



## Estimating the costs of paid and unpaid labour

**Regional Training Course on Agricultural Cost of Production Statistics**  
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### 1 - Definitions and types of labour contracts (1/2)

Labour costs often represent more than half of total production costs.

Although these shares vary significantly according to the commodity produced, labour costs rarely represent less than a third of total costs in developing countries.

## 1 - Definitions and types of labour contracts (1/2)

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- **Hired labour:** Paid labour hired to assist with the production of the commodity. Includes any kind of activity
- **Unpaid labour:** Unpaid operator, family, and other (including working age children) labour directly or indirectly linked to production.
- **Exchange labour:** Labour provided by another farmer/employee of a farm in exchange for a service

## 1 - Definitions and types of labour contracts (2/2)

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- **Unpaid labour** includes the opportunity costs of providing unsalaried labour.
- Examples are **labour provided by the farm operator** and **labour services provided by partners and family members.**
- Unpaid labour hours are measured directly in commodity surveys.
- In the old accounting methods, unpaid labour was valued annually at the hired wage rate for all agricultural employees.

## 2 - Valuing paid (hired) labour 1/3

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- Comprise salaries in monetary terms and/or in-kind payments, payroll-related taxes, and social contributions (social security, pensions, etc..)
- Account also for any in-kind retribution (i.e. free or subsidised meals). Theoretically, this includes also training activities.

**Labour Costs = (*Quantity of labour used*) x (*Unit wages*)**

Quantity of labour used: amount of labour used (in hours/days worked)

## 2 - Valuing paid (hired) labour 2/3

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Ideally, **the time spent by each employee on each of the specific activities of the farm should be recorded** and multiplied by the appropriate wage rate, as specified in the labour contract or agreement.

**In-kind payments** should be valued at the price that the products would be sold for in the market.

**If a share of the output is given to the employee**, this should be valued using the price that the farmer would have received had he sold the product in the market (i.e. the farm-gate price) and added to labour costs.

## 2 - Valuing paid (hired) labour 3/3

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**If the employee can purchase product at a reduced price,** then the difference between the farm-gate price and the price effectively paid by the employee, multiplied by the amount of produce received by the employee should be added to hired labour cost.

**In cases where wage rates cannot be easily determined** or when the information reported is unusable or simply missing, average wage rates can be used to value labour costs.

## 3 - Key issues related to paid labour (1/2)

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Which wage rate should be used?

**If actual wages are unknown or unavailable:**

- Wages reflecting the diverse tasks and farming sub-sectors may be used
- Average wage rates can be used

How to evaluate the quantity of labour used?

- **Normative:** Involves the use of determined quantity agreed among experts / focus groups
- **Actual quantity:** Estimation of actual labour input according to the farmers declaration

### 3 - Key issues related to paid labour (2/2)

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#### How to allocate labour costs?

- **To each activity or enterprise of the farm** – global issue (example of Tunisia CoP program: data collection performed by activity)
- **To each task** (harvesting, planting) (example of Colombia CoP program for Coffee, data collection performed by task)

### 3 - Key issues related to paid labour (2/2)

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#### **Example:**

Consider a farm involved in the cultivation of two crops in a sequential cropping system (growing of the two crops in sequence on the same field during a farming year). The gross annual revenue generated by the cultivation of the first crop is USD 9,750 (70 percent of the gross revenue of the farm, farm-gate price of USD 390/ton) while for the second crop it is USD 4,250 (30 percent, farm-gate price of USD 85/ton). The activities directly related to cultivation (seeding, land preparation and harvesting) required 63 days of work in the case of crop 1 and 19 for crop 2, at a daily rate of USD 8. For the remainder of hired labour costs, which represent 20 additional days, neither the commodity to which they are related nor the nature of those costs (for example, repair and maintenance) are distinguished. Finally, the farmer distributed for free to its regular employees 50 kg of crop 1 and 25 kg of crop 2 as in-kind compensation.

### 3 - Key issues related to paid labour (2/2)

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#### Crop 1

Hired labour costs directly related to the cultivation (land preparation, seeding and harvesting) = 63 days \* USD 8/day = USD 504

Other hired labour costs = 70 % of revenue \* (20 days \* USD 8/day) = USD 112

In-kind compensation = (50 kg\*USD 39/kg) = USD 19.50

**Total hired labour costs = 504 + 112+ 19.5= USD 635.5**

#### Crop 2

Hired labour costs directly related to the cultivation = 19 days \* USD 8/day = USD 152

Other hired labour costs = 30 % of revenue \* (20 days \*USD 8 /day) = USD 48

In-kind compensation = (25 kg \*USD .085/kg) = USD 2.1

**Total hired labour costs = 152 + 48+ 2.1 = USD 202.1**

### 4 - Estimating cost of unpaid labour : definitions

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Unpaid work can be done by :

- The farm owner/operator
- The spouse or any other family member,
- By children to perform tasks directly or indirectly linked to the production process
- Non-family persons who have ownership rights for the farm (often family relatives)
- Community labour (without exchange)
- Guest workers and other unpaid workers

#### 4- Estimating cost of unpaid labour: the principal of opportunity cost as first best approach

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- Opportunity cost for labour is **the corresponding wage rate that the unpaid family member would receive in the labour market with paid employment** that corresponds to the “next best alternative”.
- It is dependent on numerous factors: **the sex, age, academic qualifications and professional experience, the existence of employment opportunities in sectors other than agriculture** (industry, services, etc.)
- In some regions, **the next best alternative might relatively highly paid job** in the tourism industry whereas while in other **areas it might simply be another job in the agricultural sector.**

#### 4- Example: Estimation of the opportunity cost of unpaid labour using econometric regression

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- The principle is to determine, through an econometric estimation, **the importance of each of the main factors influencing individual wages.**
- Once these parameters are specified, the observed characteristics of the family member (**age, sex, education level, etc.**) collected from the farm survey can be included in the equation and the resulting wage used to estimate the cost of labour for this family member.
- USDA has considerable experience using this approach with data on earnings of farm operators in off-farm employment (El-Osta and Ahearn, 1996)

#### 4- Example: Estimation of the opportunity cost of unpaid labour using econometric regression

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A simple illustration of these so-called hedonic wage equations is provided below:

$$\widehat{wage}_i = \hat{\alpha} + \hat{\beta}_1 sex_i + \hat{\beta}_2 educ_i + \hat{\beta}_3 region_i + \hat{\beta}_4 age_i$$

Where:  $\widehat{wage}_i$  is the estimated wage of individual  $i$

$\hat{\beta}_1$  measures the effect of sex on the wage (e.g. the male vs. female premium)

$\hat{\beta}_2$  measures the effect of education (e.g. secondary vs. high school diploma)

$\hat{\beta}_3$  captures the region-specific effect

$\hat{\beta}_4$  measures the effect of age

$\hat{\alpha}$ , a constant term, that can be interpreted as an approximation of minimum salary

#### 4- Estimating cost of unpaid labour: other approaches (1/2)

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- **Average off-farm wages in the region or locality** can be used as a proxy of opportunity costs, but this approach does not take into account the differences in skill sets of family workers.
- **Wages used for similar tasks performed on the farm** by hired workers can also be applied.
- **Wages for hired farm managers in the same locality or region** can be used to estimate unpaid owner supplied labour cost.



#### 4- Estimating cost of unpaid labour: other approaches (2/2)

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- **Using average or median wages in the agricultural sector**, in the locality or region of interest, is likely to be the least costly method but this approach, might not reflect the true opportunity costs (unless job opportunities exist mainly in agriculture) and do not account for the variability in wage rates within farms.
- **Administrative information on official or minimum wages** can also be of use to estimate unpaid family work.
- **Information on wages pertaining to industry organizations, trade-unions or farm extensions services** could be used, provided that these data exist and are made available.

#### 4- Estimating cost of unpaid labour: specific measurement issues

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- In order to avoid an over-estimation of labour costs, it is recommended to include **consistency checks in questionnaires at data collection, input, and validation phases** to ensure that the reported amounts are credible and in line with the characteristics of the farm (size, activity, and other characteristics.)
- As a general principle, consistency in the valuation method is crucial.

## 4- Estimating cost of unpaid labour: specific measurement issues

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### Example:

Consider the same farm as in the previous example, involved in the cultivation of crops 1 and 2 in a sequential cropping system. Recall that hired labour costs amounted to USD 202 for the production of crop 2 and USD 636 for crop 1. Consider now that in addition to hired workers, the farm owner, his spouse and their 16-year-old child take part in the work of the farm. During the year, the farm owner is reported to have worked a full 250 days on activities directly or indirectly related to the production of the two crops. He spent his time mainly on administrative tasks, accountancy, financial planning and purchasing farm materials, equipment and inputs. His spouse provided assistance on administrative tasks and additional help during the harvest periods for a reported total of 50 days per year. Their 16-year-old child worked 10 days during the harvest periods.

## 4- Estimating cost of unpaid labour: specific measurement issues

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The cost of owner-supplied labour is imputed using the average wage for managers in the same region and sector (crops), 20 USD per day, resulting in a total cost of  $20 \text{ USD} \times 250 \text{ days} = \text{USD } 5,000$  for the cropping year. The 50 days worked by the spouse on the farm are valued using the region and sector-specific average wage for supervisors: USD 13/day, namely  $13 \times 50 \text{ days} = \text{USD } 650/\text{year}$ . Finally, the work of their 16-year-old child is valued using the minimum agricultural wage: USD 6/day, namely:  $6 \times 10 \text{ days} = \text{USD } 60/\text{year}$ .

**Total unpaid labour costs - Farm:  $5000 + 650 + 60 = \text{USD } 5,710 / \text{year}$**

## 4- Estimating cost of unpaid labour: specific measurement issues

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Given the overhead nature of most of the labour undertaken by the owner of the farm and his spouse, gross value added can be used for the allocation to the different commodities. The costs related to the harvesting work by the child could be allocated using area shares. As the crops are grown in sequence on the same field, a 50-50 split can be used.

**Total unpaid labour costs – Crop 1:  $[70\% * (5000+650)] + (50\%*60) = \text{USD } 3,985$**

**Total unpaid labour costs – Crop 2:  $[30\% * (5000+650)] + (50\%*60) = \text{USD } 1,725$**

## Reference

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- **AAEA Task Force on Commodity Costs and Returns (2000).** *Commodity Costs and Returns Estimation Handbook*. United States Department of Agriculture: Ames, Iowa, USA.
- **Handbook on Agricultural Cost of Production Statistics (Draft).** pp 88-95, Global Strategy Publications, 2012.