System
With 13,900 ha of water surface for aquaculture, total aquaculture production (mainly fish) was 29,156 tons, with capture fishery producing about 4,600 ton.

Among the five Central Highlands provinces, Dak Lak has the largest aquaculture area (7,800 ha) and produces 50% of the total fish production in the region.
Q & A

Thank you for your attention!

Contact details: Prof. Philippe LEBAILLY,
philippe.lebailly@ulg.ac.be