Land costs

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1 – Land: a special type of asset

- **The service life of agricultural land is indefinite** (≠ to capital and variable inputs): it can maintain its physical characteristics through time
- **Land cannot be depreciated**: it does not strictly qualify as a capital asset
- **In practice, land quality varies overtime** (+ or -), depending on several factors such as:
  - Nature and intensity of its use for cropping, pasture or other
  - Changes in climatic conditions and in the environment (physical and non-physical)
- A plot of land has a **fixed geographical position**
- **Land use and cover vary overtime**: conversion of agricultural to non-agricultural land for example

2 – Why valuing land costs

- **Land is an essential production factor** for cropping activities: as any production factor, it has to be valued to measure profitability
- A range of **costs are attached to land ownership and use**
- **For the land owner**, the selling or rental value of his land can represent a significant share of its revenues
- **For the farmer renting land**, rental costs usually represents a significant share of its total production costs
- Land values are also used for **fiscal purposes**
- **Land values affect and are affected by many factors**, among which input prices, net agricultural margins, etc. -> it is therefore key for policy purposes to properly measure land values and costs

3 – Land tenure types

- **Owned land** comprises:
  - Land owned by the farmer
  - Land owned by a group of persons, in the case of communal land
  - Land under concession, whereby an authority gives a person or group of persons the right to carry out farming activities for a pre-defined and often long period of time
- **Rented land** implies that:
  - The farmer pays a monetary rent in exchange of the use of the land
  - The farmer gives the land owner a share of its harvest in payment for the use of the land
  - The farmer provides goods or services to the land owner in exchange of the use of the land: labor to harvest the plots of the land owners, machinery, etc.
- **Land tenure type is often not formalized by a title of property or a rental contract** => challenge for a proper valuation

4 – Value of land: definition and drivers

- **Land value = market value of the land resources** used for agricultural production (including livestock), irrespective of the land tenure type
- Infrastructure not directly related to land resources, such as housing or warehouses, have to be valued separately
- **The value of the land depends on a multitude of factors, related to**:
  - Its assumed productivity, such as: soil acidity level, topography (slope, etc.) or orientation
  - The infrastructures that improve land quality, such as: drains, embankment or access to water (wells, etc.)
  - Its localization: distance to the main markets, proximity to roads or urban centers, existence of conflicts in the zone
  - The status of the land: private, communal, state-owned, religious
  - The land regulations: fiscal, land ownership structure and rights

5 – Land: expenses, investment, capital

- **Expenses** associated to agricultural land comprise:
  - Cost of the regular maintenance of the land, such as cleaning, clearing or embankment refection
  - Costs related to the use of the land, such as taxes or access rights to water
- **Investments** are expenses that aim at:
  - Increasing land resources: purchase of new agricultural land
  - Improving the quality of the land resources: construction of drainage systems, roads, creation of terraces or earthmoving works
- **Land capital:** value of the stock of agricultural land resulting from the flow of investments made on and for the land

6 – Land costs: definition

- **Land costs comprise:**
  - Expenses associated with the agricultural land
  - The cost of using the land for agricultural purposes:
    - Rental price if the land is rented
    - Imputed cost if the land is owned
- **Land costs exclude**:
  - Investments made on the land
  - Expenses associated with farm infrastructure not directly related to the land resources (housing, storage facilities, etc.)
  - Expenses associate to farm land but not agricultural land: maintenance and repair of warehouses, silos, etc.

7 – Land rental costs (1/2)

Recommended approach

- **Use the rental price effectively paid** by the farmer as stipulated in the rental contract
- **If the rent corresponds to a share of the harvest**, the cost is estimated by valuing the quantities at the producer price
- **The rental price is the best measure** of the opportunity cost of the land. It comprises by construction:
  - The cost of using the land, including taxes, permits and other expenses associated to the value/quality of the land
  - The cost of maintaining the land
  - The implicit value of the land, reflected in the yield which it generates

7 – Land rental costs (2/2)

Alternative approach

- **If the rental price is unknown** (informal contract, non-response):
  - The cost has to be imputed using standard market rates in the locality
  - Given the spatial variability of the land rental prices, it is necessary to choose locality-specific rates
- **If rental markets for agricultural land are too thin or inexistent**, market rates cannot be used. Possible alternatives are to:
  - Use official rates, where these exist, which often provide floor prices
  - Impute an rental cost based on the parameters of a hedonic equation
  - Estimate an opportunity cost based on the value of the land

8 – Cost imputation for owned land (1/4)

Recommended approach (from a theoretical perspective):

- **Determine the opportunity costs** (OCC) for the farmer associated with the ownership of the land: the flow of revenues that would have been generated had the farmer invested an amount equivalent to the value of his land in an alternative asset
- The opportunity cost is estimated as follows:
  - Step 1: **determination of the market value of the land**
  - Step 2: **determination of the annual return of the alternative investment** (often, long-term bond rates are chosen)
  - Step 3: **OCC = market value of the land x annual return**
- **Limits*:*** Value of the land? Alternative investment?

5 – Cost imputation for owned land (2/4)

Alternative approach (recommended from a practical viewpoint):

- **Impute a fictive rent to the land owner**: the rental price that he would have received had he chosen to rent his land rather than using it
- **Local rental rates can be used** for plots with similar characteristics, if a representative rental market for agricultural exists
- This approach implicitly assumes that the cost for the owner of using his land is equivalent to what he would have received as a payment for renting the land (opportunity cost / rationality principle)
- **This approach implicitly assumes that imputed rent is actually an upper bound of the net returns provided by the land**: if the net revenues associated with the ownership and use of the land for agricultural purposes are higher than rental revenues, the owner would be better off choosing the latest option

5 – Cost imputation for owned land (3/4)

• **Rental rates for farming land may be subject to local or national regulations**, specifying:

  - Ceiling rates, and
  - Floor rates (less often so)

• Using this administrative information makes an economic sense only if these rates are effectively used by a significant proportion of farmers

• **Regulated rates may be used to impute missing data**, if other auxiliary information is missing

• It is a good practice, when the estimations are made using regulated prices, to present overall results with and without these estimations

• **Practical problems** (which rate to choose) **and confidentiality issues** (will the farmer accept to respond ?) **arise when effective rates differ from legal rates**, exposing a lack of enforcement of the regulation

5 – Cost imputation for owned land (4/4)

Hedonic regressions

- **It is used to provide more accurate estimations of land values and rents**
- **Method : infers land values (or rental rates) from a number of characteristics** associated with the land and correlated to its price:
  - Step 1: The parameters (ex: effect of crop type on land price) are estimated or calibrated on the basis of a sub-sample of farms and updated regularly
  - Step 2: Land characteristics gathered in the CoP survey are then combined to these parameters to estimate the price/rent
- Limits:
  - **Existence of a detailed database** allowing to correlate prices/rents to observed characteristics of the land
  - **The estimation of the parameters requires technical know-how**

6 – Presenting data on land costs

- **Land costs are presented in a separate line** in CoP tables
- **Imputed costs for owned land and rental costs are generally presented separately**
- **Many countries present the economic indicators with and without imputed land costs,** due to:
  - **The high uncertainty** affecting the estimation of land costs
  - **The lack of robustness** of these estimations (strong variations depending on the method used)
  - Including imputed costs may sometimes lead to presenting strongly **negative returns**

7 – References

• **AAEA Task Force on Commodity Costs and Returns** (2000). *Commodity Costs and Returns Estimation Handbook*. United States Department of Agriculture: Ames, Iowa, USA.

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• **Canada Statistics**: http://www.statcan.gc.ca/pub/21-013-x/2011002/t002-eng.htm