Technical Report Series GO-13-2016

Agricultural Cost of Production

Country Field Test and Desk-Study Reports

June 2016

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Desk-Study Reports

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Introduction and Context

Country field tests form an integral part of research projects under the Global Strategy to Improve Agricultural and Rural Statistics. They are the instruments used to ground check and benchmark methodologies presented in handbooks and guidelines.

The objectives of the country field tests on agricultural cost of production COP statistics were to: i) test the validity and relevance of the recommendations given in the draft Handbook; ii) provide examples of different methods and processes used in the compilation and dissemination of agricultural cost of production statistics; and iii) provide findings to be used as the basis for revisions to be made to the Handbook.

This report presents three field tests undertaken in the context of this project. Each one was assigned a different focus so as to exhibit specific sets of findings and to cover as extensively as possible technical and process-related issues on cost of production statistics.

The first field test, which was conducted in Colombia, describes how costs of production are computed for coffee, the country's main export commodity. It also compares this methodology to the best practices presented in the Handbook to identify the differences and commonalities. Concrete recommendations are also provided, for example, on how to treat pre-production costs for multiyear crops. This work was undertaken by an external consultant under the guidance of or the Colombian Coffee Growers Federation (FNC) and the Coffee Growers and the National Administrative Department of Statistics (DANE). The Statistics Division of the Food and Agriculture Organization of the United Nations (FAO) organized a mission in Colombia in October 2014 to identify the main stakeholders and define the strategy for the field test.

The second field test provides a comprehensive presentation of the agricultural cost and returns programme of the Philippines. The objective of this field test is to evaluate the extent to which the overall characteristics of this statistical programme adheres to the Handbooks' best practices, especially with respect to the concepts used, the survey strategy and the dissemination policy. The field test also presents the different methodological options made by the Philippines, for example with respect to the valuation of land costs and family labour. This field test was prepared by a former expert of the Bureau of Agricultural

Statistics, under the guidance of Romeo S. Recide, the country's Interim Deputy National Statistician.

The third and final field test presents the experience of Tunisia in defining a new and original strategy to compute costs of production statistics and the process of construction of the data collection questionnaires. This work provides insights on the data collection strategy, not limited to survey-based approaches, and highlights the importance of the survey design phase. This field test, initiated by two missions made by FAO statisticians, was prepared by two consultants under the guidance of the FAO sub-regional office for Northern-Africa and the Middle-East, in Tunis.

Acronyms and Abbreviations

AASID	Agricultural Accounts and Statistical Indicators Division
ADP	Accelerated Data Program
AESA	Districts of Studies and Agricultural Statistics
AGC	Government Aid for Coffee Production
AIC	Coffee Farmer Support
AMSD	Agricultural Marketing Services Division
ARC	Advance Release Calendar
ASDP	Agricultural Statistics Development Program
BAE	Bureau of Agricultural Economics
BAR	Bureau of Agricultural Research
BAS	Bureau of Agricultural Statistics
BEANS	BAS Electronic Archiving and Network Services
BFAR	Bureau of Fisheries and Aquatic Resources
BSP	Bangko Sentral ng Pilipinas
CDC	Contractural Data Collector
CNEA	Centre National d'Études Agricoles
CoP	Cost of Production
CRDA	Regional Commissary for Agricultural Development
CRS	Costs and Returns Survey
DA	Department of Agriculture
DANE	National Administrative Department of Statistics
DGEDA	General Directorate of Studies and Agricultural Development
DGPA	General Directorate of Agricultural Production
DSCE	Department of Statistics and Economic Situation
EAS	Economic Accounts Section
FAO	Food and Agriculture Organization of the United Nations
FNC	Federación Nacional de Cafeteros or Colombian Coffee Growers Federation
FRKP	Farm Record Keeping Project
GDP	Gross Domestic Product
GIF	Interprofessional Fruit Group
GIL	Interprofessional Vegetable Group
GIPAC	Interprofessional Association for Poultry and Rabbit Products
GIVLAIT	Interprofessional Group of Red Meats and Milk
HVCC	High-Value Commercial Crops
ICR	Incentive for Rural Capitalization

IHSN	International Household Survey Network
ITEC	Technical-Economic Indicators
LBP	Land Bank of the Philippines
NADA	National Data Archive
NAFC	National Agriculture and Fishery Council
NFA	National Food Authority
NSO	National Statistics Organization
OECD	Organisation for Economic Co-operation and Development
OEP	Office of Livestock and Pasture
ONAGRI	National Observatory of Agriculture Data Portal
ONH	National Oil Board
OTD	Office of State Lands
PIC	Income Protection Scheme for Coffee
PMAS	Production and Marketing Analysis Service
POC	Provincial Operation Centre
PPO	Provincial Processing Officer
PSA-NSCB	Philippine Statistics Authority-National Statistical Coordination
PSF	Permanence, Sustainability and Future
PSS	Philippine Statistical System
ROC	Regional Operations Centre
SDS	System of Designated Statistics
SESS	Socio-Economics Statistics Section
SICA	Coffee Information System
SIG	Geographic Information System
SYNAGRI	Tunisian Farmers' Union
UCP	Cooperative Production Units
UTAP	Tunisian Union of Agriculture and Fisheries

Case Study 1:

Production Costs in the Coffee Industry[1]

(Ramiro César Barajas Gómez)

[1]The author thanks the collaboration of Mr. Franck Cachia of FAO, Mr. Rodolfo Suárez from the Colombian Coffee Growers Federation (FNC) and Iván Suárez (translator) in the development of this study.

1

Introduction

Calculating agricultural production costs has been a constant concern of officials tasked with establishing the national accounts because of its importance in calculating the agricultural gross domestic product (GDP) of a country. In the case of Colombia, it is even more important because agriculture is the country's largest sector as the industrial and services sectors are still developing.

This calculation, however, is not only important for the establishment of the national accounts, it is also very relevant for farmers, as they need to know the production costs of their harvests in order to determine whether a profit is being made. Once their profit status is determined, farmers can use it for comparison purposes with other producers in the country.

The precise determination of the production costs is also required to properly gauge the economic incentives offered in the agricultural sector, such as input subsidies, incentives to exports or minimum purchase prices. This is the case of the coffee sector in Colombia.

For many years, coffee was the largest sector of the Colombian economy and had been the greatest source of foreign currency. It roles in the economy has become less significant in recent years, however, it remains a larger employer, supporting 560,000 families throughout the country. Hence, it is still an important component in the primary sector of the Colombian economy.

On its website, FAO states the following:

Achieving food security for all is at the heart of FAO's efforts – to make sure people have regular access to enough high-quality food to lead active, healthy lives.

Our three main goals are: the eradication of hunger; food insecurity and malnutrition; the elimination of poverty and the driving forward of economic and social progress for all; and the sustainable management and utilization of natural resources, including land, water, air, climate and genetic resources for

the benefit of present and future generations." (Global Strategy for Enhancing Rural and Agricultural Statistics 2014).

The draft Handbook on Agricultural Cost of Production Statistics 2014, (*Manual de Estadísticas sobre. Costos de Producción Agrícolas. 2014),* which is referred to in this study as the Handbook, endorses the FAO proposal and indicates some of the best practices for determining the production costs of agricultural products. Its purpose is to "contribute to a higher food safety, reduce the volatility in the prices of food, generating higher incomes and also more benefits for agricultural and rural populations by means of policies based on empirical data" (Global Strategy for Enhancing Rural and Agricultural Statistics 2014:5). Specifically, it is directed at the first pillar of the Global Strategy to Improve Agricultural and Rural Statistics Action, which proposes "to establish a minimum set of essential data". The other two pillars of the Global Strategy are the integration of agriculture with the National Statistical System (NSS) and to encourage the statistical system's sustainability by means of good efforts and the creation of statistical capacities.

Colombian coffee was chosen as the basis for a case study not only because of its importance in the national and global context, but also because the Federación Nacional de Cafeteros (FNC) or the National Coffee Growers Federation, has developed one of the most comprehensive methodologies for capturing, classifying and analysing data among industry associations in the country. It has also obtained the most accurate calculations on production costs and therefore, has the most advanced system for obtaining agricultural information among the agricultural associations.

The present study and the FNC methodology can also be used as points of reference for agricultural associations and government agencies that are implementing statistic programmes for production costs applicable to their respective crops. A joint initiative involving the Ministry of Agriculture and Rural Development, the Colombian Corporation of Agricultural Investigation (Corpoica), and DANE to conduct pilot studies regarding agricultural production costs could benefit directly from information related to the costs programme of FNC.

The FNC method is particularly suitable for calculating the costs of production as it is adapted to the specificity of the coffee production sector. By using adapted techniques for collecting data and making costs compilations, the decision-makers can base their actions and agricultural and rural policies on

concrete data concerning production costs that are representative of the Colombian coffee sector.

Colombia has many systems for obtaining information on costs. The agricultural associations each use different methodologies to collect, calculate and update data. Consequently, it is difficult to formulate public policies related to agriculture, which, ultimately adversely affects the sector as key information needed for decision-making is not readily available for neither government officials nor private investors.

The National Federation of Coffee Growers has been estimating their production costs for many years, however, those estimates need to be interpreted carefully, considering that coffee prices production costs vary a lot. Coffee is a tradable good globally that varies in price due to price volatility of its inputs. The volatility of its price depends on such parameters as the grain quotations in the C Contract from the New York Stock Exchange and the exchange rate of the United States dollar to the Colombian peso.

2

Objectives and Approaches of the Study

This study has two objectives. The first one is to document the calculation method used for production costs related to growing coffee in Colombia, which could then be a reference platform for calculation methods to be used for other crops with similar features. Therefore, the calculation is not only important for informing coffee growers of the investments and expenses needed to produce efficiently but it is also significant from a macroeconomic perspective because of the commodity's importance with regard to the national economy, especially for exports.

The second objective is to compare the different parts of the costs platform of FNC with the recommendations given in the Handbook This comparison is needed in order to ascertain how the approaches complement each other while considering that the purpose of the Handbook is to "provide guidance to national statistics organizations (NSO) and agricultural entities, via a guidebook that shows the data recollection, compilation and broadcasting processes related to production costs" (Global Strategy for Enhancing Rural and Agricultural Statistics 2014:8).

The Federation is in agreement with the Handbook regarding the general approach to production costs estimations, which require detailed data on input costs and utilization. These estimates are needed to establish technical ratios (technical coefficients, namely the ratio of inputs to production) that are used for input/product matrixes, as for example, the case of the technical economic indicators (ITECs), which is explained later in the study.

3

Context of the Coffee Sector in Colombia and the National Federation of Coffee Growers in Colombia

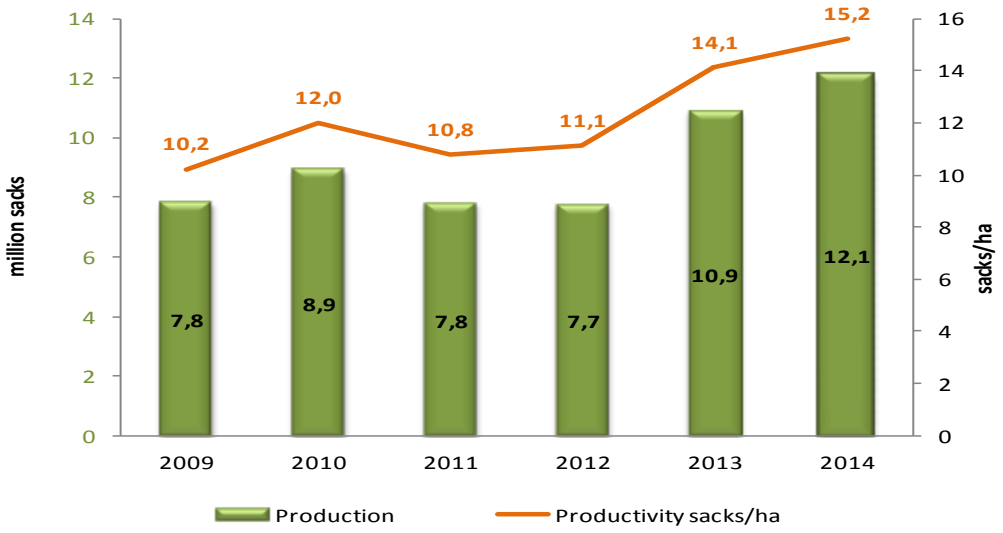
3.1. Economic characterization of the coffee area in Colombia in 2014

The coffee growing area in Colombia is 7.261 million hectares, of which 3.269 million hectares comprise coffee farm areas. Some 950,000 hectares are actually being sown with coffee. The coffee is distributed in 595 municipalities from 19 coffee-producer departments. There are 560,000 landlord producers of coffee. These producers own 719.686 farms with an average size of 1.68 hectare. Approximately 2.4 million people depend on coffee production, which equates to 21 percent of the rural population of Colombia. Coffee-related activities generate 707,000 direct jobs and 1.5 million indirect ones and contribute 18 per cent to the agricultural GDP (FNC 2014).

In the last decade, coffee production in Colombia averaged 11.5 million sacks annually, However, in 2009, the production level was 32 percent lower because of the following reasons: 76 percent of the varieties cultivated in coffee farms were prone to rust;[2] farmers cut back or did not use fertilize due to a 100-percent rise in fertilizer priced; and the rainy season lasted much longer than usual (figure 1).

[2]A disease in coffee plants that manifests itself as spores, causing the leaves to fall prematurely, which, in turn, diminishes the production considerably.

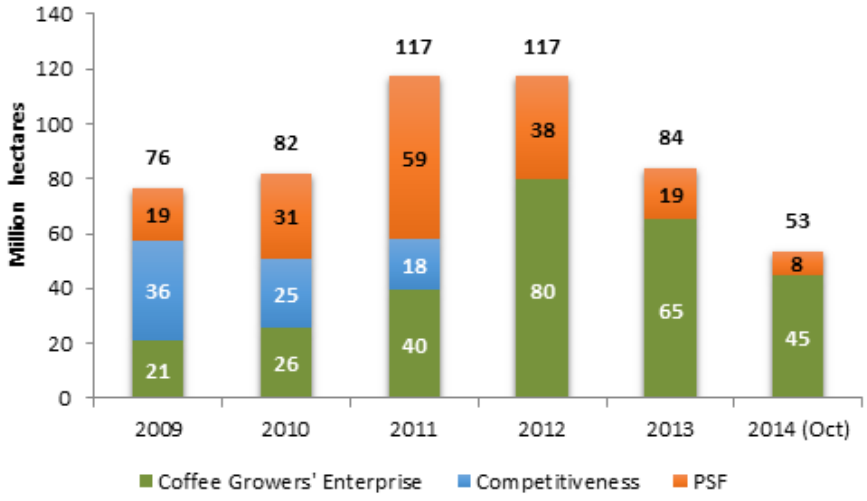
Figure 1. Coffee production in million sacks (each sack contains 60 kg), 2009-2014



Source: FNC, Technical Management.

As shown in figure 1, the renewal of coffee areas carried out by coffee growers with assistance from FNC along with improved climate conditions has resulted in increased coffee production. Since 2012, there has been a notable rise in coffee production stemming in part from the implementation of the Permanence, Sustainability and Future (PSF) programme. It should be noted that the production has increased as a result of the renewal plans for coffee crops, in addition to the improved climate conditions, as shown in figure 1.

Figure 2. Renewed areas, 2009-Oct 2014



Source: FNC, Technical Management.

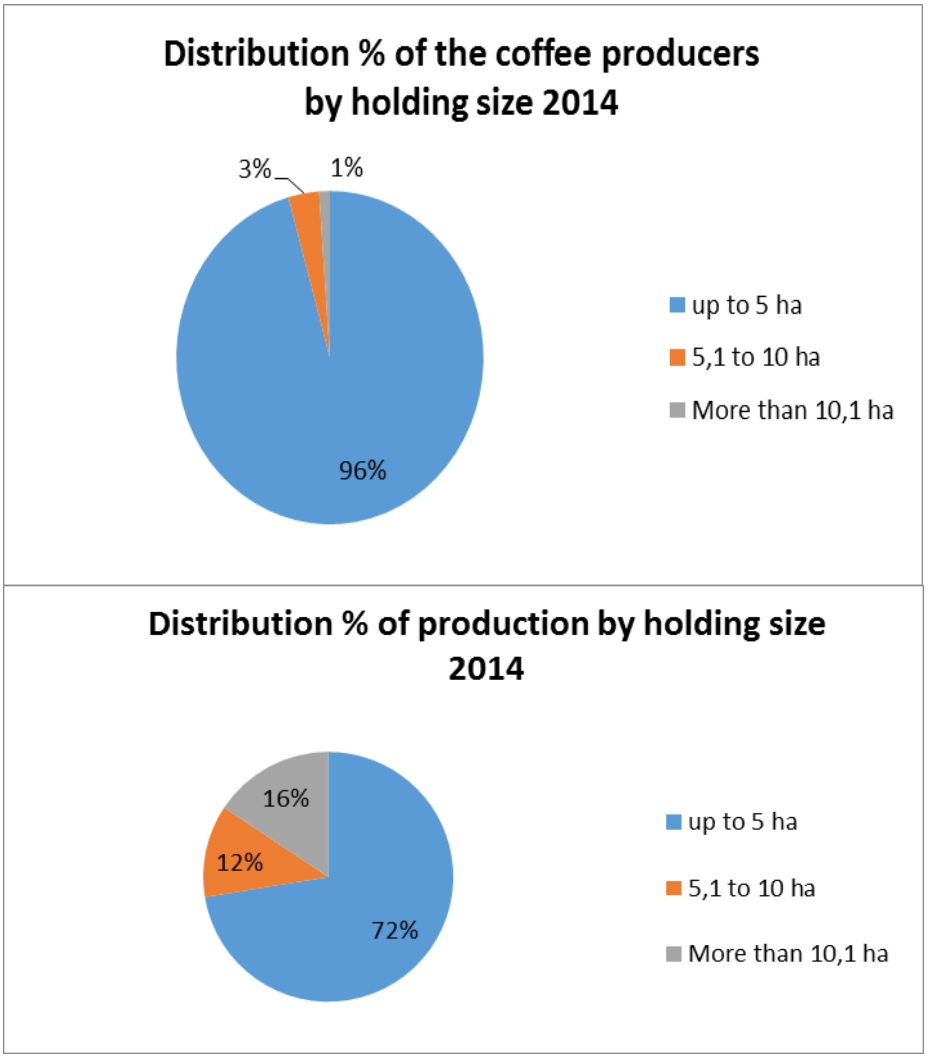
The renewal programme has supported small-scale producers with old crops, namely those that have been exposed to the sun for more than nine years or have been in shadowy or semi-shadowy areas for at least 12 years, especially those that lacked the resources to cover renewal costs. The objective of the programme is to enable farmers to obtain profits during unproductive periods to compensate for the income lost during the renewal period. This would make it possible for farmer's families to subsist and the farmers to buy inputs for their crops (FNC 2007).

To fund small scale owners with old crops (technical or traditional ones), of credits for 60,000 hectares were extended annually during the five years. The amount totaled $4.5 million per hectare, distributed over a 20-month period, $150 each, and $1,500 to buy agricultural inputs. Farmers were expected to learn and apply this practice at the end of each economic production cycle, after they had obtained economic benefits from the renewal (FNC. 2007).

Since 2008, 601,000 hectares have been renovated (more than three million trees). This effort has resulted in a production increase from 7.8 million in 2009 to 12.2 million sacks (each sack contains 60 kg) in 2014. It is important to highlight that productivity also, as a consequence of the renewal, increase considerably from 10.2 sacks per hectare to 15.2 sacks per hectare.

In Colombia, coffee farms that are five hectares or less account for 96 percent of the total farms and 71 per cent of the national production. Another 3 per cent of the coffee growers are referred to as medium owners, which means that their coffee farms are between 5.1 and 10 hectares. The remaining 1 percent of the farms fall in the big owner category, indicated that the size of their farms exceeds 10 hectares. This last group is responsible for 17 percent of the annual national harvest (figure 3).

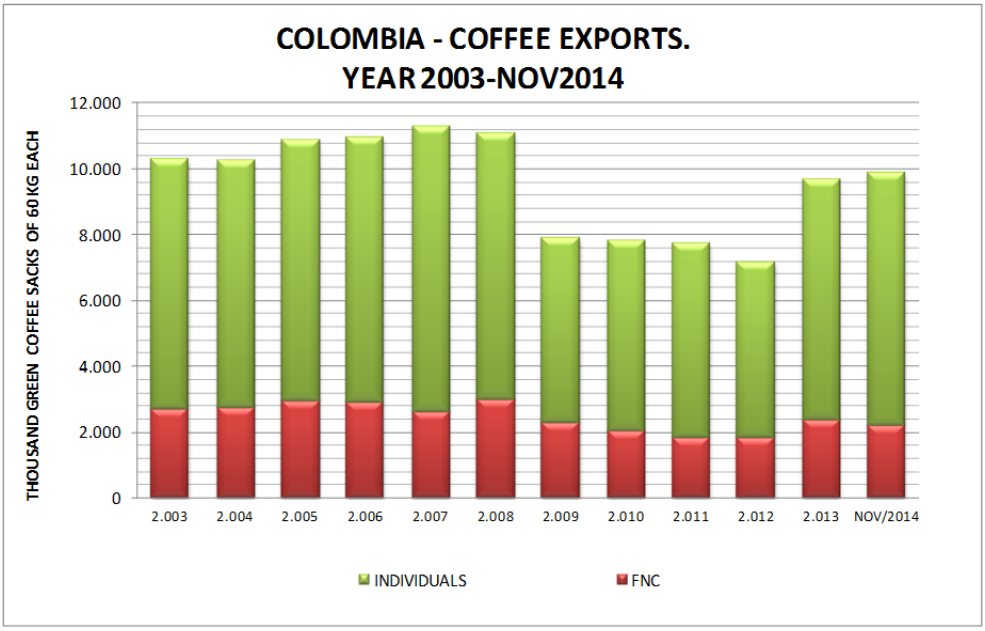
Figure 3. Distribution percent of coffee producers and of production per farm size, 2014



Source: FNC, Technical Management.

As shown in figure 4, most of the coffee production is exported, as national consumption represents only a small part of the total produced coffee. Thus, coffee is basically a product for export. Private exports dominate the export market, accounting for 75 percent of the coffee export, with the rest attributed to FNC.

Figure 4. .Colombia coffee exports, 2003-November 2014



Source: FNC, Technical Management.

Coffee is a key product for the economy of Colombia. It is the third top product in the list of traditional exports, after oil and coal (DANE, 2014).

3.2. The National Federation of Coffee Growers in Colombia: responsibilities and history

According to the FNC official website, "in 1927 the coffee growers united with the purpose of creating an organization that would represent them both in a national and international scope, and that would also look after their welfare, so as the improvement of their life quality. That was how FNC was set up. It has since become one of the largest rural non-governmental organizations in the world. The Federation is nonprofit entity, and is not affiliated with any political party.

Since 1927, FNC has been the main commodity association in Colombia, with a presence in the rural areas where coffee is produced. Its main objectives are to assist coffee producers and their families by helping to make their operations sustainable and support the social aspects of the coffee growing communities and ensure that Colombian coffee continues to be considered among the best in the world.

Through its different actions, FNC seeks to increase the quality of life of Colombian coffee growers. The Federation is involved in research with the objective to optimize production costs and maximize the quality of the coffee. It also extends technical assistance to producers through the Extension Service and participated in setting coffee regulations and merchandizing to optimize the price paid to the producer (FNC 2014).

According to FNC, the research and transfer programmes are aimed at producing relevant technologies that can be easily implemented by coffee producers. More than half a million coffee growers have access to the Purchase Guarantee service, which is operational, thanks to the federation's involvement in merchandising Colombian coffee.

Using its own and other resources FNC carries out not only statistical, but also technical research, which is provided to the National Administrative Department of Statistics – DANE – (a government statistics organization), with the objective to show that the considerable contribution of coffee production to the national economy.

It must be highlighted that FNC not only collects data and produces information. The Association is also tasked with bringing forward development projects, which, over the years, has helped the coffee zones have access to better infrastructure and technological advances for agriculture production as well for the environment and food security.

3.3. The National Federation of Coffee Growers in Colombia: activities related to statistic production and technical-economic analysis

Prior to 1997, FNC conducted an agricultural census to obtain information regarding coffee activity. It abandoned those efforts and created SICA (Coffee Information System) to regularly conduct the national coffee survey. Since 1990, the business management area of the Technical Management of FNC has been generating ITECS and production costs of the Colombian coffee market.

4

Significance of the Cost Statistics for the Coffee Section

4.1. Economic incentives: subsidies and low-price policy in the coffee sector

For an extensive period of time, Colombian coffee production has been benefiting from special treatment extended by the national Government.

In recent years, especially after 1989 when the Coffee Covenant[3] ended, the government has been subsidizing coffee producers when the price of coffee falls in the international markets. This has led to the creation of subsidy platforms, such as the "Government Aid for Coffee Production" (AGC), implemented in 2001 and 2002, in which small producers were given between $15.000 and $30.000 for every 125-kilogram load of dry parchment coffee (FNC. 2002).

Another incentive offered was the renovation plan under, which was explained in section III., Through this plan, farmers learned about and applied this practice at the end of each economic production cycle, after they had obtained economic benefits from the renewal (FNC. 2007). This plan was supplemented with another one, entitled "Incentive for the Rural Capitalization" (ICR) under which a 40-percent payment of the total credit balance was extended.

Between October 2012 and December 2013, 1.2 billion Colombian pesos ($Col) (approximately $390,000, in USD) in aid was given to producers under the Support to Coffee Farmer Support and Income Protection Scheme for Coffee (AIC-PIC) programmes. Some $145,000 was granted when the internal reference price of coffee fell below Col$700,000 per 125-kilogram load of dry

[3]Arrangement between producer and consuming countries in which the goal was to stabilize prices based on a remunerative strip for producers and what is acceptable for consumers.

parchment coffee and an additional $165,000 was granted when it fell below Col$480,000.

The last aid of this type for coffee producers was granted under the under the Protection Platform for the Coffee Income 2014 (PIC), which operated from 1 January to 31 December 31 2015. The grant was fixed at a flat price of Col$ 00,000.

Table 1 shows production per hectare, in sacks and in loads, the prices and the internal price per load, the PIC per load, and the internal final price including PIC. It indicates that PIC decreased considerably starting in October 2014 as a consequence of the high international price for coffee and the large devaluation of the Colombian peso against the United States dollar.

Table 1. Income and costs evolution, 2013-2014

INCOME AND COSTS EVOLUTION 2013-2014						
YEAR	**AVERAGE OF 60-KGS SACKS OF GREEN/ha**	**AVERAGE OF 125-KGS LOAD OF D.P. C/ha**	**COST PER LOAD $ CURRENT**	**INTERNAL PRICE PER LOAD $ CURRENT**	**PIC PER LOAD $ CURRENT**	**INTERNAL PRICE + PIC**
2013	14,1	8,5	$ 569.911	$ 466.121	$ 156.000	$ 622.121
2014	15,2	9,1	$ 556.839	$ 704.540	$ 22.027	$ 726.567

Source: Technical Management,. Business Management.

Abbreviations: D.P.C., dry parchment coffee; PIC, Protection Platform for the Coffee Income.

4.2. Main uses and users of the production cost statistics for coffee

The use and users of the production cost statistics for coffee are varied. Among the users are members of academia for research projects, producers looking to make the best investment decisions and establish ways to improve the efficiency and profitability of their operations, coffee-related entities, the extension agents to optimize their training tasks, international corporations that participate in special platforms of FNC, government agencies, FNC to formulate their policies and suppliers of good and services. The national accounts established by DANE, require complete and precise data regarding production costs to measure the added value generated by the coffee sector, which, as mentioned earlier, is an important contributor for agricultural sector.

Consequently, it is very important to have a clear understanding as to what extent the quality and timeliness of the statistic information serves the users' interests so they can accurately use the data in in decision-making.

5

The National Federation of Coffee Growers in Colombia Platform for Statistics Regarding Production Costs

5.1. Generalities

The Handbook and FNC are in accordance in many aspects of the methodology for establishing the production costs. The costs analysis, productivity and profitability of Colombian coffee production that was carried out in June 2013 was supported by work that FNC makes annually to forecast the harvest, based on the grain weighting methodology suggested by Arcila & Chavez (1995) and Echavarría & Montoya (2013:1). For the practice done in June 2013, Cenicafé[4] advised the 1.451 lots in proportion to the coffee area in each department be used. That is to say, the farms sample used to establish costs in 2013 was not specifically chosen for the costs platform, but it was based on the annually surveyed farms for the harvest forecast.

In addition to the normal production operative, a survey about costs and prices was conducted in the 1, 121 reported lots using ITECs and labour frequencies to precisely establish costs for the different activities associated with coffee production. It was not possible to carry it out in 330 of them because of the inability to contact the people who could provide the required information (Echavarría & Montoya 2013). The recommended methodology in the Handbook regarding pre-operative costs is broadly in line with what is suggested by FNC, although the latter uses an approach specifically adapted to the case of coffee production. The different parts of the programme components used by FNC are detailed below and compared with those listed in the Handbook.

[4]National Center for Coffee Research.

It is worth noting FNC has planned to improve the information about costs with the 2000 Farms Platform, that was scheduled to take effect in in 2015 (annex II), with a farm sampling chosen specifically to determine the costs.

5.2. Sampling frame, sampling and statistic unit

The so called Coffee Information System permits the establishment of the sampling frame from which the different farms are chosen and submitted to the survey for production costs. SICA "serves as (a) planning tool for FNC, built up by a unique, dynamic, and georeferenced database with national coverage. It is accessed through the Internet to consult, analyse, model, and visualize geospatial data sets of the basic information of registered coffee growers, farms, and coffee lots in the country, and is constantly updated through a process completed by the Extension Service of FNC. SICA also is used to support institutional decision-making. As a geographic information system, it is consists of methodologies, tools and people who work in a logical, coordinated and systematic way in order to store, display, consult, analyse, and model geospatial data sets (coffee plots), as well as alphanumeric data sets (registered coffee growers)" (FNC. 2014:1) In summary, SICA serves as a strategic information tool for designing, formulating, tracing and tracking competitive and sustainable policies for Colombian coffee production. Its management allows users to track and verify the accomplishment of the objectives and requisites demanded by the different support programmes for coffee producers SICA can be defined as a sampling frame with multiple utilities, which, according to the Global Strategy project regarding multiple sampling frames, ensures benefits in terms of quality in the selected samples, as well as a higher efficiency in the agricultural surveys platform.[5]

In the case of the selection of the 1,451 lots advised by Cenicafé, the sampling frame is the number of farms that that have at least one hectare of productive coffee and are at least two-year old according to records in the SICA databases.

Regarding the sampling, the stratified sampling methodology is used, with the stratums being the coffee departments. After farms with features mentioned in the sampling frame are identified, a proportion of ages per hectare is established for the young, technified hectares from five to seven years old, the proportion of young hectares from seven to nine years old, the proportion of old, technical

[5]Global Strategy to Improve Agricultural and rural statistics (2015), draft of the handbook about multiple sampling frames.

hectares and the proportion of hectares with a traditional crop (coffee production composition), with the objective to determine the size of the sample with proportional allocation, in each department. The statistic unit is one hectare.

5.3. Description of the survey regarding costs and prices, 2013

The questionnaire shown in annex I was conducted to gather information about costs. It covered the following topics: (1) control over harmless weed; (2) fertilization; (3) phytosanitary control; (4) harvest; (5) washing and drying; and (6) management and general expenses. For topics 1 to 3, costs related to labour and inputs are distinguished. For example, questions concerning labour refer to plateo[6] and time spent to apply chemical products while those referring to inputs include the purchase of such things as machetes and herbicides.

The calculation of the total costs (per hectare or load) is based on technical coefficients (amount of labor and inputs per hectare) and the prices for those factors or inputs (wage for every labourer, collection cost and the input prices). The first can be calculated in the survey beginning with the "quantities" and the "times per year", while the unit price appears in the last column of the survey as "values". These procedures make it easier to make cost projections for the coming years" (Echavarría & Montoya 2014:4).

In the survey, ITECs are added for every agricultural activity, such as weeding, fertilization and phytosanitary control, control over harmless weeds, collection, washing and drying, and the frequency and labour for each zone are established. This items are used in the survey to collect information with a validation system (see annex II, which shows the high and low range, avoiding lags in the producers' answers.

Technical economic indicators are also used similarly to a pedagogic method, which entails transferring knowledge about efficient practices to help them to have a reasonable measurement to determine the cost of labour for each crop.

[6]Specific weeding around the coffee plant's stem, forming a plate-shaped uncovered ground area where fertilizers and other products are directly applied.

5.4. Used classification and structure of costs

The determining factor for costs in coffee production is the distance to the optimal or recommended technology of production, which is essentially a function of the crop's age, its plantation density, variety type, luminosity, and cropping practices (fertilization, phytosanitary control, and washing and drying), and regarding labour, the level of skills and qualification of the labour. Table 2 indicates how coffee productions costs are structured, discriminated and put into a participation percentage of each of them in the total costs.

Table 2. Cost production structure in Colombian coffee industry and its evolution, 2013 – 2014

Years	2013	2014
Production in hectare/year		
60-kg. Green coffee sacks hectare/year	14.1	15.2
125-k. D. P. C. coffee loads hectare/year		
Percentage of participation		
Collection	39%	40%
Washing and drying	6%	6%
Control over harmless weeds	8%	8%
Fertilizers	11%	10%
Berry borrer control	5%	5%
Rust control	4%	4%
Other pests and illnesses	1%	2%
Shadow management and other labour	2%	2%
Crop installation	13%	13%
Management	10%	10%
Dry parchment coffee cost of a load (D.P.C.)	100%	100%

Source: FNC, Technical Management. Business Management.

Table 3. Cost production structure in Colombian coffee industry, costs per hectare/year on current prices, COP$, 2013–2014

Years	2013	2014
Production in hectare/year		
60-kg. Green coffee sacks hectare/year	14.1	15.2
125-kg. D. P. C. coffee loads hectare/year		
Collection	1 851 956	2 027 989
Washing and drying	286 154	322 851
Control over harmless weeds	406 640	385 336
Fertilizers	538 200	530 000
Berry borrer control	260 360	259 620
Rust control	206 720	196 250
Other pests and illnesses	71 760	77 415
Shadow management and other labour	95 680	100 475
Crop installation	621 852	671 041
Management	485 593	507 445
Overall costs of hectare/year	4 824 915	5078 421
Dry parchment coffee cost of a load (D.P.C.)	569.911	556.839

Source: FNC, Technical Management. Business Management.

Table 3 shows the production costs in Colombian pesos. It indicates that the cost per load decreased and productivity increased during the two-year period analysed. Costs are dynamic; they show changes in the global market. This analysis indicates that, as long as good practices are applied, the plantation increases its productivity, which enables coffee growers to lower their production costs and ultimately generate more income.

Unlike advice given the Handbook, FNC does not account for the cost of land. This is because 96 percent of the country's coffee producers are small owners and most of their land was obtains through inheritance, making the cost of land an inconsequential factor. However, the federation agrees with the Handbook regarding imputed cost, and in the 2014 analysis, the opportunity cost of land is shown outside of the cost structure.

Regarding labour costs in coffee production, the estimation is based on daily rates from the market combined with the data collected on hours or days

worked from the survey. It is worth highlighting that small producers and their respective families contribute between 37 and 45 of the total labour used per hectare to harvest coffee. The family work force is also valued at the market price of the labour.

5.5. Description of the collection process

I. Collectors

The extension agents are technical management staff members of FNC.

II. Collecting method

The collection process is carried out through the survey described in annex I, which consists of the following steps: (1) a sampling plan; (2) field information data intake; (3) elaboration of the database; (4) information analysis; and (5) sharing the results.

For this survey, the manager of large farms is interviewed, while at medium farms, the owner or a caretaker is interviewed and at small farms the owner is interviewed. It is important to note that most of the small coffee growers are not well educated and have difficulty taking written notes in an organized way. As a consequence, the method used by the extension agents for FNC is based on ITECs as a reference point and a validation method for the collected information. This method, in addition to providing a benchmark for the technical coefficients and costs, is pedagogic because it facilitates the assessment of the grower's practices with respect to the average and the recommended practices.

III. Frequency and collection periods

The exercise to determine national costs was completed in the second half of 2013. Verification of the data was undertaken one time. Another one, which would incorporate suggestion from the Handbook, was planned to be taken in 2015 One of the suggestions is to make multiple visits to adjust the type of information collected for the production practices.

The platform called "2000 Farms", which was approved by FNC in 2014, is to be used from now on to constantly access the changes in the coffee sector. Under this platform 2,000 farms are monitored, namely two farms per extension agent, (currently, there are 1,000 extension agents to assess changes in the

coffee industry in Colombia). To be effective, the farms being monitored must be representative of the country's coffee industry and the total number of chosen farms must correspond with the most relevant indicators in the coffee sector, as indicated in table 4.

Table 4. 2,000 Farms Platform–national overview

2000 FARMS PLATFORM - NATIONAL OVERVIWE																
	CROP SIZE				COFFEE GROWERS	KIIID OF CROP				LUMIIIOSITY				VARIETY		
DEPTS	UP TO 5 HA	5,1 - 10 HA	MORE THAN 10,1 HA	TOTAL OF FARMS		OLD	YOUNG	TRAD	TOTAL	SEMI SHADE	SUNNY	SHADOW	TOTAL	RESIST.	SUSCEPT.	TOTAL
	IIUMBER OF FARMS					HECTARES										
TOTALS	1.545	256	138	1.939	1.886	471	8.222	87	8.779	2.715	5.527	538	8.779	6.940	1.839	8.780
SAMPLE	80%	13%	7%			5%	94%	1%		31%	63%	6%		79%	21%	
IIATIOIIAL	73%	12%	15%			15%	81%	4%		34%	58%	8%		64%	36%	
%PROD COIITRIBUTIOII	72%	12%	16%													
%COFFEE GROWERS	96%	3%	1%													

Source: FNC, Technical Management. Business Management.

The following activities had been planned for 2015: in March, collect the 2014 information with the same methodology of the survey used in the second half of 2013; update and improve aspects, such as coffee technologies, management; and personnel issues pertaining to the education level, the management of the company, and data on coffee production's contribution to the grower's income. In addition, the extension agent was to have delivered an economic balance sheet about coffee production in 2014, and prepare an initial analysis on for each farm, Each agent receives a one-year consultancy. During that year, the agent my continuously monitor the farm to reconfirm that the information is collected at least three times. A standardized record is reported on the 2,000 farms and at the end of the year, a report that includes analysis of income, costs, and management of the farm must be submitted.

IV. Management of the information flow among collectors, supervisors, and coordinators

The collectors (extension agents) deliver the data to the programme coordinator of each department, which is later submitted to the business area in Bogotá, specifically to the Technical Management. Then, a database is compiled, and the Technical Management Team is responsible for the information analysis and building a results report.

V. Data validation

The results report is discussed and evaluated in the Business Management area and then submitted to Technical Management for validation.

There is a designed application for extension agent when collecting information during every phase of the process. This application has a pre-programmed validation system that stops the data from overwhelming the real information (see annex II). After the extension agent obtains the information for his/her two assigned farms, a report is submitted to the regional coordinator whose job is to gather information for his/her corresponding region, checking it for inconsistencies and then send it to the central office, where it is used for the overall analysis to determine national costs.

5.6. Technical-economic indicators: a base to determine national costs

As mentioned earlier, the production costs for the coffee sector in Colombia is based on the costs and prices survey that was completed in 2013. The technical basis for the survey is shown in table 5.

Table 5. Technological basis 2014

TECNOLOGICAL BASIS 2014						
LABORS	INPUTS			LABOR		
	KGVALUE	KILOGRAMS	TOTAL	VAL @	@$	TOTAL
Collection and Benefit	$ 356	5.700	2.027.989	3.540	91	322.851
Fertilization.kilograms	KG/HA OR UNIT	KGVALUE	TOTAL VALUE	LABORS	LABOR VAL	TOTAL VALUE
	414	1.100	455.000	3	25.000	75.000
Manual weeding. Labor				14	28.000	385.336
Berry Borrer	1,4	25.000	34.620	9	25.000	225.000
Rust	0,7	125.000	83.750	5	25.000	112.500
Other pests and illnesses	0,2	10.500	2.415	3	25.000	75.000
Shadow handling and other tasks			0	4	25.000	100.475
Crop installation	9,1	73.578	671.041			
General Expenses			152.233			355.445

Using the information regarding the technological basis, the calculation of incomes, costs, and profitability was completed along with other additional indicators, as shown in table 6.

Table 6. Coffee production costs, 2014

Coffee production costs - 2014			
Production of green sacks/ha		15,2	
Production of loads/ha		9,1	
Costs:		Nationals	
		Per/ha	Per/load
Collection		2.027.989	222.365
Washing and drying		322.851	35.400
Fertilization		530.000	58.113
Control over harmless weed		385.336	42.251
Berry Borrer		259.620	28.467
Rust		196.250	21.518
Other pests and illnesses		77.415	8.488
Shadow handling and other tasks		100.475	11.017
Crop Installation		671.041	73.578
Sub-total		4.570.977	416.603
Management		507.445	55.640
TOTAL COSTS		5.078.421	556.839
INCOME		6.626.357	726.567
RANGE		1.547.936	169.728

Benefit/Cost Relationship		0,30
Breakeven		4,71

LAND COST	765.000	83.881

5.7. Technical economic indicators; a pedagogic method

The Colombia Coffee Growers Federation developed a manual on technical-economic indicators for coffee production This manual helps users determine the efficiency indicators, which are the starting point for coffee producers to break down their budgets and determine their own costs. Generally, small and medium coffee growers do not note in written form labour payments, input prices, and coffee production, plus other company products to establish the production costs. The obtained indicators to assess the management of the coffee company (farm) are compared with other ones to reference and upgrade. They are then used as a guide to continuously control the critical variables that interfere with the productive process. The indicators are also useful for valuing the coffee production.

Each cost production structure is representative of the diversity in the coffee production systems, which, in turn, makes it possible to obtain representative data for coffee production in Colombia. Exercises related to production costs are carried out for coffee growers to review them and use them for comparison purposes with their counterparts. Bases on the comparison, coffee growers can the necessary adjustments in order to be more efficient and obtain better production results and increased income.

The surveys show that the age and schooling levels of the coffee growers can be factors that limit their ability to systematically collect information and to develop their operations. Thus an alternative option for them in assessing real progress in their business is through the ITECs, as shown in tables 7 and 8.

Table 7. Income expenditures in coffee production, sun-technified coffee, sowing cycle

INCOME-EXPENDITURES IN THE COFFEE PRODUCTION. SUN-TECHNIFIED COFFEE.							
SOWING CYCLE.							
AREA: 1.0 HECTARE(S). - DENSITY: 5,000 COFFEE PLANTS / HECTARE.							
*** WORKMANSHIP ***			SOWING	YEAR 2	YEAR 3	YEAR 4	YEAR 5
COFFEE PLANTATION SOWING		LABOR	98,7	0,0	0,0	0,0	0,0
GROUND PREPARATION		LABOR	27,3	0,0	0,0	0,0	0,0
TRACING		LABOR	7,0	0,0	0,0	0,0	0,0
HOLE-MAKING		LABOR	28,0	0,0	0,0	0,0	0,0
FERTILIZING WITH ORGANIC MATTER		LABOR	7,0	0,0	0,0	0,0	0,0
TRABSPORT AND SEEDLINGS DISTRIBUTION		LABOR	7,0	0,0	0,0	0,0	0,0
SEEDLINGS SOWING		LABOR	22,4	0,0	0,0	0,0	0,0
PLATEOS AND WEEDINGS		LABOR	68,0	20,0	4,6	4,6	4,6
HAND-OPERATED PLATEO		LABOR	28,0	0,0	0,0	0,0	0,0
HAND-OPPERATED WEEDING		LABOR	40,0	20,0	3,0	3,0	3,0
HERBICIDE WEEDING		LABOR	0,0	0,0	1,6	1,6	1,6
FERTILIZATION		LABOR	23,2	13,6	2,2	2,2	2,2
APPLYING UREA		LABOR	22,6	0,0	0,0	0,0	0,0
APPLYING FERTILIZER	25- 4-24	LABOR	0,0	6,8	1,1	1,1	1,1
APPLYING UREA MIXTURE	KCl	LABOR	0,0	6,8	1,1	1,1	1,1
APPLYING CORRECTIVE	LIME DOLOM.	LABOR	0,6	0,0	0,0	0,0	0,0
PHYTOSANITARY CONTROL		LABOR	0,0	7,9	20,9	34,5	27,3
BERRY BORER CONTROL	CULTURAL	LABOR	0,0	6,9	18,2	30,0	23,7
BERRY BORER CONTROL	BIOLOGIC	LABOR	0,0	0,3	0,9	1,5	1,2
BERRY BORER CONTROL	CHEMICAL	LABOR	0,0	0,7	1,8	3,0	2,4
BERRY BORER CONTROL (CULT. BIOL. CHEM.		LABOR	0,0	7,9	20,9	34,5	27,3
OTHER SUPPORT TASKS		LABOR	8,5	1,6	1,0	1,0	1,0
RE-SEEDING		LABOR	1,3	0,6	0,0	0,0	0,0
SELECTION OF THE NEW STEMS		LABOR	6,2	0,0	0,0	0,0	0,0
SOIL CONSERVATION		LABOR	1,0	1,0	1,0	1,0	1,0
TOTAL SUPPORT LABORS		LABOR	99,7	43,1	28,7	42,3	35,1
COLLECTION AND BENEFIT		LABOR	0,0	47,4	125,6	206,8	163,2
COLLECTION PER LABOR		LABOR	0,0	7,3	19,3	31,7	25,0
PIECE RATE COLLECTION (EQUIVAL.)		LABOR	0,0	35,4	93,9	154,7	122,1
COLLECTION (LABOR AND PIECE RATE)		LABOR	0,0	42,7	113,2	186,4	147,1
BENEFIT		LABOR	0,0	4,7	12,4	20,4	16,1
TOTAL WORKMANSHIP		LABOR	198,4	90,5	154,3	249,1	198,3

Source: FNC, Technical Management. Business Management

Table 8. Income-expenditures in coffee production, sun-technified coffee, sowing cycle.

INCOME-EXPENDITURES IN THE COFFEE PRODUCTION. SUN-TECHNIFIED COFFEE.									
SOWING CYCLE.									
AREA: 1.0 HECTARE(S). - DENSITY: 5,000 COFFEE PLANTS / HECTARE.									
*** INPUTS ***			SOWING	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR6	YEAR 7
COFFEE PLANTATION SOWING									
ORGANIC MATTER	COFFEE PULP	KILOGRAMS	5.000,0	0,0	0,0	0,0	0,0	0,0	0,0
COFFEE SEEDLINGS		SEEDLINGS	5.000,0	0,0	0,0	0,0	0,0	0,0	0,0
PLATEOS AND WEEDINGS									
HERBICIDE WEEDING	ROUNDUP	LITROS	0,0	0,0	1,0	1,0	1,0	1,0	1,0
FERTILIZERS									
UREA		KILOGRAMS	680,0	300,0	300,0	300,0	300,0	300,0	300,0
FERTILIZER	25- 4-24	KILOGRAMS	0,0	400,0	400,0	400,0	400,0	400,0	400,0
FERTILIZER	KCl	KILOGRAMS	0,0	200,0	200,0	200,0	200,0	200,0	200,0
CORRECTIVE	CAL DOLOM.	KILOGRAMS	50,0	50,0	50,0	50,0	50,0	50,0	50,0
PHYTOSANITARY CONTROL									
BERRY BORER CONTROL	BAUVERIA	KILOGRAMS	0,0	3,1	12,4	15,0	9,8	6,7	5,7
	OIL	LITRES	0,0	0,1	0,2	0,3	0,2	0,1	0,1
	LORSBAN	KILOGRAMS	0,0	0,2	0,8	1,0	0,7	0,4	0,4
BROWN SPOT CONTROL	Cu2(OH)3Cl	KILOGRAMS	0,0	0,0	0,0	0,0	0,0	0,0	0,0
OTHER SUPPORT TASKS									
SEEDLINGS FOR RE-SOWING		SEEDLINGS	100,0	50,0	0,0	0,0	0,0	0,0	0,0

Source: FNC, Technical Management. Business Management.

5.8. Calculation method for the installation and pre-production costs

The value of a coffee investment is considered from the first month (moment zero) until the crop begins to produce coffee, between 18 and 24 months later. This investment is quantified at about Col$8 million per hectare, with 5000 plants. According to the analysis made by Cenicafé on the productive capacity of a coffee plant, the productive cycle is estimated to be between 7 and 9 years, and during that cycle, it produces 100 coffee loads. Under these assumptions, the amount of the pre-production investments to be charged against each production year is estimated at Col$73,000 per load. This annual cost is included in the final costs estimations, which are compared with prices and are the base used to gauge the minimum price policy.

5.9. Calculation method for the installation and pre-production costs

Medium and large coffee producers represent 4 percent of the coffee production sector in Colombia and are represented in the farm sampling procedure. They usually own drying equipment and industrial beneficiaries and compute depreciation per produced units (125-kg dry parchment coffee loads) or per used hours of the machine, depending on the established accounting standards. The remaining 96 percent are small coffee producers, and in general, they wash and dry the coffee in the sun or with artisanal structures that are not costly. Because there is no fixed capital in these farms, depreciation is not calculated and thus, it is not included in the final costs estimations. Not considering certain items which, individually, are negligible in terms of contribution to costs, allows focusing the data collection efforts on the principal cost items, improving the global efficiency of the programme. This practice is recommended in the Handbook, as long as it has a limit, because the omission of several small items could ultimately sum up to a significant quantity.

5.10. Economic indicators in a micro and macroeconomic level

The Handbook and FNC apply the same calculation for the following indicators: total production costs/hectare; net return/hectare and breakeven. Nevertheless, FNC has established other indicators, such as: monthly production percentage, cash flow, benefit/cost relationship, labour costs per hectare, and annual profitability and at the macro level, average cost of Colombian coffee production. Table 6 shows the gross income and costs pertaining to coffee activity that measure the profitability per hectare and per produced load, indicating that, even if the land opportunity cost is considered, it is still profitable.

5.11. Other indicators

Other indicators, such as fertilizing kilograms/hectare have been established, and the *handbook* suggests others, including, among others, the use of agricultural inputs/hectare, use of energy/coffee load, the use of fuel and lubricants/hectare, the use of pests/hectare, the production value/use of inputs per hectare, number of individuals that conform the coffee growers' family, number of homes with public utilities, and the production increase of the items.

5.12. Confidentiality and accessibility to data and micro data policy

Information on added data from SICA is available to the general public, but individual information is restricted. Starting in 2015, a more accessible platform for coffee growers was scheduled to be available with the objective to familiarize them with fertilizing programmes and the plans pertaining to reference costs based on the "farm's structure"[7] document and extension programme, which is currently being delivered to the coffee growers based on their necessities.

[7]Name of the document that the coffee growers are currently receiving.

6

First Results of the Pilot Survey made in 2013

6.1. Descriptive statistics about the universe and the farm sampling

In June 2013, a survey on costs and prices at 1,121 lots was carried out. It could not be done in 330 of them due to the absence of the people who had the relevant information. In addition, in the costs analysis, 71 lots with costs per load exceeding Col$1,230.644 (5 percent of the total) were discarded, and in the profitability analysis, 17 extra ones were discarded, of which the price per load was less than Col$100,000 or higher than $1,100. Finally, grains were weighted in 1,451 lots, the costs survey was carried out in 1,121 of them, costs were evaluated in 1,050, and profitability was measured in 1,033 lots. The higher number of discarded lots in the different departments was: Huila (61), Tolima (55), and Valle del Cauca (48). The Technical Management of FNC was in charge of the field work.

The number of lots used in the costs and profitability study in 2013 was higher than the suggested 976 lots. The study was based on a stratified sampling methodology, with an error rate of 5 per cent in which, where the sampling frame is the number of farms with at least one coffee hectare, with an error rate of 10 percent. (Echavarría & Montoya 2013).

The calculation of the total costs per hectare and per load, was based on the physical-technical coefficients (amount of labour and inputs per hectares) and on the prices for those items or inputs (the wage for every labourer, collection cost and input prices), computed according to quantity and times used per year. This cost is then compared with the value of production to calculate the profitability obtained in the cropping year. In this calculation, both the prices of the survey and the ones published by FNC in the purchase guarantee were used. The Federation's ITECs helped to calculate the production costs.

It must be said that, even though the data obtained from the survey are not exactly the same compared with those from ITEC, they are quite similar. The items are: labour and collection values, productivity (with some differences due to, varied land conditions, and altitude, among others), and total production cost per load (Echavarría & Montoya 2013).

6.2. Economic indicators

The indicators are the total costs and the number of loads per hectare that produce a total cost per load. The variable costs are: collection; and washing and drying; and the fixed costs are plateo and weeding, fertilizers, berry borer control, rust control, shadow handling and other activities involving labour, such as crop installation and management.

6.3. Identified problems and necessary upgrades

The basic problems that the survey had were unable to collect information from a farm because those responsible for presenting it were not present or did not know about it, exaggerated reports were delivered, or very high or low costs per load. Because of these problems, the 2000 Farms Platform was set to be executed in 2015, which would improve the survey and enable better results to be obtained, as was explained in different parts of this study.

Annex I

Business management survey: cost production per hectare, 2013

BUSINESS MANAGEMENT				
SURVEY: COST PRODUCTION PER HECTARE YEAR				
YEAR 2.013				
DEPARTAMENT NAME				
COFFEE PRODUCER'S NAME				
ID NUMBER				
FARM CODE				
ITEM	**UNITS**	**ITEC**	**FREQUENCY (TIME/YEAR)**	**VALUES**
0. COFFEE INSTALLATION				
Investment value before production	Value/ha			
1. HARMLESS WEED CONTROL				
1.1. Work labour	**Units**	**Quantity**	**Times/Year**	**Unit Price**
Plateo	Labor/ha			
Hand-operated control (machete)	Labor/ha			
Mecanic Control (scythe)	Labor/ha			
Chemical Control	Labor/ha			
1.2. Inputs				
Saws	Units			
Machetes	Units			
Herbicide	Litres/ha			
2. FERTILIZATION				
2.1. Work labour				
Work labour - Fertilization	Labor/ha			
2.2. Inputs				
Input - Fertilizer	Kilograms/ha			
3. CONTROL WITH PLANT PRODUCTION PRODUCTS				
BERRY BORER CONTROL				
3.1. Work labour (Manual, Biological, Chemical)	Labor/ha			
3.2. Inputs	Unit/ha			
RUST CONTROL				
3.3. Work labour	Labor/ha			
3.4. Inputs - Fungicide	Unit/ha			
OTHER PLAGUES AND DISEASES				
3.5. Work labour	Labor/ha			
3.6. Inputs	Unit/ha			
OTHER SUPPORT TASKS				
3.7. Work labour	Labor/ha			
3.8. Inputs	Unit/ha			
4. COLLECTION				
Collection price	Value per chrrey coffee kilogram			
5. BENEFIT				
Cost per load (wet and dry)	Value per D.P.C. load			
6. MANAGEMENT AND GENERAL EXPENSES				
Management and general expenses	Value/ha/year			
INCOME	Value per load	Basic price		
		Differential - Healhy almond, labels, codes of conduct		
		Total per load		

Annex II

Business management survey: production costs per hectare year, reference values, 2013

BUSINESS MANAGEMENT				
SURVEY: PRODUCTION COSTS PER HECTARE YEAR. REFERENCE VALUES				
YEAR 2.013				
DEPARTAMENT NAME				
COFFEE GROWER'S NAME				
I.D. NUMBER				
FARM CODE				
ITEM	UNITS	ITEC	FREQUENCY (TIME/YEAR)	VALUES
0. COFFEE INSTALATION				
Investment value before the production				
5000 trees in the sun per ha	Value/ha			$ 8.500.000
5000 in the shadow per ha	Value/ha			$ 7.500.000
Bearing in mind this reference values determine with the coffee grower the installation cost, inputs or hill-tree prices that may change this value can be present.				
4. COLLECTION				
Collection price	Cherry coffee kilogram value			
In order to determine the collection value of the cherry coffee kilogram, bear in mind the percentage of paid coffee per kilogram and per labor, and in that way determine the average paid per kilogram.				
5. BENEFIT				
Cost per load	Value/load/small			$ 26.500
				$ 34.600
	Value/load/medium and big			$32.000
				$ 45.000
6. MANAGEMENT AND GENERAL EXPENSES				
Management and general expenses	General expenses value/ha/year. Small			$ 350.000
				$ 460.000
	Management and general expenses value/ha/year. Medium			$750.000
				$ 1.050.000
	Management and general expenses value/ha/year. Big			$980.000
				$ 1.550.000
For small producers, Management was valued in $0 and General Expenses was the unique item taken into account. In order to derermine Management for small, medium, and big producers it is neccesary to ask for certain ranks.				
INCOME	Value per load			
Ask if the coffe produder has addition income regarding quality, labels or conduct codes, do not consider AIC nor PIC.				

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Case Study 2:

The Statistical Programme for Cost of Production in Agriculture in the Philippines

(Maura S. Lizarondo)

1

Background Information

1.1. Rationale

This report presents the case of the CoP Statistical Program in the Philippines. A thorough review of the inputs, processes and outputs was conducted for this report. As a matter of course, the review has accounted for similarities and deviations from statistical theory, from best practices and recommended methodologies. This case study is expected to complement or support the global efforts towards the finalization of the Handbook on Cost of Production (CoP) Statistics, which is intended to improve the quality and availability of CoP data at the national, regional and global levels.

The objective of this case-study is twofold. First, it intends to give a thorough description of the CoP Statistical Program as it is implemented in the Philippines. It can be considered as an example of good practice for developing countries that are interested in creating a similar programme or upgrading their existing surveys and methodologies. Second, the major components of the programme are compared and assessed against the recommendations given in the Handbook. This comparison is essential in ensuring that the Handbook's guidelines are relevant and adaptable to the conditions that farmers and statistical organizations from developing countries face.

1.2. Data system for cost of production in the Philippines: a brief history

Cost of Production data collection and generation has a long history in the Philippines. The law (Republic Act 10625) creating the Philippine Statistics Authority (PSA) was signed on 13 September 2013. While the transition from being individual statistical agencies to an integrated PSA is still in progress, the statistical programme for CoP in agriculture is being maintained by the Agricultural Accounts and Statistical Indicators Division (AASID) under the Bureau of Agricultural Statistics (BAS). Specifically, the Socio-Economic Statistics Section (SESS) of AASID has been tasked with generating survey-based CoP estimates. BAS through the Economic Accounts Section (EAS) of AASID is responsible for generating CoP estimates for non-survey years.

Prior to the creation of BAS under Executive Order 116, which was issued in January 1987, its forerunner, the Bureau of Agricultural Economics (BAEcon) had the responsibility of generating CoP estimates. Under the BAEcon structure, the development and maintenance of a CoP data system was lodged mainly at the Economic Research Division. The Agricultural Marketing Services Division (AMSD) of BAEcon, through its Marketing Research Section, has conducted surveys for the purpose of generating marketing costs and margins. In the process, CoP data were also collected to complete the input-output flow. However, commodity coverage was limited to the specific items of interest of funding agencies or partners.

In 2010, BAS issued an important document entitled "Agricultural Statistics Development Program (ASDP) 2010-2016". In broad terms, ASDP presents the plans and programmes that would support the statistical requirements of relevant development frameworks. It states the need to conduct the Costs and Returns Survey (CRS) on a more regular basis.

A complementary document is the Research and Development (R&D) Agenda for Agricultural Statistics, which emphasizes the collection and generation of CoP statistics.

The Agriculture Statistics (AgStat) system has benefited from the strategic planning exercise which was introduced to BAS about 15 years ago. One significant outcome of this exercise is the packaging of the Strategic Plan, a three to four-year planning document, which is regularly updated. This Plan spells out the Bureau's intention to conduct CoP surveys annually for a set of commodities, which will be repeated every five years.

The AgStat system is governed by the Operational Plan, an annually prepared report that guides statistical operations for a given year. Cognizant of the demand for CoP data, the BAS' Operational Plan includes the development and maintenance of the CoP data system.

1.3. Objectives of the statistical programme for cost of production in agriculture

The statistical programme for CoP in agriculture is designed to address the general objective of generating and disseminating data on costs and returns of production of agricultural commodities. The main contributor to the programme is CRS. The specific objectives of CRS are the following:

1. To establish an up-to-date CoP structure for the commodity of interest;
2. To determine indicators of profitability;
3. To determine input usage;
4. To generate other related data, such as farm and farmer's characteristics and practices.

A second feature of the programme is the production of updated costs and returns of production reports, which provide data users with an annual series of CoP statistics for about 30 commodities.

A related project under the CoP statistical programme management is the Farm Record Keeping Project, which aims to improve farmers' productivity, efficiency and income by building capacities in areas pertaining to operational and financial farm management.

1.4. Uses and users of cost of production data

Cost of production data are critical in the compilation of national accounts as it provides the National Statistical Coordination Board with data files that are used to establish and update gross value added for agriculture.

The data system for CoP enables the generation of statistical indicators of farm productivity and profitability. These indicators help in assessing the economic conditions of the farmers which are important inputs to economic and policy analysis, planning and formulation of development plans, and programmes for the agriculture sector. Information obtained from the CoP programme is used when deciding on appropriate market intervention schemes and the promotion of area/commodity specialization. Examples of market intervention can be in the form of setting a floor price at the farm level and a ceiling price at the retail level, and to establish a farm price for a commodity that will encourage farmers to produce the said commodity. For example, the Government, through the National Food Authority (NFA), implements a floor price policy for palay (paddy rice) that guarantees farmers a minimum price. Complementary policies are administered by the Department of Trade and Industry (DTI), which puts into effect policies that provide consumers with relatively stable prices of basic commodities.

For farmers, CoP data can help them determine which commodity to produce, what level of inputs to use and other decision points. The profitability indicators from the CoP data system can guide decision makers as to where and how to pursue specialization for increased efficiency in the agriculture sector. These

concerns are being discussed with farmers during the consultation and training sessions of the PSA-BAS project Production and Marketing Analysis Service (PMAS).

A key component of the Farm Record Keeping project is the generation of CoP data based on farmers' records. These CoP data together with other records are directly assist farmer-recorders in making decisions regarding their production and marketing operations. Actual experiences are being shared with other farmers and farm extension workers during consultation and training sessions. Government personnel, farmers' association officials and members attend those sessions.

For government planners in the agriculture sector, the CoP data can guide them in determining which programmes to develop for the benefit of farmers and the agriculture sector, in general. Among the data items presented along with CoP are input use, which allows policy analysts to inform development planners and decision-makers on farming practices in need of improvement. Together, these help government planners design programmes to reduce farm production costs, which, in turn, enhance the competitiveness of a given commodity. An example of this is the input subsidy being offered to farmers under the commodity development programmes. The production costs and returns data are used in determining the type and/or level of credit assistance that the government under its development programmes can provide.

For financial institutions, the CoP data are used to evaluate the degree of financial soundness of the agriculture sector and of specific proposals. Insurance companies make use of CoP data in determining appropriate insurance premium rates. For those interested in agribusiness, the CoP data can serve as inputs towards deciding which business venture to engage in.

The concern of the legislative branch of government about farmers' welfare is addressed by the statistical indicators from the CoP data system. The more frequently requested data are cost of production and price received by farmers.

A large user of CoP data sets is the group of researchers from academic, research institutions and other organizations. The CoP variables can aptly respond to the data requirements for carrying out a production function analysis, as well as other economic and statistical analysis.

2

Basic Features of the CoP Statistical Program

2.1. Commodity coverage

Available records about CoP surveys have shown that palay (paddy rice) and corn (maize) are covered more frequently than the other agricultural commodities. This is understandable, as those crops are considered staple food items in the Philippines. Of late, however, onion and garlic have attracted increasing attention because of their important role in agricultural trade.

Survey-based CoP estimates are produced for a range of commodities (see annex I) and have been updated annually since 1996 using established assumptions. (It is recognized that this approach assumes that cost structures are fixed, but nevertheless, users have insisted that the estimates be updated despite this weakness).

Commodity coverage of the surveys is, by and large, influenced by the plans and programmes of the Department of Agriculture (DA). The department, through its commodity development programmes, has contributed financially to CRS. BAS as a staff bureau of DA (until the creation of PSA) is involved in the commodity development programmes; its main role is to provide statistical support. The top data request has been for CoP, which, contrary to data on production, inventory, trade and prices, are not always available and accessible. What normally happens is BAS would be advised to prepare a proposal for conducting CRS for a particular commodity. The selection is an offshoot of a consultation among stakeholders.

The FAO Handbook is open to different approaches regarding how often CRS is conducted for each commodity. It, however, points out that iteration of surveys should not be excessive, not more than five years. The CoP Statistical Program of the Philippines has always proposed that a survey for a set of commodities be conducted every five years. Unfortunately, financial requirements have constrained PSA from implementing this plan.

2.2. Data disaggregation

The design of CoP surveys for palay (paddy rice) and corn (maize) supports the generation of data at provincial, regional and national levels. It likewise allows disaggregation by type of farm and by cropping season. Researchers and analysts can also do other types of disaggregation, depending on their particular areas of concern. The CRS design enables the generation of estimates by type of inputs (organic and inorganic), by size of the farm. However, in these cases, estimates tend to be reliable only at the national level.

For most other commodities, survey coverage is usually limited to those provinces with considerable volume of production of the subject commodity and statistical reports normally reflect national-level estimates only. Production costs and returns data for each of the provinces surveyed are sometimes made available. Similar to the palay (paddy rice) and corn (maize), other types of disaggregation can be done by interested researchers and analysts.

2.3. Classifications, concepts and definitions of cost items and indicators of profitability

2.3.1. Cost classification

In relation to cash flows

Cash Costs refers to direct cash outlays or cash payments for the use of different factors of production such as hired labour, fertilizers and chemical.

Non-Cash Costs are expenditures that are paid in kind. Valuation of cost items makes use of the prevailing prices in the community. Generally, these non-cash costs represent the portions of the farmer's production that serve as payments for the use of particular factors of production.

Imputed Costs are expenditures that do not involve actual outlays in cash or in kind; they represent the opportunity costs of using owned resources in a particular activity and are computed using the values of the best alternative uses foregone.

In relation to production level:

Fixed Costs are costs that do not change when the level of output changes.

Variable Costs are costs that change as level of output changes.

2.3.2. Cost items: concepts and definitions

Depreciation refers to the cost of wear and tear of farm tools and equipment, machinery and other farm facilities and structures. The straight-lined method is used in computing for depreciation in which the cost of acquisition is divided by the estimated lifespan of farm equipment, which is provided by the farmer-respondent. The CRS questionnaire asks for the year of acquisition and the expected number of years that the equipment would be useful or serviceable from the date of interview. Together, these two data items represent the expected lifespan of the equipment (imputed cost).

Electricity is payment for electricity consumed in the production process. The respondent is asked about the expenses incurred for the use of electricity in the production of the subject commodity. The allocation of cost between commodity production and household use is completed by the respondent (cash costs).

Fertilizer is the cost of using any substance, solid or liquid, inorganic or organic, natural or synthetic, single or combination of materials that is applied to the soil or on the plant to provide one or more of the essential elements to improve plant nutrition, growth, growth, yield or quality, or for promoting a chemical change that enhances plant nutrition and growth. (cash, non-cash or imputed cost)

Food expenses are those expenditures incurred in providing food to farm labourers. The respondent is asked whether food has been provided to the farm workers. If the answer is yes, the interviewer then asks the respondent to provide the actual expenses incurred in food provision. The farm workers covered in this cost item are those under the categories of exchange and hired labour (cash or imputed costs).

Fuel and oil is the cost incurred for the use of gasoline, oil, and other related inputs (ash or imputed cost).

Interest on operating capital is cost of capital foregone for the purchase of seeds, fertilizers, chemicals and payment for hired labour; this is derived by multiplying the total cash outlays by the prevailing lending rate (imputed cost).

Interest payment on loan is payment for the interest on borrowed capital used in the farm operations (cash or non-cash cost).

Irrigation fee is payment for irrigation services reported by the farmers during the reference period (cash or non-cash cost).

Labour, exchange is work done by farm labourers in exchange (or as payment) for the work done by the farm operator and family members outside the operator's own farm (imputed cost).

Labour, family is labour provided by the farmer's family members who take part in any production activities. Man-days of labour are valued at the prevailing wage rate in the locality. (imputed cost) Conceptually, one man-day is equivalent to eight hours of work. To compute man-days, multiply number of days by number of hours worked per day and divide the result by eight.

Labour, hired is labour provided by a person who is paid by the farm operator. Payment of wages is either in cash or in kind (as agreed). Hired labour includes a man, eventually in combination with an animal or machine in the case of custom services (wages as well as in-kind payments have to be considered).

Labour, operator is labour contributed by the farm operator. Man days of labour are valued at prevailing wage rate in the locality (imputed cost).

Land Tax is amount of tax paid by the owner-operator for the farm land (cash cost).

Landowner's share is the portion of the farmer's production that goes to the owner of farm land based on the agreed sharing system. The valuation is based on the price at which the produce is sold or would be sold on the market (non-cash cost).

Pesticides refer to all types of yield-protecting forms of chemicals which may be acquired through payment in cash or in kind. These may also be produced by the farmer for his/her farm operation (cash, non-cash or imputed cost).

Rentals refer to payments for the use of land, machine, animal, tools and farm machineries (cash or non-cash).

Rental value of owned land is the imputed cost for the use of farmland which is derived by asking the farmer how much would be the annual value of the land if it will be rented out (imputed cost).

Repairs cover all repairs and improvements made on tools and equipment and other facilities used in the production process (cash cost).

Seeds/planting materials are plant materials used for sowing purposes for the production of food, fodder, oil, industrial crops, vegetable, fruit flower, lawn and tree crops and include vegetative parts and/or organs used for propagating the crops/species (cash, non-cash or imputed cost).

Sheller's/harvester's/ thresher's share is the portion of the farmer's production that serves as payment to farm labourers who perform the harvesting, threshing and shelling activities. The share is valued using the price received by the farmer in selling the produce (non-cash cost).

Soil ameliorants are elements placed or mixed into the soil to replenish depleted soil nutrients for better plant growth (cash, non-cash or imputed cost).

Transport cost of inputs are expenditures incurred in transporting farm inputs to the production sites (cash cost).

2.3.3. Major profitability Indicators

Gross returns is the gross value of production, which is derived by multiplying volume of production by farm-gate or producer price.

Net returns is the net profit from production, which is derived by subtracting all costs from the gross returns.

Returns above cash costs refers to the receipts of the farmer-producer after deducting the cash outlays.

Returns above cash and non-cash costs refers to the receipts of the farmer-producer after deducting cash and non- cash outlays.

Net profit-cost ratio is the rate of return to the farmer-producer, which is derived by dividing net returns by cost of production; it indicates the amount earned by the farmer-producer for every peso invested in production.

The profitability indicators listed above have different types, such as by cropping season and by farm type and levels, namely national, regional and provincial data disaggregation. Input usage is also covered. The presentation can be on a per hectare or a per kilogram of output basis. Below is a summary

of comparisons of indicators between the draft CoP Handbook and the current CoP data system in the Philippines.

Indicator 1 total costs/planted area

Indicator 2 total returns (revenues/land unit)

In the Philippine CoP data system, these two indicators are put together in one data table, which is entitled "average costs and returns of production per hectare". All cost items are detailed in the table. However, the computation for indicator 2 does not include receipts from co-products (cases in which another commodity is planted/grown in the same farm).

Indicator 3. Breakeven price per unit of output

This is not a part of the CoP data presentation in the Philippines.

Indicator 4. Energy use/land unit

This is noted in the costs and returns table.

Indicator 5. Fertilizer use/land unit

This is noted in the costs and returns table.

Indicator 6. Pesticide use/land unit

This is noted in the costs and returns table.

Indicator 7. Costs and returns by soil type or climate zone

The geographical disaggregation deals with this indicator.

Indicator 8. Costs and returns per standard unit of labour

The Philippine CoP data system comes up with costs per man-day of labour by source (operator, exchange, family, hired)

Indicator 9. Comparative costs and returns of production on irrigated and non-irrigated land

This is part of CRS-palay (paddy rice)

Indicator 10. Costs and returns by farm type, farm size, organization type and ownership

The Philippine CoP data system does not yet account for costs and returns by organization type and ownership, but these indicators can be derived from the datasets subject to certain conditions or limitations, such as small sample size.

Indicator 11. Concentration ratios

This is not part of the Philippine CoP data system.

Indicator 12. Value added

The term net returns is used for value added in the context of CoP data compilation and dissemination. Net returns are included in the Philippine CoP data system and are provided by PSA–BAS to PSA-NSCB (National Statistical Coordination Board) along with information on costs for national accounting purposes.

Currently, there does not appear to be need nor demand to use the above-mentioned indicators in the Philippine CoP data system. Compilation of the value-added estimates is being handled by the national accounts compiler. Estimates of gross output and CoP are provided by the AgStat system. All other indicators listed in the draft Handbook are covered by the Philippine CoP Statistical Program. Below is a sample statistical table contained in a costs and returns survey report.

Table 1. Average costs and return of palay production, Philippines, 2009

Table 37.01 All Palay: Average production costs and returns per hectare, Philippines, 2009

ITEM	UNIT	JANUARY- JUNE		JULY- NOVEMBER		AVERAGE	
		QUANTITY	VALUE	QUANTITY	VALUE	QUANTITY	VALUE
Production	kg.	3,499.71		3,280.22		3,408.94	
Area harvested	ha.	0.98		0.95		0.97	
Number of Farms		4,302		3,142		7,444	
CASH COSTS			16,610		14,846		15,881
Seeds	kg.	36.80	837	36.30	765	36.60	807
Organic fertilizer: Solid	kg.	13.24	49	9.49	33	11.69	42
Liquid	li.	0.57	10	0.07	15	0.36	12
Inorganic fertilizer: Solid	kg.	202.29	4,686	193.68	3,758	198.73	4,302
Liquid	li.	0.08	21	0.06	18	0.07	20
Soil Ameliorant: Solid	kg.	0.51	3	0.02	4	0.31	3
Liquid	li.	a/	c/	a/	2	a/	c/
Pesticides: Solid	kg.	0.81	232	0.66	234	0.75	233
Liquid	li.	1.61	1,041	2.43	1,529	1.95	1,243
Hired labor	manday	23.16	5,152	22.31	4,880	22.81	5,039
Land tax			149		197		169
Rentals: Land			119		111		116
Machine, tools, equipment & animals			147		98		127
Fuel & Oil	li.	22.27	854	12.88	514	18.39	713
Interest payment on crop loan			376		197		302
Irrigation fee			361		267		322
Food expense			642		653		646
Repairs			1,387		1,010		1,231
Others d/			544		560		551
NON- CASH COSTS			13,882		11,872		13,051
Seeds	kg.	43.34	675	56.67	888	48.86	763
Organic fertilizer: Solid	kg.	9.40	18	7.95	12	8.80	16
Liquid	li.	a/	c/	0.02	c/	0.01	c/
Inorganic fertilizer: Solid	kg.	0.59	16	0.80	17	0.67	16
Pesticides: Solid	kg.	b/	c/	b/	c/	b/	c/
Liquid	li.	a/	c/	a/	3	a/	1
Hired labor in kind	manday	2.23	662	2.17	590	2.20	632
Harvesters' share	kg.	230.29	3,470	219.42	2,920	225.80	3,242
Threshers' share	kg.	209.24	3,162	184.17	2,477	198.88	2,879
Landowner's share	kg.	210.15	3,152	204.44	2,821	207.79	3,015
Rentals: Land	kg.	51.56	729	47.94	584	50.06	669
Machine, tools, equipment & animals	kg.	3.93	57	3.51	46	3.76	52
Fuel & Oil	kg.	0.06	c/			0.03	c/
Interest payment on crop loan	kg.	13.99	192	4.50	57	10.07	137
Irrigation fee	kg.	26.76	416	6.75	83	18.49	278
Others d/	kg.	91.16	1,330	108.43	1,373	98.30	1,348
IMPUTED COSTS			8,815		8,743		8,785
Seeds	kg.	16.37	363	16.53	314	16.43	343
Organic fertilizer: Solid	kg.	2.61	14	17.26	10	8.67	12
Liquid	li.	0.01	2	a/	1	0.01	2
Inorganic fertilizer: Solid	kg.	6.55	144	1.01	20	4.26	93
Liquid	li.	0.01	3	a/	c/	0.01	2
Soil Ameliorant: Solid	kg.	0.09	c/			0.05	c/
Liquid	li.	a/	c/			a/	c/
Pesticides: Solid	kg.	0.02	6	b/	c/	0.01	4
Liquid	li.	0.04	27	0.01	6	0.03	18
Operator labor	manday	9.83	1,813	9.76	1,761	9.80	1,792
Family labor	manday	9.15	1,610	9.99	1,700	9.50	1,647
Exchange labor	manday	0.97	180	0.95	173	0.96	177
Depreciation			612		629		619
Interest on operating capital			1,925		1,801		1,874
Rental value of owned land			2,079		2,289		2,166
Others e/			39		37		38
TOTAL COSTS			39,307		35,460		37,716
GROSS RETURNS			53,773		45,434		50,324
RETURNS ABOVE CASH COSTS			37,162		30,588		34,444
RETURNS ABOVE CASH AND NON- CASH COSTS			23,280		18,717		21,393
NET RETURNS			14,465		9,974		12,608
NET PROFIT- COST RATIO			0.37		0.28		0.33
COST PER KILOGRAM			11.23		10.81		11.06

a/ Less than 0.01 li.
b/ Less than 0.01 kg.
c/ Less than P1.00
d/ Include: Transport, electricity, salaries and wages, sacks, tying and other material costs.
e/ Include: Transport, electricity, sacks, tying and other material cos

2.4. Expected Outputs of the CoP Statistical Program

2.4.1. Statistical reports

Cost of production reports are released in two parts. The first part contains survey based results while the second part consists of projections for non-survey years. (Due to financial and respondent burden reasons, the surveys cannot be conducted annually, so in non-survey years, costs and returns reports are made current using a predetermined updating methodology.) The report consists of a volume on palay (paddy rice) and corn (maize) and one for the remaining CoP commodities. The report on paddy rice and maize is inherently larger because it includes various types and levels of data disaggregation.

The part based on the survey results accounts for the data covering the reference period/year while, the other part, which is based on projected CoP presents a three-year data series. Survey-based estimates released to the public are included as part of the data series. Situations that call for a change in any of the updated data items or the cost structure, prior to conducting a survey are properly noted.

Below are the titles of CoP reports:

- Costs and Returns of (*commodity)* Production;
- Updated Production Costs and Returns of Selected Commodities;
  Part I: Palay and Corn;
  Part II: Other Commodities.

2.4.2. Databases

The completion of CRS does not end up with the release of a statistical report that contains the survey results for a given reference year. The staff in charge of the CoP statistics is mandated to compile the relevant data to be uploaded into? CountrySTAT database system of FAO.

Similarly, the series of updated CoP data are uploaded into the CountryStat. In the data series, appropriate notes are provided to signal the year when new benchmarks are established resulting from the survey. To date, the CountrySTAT shows a 12-year- data series on CoP-palay (paddy rice) and corn (maize), from 2002 to 2013. Data series previous to this period are furnished upon request. The CoP database for other commodities is from 1996/1997 to

2013. About 30 commodities are covered by the CoP database in the CountrySTAT.

2.4.3. Microdata files

Through the Accelerated Data Program (ADP) of the Organisation for Economic Co-operation and Development (OECD), training on the development of a web-based data cataloguing system was held in the Philippines in 2009. Selected staff of BAS participated in the training. The system is powered by the National Data Archive (NADA) application developed by the International Household Survey Network (IHSN). A significant outcome of this training is the establishment of the BAS Electronic Archiving and Network Services (BEANS), which was launched on 29 June 2010. BEANS is a web-based survey cataloguing system that serves as a portal for researchers to browse, search, apply for access and download relevant census or survey data and metadata. The system continues to put pressure on the AgStat system because of the number and frequency of surveys that PSA-BAS conducts.

Thus far, five CRS have been uploaded into the BEANS. This means that data users can access information/documents about those surveys. More importantly, apart from the survey questionnaire, the microdata or household-level data files are also available and researchers can access the files by registering and requesting to download them. This development is great milestone for the AgStat system, as t can now accommodate the demand for microdata files for further analysis of survey results.

As of October 2014, the following Costs and Returns Surveys are available at the BEANS website:

1. Costs and Returns Survey of Palay Production, 2005
2. Costs and Returns Survey of Garlic Production, 2006
3. Costs and Returns Survey of Onion Production, 2006
4. Costs and Returns Survey of Milkfish Production, 2006
5. Costs and Returns Survey of Seaweed Production, 2007

Microdata files have been prepared for additional three surveys to be uploaded but the process has been delayed because technical problems. However, requests for microdata files for surveys which are not yet available at BEANS are being accepted through special request.

Information on data dissemination and access to microdata and metadata is missing in the draft Handbook. Given the successful experience of the Philippines in this domain, it could certainly serve as a good practice for other developing and developed countries that are looking to disseminate agricultural data in general and agricultural CoP statistics in particular.

2.4.4. Metadata

CountrySTAT Philippines, a sub-website being maintained by PSA-BAS, is a very intuitive system because it explains all the data presented in the website through its metadata system. CoP is one of the databases under the domain entitled "Costs and Returns". The CRS metadata covers the following topics:

1. Concepts, definitions and classifications;
2. Coverage, availability, data sources and responsible agencies;
3. Data processing, estimation and revision methodology; other reference information

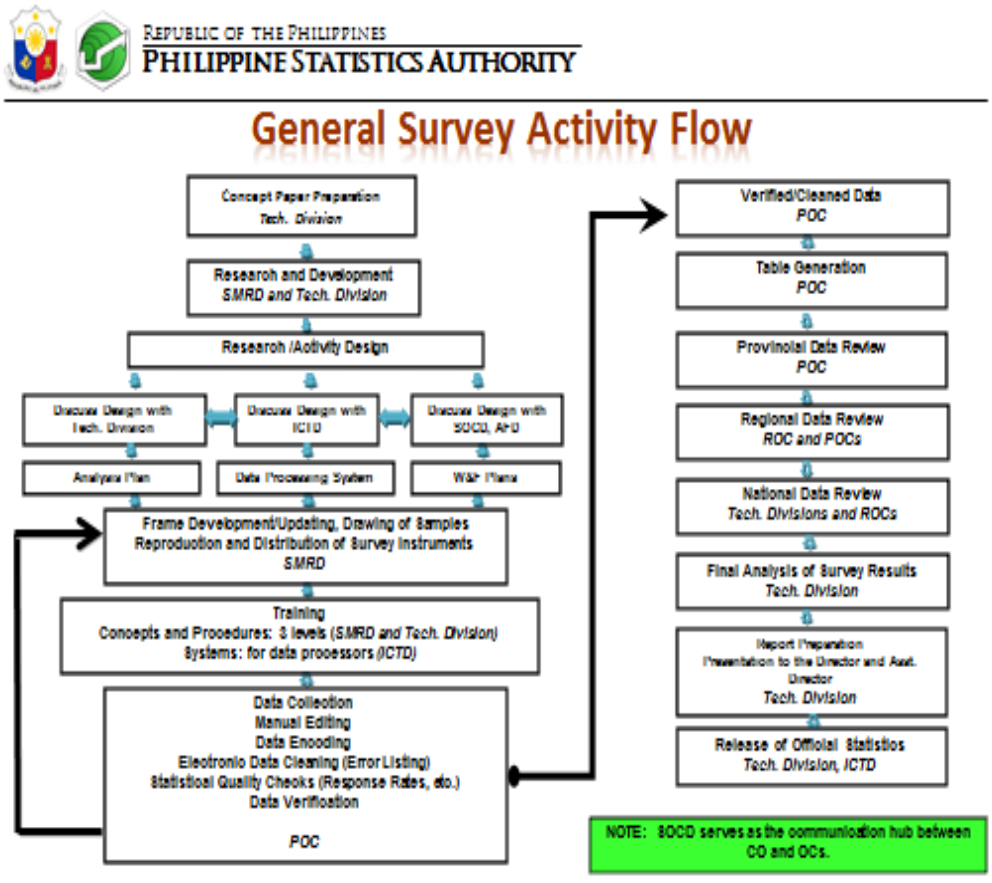
The BAS Electronic Archiving and Network Services provide access not only to microdata files, but also to the other relevant documents that contain descriptions or explanations of the microdata. Therefore, CRS that have been uploaded to the BEANS are accompanied or supported by survey-related documents, such as manuals of operation, questionnaires and minutes of meetings of concerned staff.

3

Implementation of the CoP Statistical Program

3.1. Institutional setting

To date, the reorganization of the operating units into the agencies that form PSA is still work in progress. Therefore, the presentation is reflective of the BAS structure, although, the operational flows will be essentially the same under PSA. The diagram below illustrates the flow of activities and the corresponding centres of responsibilities for the regular surveys of PSA-BAS. By and large, CRS adopts this flow/procedure with deviations possibly occurring at the processing and data review stages; these are detailed in parts VI and VII.



Notes:

1. The illustration reflects the existing BAS organizational structure. With the full integration of statistical agencies, the flow of activities would be the same, but, the identification of responsibility centres would change
2. Technical divisions are Crops Statistics Division, Livestock and Poultry Statistics Division, Fisheries Statistics Division, Agricultural Marketing Statistics Analysis Division and Agricultural Accounts and Statistical Indicators Division.

Abbreviations:

SMRD, Statistical Methods and Research Division, ICTD, Information and Communications Technology Division, SOCD, Statistical Operations Coordination Division, AFD, Administrative and Finance Division, ROC regional operations centre, POC, provincial operations centre

Updates on costs and returns estimates are prepared by the Economic Accounts Section (EAS) of AASID. Given the benchmark CoP structure from CRS, the EAS staff updates the cost items based on established assumptions. AASID and other divisions that deal with agriculture production and price statistics review the review and validate the data in the updated data tables. AASID takes the lead in both CRS and CoP updating.

Farm record keeping has always been a special project at PSA-BAS. This was last implemented from 2011 to 2013 under the project entitled "Enhancing Farmers' Capacity to Access, Analyze and Utilize Statistical Information". For the project, which received funding assistance from the Government of Japan through the National Agriculture and Fishery Council (NAFC), PSA-BAS created a project team to lead the implementation of the activities and AASID served as the focal unit. There was active coordination with the PSA-BAS regional and provincial operations centres (ROC/POC) in the provinces covered by the project. ROCs and POCs backstopped the project team in conducting the different activities, including, for example, identification of farmers' organizations and farmer-cooperators, training, and monitoring and evaluation of farm recording and records.

3.2. Technical matters

The Philippine Statistical Authority-Bureau of Agricultural Statistics underscores the importance of planning the implementation of the various aspects of the CoP statistical programme. This is particularly true for CRS. In setting the stage for CRS, the operating units/staff involved have to agree on the objectives of the survey. The CRS objectives largely influence the design of the survey in terms of sampling and questionnaire preparation, including all the other stages (collection, processing, analysis and dissemination of reports) of the data system.

Traditionally, the sampling design for CRS is based on the production survey in that the CRS samples are subsamples of the production survey. The details of the design, such as the size of samples, areas of coverage, and timelines, are governed by administrative and financial considerations, apart from the objectives set out for CRS.

During the planning stage when the survey instruments are being drafted, the CRS team assesses the draft output tables and outline of the report. The availability of these documents facilitates the design of the questionnaire and other survey instruments, such as the manual of operations (ManOps). For CRS, the operations manual includes instructions to field interviewers, field supervisors, flow of communications and guidelines for editing and coding.

For the farm record keeping project, the project team comes up with guidelines for recording farm operations and expenses and manuals for processing. Both recording and processing take place at the project sites.

The table below illustrates the planning and implementation processes involved in conducting CRS –palay (paddy rice) and corn (maize).

Table 2. 2013 Costs and returns survey: timetable of operations

Activity		Expected output	Palay		Corn	
			Dry season[1/]	Wet season	Dry season[1/]	Wet season
1.	Preparation of project proposal	Project proposal	January			
2.	Submission to the management	Project proposal	January			
3.	Revision/finalization of project proposal	Project proposal	April			
4.	Preparation of outline of report	Outline of report	April			
5.	Preparation of the dummy tables per commodity and specifications	Dummy tables and table specs	15 May			
6.	Preparation and pre-test of survey instruments	ManOps/questionnaire	7 May – 10 June			
7.	Preparation of survey frame and design	Survey design/frame	7 May – 10 June			
8.	Finalization of questionnaire and survey design	Final questionnaire and survey design	17 – 20 July			
9.	Development of processing programmes	Computer data processing programs	14 May – – 30 July			
	- data capture					
	- error listing					
	- tabulation					
10.	Reproduction of survey instruments	Survey instruments	21-26 June	21 October	21 – 26 June	20 August
11.	Mailing of survey instruments		27 June	28 October	27 June	26 August
12.	Trainers training	No. of trained staff				
	First level		June 19			
	Second level		June 27 (NMCM)			

13.	Field training (Third level)	No. of trained CDCs	22-23 July	4-5 November	22-23 July	2-3 September
14.	Field data collection and supervision	No. of survey returns	24 July – 2 August	6 – 15 November	24 July – 2 August	4 – 13 September
15.	Field editing and coding	No. of edited returns	29 July – 9 August	11 – 22 November	29 July – 9 August	9 – 20 September
16.	Data encoding	Encoded data	5 – 16 August	18 – 29 November	5 – 16 August	16 – 27 September
17.	Running of editing programme	List of errors	5 – 16 August	18 – 29 November	5 – 16 August	1627 September
18.	Correction of errors	Clean/sorted file	5-16 August	18-29 November	5-16 August	16-27 September
19.	Data table generation	Data tables	19-30 August	2-31 December	19-30 August	1-31 October
20.	Data review and validation		19-30 August	2-31 December	19-30 August	1-31 October
21.	Submission to C.O.		2 September	3 January 2014		4 November
22.	Preparation of micro data files		9-13 September	6-10 January 2014	9-13 September	11-15 November
23.	Data review, cleaning and updating of raw data files		16-30 September	13-31 January 2014	16-30 September	18-30 November
24.	Data processing and tabulations per commodity		1-10 October	3-14 February 2014	1-10 October	2 – 13 December
25.	Data review and analysis		11 – 31 October	17 February – 14 March 2014	11 – 31 October	16 – December-10 January 2014
26.	Report preparation		4 – 15 November	17 March – April. 2014	Nov. 4 – 15 November	13 January – February. 2014
27.	Presentation of results			May 2014		March. 2014
28.	Finalization of reports			June. 2014*		April. 2014*

Notes: Pre-test of survey questionnaire are not included in the timetable. The 2013 CRS used the questionnaire of the last survey for palay (paddy rice) and corn (maize). Pre-test is discussed under the section on Data Collection.

3.3. Administrative and financial matters

It should be noted that the Philippine Statistical System (PSS) goes by the System of Designated Statistics (SDS). SDS is prescribed by Executive Order 352 to serve as a mechanism that identifies and generates the most critical and essential statistics required for social and economic planning and analysis based on approved criteria. It establishes priorities for data production and provides means for more rational resource allocations among government statistical offices. CoP statistics has not been designated yet. Thus, the AgStat system does not have strong bargaining power for regular budgetary support for CRS. This condition largely explains the failure to fully implement the plan of doing annual CRS on a five -year rotational basis, but, the AgStat system has not dropped this plan.

As mentioned earlier, conducting CRS is highly dependent on external financial assistance, which oftentimes comes from DA through different commodity development programmes, the Bureau of Agricultural Research (BAR) and the Bureau of Fisheries and Aquatic Resources (BFAR).

Because the implementation of CRS relies heavily on external funds, administrative and financial considerations are also greater. What is happening is the lead unit, AASID, packages the proposal to be submitted to the funding source (usually, the Department of Agriculture). The timing and amount of external financial support affect the implementation of the technical design of CRS, thus the active communication between PSA-BAS and the funding source. As a matter of practice, all three operating units of AASID actively participate in the implementation of CRS. The expertise of selected staff members from various units of PSA-BAS are also tapped through the Technical Working Group on Accounts and Indicators and the Task Force on CRS.

The Philippine Statistical Authority-Bureau of Agricultural Statistics, through the implementing units, puts in place a control system, which is generally characterized by the following:

1. Observing the schedule of operations;
2. Monitoring the settlement of financial claims, such as travel expenses and, wages of data collectors.

4

Data Collection: Methods and Practices Sample Survey

4.1. Sample survey

4.1.1. Survey design

Integrated or stand-alone survey. Historically and as a matter of practice in the AgStat system, the stand-alone approach has been used to conduct CRS. Over the years, PSA-BAS has been conducting farm economics surveys, which integrate CoP data items to arrive at farm household income and expenditure estimates. However, the sampling and questionnaire designs would only allow generation of total CoP for all farm enterprises and not, by commodity. This is because the unit of observation is the farm household and survey results at the commodity level may not yield the desired degree of reliability. The demand for CoP data is by commodity.

Domain of the survey. The domain of all the surveys on CoP is the province. It means that the CRS should be able to generate CoP estimates for the province with the required level of reliability and statistical representativeness. The choice of domain of the survey or study influences the size and distribution of the sample.

Sampling frame. The most recent CRS for Palay (Paddy Rice) covered 67 of the 81 provinces of the country. The lists of agricultural operators who were successfully interviewed in the Palay and Corn Production Survey (PPS and CPS) were used as the sampling frames. For the July CRS-palay round, the April 2013 PPS data files were reviewed to establish the sampling frame. For the November round, the July 2013 data files were used.

The CRS-Corn (Maize) was conducted in 36 provinces. The sampling frame for the July 2013 Round was established from the data files of CPS April 2013 and those of CPS July 2013 for the September 2013 Round.

The data sets that directly served the purpose of setting up the sampling frame for CRS were obtained from production surveys. The output of this review of data files was the list of palay (paddy rice) and corn (maize) farm operators who had harvests during the survey's reference period. This list was further subjected to screening during the survey operations.

It should be noted that in previous surveys on CoP, all provinces were covered. The sampling frames were the lists of samples of the production surveys.

CRS-High Value Commercial Crops (HVCC) was conducted in top producing provinces for the crop being covered by the survey. To the extent feasible, selection covers the three major island groups of the country, namely Luzon, Visayas and Mindanao. The provinces were identified and listed based on production data from BAS. Reference to data on area harvested and the number of trees from the census on Agriculture was also completed to validate production data. Top-producing municipalities in the identified provinces were listed and correspondingly, the same procedure was done for the *barangays* (villages). Using the key informant approach, farm households engaged in the production of the crop under study were listed and served as the sampling frame for the CRS.

An illustration of the selection of provinces is provided below. This was implemented in the 2014 CRS–Cassava survey. The three major island groups were represented by their top-producing provinces. It should be noted that the province of Leyte in the Visayas was another top producer, but was not included because it was greatly damaged by a typhoon in the latter part of 2013. In this particular case, the six top-producing provinces accounted for about 63 percent of the country's cassava production.

Table 3. Cassava: Average annual production and share in country's production by province, Philippines, 2007-2011

Province	Average Annual Production (mt)	% share in country's production
Luxon		
Camarines Sur	82 991	4.08
Visayas		
Bohol	69 530	3.42
Mindanao		
Lanao del Sur	489 343	24.06
Basilan	235 770	11.59
Bukidnon	233 711	11.49
Sulu	174 545	8.58
Philippines	2 033 514	100

CRS-Hog was conducted in the 20 top producing provinces across 12 regions of the country. These provinces were identified according to the average inventory of hogs over the last three years. The list in the 1997 Agribusiness Directory for Hogs served as the sampling frame for commercial hog raisers. The directory contained information as to the name, address, contact person and total housing capacity of the hog farm. For backyard hog raisers, the top producing municipalities and *barangays* in the selected provinces were listed. The top two (*barangays* in each of the top five producing municipalities were selected at random. Using the key informant approach, a list of backyard raisers was established to serve as the sampling frame.

CRS-Milkfish covered the top four producing provinces in the Philippines. The lists of milkfish producing *barangays* by province which were prepared by the staff in BAS-POCs were used as the sampling frame for the survey. These lists contain data on area devoted to milkfish production and the number of milkfish farm operators by *barangay* as of 2006. These data were obtained from the lists of BAS, BFAR and local government units.

CRS-Tilapia was conducted in the six top producing provinces. The sampling frame used in the survey was based on the results of the Aquaculture Farms Inventory, which was undertaken from 2005 to 2011 in the major producing provinces, namely Pampanga and Camarines Sur in 2005, Batangas and Iloilo in 2007 and South Cotabato and Sultan Kudarat in 2011. The inventory contained information on the name and address of operator, type, area and location of aquaculture farm.

CRS-Seaweeds was done in five provinces, namely Palawan, Bohol, Zamboanga Sibugay, Maguindanao and Tawi-Tawi. These provinces were among the top producing areas in the country. The list of seaweed producing *barangays*, which was established from the results of the Aquaculture Farms Inventory, served as the sampling frame.

The following table illustrates the results of the selection of provinces in CRS – Seaweeds. The representative provinces shared about 64 percent in national production.

Table 4. Seaweeds: annual production and share in the country's production by province, Philippines, 2006

Province	Annual production (MT)	% share in country's production
Luzon Palawan	401 532	26.01
Visayas Bohol	101 273	6.56
Mindanaao Zamboanga Sibugay Maguindanao Tawi-Tawi	 73769 57 719 351 229	 4.77 3.74 22.76
Philippines	1 543 825	100

Sampling Design. The sample palay (paddy rice) and corn (maize) farmers consisted of the "clean" list from the data files of the production survey and the screening done by field interviewers. The "clean" list included only those farm operators who had harvested during the reference period. This process yielded sample sizes of 3,709 farmers for the CRS-Palay (Paddy Rice); and 1,356 farmers for the CRS-Corn (Maize).

The sampling process for CRS-HVCC varied from 5x5x5, to 5x5x2 to 5x4x2. These numbers indicated the number of sample municipalities, *barangays* and farm households in each of the selected provinces. Sample farm households were drawn by means of simple random sampling, a standard probability-based sample design, which is described in the draft Handbook on cost of production. In 2014, PSA-BAS implemented CRS-Cassava and CRS-camote (sweet potato). In the top six producing provinces covered for those two surveys, the top producing *barangays* were selected from the ordered list of *barangays*.

Then, sample farmers were identified in each sample *barangay* using the snowball approach. This selection process is described in greater detail in box 1. The number of sample *barangays* was set at 15, while the number of sample farmers was set at 75 for equal allocation among sample *barangays*. The process yielded a final sample size of 450 farmers by commodity.

For CRS-Hog, a complete enumeration of commercial raisers was completed in provinces where the number of commercial raisers was 10 or less. In other provinces, a single stage stratified random sampling was adopted with total capacity as the stratification variable. Uniform cut-off points were set and three strata were formed as follows: small farms with number of cattle heads comprised between 21 to 99, medium farms between 100 and 999 and large farms above 1000. Correspondingly, sample sizes of 132, 34 and 31 farms were drawn.

The total sample size of 10 farms per province was allocated proportionately to the strata with farms at a minimum of two samples per stratum, whenever applicable. Selection was done through simple random sampling, which resulted in a sample size of 197 commercial hog raisers. Similarly, sample backyard raisers were drawn by means of simple random sampling, which yielded a total sample size of 795.

For CRS-Milkfish, a two-stage sampling design was employed with the *barangay* as the primary sampling unit and the fishpond operator as the secondary and ultimate sampling unit. This multistage sampling procedure is also described in the Handbook and presented as a good practice for selecting statistically representative samples. The *barangay*s were selected using systematic sampling from an ordered list of *barangays* with at least five milkfish farm operators. Sample milkfish farm operators were drawn using the snowball approach, which was implemented during the data collection period. In the search for sample operators, two criteria must be satisfied: the operator was engaged in milkfish culture in fishpond and harvested milkfish in 2006. The total sample size of 100 fishpond operators per province was equally allocated among the 20 sample barangays.

CRS-Tilapia adopted the snowball sampling procedure in the selection of sample farm operators. The data collector started off by selecting names farm operators from a list provided by the PSA-BAS Central Office. This was the first potential sample. Inclusion in the list of samples was dependent on the responses to the screening questions which focused on information on engagement in tilapia culture, harvesting during the reference period and

knowledge about tilapia culture. The next potential sample was a referral from the first respondent or the data collector had the option to revert to the list and choose a name as the next sample operator.

For CRS-Seaweeds, a two-stage sampling design was used. A *barangay* was the primary sampling unit and seaweed farm operator was the secondary sampling unit. Sample *barangays* were drawn through simple random sampling from the list of *barangays* with at least a 90-percent cumulative share in the seaweed harvested area in the province and with more than five operators. Ten *barangays* were selected from each province, except in Maguindanao, which had less than 10 seaweed-producing *barangays* and therefore all the *barangays* were covered.

At the seaweed operator level, the number of samples was proportionately allocated to the number of operators in the sample *barangas*. Sample seaweed farm operators were identified through the snowball sampling approach. The start off point was the list obtained from the village official or a seaweed farmers' association. A set of screening questions was used to pinpoint qualified respondent for the survey. A qualified sample operator was one who was engaged in seaweed culture, with harvest in 2007 and was knowledgeable about seaweed farm operations.

Box 1 Snowball sampling for CRS

Snowball sampling is a special" non-probability method of selecting samples for a survey. It is used when the survey's objective is after very specific characteristics. In CRS, the qualified respondents are those who have completed their production cycles or have harvested during the reference period of the survey. The field interviewer is equipped with the list of farmers/producers and during the survey operations, the interviewer selects a name, locates the potential sample, checks if the potential sample qualifies for the survey (using the screening questions). Whether this first interviewee qualifies, he/she will be asked for a name of next potential sample. If the interviewer fails to get a name, he/she will refer to his/her list. This procedure is applied until the desired sample size is reached.

4.1.2. Unit of observation

An important aspect of planning CRS is the choice for the unit of observation. The decision is motivated by the objective to enhance the accuracy of data collected at the farm level. The unit of observation is the particular commodity covered by CRS (noting that CRS in the Philippine AgStat system is done by commodity). The unit of observation is the commodity, not the whole farm, which can be divided into different activities or enterprises producing different commodities.

There are further details in the case of palay (paddy rice). CRS-Palay covers a "focus" parcel operated or managed by the farmer. The focus parcel is the area where the most recent palay (paddy rice) production cycle took place during the reference period. The size of the focus parcel may be equal to or less than the total palay (paddy rice) area under cultivation by the farmer.

For other crops, the data items collected refer to the area where production occurred during the reference period. This approach applies to livestock and aquaculture CRS surveys.

The approach being used in the Philippines is aligned with the discussion on unit of observation in the Handbook.

4.1.3. Questionnaire design

The design of the survey questionnaire follows the objectives of the study/survey.

The CRS questionnaire asks for a lot of detail on the farmer's operations, and attempts to remain respondent-and interviewer friendly. In practice, they have a structured format, with the same questionnaire used for all respondents. Information that is supposed to validate and enrich the analysis of farm profitability is sought by using close-ended questions (see annex II for an example of the 2013 questionnaire on the 2013 Costs and Returns Survey of Palay Production). Importantly, the questionnaire guarantees confidentiality to respondents for individual responses.

After the questionnaire has been drafted, the project staff normally pre-test the instrument to check for possible errors and areas for improvement, such as question order and flow and wording of questions. The results of the pre-test are then reviewed by the staff for the final draft.

The questionnaire used in the 2013 CRS-Palay had 12 pages consisting of 15 blocks, as listed below:

Block A. Geographical information

Block B. Sample identification

Block C. Basic characteristics of the farm

Block D. Farm investments

Block E. Material inputs

Block F. Labour inputs

Block G. Other production costs

Block H. Production and disposition

Block I. Production – related information

Block J. Marketing – related information

Block K. Access to credit

Block L. Participation in commodity development programme

Block M. Other information (climate change, organic farming, farmers' organization)

Block N. Plans and recommendations

Block O. Interview/survey details

The questionnaire content is generally the same across agricultural commodities, with the main differences found in the details of cost items, such as seeds for palay (paddy rice), seedlings for calamansi and stocking materials (fry or fingerling) for milkfish. There are also some differences in qualitative questions about the farm and farm household, which are requested by the funding office/organization.

The design accounts for joint costs and allocation of common use of inputs by asking the operator/farmer-respondent to allocate by specifying a percentage of use of a particular farm input for the production of the commodity being covered by CRS. Because of the complexity of these questions, extra attention is given to these sections in the manual covering operations (instructions to interviewers) and pre-survey training of field supervisors and data collectors (refer to annex I- questionnaire for.2013 Costs and Returns Survey of Palay Production).

The validation of expenses reported as in-kind and owner supplied is accounted for in the data processing phase and is combined with external data on market prices for inputs and outputs. In limited instances, such as cases in a farmer had

not purchased inputs, the valuation of in-kind acquisitions and owned inputs entails using prices in the sample area.

Reference period and survey operations The latest CRS for Palay and Corn was conducted in 2013. For palay, there was a survey for each of the two cropping seasons. The first survey was conducted in July 2013 to collect data for the most recently completed harvest during the period ending in June 2013, while the second one was conducted in November 2013 to collect data for the last completed harvest carried out from July to November.

For corn, there were two survey iterations; the first one was for the Luzon provinces and the second one was for Visayas and Mindanao provinces.

For crops, other than palay (paddy rice) and corn (maize), the reference period is the most recent cropping cycle for short season crops and the latest completed harvest for permanent crops.

In the fisheries subsector, the CoP programme has considered milkfish (*chanos chanos forsskal*), tilapia (*oreochromis niloticus Linnaeus*) and seaweeds. The last CRS-Milkfish was conducted in November 2006. The reference period of the survey was the last completed production cycle in 2006. CRS-Tilapia was implemented in 2011. The reference period was the last completed production cycle from June 2010 to May 2011. CRS-Seaweed was conducted in 2008 and its reference period was the last completed production cycle in 2007.

For each CRS, the usual number of days allotted for field data collection is 10. But, during this period, other field-based activities are already being carried out. Such activities include review of accomplished survey questionnaires, editing and coding.

4.1.4. Considerations on data collection

Data collection for CRS always uses ***face to face interviews to complete the questionnaires.*** The interview is facilitated by a structured questionnaire in which the field interviewer records/enters the answers of the sample farmer. Depending on administrative, financial and technical conditions, the field interviewer may be a regular staff member of PSA-BAS, or an interviewer specifically hired to perform the data collection or a contractual data collector.

Contractural data collectors move around their respective areas of assigned sample *barangays* with the list of sample farmers (if the samples are pre-drawn)

or number of samples (if the snowball approach for sampling is used). Their point of entry is the residence or office of the *barangay* official for a courtesy call and some briefing about the survey, including request for names of potential farmer-respondents, in the case of snowball sampling.

When the respondent is not available, the CDC schedules a return visit to finish the interview.

Contractural data collectors are made aware of the role of field supervisors, who may come from the provincial, regional and/or central office. These field supervisors are expected to do back checking and/or spot checking of the survey.

4.1.5. Manual of operations and other survey instruments/documents

One important requisite in conducting survey is a manual of operations (ManOps). In the recent series of CRS implemented by PSA-BAS, the ManOps contains the basic background information about the survey, including the objectives and methodology. The major contents are the instructions to the field interviewers. It should be pointed out that the ManOps does not only contain instructions on how to handle the questions, but it also has definitions of concepts used and illustrations of questions and answers for better understanding of the intent of the question. A CRS ManOps usually includes pictures of farm tools, equipment and machineries for easy reference, especially during the survey operations (a copy of the Manual of Operations of the 2013 Costs and Returns Survey for Palay Production is provided along with this case study).

The ManOps is comprehensive in that it contains directions pertaining to the survey operations, namely conducting the pre-survey training, data collection procedures, and post data collection protocols.

Additional guidelines

In addition to the ManOps, field interviewers, supervisors and the rest of the staff in the provincial and regional offices rely on additional guidelines and reminders while survey operations are ongoing. Active exchanges of communication between the field offices and the concerned units in the central office is documented to support agreements or resolve issues that are discovered during data collection. The issues are not necessarily only about

sampling, interviewing and other technical matters, but they can be administrative or financial-related as well.

4.1.6. Quality control

To ensure quality results from the survey operations, specific quality control mechanisms are put into place.

Pre-survey training

There are three levels of training prior to field data collection. The first is training for the central office staff members who are involved in the different stages of CRS. The topics for the project team training are:

- Survey design;
- Questionnaire design;
- Methods/procedures in data collection;
- Editing guidelines;
- Other administrative and financial concerns.

The second level of training is aimed at staff in the regional and provincial offices where a particular CRS will be conducted. The trainers are staff from central office. The third level of training is aimed at the field interviewers or CDCs. At this level, a detailed discussion of the questionnaire takes place. However, in cases in which CRS adopts the snowball approach in sampling, this would be very time-consuming, as CDCs would be doing the sampling of farmers. An interesting aspect of this training is the conducting of a mock interview, which serves as an exercise in handling the questions. Administrative matters are also discussed. Apart from the mock interview, CDCs are asked to go through a dry run of data collection. After all those activities/topics have been carried out, field supervisors and CDCs meet to clear issues observed during the exercises and to finalize plans for the survey operations. The resource persons at this level are the heads of the regional and provincial offices. The central office staff members cover selected areas to assist in the conducting of pre-survey training and the start of data collection.

Supervision of survey operation

The field supervisor does back checking of the survey operations; this is especially encouraged during the initial stage of data collection. Back checking

requires that the field supervisor contact the respondent to be interviewed again for a part or in some cases the entire questionnaire. Field supervisors also spot check the coverage and interviews completed by the CDC. Notably, CDCs are not aware the date of their supervisors' visits.

Record of visits

The field interviewer is instructed to use the list of sample farmers in recording the results of the visit to the samples. The record shows any problems in sampling and/or problems with the interviewer. If the record of results is not encouraging, the supervisor should be notified about it immediately. The record is used as a basis for reporting the response rate

Review of accomplished questionnaire

The field interviewer is tasked with inspecting the data reported on the survey questionnaire to correct errors, complete responses, clarify responses and check for inconsistencies. The process is known as field editing. Field supervisors are also instructed to do some field editing. This gives them the chance to determine the quality of the work carried out by the field interviewer.

4.2. The Farm Record Keeping Project

The Bureau of Agricultural Statistics and its forerunner, (BAEcon are experienced in implementing what is commonly known as the Farm Record Keeping Project (FRKP). The implementation period of the most recent project has just ended in 2014. FRKP intends to enhance the capacity of farmers and farmers' organizations to generate, analyse and utilize farm-level data in making decisions regarding their production, marketing and other farm enterprise-related concerns. As the project implementer, BAS leads the following activities:

I. Training of farmers on farm recording;
II. Development of programmes for processing and generating data tables;
III. Provision of computer facilities and installation of software;
IV. Training of staff of farmers' organization and BAS staff in the project sites on recording, processing, analysis and utilization of data;
V. Conducting regular meetings/workshops with farmers.

4.2.1. Recording form

The form (annex recording of farm operations and expenses) used in FRKP is seven pages; the last two pages are used for the recording farm operating expenses. The first five pages contain data on geographic matters, the farm and farmers details and the composition of farm investments. The forms are translated into local dialects to make it easier for farmers to use.

4.2.2. Manual of operations

The completion of the recording form by farmer-cooperators is facilitated by the Guidelines in Accomplishing the Recording of Farm Operations and Expenses. This document gives instructions for completing form, defines terms and concepts, and illustrates computations to derive required indicators, providing examples when needed.

4.3. Updating the cost of production data

The Costs Return Survey estimates are updated annually based on established assumptions and procedures in response to the demand for current and timely CoP data. While the "grand" plan is to conduct a regular survey at least every two years for the staple crops, namely palay (paddy rice) and corn (maize), and every five (5) years for other agricultural commodities, this has not been fully realized because of financial constraints.

4.3.1. Use of secondary data

Most of the data being used for updating CoP are internally produced. Consequently, updating the data is relatively easy. Data that are sourced outside the Bureau include the consumer price index from NSO. Some research and checking with the Land Bank of the Philippines (LBP) and Bangko Sentral ng Pilipinas (BSP) are also consulted in the process to update coefficients.

4.3.2. Guidelines for updating

The general guidelines for producing updated estimates are outlined in the table below. It should be noted that updating procedures are constantly reviewed and improved.

Table 5. Assumption or basis for updating each cost item in the cost of production in agriculture, Philippines

1. Cost of seeds/planting materials/stocking materials (cash or non-cash)	Movement of producer price
2. Irrigation fee	Movement of producer price
3. Lease rental-crops Milkfish	Movement of producer price, movement of fishpond lease agreement (FLA) (FLA)
4. Rental value of owned land crops/milkfish	Movement of producer price/movement of FLA rate
5. Landlord's share	Movement of producer price
6. Harvester's/ thresher's/sheller's share	Movement of gross value of production/hectare
7. Cost of fertilizer	Quantity used based on latest CRS and retail price of urea from Weekly Price Survey
8. Cost of pesticide Solid, Liquid	Movement of retail price of pesticide, quantity used based on latest CRS and price paid for pesticide from the Monthly Farm Price Survey
9. Soil ameliorants and other inputs	Movement of retail price of fertilizer
10. Cost of mulching materials	Movement of retail price of fertilizer
11. Labour cost (hired, operator, family & exchange)	Number of man-days based on latest CRS & current agricultural wage rate
12. Rentals (tools, equipment, machine, animals)	Movement of agricultural wage rate
13. Food cost	Movement of CPI-food

14. Transport cost	Movement of CPI-transport
15. Fuel & oil	Movement of CPI-fuel & oil
16. Repair cost	Movement of CPI-minor repairs
17. Electricity cost	Movement of CPI – light
18. Interest on crop loan	Increase of 10% per annum
19. Other production costs	Movement of CPI-all items
20. Depreciation cost	Increase of 10% per annum
21. Interest on operating capital	Average lending rate (obtained from Bangko Sentral ng Pilipinas)
22. Land tax	Increase of 1% per annum
23. Licence/permit –milkfish	Movement of FLA rate

Notes:

- Data on producer prices of crops and livestock commodities are sourced internally at PSA-BAS through its monthly Farm Prices Survey (FPS).
- Data related to fishpond lease agreement are sourced from BFAR.
- Data on gross value of production by commodity are available at PSA-BAS. Valuation of production at current and constant prices is a key component of the reporting system on the performance of Agriculture.
- The Philippine Statistics Association-Bureau of Agriculture Statistics conducts a weekly survey of prices of cereals and fertilizer to monitor price movements.
- Assumptions are reviewed against available information on recent developments.
- It should be noted that every issue of the report on updated CoP contains the assumption and/or basis for updating each cost item for information and guidance of data users.

Abbreviations: CPI, consumer price index; FLA, fishpond lease agreement

5

Data Processing and Estimation: Methods and Practices

5.1. Data editing and coding

Editing is the process of checking whether a reported value is acceptable based on the criteria, such as consistency with other data items and plausible data ranges. Coding is defined as transforming particular data items into codes according to statistical standards and classifications. Editing and coding operations are undertaken in preparation for the production of survey estimates.

Following the operations timetable, editing and coding of entries or responses recorded in the survey questionnaire are carried out a few days after the initial round of interviews or data collection. Those activities are amply guided by examples and illustrations in the ManOps. In practice, codes for most items that require coding are already integrated into the interview schedule, but, as always emphasized during the pre-survey training, field interviewers must check if the coding has been done properly. Coding is also done during the editing stage when some basic computations of the entries/responses in the survey questionnaires are completed in order not to disrupt the process of interviewing. These activities are expected to be accomplished a few days after the completion of data collection.

Apart from the editing and coding instructions, which are contained in the ManOps, there is another relevant document entitled “Editing Guidelines”, which is comprised of three major parts/sections, as follows:

1. General instructions;
2. Editing instructions;
3. Coding instructions.

As expected, the editing instructions account for the largest part of the Guidelines. The introductory part of the Guidelines is about general instructions to the editor on how to handle editing the whole questionnaire. The specific

instructions present the questionnaire blocks (or sections) and details for the procedure to check the entry/response for every question item.

Coding entails grouping the responses to a question into categories and assigning numbers, characters, or symbols called codes in those categories. It serves as a means to facilitate the management of files, including data analysis using computer software, such as MSExcel and SAS. Regarding the CRS questionnaire, coding requirements cover only a few question items, as listed below:

1. Level of education;
2. Main occupation;
3. Material inputs;
4. Other production costs;
5. Production and disposition.

5.2. Data encoding

The encoding of edited and coded questionnaires is carried out in the field offices. Customized programmes based on CSPro are developed in the central office by the Processing Group. On a selective basis, central office staff members visit field offices to extend technical assistance in the process of encoding. This activity begins a few days after the first round of editing and coding. The schedule of field operations is such that some overlapping of the three activities, data collection, editing and coding, and data encoding, is necessary.

Given the schedule and area of survey operations, field interviewers are instructed to report to the provincial office/operations centre to submit the completed survey questionnaires. Encoding is implemented by batches.

After data encoding, data are subjected to further data cleaning using an automated editing programme. The programme is designed to spot errors for correction. Once cleaned, the data files are then forwarded to the central office. In practice, the lead implementing unit at the central office, the Analysis Group, reruns the editing programme for some validation and confirmation of the results of data cleaning at the field offices.

5.3. Generation of estimates

Normally, the Processing Group (or the Systems Development and Operations Section of PSA-BAS) develops the processing programmes for generating the estimates. This process is guided by dummy output tables and technical notes prepared by the Analysis Group (or the Socio – Economic Statistics Section of PSA-BAS). However, recent developments, such as the availability of more ICT facilities and the presence of ICT "experts" at the Analysis Group work station have encouraged the CRS lead implementing unit to take on the task of generating the estimates using the MSExcel programme.

For the relatively large-scale surveys on CoP, namely CRS-Palay (Paddy Rice) and Corn (Maize), the generation of estimates at all levels (provincial, regional and national) is done at the central office, while the small-scale surveys in which coverage is limited to the top-producing provinces of the country, the generation of estimates for each of the sample provinces is done in the provincial office.

Under circumstances when all stages of data processing, including the generation of estimates is undertaken in the field office, rigid training or orientation of concerned field staff is required. It should be noted that each provincial office has a designated provincial processing officer (PPO). Each PPO is instructed to attend the training, which is facilitated by data processing and analysis groups of the central office.

5.4. Quality control system

Under the AgStat system, CoP data generation is a relatively complicated statistical process, thus, considerable attention is put into checking the data items in the questionnaire until they are encoded for the generation of estimates/data tables. Error listing is an effective and efficient way to protect the quality of data inputs used to generate estimates. In addition, there is active consultation between the central units/staff, particularly those involved in data processing and analysis, with the concerned field offices. Documentation of observations and comments is required. This report is made available as a reference in the data review.

6

Data Review and Analysis: Methods and Practices

6.1. Discussion of survey results

The "largest" CRS is for palay (paddy rice) from which about 200 data tables are generated. For other commodities, the number of data tables generated is less than 100. The CoP estimates contained in the data tables are subject to review and validation by the Analysis Group. During this stage, the group holds discussions and comes to an agreement on the estimates, particularly, on the acceptability and consistency of the estimates.

For small-scale surveys, data processing at the field offices extends to generation of estimates. Data review, *especially* the data tables on CoP is carried out in the field office. Results are then submitted to the central office where a second round of review takes place.

During the data review, access to relevant reference materials, including earlier data series on CoP, input prices, volume of production and commodity prices is given to the staff to enable them to validate survey results with historical and current conditions related to the commodity under study.

6.2. Presentation of estimates

The presentation of estimates from CRS is considered a milestone in the AgStat system. The results inform the project staff of the next course of action. There are both data tables that can be considered final as well as some that require additional research.

While the presentation accounts for the data generated by the survey, its main focus is the data set costs and returns. To facilitate the presentation and discussion of the estimates, participants are provided material in advance of the meeting. Officials representing PSA-BAS, selected staff from the technical and support divisions and members of the Project Team and Technical Working Group on Accounts and Indicators attend the presentations.

Even though the certification of the data tables has not been finalized, the data analysis unit begins to draft the written report.

6.3. Data analysis

Under the existing CoP Statistical Program at PSA-BAS, the estimation and analysis of costs and returns data make use of simple accounting procedures. This approach is simple, but needs to be broken down in detail by accounts.

Estimates of costs and returns of production are presented and analysed on a per hectare of farm basis (farm used in the production of the subject commodity) Analysis based on per kilogram of output is also done in some reports Averages, ratios and proportions are used to characterize the farmers' operations, including allocation behaviour in terms of cost distribution. Farm performance is analysed based on the following indicators:

- Returns above cash costs;
- Returns above cash and non-cash costs;
- Gross and net returns;
- Profit-cost ratio;
- Returns above variable costs or operating profit;
- Benefit-cost ratio.

6.4. Quality control system

The proceedings during the discussion of survey results and the presentation of estimates are documented. The documentation is used to guide the Analysis Group in revising (if necessary) and finalizing data tables as the Group moves forward in preparing the statistical report. Notably, at this stage of data review and analysis, the major concern of the CRS project staff is the quality of data, particularly, in terms of consistency or coherence, accuracy and precision.

7

Generation and Dissemination of Reports

7.1. Cost of production reports based on survey results

Palay (paddy rice) and corn (maize).

Owing to the characteristics of these crops and their critical role in the country's economy, generating reports on them involves a more complicated or detailed preparation than for other commodities. The CRS-Palay (Paddy Rice) and Corn (Maize) allows data analysis and reporting of CoP by various types and levels of disaggregation. The CoP report released by PSA-BAS contains data disaggregation by type of farm and by cropping season. Importantly, the reports have national, regional and provincial levels of disaggregation.

To give an idea of what the CRS–Palay and Corn report offers, the report's table of contents and the list of tables are presented in annexes II and III.

Meeting the planned schedule of report dissemination for the most recent CRS has been problematic. The dissemination of the report was originally set at six months after submission of data files to the central office. The problems are related to delays in data processing and the subsequent delays in the next stages of the data system. Inadequate personnel support was noted. Some technical issues also cropped up when field offices were tasked with carrying out different phases of data processing and data review (field offices are very familiar with these activities, but, for production and price surveys, which are comparatively simpler and shorter in data coverage). Also hindering the process is the implementation of the planned CRS for other crops. All these factors have contributed to the delays.

Other commodities

The geographical coverage of CRS for other commodities is understandably smaller compared with palay (paddy rice) and corn (maize). Normally, the last completed production cycle serves as the reference period. The analysis and

report writing are easier to handle, noting that, as mentioned earlier, on the average, the CRS generates about a hundred data tables.

7.2. Costs of production reports based on updating

The Philippine Statistics Authority-Bureau of Agricultural Statistics is committed to make available data on production costs and returns of selected agricultural commodities. Even in the absence of a CRS, an annual CoP report is prepared and published. The report is comprised of two volumes; the first volume is the updated costs and returns of palay (paddy rice) and corn (maize) and the second one is the updated costs and returns of all other commodities with survey-based benchmark data. Annex II presents the report's table of contents.

7.3. Costs of Production databases

As mentioned earlier, the data tables on costs and returns are compiled for uploading into the CountrySTAT. PSA-BAS developed and continues to maintain the data series on CoP data users. Researchers can access data series from 2001 to 2013 from the CountrySTAT Philippines. However, they can also request data series for years prior to 2001 and for other data related to CoP. The ICT and Analysis Groups will respond accordingly.

7.4. Microdata files from Costs and Returns Surveys

Before the introduction of BEANS, PSA-BAS dealt with requests for microdata files by requesting data users to specify the needed variables. These data items were then retrieved from the encoded data. The process takes some time from both the researcher and PSA-BAS. In recognition of this, PSA-BAS is aligning its processes to address these demands using BEANS.

The Philippine Statistics Authority-National Statistical Coordination Board, in recognition of the critical role of microdata files in promoting the use of statistics, has drawn and approved a resolution requiring statistical offices to make microdata files available six months after the statistical report from a particular survey and other statistical activities have been released/published. About four years into BEANS, PSA-BAS has yet to keep up with the desired calendar, particularly for "big" surveys, such as CRS. However, PSA-BAS still responds to request for microdata files outside BEANS.

7.5. The Farm Record Keeping project results

A critical component of FRKP is the provision of ICT hardware and software facilities to cooperating farmers' associations. A complete processing programme has been developed and downloaded to the farmers' association. The association staff has been trained in the use of those programmes. The farmers' records can be easily processed to generate costs and returns estimates. It should be mentioned that a feature of the consultative sessions is the training of farmer-cooperators in analysing and interpreting the costs and returns data. Similar to the data tables produced from CRS and the updated CoP, the generation of costs and returns follows simple accounting procedure.

The costs and returns estimates from the farmers' records are their personal data and consequently are not used in the publication programme of PSA-BAS. They are used as reference material in validating agricultural statistics, including costs and returns. In the course of project implementation, various documents are prepared to serve as references in project monitoring and evaluation. These are not published, but, instead are being made available to project cooperators and beneficiaries, as well as to interested researchers.

7.6. Quality control system

The reports based on survey results or on updated costs and returns usually undergo at least three levels of review before they are given approval the Office of National Statistician for release by uploading to the PSA website and printing for publication. The approval comes from the Office of the Director.

The Costs Return Survey has yet to be designated. The Advance Release Calendar (ARC), which was put in place through an executive order, discloses to the units/staff involved in the preparation, generation and release of reports, including databases and microdata files the schedules for the release of those reports. Failure to meet the schedule, per ARC, is a count against the performance of the concerned unit/staff. The Information Dissemination Services Section of PSA-BAS monitors compliance with ARC. Recent developments show that the CRS-Palay and Corn reports have failed to meet ARC. The lead unit has explained its predicament, resulting in some leeway in meeting the schedule set for CRS –Palay and Corn release. In the case of CRS–Cassava and Sweet Potato, the schedule of release has been met.

8

Challenges and Areas for Enhancing the CoP Statistical Program

8.1. Revisiting the CoP Statistical Program

In the course of preparing this case study, one idea that springs to mind is the need to revisit the CoP Statistical Program with a new perspective. This means expanding the horizon of statistical services and going beyond addressing the data requirements of the Department of Agriculture (DA) and local stakeholders. Years ago, this may not have seemed feasible, but recent developments at the national and international levels should lead the AgStat system to take a more serious look at the current state of the CoP Statistical Program.

At the national level, one significant development is the creation of PSA, which essentially integrated the statistical offices in the country. The merging of NSO, which is a provider of sample frames for CRS and NSCB, which is a user of the CoP data and BAS, which runs the CoP Statistical Program, makes it easier to facilitate the task of enhancing the programme. A key word in the Action Plan for the Global Strategy to Improve Agricultural and Rural Statistics is integration of AgStat in the national statistical system and this seems more doable under PSA.

8.2. Designation of cost of production of statistics

Among the priority concerns for the CoP Statistical Program is the designation of CoP statistics, which can serve as a vehicle for obtaining regular and adequate allocation of resources. Designation does not come easy, thus, it remains a challenge to the AgStat system. The request for designation should account for issues about commodity coverage, frequency, data disaggregation and cooperation between the PSA and possible data sources. Again, the creation of PSA may pave the way towards the desired designation.

8.3. Compliance and support to the international reporting system

This case study covers the history and evolution of the CoP Statistical Program in the Philippines. The features of the existing data system are analytically compared with the best and alternative approaches presented in the draft CoP Handbook. By and large, the CoP data system in the Philippines complies with and supports the recommendations set forth by the Handbook, but, still, there are areas that need some modifications/adjustments. An example is the treatment of pre-productive costs in the CoP data system.

For purposes of international reporting for better global comparisons, the Philippine CoP Statistical Program should consider the cost categories used in the Handbook. This should not pose any problem as all cost items are accounted for. Instead, the modification can be treated as another classification and may prove to be useful to the clients and stakeholders of the AgStat, locally and globally. However, this should not mean discarding the current approaches in presenting costs and returns by commodity, but, it would be more of adding a new dimension in data analysis and reporting in CoP.

8.4. Maintenance and Expansion of the Farm Record Keeping Project

The Philippine Statistics Authority- Bureau of Agricultural Statistics and its predecessor, the Bureau of Agricultural Economics (BAEcon), have extensive experience in implementing FRKP. The project, which has been supported by foreign funding, is inherently designed as an extended information service to the farmers. Experience and records about the project highlight its usefulness to the farmers, farmers' associations and the agriculture sector, in general.

With the proposed revisiting of the CoP Statistical Program, attention should be placed on coming up with a future plan for FRKP. Among the options is establishing an agreement with farmers 'association and concerned local and national government units for the maintenance of the project.

Annex I

Summary of information on commodities covered by Costs and Returns Surveys, Philippines, 1991-2014

Reference year	Survey year	Commodity	Geographical scope	Publication of report
2013	2014	Cassava Sweet potato	Selected producing provinces; national and provincial estimates	2014
2013	2013		All producing provinces; national, regional and provincial estimates	2014
2013	2013	Garlic Onion	Selected producing provinces; national and provincial estimates	2014
2011	2011	Tilapia	Selected provinces; national and provincial estimates	2011
2009	2009	Palay (paddy rice)Corn (maize)	All producing provinces; national, regional and provincial estimates	2011
2007	2008	Seaweeds	Selected producing provinces; national and provincial estimates	2009
2006	2006	Garlic Onion Milkfish	Selected producing provinces; national and provincial estimates	2007

2005	2005	Palay (paddy rice)	Selected provinces; national and provincial estimates	2006
2002	2002	Palay (paddy rice) Corn (maize)	All producing provinces; national, regional and provincial estimates	2004
2002	2002	Garlic Onion	Selected producing provinces; national and provincial estimates	2003
2001	2001	Milkfish Tilapia	Selected producing provinces	2003
1998	1999	Papaya Pineapple Watermelon Ampalaya String beans Hog	Selected producing provinces; national and provincial estimates	2000
1998	1998	Eggplant Tomato	Selected provinces; national and provincial estimates	2000 1999
1998	1999	Cassava	Selected provinces; national and provincial estimates	1999
1997	1997	Pili Mongo Peanut Garlic Onion Sweet potato	Selected provinces; national and provincial estimates	1998

1997	1998	Coffee Calamansi	Selected provinces; national and provincial estimates	1999
1996	1996	Mango Cashew Cabbage Carrot Cauliflower Habitchuelas White potato Cut flowers	Selected provinces; national and provincial estimates	1998
1996	1997	Durian	Selected provinces; national and provincial estimates	1998
1991	1992	Palay (Paddy rice) Corn (maize)	All producing provinces; national , regional and provincial estimates	1993

Annex II

Table of contents of CRS- Palay 2013 Report

Annex III

List of tables on the CRS-Palay 2013 Report

Annex IV

Table of contents of the updated costs and returns report

Case Study 3:

A Pilot Study in Tunisia Focusing on the Process for Designing Cost of Production Questionnaires

(Nancy Morgan and Aicha Mechri)

1
Introduction and Objectives

Information on production costs is essential for policymakers, farmers and the different actors involved in agricultural products value chains. For policymakers, information on the cost of production (CoP) contributes towards better targeting and efficiency when implementing agricultural policy instruments, such as subsidies and price fixing. In countries where policies aim to regulate agricultural markets by addressing market failures, access to high quality data on farm production costs is crucial for: (1) designing and implementing these instruments (such as subsidies); or (2) engaging in informed dialogue and negotiation about administered prices with the relevant stakeholders. Reliable and accurate data on production costs can be used to understand the impact of new policies and regulations on the level of production, productivity and utilization of productive resources.

In most developing countries, subsistence farming and livelihood systems often dominate agriculture. An understanding of the cost structure of different types of agricultural operations can translate into policies that generate equitable and targeted income distribution, improved food security/poverty reduction, and more effective on-farm investment.

At the farm level, input costs and product prices determine the structure of production, the distribution of inputs and production technology. Price changes affect the allocation of productive resources with the aim of achieving increased efficiency and competitiveness. Knowledge of costs, therefore, paves the way to better understand and evaluate the performance of a farm and its "benchmarking" with other farms in the same area with similar physical and agronomic characteristics. It also allows for a better focusing of extension support.

Finally, the sectors that provide agricultural services (financial institutions, equipment manufacturers and agricultural input companies, processors and traders in food processing) also benefit from access to information on production costs. Reliable data on costs and returns results in more accurate assessments of financial risks as, well as better conditions of supply and supply factors in specific product markets. Access to accurate and reliable information on CoP hinge on the existence of a well-organized data collection system,

supported by good estimation methodologies, strong analytical capabilities and an efficient dissemination system.

In Tunisia, the system currently in place, despite its relative development in terms of institutions, resources and amount of information collected, only partially meets the needs of the CoP users. Because of the priority placed on good CoP data, the Government requested the Food and Agriculture Organization of the United Nations (FAO) to commission a study to review options for improving the existing system. This study (Karray 2014) entitled "The national estimates of agricultural production costs information system in Tunisia" highlighted some weaknesses of the current mechanisms to estimate CoP of agricultural products.

Those weaknesses were the following:

- The diversity and dispersion of national institutions responsible for the estimation of the production costs;
- Lack of harmonized approaches and methods across these institutions;
- Lack of farm typologies based on the structure and performance criteria;
- Lack of data on input prices and information on the opportunity cost of land, labour and capital, which may lead to the adoption of normative approaches to estimate production costs, which would result in reconstituted costs that fail to reveal the reality of production systems;
- The limited ability to disseminate, analyse and use the results of the production costs.

The context and objectives of this pilot cost of production study

Given that the priority focus is on improving production costs related to agricultural policies, policymakers in the Ministry of Agriculture in Tunisia confirmed the need to improve the current national statistical information system to ensure access to accurate estimates of CoP. A particular focus was to review comprehensive approaches, harmonize methods for their estimations and adapt cost-effective options for collecting representative costs that better inform policy and investment.

Within the ongoing work of the Global Strategy on CoP and the design of the Handbook on agricultural cost of production statistics, it was suggested that Tunisia be included as one of three country-specific case studies to be carried out to test the validity of CoP data collection strategies. The objectives of these three case studies, involving Tunisia, the Philippines and Colombia, are to

support and illustrate real country issues in the methodological handbook (see bibliography). In particular, the proposed pilot study in Tunisia aimed, through a consultative and participatory process, to:

i. Review the current CoP system in Tunisia for major agricultural products, identify key priority uses for these data and explore user's perceptions of the data;
ii. Develop, based on stakeholder's consensus of priority products, and validate CoP questionnaires for two products of interest, starting from existing surveys, engaging in dialogue with statistical/commodity experts (both national and international) and drawing on methodological recommendations from the CoP Handbook;
iii. Discuss implementation modalities for survey data collection, such as launching specific commodity specific CoP questionnaires versus introducing questions into a separate Farm Survey Questionnaire or appending CoP questions into ongoing surveys.

These activities were conducted in close collaboration with members of the FAO Subregional Office for North Africa (SNE, Tunis) and Statistics Division (ESS, Rome), the various branches of the Ministry of Agriculture involved in the field of production costs and agricultural producer organizations. The modalities for engagement included: (1) stakeholder meetings, involving approximately 50 experts from 20 Tunisian institutions involved in production or use of CoP data; (2) the use of innovative means of assessing data availability and needs, such as an online Survey Monkey completed by more than 50 experts; (3) a technical validation process/survey review after testing the questionnaires in the field with support by Government departments and expert enumerators.

One of the broader objectives of this initial pilot is to launch an experimental approach to build a CoP data collection system in Tunisia that pilots a hybrid and cost-effective approach to CoP data collection. A subregional workshop on CoP methodologies revealed the interest of countries in the Maghreb to share the lessons of this Tunisian initiative, upscaling best practices in the region with the objective to do the following:

- Identify the elements of a cost-effective CoP system: structure, functioning and data analytical/dissemination structure.
- Implement a pilot project in Tunisia under the tutelage of the recently reconvened National Commission of Cost of Production to improve this system. Under this project, a hybrid approach that aims to identify

"typical farms" through a sound statistical process has been proposed. This set of typical farms will focus on the products of interest and will be regularly monitored to assess changes in production characteristics, prices and costs. This monitoring system is known as local observatories for agricultural cost of production.

- Results will be shared in the subregion with the objective to upscale best practices. Communication tools developed to share regional experiences include a D-group[8] on CoP, which regroups approximately 100 experts throughout the region.

Finally, the Tunisian pilot and its improved CoP surveys and implementation mechanisms will also generate regional dialogue on the following:

- The construction of farm typologies, which will subsequently lead to the establishment of local observatories;
- The role of observatories is improving not only with regard to the estimation of the production costs but also in proposing cost-effective mechanisms for ensuring sustainable statistical systems and transparent institutional systems that are relevant for all stakeholders.

This report is organized in two parts. The first part provides an overview of the current national system in Tunisia for estimating production costs. The second part contains a description of the process in choosing the commodities of interest and the design and validation of the questionnaires.

[8] D-groups are exchange platforms designed to foster and facilitate exchanges between teams, groups or organizations through the provision of appropriate tools and services. Free of charge and adapted to low-bandwidth internet connections, this platform is particularly adapted to developing countries.

2

A Review of the Agricultural Cost of Production System in Tunisia

The system for agricultural statistics in Tunisia is relatively well developed in terms of institutions involved in the data collection and the type and quality of information collected. However, this system only partially meets the needs for statistical information for the formulation and implementation of agricultural policies (Serghini 2013; Karray 2014). This is particularly true with regard to CoP estimates.

Several departments within the Ministry of Agriculture, as well as several professional organizations have developed their own systems for data collection, which, according to their responsibilities and needs, feeds into differing estimates of CoP. This has resulted in a variety of estimates characterized by a diversity of data sources, data collection methods and computation approaches, which feed into the analysis and dissemination of these statistics.

2.1. Who does what related to agricultural statistics in Tunisia

Table 1 shows the main structures involved in the compilation of statistics in Tunisia and the main statistical activities undertaken by those structures.

Table 1. National system of agricultural statistics

Structure/department	Main statistical 0perations
Directorate of Statistics and Economic Outlook (DSCEA) within the General Directorate of Studies and Agricultural Development (DGEDA) -Ministry of Agriculture Public statistical hub in charge of collecting, processing, analysing and disseminating statistical information at the central level	**10 year farm structure survey** **Annual surveys** Crop monitoring survey, grain yield survey, seasonal and off season potato surveys, seasonal tomato survey, olive oil survey, survey of oases, irrigated areas survey. **Non-regular surveys** Cereal marketing survey (2005) Feed supply survey (2002) Survey of livestock production parameters (1996) **Methodological support to other structures** General Census for fishery through the Fisheries General Directorate (2003) Citrus census undertaken by the Interprofessional Group of Fruit stakeholders (2002) Industrial poultry production census conducted with the Interprofessional Poultry Group. (1986)
The Departments of Studies and Agricultural Statistics, that depend on the regional offices for agricultural development	Collecting sample-based information Data entry and cleaning Monitoring data entry errors to ensure the coherence of the statistics
General Directorate of Agricultural Production, – Ministry of Agriculture	Production cost estimates for different agricultural products (except grains, which is managed by the Directorate of Statistics and Economic Outlook Compile expert estimates of production costs for commodities not estimated by the Directorate of Statistics and Economic Outlook.
General Directorate of Forestry	Inventories of forestry and pastoral areas using a geographic information system (GIS)

General Directorate of Fishery	Fishery general census: information on fishing fleet , the maritime population, employment, the types of fish at ports, transport, collection, retail outlets, storage, and service cooperatives
Cereals Office	Database of all producers who deliver grain to collection centres (ID numbers are registered along with the quantities supplied and the value of the deliveries) Data collection on official market transactions, industrial processing, the levels of the official grain stocks, marketing and imports of cereal
Livestock and Pasture Office	Drawing on a database of tagged beef animals, the following data are estimated and feed into national statistics: • Cattle and sheep number by race and type; in addition numbers are estimated for goats, camels and inventory are undertaken for bees and rabbit farms; • Slaughterhouse production figures for, among others meat; other sources for milk, egg and honey. • The production costs per animal production system (milk and meat) are monitored as part of a monitoring program of 200 small and medium-sized farming units; •Live weight price of animals
Interprofessional Group for Red Meat and Dairy	Information on milk collection and processing as well as milk prices. Estimates of production of red meat derived from estimated livestock numbers and controlled slaughtering (from the abattoirs)
Interprofessional Group for Vegetables	Databases are maintained of selected horticulture farms and export prices are collected. Statistics on the collection and stocks of some strategic products, such as potatoes Information on acreage planted, horticulture production and prices and inputs (data from the wholesale market at Bir Kassaa).

Interprofessional Group of Poultry and Rabbit Products (GIPAC)	A comprehensive GIS database of all industrial breeders (location of establishments and estimates of livestock production parameters)
Interprofessional Group of Fruits	Wine: a GIS database covers 3,500 wine grape farmers and 2,100 table grape farmers, which includes data on all parcels, grapes, area, topography, crop management, acreage, AOC classification, operator and owner as well as the use of family labour. Citrus: geo-referenced information collected on citrus area, types of varieties by age group, number of trees, soil type, equipment, size and frequency, types of irrigation, fertilizer types and application, the health of the trees and type of phytosanitary treatment applied, type of weeding and uprooting methods and reasons for uprooting. GIS system for date production: in the process of being developed.

In addition to the institutions mentioned above, other departments within the Ministry of Agriculture, as well as other technical institutions, scientific and research centres and professional organizations also estimate CoP based on a variety of data collection approaches. These structures are typically involved in analysing the data for a variety of studies. These multiple estimates complicate the work of the various sectoral committees and are often a source of debate among government organizations.

DGEDA/DSCEA are the most prominent organizations with respect to data collection systems, as they are in charge of the most important annual surveys, which often have multiple objectives. This is particularly true of the Crop Monitoring Survey to which a series of specific surveys are appended, as shown in the table 2.

Table 2. Surveys of agricultural statistics carried out by the DGEDA / DSCEA

Surveys		Scope of the survey	Undertaking period
Year Crop Monitoring Survey	1st survey	Land use at the beginning of the season	January – March
	2nd survey	Update on planted and harvest areas. Estimating livestock inventories (cattle, sheep and goats)	March – April
	3rd survey	Agricultural labour estimates	July – August
Irrigated Area Survey		Estimated acreage of irrigated and potentially irrigated crops, based on the irrigation method	July – August
		Estimated crop intensification and land use	
Cereal Survey		Estimation of grain production by objective measurement	May – July
Olive Oil Survey		Estimated production of olive oil by objective measurement	November – January
Oasis Survey		Date production estimation	September – December
Seasonal tomato production		Estimation of production, area and yield	July – August
Seasonal potato production		Estimation of production, area and yield	June – July
Late Apple survey		Estimation of production, area and yield	November – January

Source DGEDA, 2014.

These surveys compile a significant amount of information related to land use, yields and agricultural production and can provide some basic information which feeds into estimates of cost of production, but mostly through normative approaches.

2.2. Institutional structure supporting cost of production data collection, estimation and analysis

Since 2001, the General Directorate of Agricultural Production (DGPA) has been the institution structure officially tasked with for estimating and monitoring the production costs of all agricultural products. However, several other structures, as pointed out, have developed their own approach for estimating CoP. Of note and of particular concern is the diversity of approaches, methods of data collection and methodologies for calculating those costs. Dissemination of the related information is sporadic and challenged by the absence of a national coordinating structure, which could serve as the unique and official reference point for national cost estimates.

Karray (2014) highlighted the multiplicity and dispersion of stakeholders involved in the collection of data feeding into the calculation of production costs. Additional challenges are the absence of national training and a development programme for the conceptual and methodological knowledge on production costs, a system for national dialogue, and exchange and sharing of knowledge between different structures. These gaps have exacerbated the use of heterogeneous methods, different data collection processes and the lack of consistency in underlying assumptions.

Moreover, other weaknesses characterize those national cost estimation processes. Of particular, the lack of the following are noted:

- Human and logistical resources at the regional and central levels;
- Manuals, models and supportive software to facilitate the estimation of the production costs for different agricultural products;
- Limited information and restricted dissemination of CoP estimates, which constrain use of this information by users.

At the operational level, as highlighted earlier, several governmental and professional structures are involved in estimating agricultural production costs. Their structures, areas of intervention and approaches used for the calculation of production costs are reviewed in the following section.

The national average cost of production of agricultural products estimated by the General Directorate of Agricultural Production

The General Directorate of Agricultural Production estimates CoP of several products, including, among them, olive oil and table olives, various fruits (apples, citrus, dates), fishery products, vegetable crops (tomatoes, potatoes and others as required by decision-makers) and livestock products (milk, red meat, white meat and eggs).

The estimates are calculated based on reconstituted costs, namely a normative approach. They are derived from assumptions of average farm management and farming operations. These assumptions are defined and discussed among sectoral boards usually composed of representatives of professional and interprofessional organizations, technical centres, agricultural research

institutions, offices and the regional commissions for agricultural development (CRDAs).[9]

These boards determine typical farm operating systems and their corresponding cost structures in consultation with members; similarly, the average yield is determined by consensus. For the calculation of costs, current average production factor prices are used.

The costs of producing domestic grain: durum and soft wheat and barley (DGEDA)

These cost estimates are also estimated through a normative framework based on agreed upon definitions of typical farm operating systems, referring to a reference system set in 1980 and only updated in 2012. The yield is an average calculated on the basis of available regional and national statistics and is subject to consensus.

The national average cost of production estimated by producer organizations (UTAP and Synagri)

Two farmer unions in Tunisia (UTAP and Synagri), annually estimate the cost of production at the national and regional levels based on production and farming systems. With agricultural margins and price fixing of selected agricultural products subject to State intervention, the unions undertake estimates for all livestock and crop production; these estimates serve as the basis for negotiation with the Ministry of Agriculture (see box 1).

Their approach is generally based on rapid surveys of selected farmers and livestock producers, adherents of the specific union, costing various technical operations and estimating yields in collaboration with the technical staff of various professional organizations, representatives of DGPA, interprofessional groups, technical centres and the Ministry of Trade and Commerce. For some products, the assistance of national experts is occasionally requested.

Their method of cost calculation takes into account fixed and variable costs, as well as other expenses, allowing an estimation of the full CoP.

[9] CRDA : Commisariat Régional de Développement Rural, is the representative of the Ministry of Agriculture at the regional level and present in each governorate.

Box 1: Tunisia- an increase in milk producer and processor prices as of 1 October 2014

Increased price of milk producer and processor is planned from October 1, 2014, said, on Monday, 1 September 2014, the TAP agency quoting the Tunisian Union of Agriculture and Fishery (UTAP), noting that this increase will be borne by the General Compensation Fund (CGC) to avoid its negative impact on consumer purchasing power.

The various stakeholders in the dairy sector (ministries, professional organizations, organization for consumer protection) have agreed upon an increase of 40 millimes per liter for farmers and 20 millimes per liter for the benefit of the industry. Although considering it as "non-profit", UTAP accepted this increase.

The same source had said that the agricultural organization had originally proposed an increase of 150 millimes per liter to the benefit of the producers, because the cost of one liter oscillates currently between 800 and 850 millimes, while most breeders and farmers sell a liter of milk between 700 and 740 millimes. It considers that, given the permanent rise in the milk cost of production, the whole dairy sector will barely continue its natural activity and is facing a high risk of annihilation.

The dairy sector in Tunisia suffers from the high cost of production due to a series of increases in feed prices, energy (electricity), labor and packaging, which had a negative impact on the cost of production and processing.

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Poultry and rabbits: average production costs estimated by the Interprofessional Group of Poultry and Rabbit Products

For poultry and rabbit products, GIPAC reviews production costs in the context of any change in input prices or in response to any specific requests. CoP estimates are carried out, drawing on data derived through field surveys every two years for laying hens and once a year for broilers and turkeys. In cases in which there is lack of technical information, GIPAC refers to livestock standards.

Vegetables: average production costs estimated by Interprofessional Vegetable Group

Vegetable crops, production costs are occasionally estimated at national and regional levels for different types of production systems, upon the request of decision makers and/or on the initiative of a producer’s organization.

A normative approach is used, incorporating research results that are validated on a larger scale based on both farm management/operational processes and official statistics on crop yields. This is periodically supplemented by specific studies. Data on factor prices and production inputs are collected from suppliers. In some cases, the Interprofessional Vegetable Group (GIL) adopts a real-cost approach, collecting real data from production units. However, this activity generally uses data from experimental plots and demonstration fields

that do not reflect the reality and diversity of vegetable production systems. However, the information obtained can be used as reference for information on production costs.

Cost of milk production: numerous estimates by an interprofessional group – Interprofessional Group of Red Meats and Milk

Estimates of milk production costs are made by the Interprofessional Group of Red Meats and Milk (GIVLAIT) at the national and the farming-system levels, at the request of policymakers. However, again, the approach is normative, using data available from DGPA and the Office and Livestock and Pasture (OEP).

Office of Livestock and Pasture

Data collection and estimation is performed regularly for products derived from OEP farms or at the request of policymakers for the costs of milk, meat and artificial insemination. More precise data on livestock can be obtained through the network of 200 small and medium-sized farms monitored by OEP, on the basis of which actual costs (as opposed to normative costs) can be derived. However, the results may often conflict with estimates that have been derived normatively by DGPA.

Olives and olive oil costs as estimated by the Office National de l'Huile

The Office National de l'Huile (ONH) has the mandate for estimating the cost of olive oil production, along with DGPA. The approach used is normative. It is based on the identification of average farm management and includes costs related to all production phases, such as tillage, tree felling, harvest and security. Those costs include the cost of transporting olives between the major regions (North, Central and South). The cost estimates of each operation are based on current prices. The total costs are supplemented by an assessment of the cost of capital in order to better estimate the total production costs.

The national study of 2001 for which surveys were undertaken across representative samples of olive farms and mills (real-cost approach) was used to generate a computational model (software). This has allowed the inclusion of all activities related to the production and marketing of olive oil, thus systematically calculating the cost of production of olive oil. This approach for cost estimation was discontinued in 2009.

Using state farms to estimate production costs (Office of State Land and cooperative production units)

The Office of State Land (OTD) and the cooperative production units (UCP) have an accounting and management system that includes, among other things, documentation on all crops, daily monitoring of labour costs, documentation on livestock inventories, and animal production technical factors, farm equipment records and records of stored products. This system allows the systematic generation of annual estimates, ensuring more precise estimates of production costs and farm revenues of various commodities, thus highlighting the usefulness of adopting real-cost estimations based on real data.

2.3. Leveraging information on production costs for setting agricultural policies

To better inform agricultural policies, such as fixed input and output pricing, supportive grants and subsidies, and tax benefits, the diverse structures currently involved in estimating production costs were lumped together into multi-institutional and product-specific committees composed of representatives of the Ministry of Agriculture, UTAP and SYNAGRI. These commissions typically interact on policy issues for the commodities of which prices are set by the State, namely cereals (durum wheat, soft wheat and barley), milk, meat (beef and lamb), poultry (meat and eggs), fruits and vegetables (tomatoes, potatoes, sugar beet). Each product committee's mandate is to determine, on an annual basis, national production costs, using a participatory and collaborative approach. This is generally based on a normative approach that references the estimates made by the various stakeholders. The estimate is derived from a consensus among the members of the commission, generated through dialogue among a variety of professional organizations and representatives of the government. The derived CoP, thus, becomes the reference for policymakers (for example see box 1).

In July 2013, a small technical advisory committee, the Commission of Cost of Production, was created within the Ministry of Agriculture. The work of this commission, which is coordinated by the National Observatory of Agriculture Data Portal (ONAGRI), consists of four permanent members: in addition to ONAGRI, the Director General of DGPA, DGEDA and CNEA (Centre National d'Études Agricoles). In addition, invited members also represent the administrative structures of the Ministry responsible for the estimate of agricultural products production costs. The mandate of this committee is to

review options for establishing a national system for the estimation and monitoring of production costs.

Table 3a: Summary of the main stakeholders involved in costs of production estimation by commodity

	Cereal			Dairy					Olive oil		
Responsible institution	DGEDA	OTD/UCP	UTAP/SYNAGRI	DGPA	OEP	GIVLAIT	OTD/UCP	UTAP/SYNAGRI	ONH	DGPA	OTD/UCP
Operations	Yield Survey Seasonal monitoring survey	Analytical accounting system	Expert study Eventually a field survey	Data coming from other institutions	Coaching of small and medium-sized enterprises Identification programme (OEP/CRDA/UTAP)	Data from other institutions	Cost accounting system	Expert study Eventually a field survey	Development of an average crop management technique	Data from other institutions	Analytical accounting system
Cost Calculation	Normative approach Full cost (including opportunity cots and additional costs)	Analytical cost Real Cost Full cost	Real cost Full cost	Reconstituted cost Representative system Normative approach	Real cost based on a technical and economic monitoring of the small and medium farms Price reference	Reconstituted cost Normative approach	Analytical cost Real Cost Full cost	Real Cost Full cost	Normative approach	Reconstituted cost Representative system Normative approach	Analytical cost Real Cost Full cost

Table 3a (continued)

	White meat		Red meat				Tomato and vegetable crops		
Responsible institution	GIPAC	DGPA	DGPA	GIVLAIT	OTD/UCP	UTAP/SYNAGRI	DGPA	UTAP/SYNAGRI	GIL
Operations	Survey, reference and standards	Data from other institutions	Data from other institutions	Data from other institutions	Cost-accounting system	Etude Expertise Eventuellement enquête de terrain	Data from other institutions	Expert study Eventually a field survey	Studies Research results Data from other institutions
Cost calculation	Real cost or reconstituted cost According to data availability	Normative approach Reconstituted cost	Normative approach Reconstituted cost	Normative approach Reconstituted cost	Analytical cost Real cost Full cost	Real cost Full cost	Normative approach Reconstituted cost	Real cost Full cost	Reconstituted cost or real cost on experimental plots

3

Piloting a Participative Approach Towards Designing Better Estimation Methods for Costs of Production

The end products of this “proof of concept” approach towards improving CoP statistics were “Cost of production questionnaires" for one or two products following the recommendations of the Handbook. However, participatory approaches and tools were required to assess the relevance and scope of those questionnaires, the section of priority products, recommendations on approaches for data collection and survey implementation. The objective was also to create and document best practices that could be introduced in other countries with the aim to establish or improve CoP information systems.

During discussions and debates at various workshops on "production costs", stakeholders expressed the need for information that primarily reflects structural aspects, economic performance and competitiveness of farms. This information is required for the development of farm typologies, a necessary input into hybrid[10] approaches for the collection of representative CoP data. Possible options for integration and synergies with a potential CoP pilot project in Tunisia were reviewed with stakeholders, in particular, potential collaboration with FAO through an initiative called “World Agriculture Watch”, which supports regional harmonization of farm typologies. The benefits of expanding the content of the "cost of production survey" to a "farm questionnaire" were reviewed, recognizing that longer surveys are expensive and add to the response burden. Additional information required included data

[10] These include other methods of data collection than just through standard surveys.

on farm structures and indicators that capture economic performance and farm competitiveness.

Starting the stakeholder dialogue and choosing the pilot product

It was decided by consensus among stakeholders that the designed questionnaires would be conducted on a pilot basis for two products. The products were to be selected through participatory approach (second ballot) during the first technical consultation workshop, which was held in Tunis on 22 and 23 October 2014.

The objectives of the workshop were to:

- Review the CoP data collection system in Tunisia;
- Identify best practices for data collection and calculation methods;
- Identify the needs and priorities of Tunisia in terms of CoP statistics;
- Develop a skeleton of a pilot questionnaire on production costs.

The workshop brought together 45 participants from 20 institutions involved in the collection, evaluation and use of CoP data (departments of the ministries of agriculture, the trade ministry, producer organizations, farmers' unions, interprofessional groups, technical institutes and research centres).

The two-step process for prioritizing selection criteria and identifying pilot products was follows:

Step 1: Identification of key criteria for selecting the commodities on which the pilot approach would be conducted. The following criteria were selected:

- Economic importance of the product (share of the product in terms of volume and value in total agricultural production);
- Integration in the value chain;
- Value of exports/imports;
- Contribution to food security policy;
- Policy support measures, share of land occupied by the product;
- Investments made in the product sector;
- Impacts on natural resources, such as water consumption);
- Number of producers;
- Importance of the sector for employment.

Step 2: Classification of products on the basis of the first four criteria, which were considered to be the most important, namely, (i) the product of economic importance; (ii) the contribution to food security; (iii) policy measures or subsidies associated with the product; and, (iv) the number of producers.

Participants first brainstormed on the most important commodities in Tunisia, namely cereals, milk, red meat, white meat, olives, tomatoes, potatoes, citrus, other fruits, dates and legumes. Using a secret ballet approach, cereal and milk were selected as priority products for the pilot studies and the development of the questionnaires.

3.1. Process of designing questionnaires

A three-stage process was used to design and validate the CoP questionnaires.

First Step: Using stakeholder knowledge to build the skeletons of the questionnaires. During technical consultations held on 22 and 23 October 2014, the participants reviewed different methodologies and surveys used in other countries and then broke up into groups to draft CoP questionnaires for three products (milk, cereals and meat). The structure of those questionnaires was based on best practices presented from the manual of CoP, survey examples from other countries, including, among them, Colombia, Morocco, Nigeria and Zambia. Experts from FAO and other international experts provided methodological support for this exercise.

Second Step: Improvements in the form and structure on the questionnaires were made based on:

- Discussions with Tunisian commodity experts;
- Different concepts related to CoP-related theories;
- Methodological and practical recommendations contained in the CoP Handbook;
- Lessons learned from experiences, in, for example, Colombia, Kenya, Morocco and Zambia; as well from regional experts who attended a subregional workshop on CoP

Third Step: Validating the questionnaires:

In collaboration with Government experts, farmers were interviewed about the questionnaires to ensure that the structure of each one was feasible and consistent.

Table 4. Test of the questionnaires for cereals and dairy

Questionnaire	Respondent	Farm/herd size	Duration of the test
Cereals	Farmer	19 ha	1h
	Employee-agricultural engineer Farming as a second job	29 ha	20 min
	Farmer-agricultural engineer - Member of the farmers union	70 ha	20 min
	Trainer (ATFP) Farming as a second job	25 ha	30 min
Milk	Livestock farmer	23 dairy cows	30 min
	Livestock farmer	15 dairy cows	20 min

The testing of the milk questionnaire, which took place in the area of Borj Touil-Soukra (Ariana Governorate, northern Tunisia), involved three livestock breeders. The process was undertaken with support from regional experts working for OEP. Table 4 provides an overview of key parameters influencing the process of testing the questionnaires.

Lessons observed during testing the questionnaires:

Given the small number of respondents, it is difficult to draw final conclusions on the key issues influencing the implementation of the questionnaires. However, the test showed the following:

- Considerable variability in the total duration of the interviews. It appeared that the time allocated for the interview depended mainly on the educational level of the respondent, the degree of understanding of the context of the investigation and the extent of his adoption of the process.
- Difficulty in disaggregating the costs of specific inputs, such as the date of purchase of equipment and amount of inputs used in the beginning of the season.

- Difficulty in separating aggregated costs.

The assistance extended by the accompanying staff, such as the INGC engineer and the regional experts from OEP, was considerable. Given the nature of their businesses, they are in regular contact with farmers and ranchers through supporting mission and the provision of technical advisor services. They obviously have considerable knowledge on agricultural operations under their supervision and have established trust among farmers. Their assistance helped accelerate the information collection process during the testing phase and was invaluable in making adjustments to the sequencing of questions within the survey, such as identification of operators and operations, plot structure, assets, herd size, cost a few inputs and yields and checking the quality and validity of responses.

Broader stakeholder engagement:

In addition to the field testing, the two questionnaires were sent to the various participants of the workshop that was held on 22 and 23 October 2014. The participants were asked to provide their comments, questions and suggestions on the questionnaire structure and content and thus played in a role in the questionnaire design. The final questionnaires were then discussed in a technical validation workshop, which was held on 12 November 2014. The discussion focused on the current system for collecting and calculating production costs, a detailed presentation of questionnaires and methodological aspects to consider when implementing the questionnaires. Finally, at a regional dialogue, facilitated through a subregional workshop, which was held on 13 and 14 November 2014, 43 experts provided input/guidance. Participants included:

- Government representatives of Algeria, Mauritania, Morocco, and Tunisia
- Representatives of selected research institutions and non-government experts from Algeria, Tunisia and other Mediterranean countries
- Representatives of international research institutions (CIHEAM and JRC)
- International experts in typologies and production costs

The workshop objectives were:

1. To discuss statistical methodologies and best practices to implement for the data collection;
2. To finalize an approach to CoP data collection, analysis and dissemination that is to be presented in a subegional project.
3. To review possible regional initiatives aimed at improving the CoP data information system in the Maghreb region.

Feedback on questionnaires:

During this workshop, a comprehensive overview of the development and validation of CoP questionnaires in Tunisia was undertaken. The main observations and recommendations made by the participants were related to the form and content of the questionnaires. Additionally, a discussion at the workshop was dedicated to reviewing options for implementation to ensure that accurate information on actual costs can be computed. In terms of the questionnaire structure, the participants indicated that the questionnaires were well structured and useful in that they provided a clear picture of the overall situation pertaining to farm and operating costs. Countries expressed interest in using the questionnaires.

Two suggestions were expressed to improve the structure of the questionnaires:

- Incorporate a coding system for the responses;
- Provide some terminological (wording) corrections.

With regards to the **content** of the questionnaires, participants made the following comments/recommendations:

- If a questionnaire designed exclusively to calculate COP already had already been designed, some questions could be deleted. Thus, the part relating to total on-farm labour was not necessary because, in some cases, the following sections provided information by type of operation;
- Selected sections of the questionnaire needed to be reviewed; in particular, it was recommended that more precision on water resources and irrigation methods be added while the commercial name of products, including fertilizers and pesticides be eliminated.
- In the context of the cereal questionnaire, it was recommended to select clearly representative farm sizes (preferably larger) in cases in which

the focus of questions about the use of production factors were more relevant;

- The milk questionnaire should consider livestock numbers, as well as other pertinent indicators, such as those related to biological parameters (for example, race and age classification,) and the purchase price for cows.
- In addition, as the milk questionnaire would require a specific sequencing of information related to feed costs/purchases questions (in the context of feed) about the unit of measure, location of purchase and transport costs must be included.

As for the **implementation** of the questionnaires, the following proposals were made:

- Expand the "questionnaire on COP" to a "farm-level questionnaire", which, in turn, would provide more information on the structure of farms and facilitate the construction of typologies;
- Ensure appropriate training of interviewers before the implementation of the investigations; this is particularly critical given the degree of detail provided in the questionnaire, the need to understand the technical context and the time requirements for interviewing.
- Agree on the underlining hypotheses, which feed into the calculation of less transparent costs, such as opportunity costs, and adjust selected questions accordingly
- Adopt a regional price reference, which would result in either 1) less questions; or 2) validation of producer responses on prices.

Designing the final version:

To develop the "final version" of the two questionnaires, overall feedback was conducted following the testing phase and the validation process during the workshop. Other changes were made to the questionnaire as part of an internal validation with the staff members from DGEDA and OEP. The revisions mainly affected the sequencing of questions, their formulation and the type of the questions asked.

3.2. Structure of the questionnaires and expected information about their implementation

The elaborated questionnaires are structured into chapters. Each chapter is decomposed based on the characteristics of the individual product. This sequencing is intended to provide input into the following three areas: farm typology; production costs; and other components of economic performance (other than production costs).

Table 5. Structure of the questionnaire and use of the information provided

Product	Questionnaire			Use of the information		
	Chapter	Sequence	Information	Typology	Cost of production	Economic performance
Cereal and milk	General farm information	Farm location	Geographical and administrative location	●		
		Information about the farmer	Legal status	●		●
			Educational level	●		●
			Main and secondary activity	●		●
		Plot structure	Number of plots For each plot: acreage, land status/land tenure, rent price, current land use, crop management and previous cropping	●	●	●
Milk		Herd	Number of animals per animal type	●	●	●
Cereals and milk	Assets and fixed costs	Farm buildings	Building type For each type : acreage, year of construction, current state, construction cost and maintenance cost	●	●	●

		Machinery and equipment	Type of equipment For each type: number/power/size, year of acquisition/price of purchase/acquisition, insurance and administrative costs, current status and maintenance costs	●	●	●
Milk	Specific costs	Feed costs	Feed type Each feed type: price of purchase, consummation and use period (along the year)	●	●	●

Cereal and milk	Crop and forage management	Acreage	Planted acreage Harvested acreage		●	●
		Use of Input	Input used (seeds, fertilizer, pesticides, irrigation water, other) Machinery used during farming operations (machinery used, duration of the operation, hourly cost) Labour per type (Family, permanent, seasonal, specialized) per farming operation (number, working days, salaries and costs)		●	●
	Other costs	Loans	Types Per type: funding sources, amount, duration of the reimbursement and interest rate		●	●

		Subsidies	Types For each type: sources, amount, quantity		●	●
		Insurance	Types For each type: premium, contribution rate, reimbursement		●	●
Milk		Veterinary costs and others	Products Annual cost per product		●	●
Cereal and milk	Production and trade	Product and by-product	Products For each product: produced quantity, home-consumed Sale points For each point of sale: quantity sold, buyer, unit price or total value of the sold, transport costs, other costs	●	●	●

3.3. Putting the questionnaires into action

To implement the two questionnaires, whether through a comprehensive survey or integrated into other surveys, the existing institutional framework needs to be strengthened. To collect this additional survey data, awareness, survey testing, training material development and enumerator training are required.

Discussions with stakeholders resulted in several options for implementing the surveys. The positive and negative aspects associated with the various options are also discussed in the CoP Handbook.

For cereals, two options were identified:

Options 1: Annex the CoP questionnaire to existing cereal surveys (see table 2), which are usually undertaken during three separate periods over the cereal campaign. Thus, the implementation of the cereal CoP questionnaire could be divided into three separate sorties. Each specific section could then be divided to ensure the collection of information related to the specific activities planned during the period. This option allows for cost benefits in the survey operation. However, it should be acknowledged that the addition of these "cost of production" questions to those already in place to support the harvest surveys make the existing questionnaires “heavier” in terms of time.

Options 2: This option involves undertaking a separate CoP survey. Tunisian officials questioned whether the human and logistical resources available at the regional level would be able to support such a comprehensive survey of this importance. DGEDA, therefore, proposed to review the process for selecting farmers from specific regions that represent the major production areas of cereals in Tunisia. The survey could not be implemented with the country as a whole because of limited resources. Consequently it was proposed to focus on areas where cereal production was relatively significant and regional services were adequately equipped. The Government proposed that the first agricultural census be implemented in 2015/16. This would allow the development of a sampling frame, which could feed into better CoP estimates in the future.

Milk options:

It should be noted that unlike the cereals questionnaire, the milk questionnaire data analyses are inherently more complex because of the specificity of the activity (daily activity unlike cereals), seasonality of production (high and low lactation period) and inter and intra-annual price of food.

As a questionnaire on milk production costs is already available and currently used by OEP, it was suggested that the CoP questionnaire be integrated into this existing survey. Regional advisers of OEP would then support the testing and collection of CoP data. The questionnaire would, as a result, focus on a sample of farmers drawn from the group of farmers enrolled in ongoing milk recording system. Subsequently, a typology of farms would be elaborated in order to select the "typical farms"; a review of the criteria used to construct the farm typologies will be undertaken during the pilot project for Tunisia.

Critical assumptions:

For both products, the quality of the data generated through the implementation of the final versions of the two questionnaires is dependent on the validation of a number of key assumptions that had already been raised during the validation workshops. In particular, the assumptions remain yet to be decided and will probably be set by the newly convened Commission on Cost of Production (see early section). The assumptions will most likely cover the following:

- Adoption of a price referential, which would make it possible to eliminate some the questions related to unit costs of inputs from the questionnaire;
- Appropriate methods of calculating indirect cots based on the recommendations of the Handbook on production costs;
- The inclusion of forage costs in integrated farming systems: options include the prices from fodder markets where relevant/available or alternatively deriving a calculation of forage production costs for each livestock unit.
- Weights for fixed cost allocation;

4

Conclusions

Responding to a priority of the Government of Tunisia to improve estimation methods of cost of production, this CoP pilot, supported by the Global Strategy, aimed to build on an ongoing process to validate a recently commissioned study on national challenges related to CoP data collection methodologies and institutional challenges (Karray 2014). With the objective to undertake and document a national consultative process for prioritizing and outlining an approach to improving CoP estimation, more than 50 experts from 20 organizations, both public and private, contributed to a plan of action to improve these estimates.

The process:

These participants, drawn from diverse organizations engaged in CoP estimation, worked over a two month process to collectively:

- Identify the key criteria underlining the need for CoP data, which included, for example, policy formulation, importance for the national economy, competitiveness benchmarking, food security, investment and job creation;
- Determine and prioritize the principal commodities for which CoP is regularly required;
- Design and validate CoP questionnaires on priority products, test them in consultation with national participants, and review some of the challenges in their design and potential implementation.

A variety of mechanisms were used to engage participants, ranging from SurveyMonkey, which was designed to identify data user's needs, perceptions of CoP data, institutional challenges and options for improving CoP methodologies to three technical workshops, small group discussions, and on-farm questionnaire testing.

The questionnaires:

The priority commodities, selected through a system of secret balloting, were identified as cereals and milk, with red meat as an alternative. After the CoP

questionnaires were designed, in collaboration with both Tunisian and international experts, they were tested in the field and validated by stakeholders in a final workshop. They were also shared with participants who attended a subregional workshop organized in Tunisia and circulated through a regional electronic network on the cost of production (d-group) organized to facilitate dialogue in the North African subregion.

These surveys and their design process can be used in Tunisia and in other counties that would like to set up or improve their data collection systems on costs.

Strengthening the Cost of Production Manual:

This consultative process allowed for the testing and documentation of some of the concepts and recommendations found in the CoP Manual which includes:

- Innovative communication methods, such as online surveys, with the objective to raise the awareness of stakeholders on the quality, relevance and availability of CoP data.
- Approaches to prioritizing products to be covered in CoP questionnaire design; in this case, cereals and milk;
- Developing a participatory approach to survey design, drawing on in-country expertise, best examples of CoP questionnaires from other countries and international expertise.
- The critical need to develop commodity/production system typologies and classification systems for production costs;
- Methods for data collection and methodologies for estimation (such as the use of price benchmarks versus the approach of actual costs);
- Implementation mechanisms: integrated or modular surveys versus. independent research/data collection;
- The importance of a participatory process of questionnaire development and validation.

Moving ahead: developing effective cost-effective systems for data collection

This stakeholder dialogue highlighted, in particular, the importance of identifying typologies that characterize "representative farms", a challenge for developing countries, which are characterized by a hetrogenerity of production systems. Gaining a clear understanding of these systems is critical for the

establishment of a system for collecting appropriate and representative CoP data.

While CoP data can potentially be drawn from CoP questionnaires fielded through “representative” farms, specific information on the microstructure parameters, their operations and economic performance are also required. CoP questionnaires typically generate only partial information on the structural parameters of farms and their operation and performance. A review of existing questionnaires is, therefore, needed to make reliable and relevant typologies, which feed into cost-effective CoP data collection systems.

Once validated, the sustainable implementation of "new" questionnaires remains dependent on not only government financing for data collection and analysis, but also on strengthening the human and logistical capacity of the current systems, including the introduction of new technologies. It is essential to provide in-depth training sessions on the use of developed questionnaires, survey techniques, data analysis and dissemination and use of data.

Specific challenges to introducing and ensuring a sustainable CoP system in Tunisia

The proper implementation of these new questionnaires and the need to respond to stakeholders requirements for high quality and regularly distributed CoP data necessitates overcoming some key challenges, related to in the following areas:

1. Methodologies: harmonizing methods, identification of sampling frames, determination of the criteria and type of procedures, the frequency of surveys and updating of information;
2. Institutional and organizational structures: Critical to good quality data is the coordination of activities during and after the pilot phase; identifying and defining the responsibilities and roles of the partner institutions, which includes, among others, information gathering, data analysis, costing, information dissemination, support for the construction and monitoring of "typical farms" and evaluation process;
3. Transparency and engagement with the private sector: Ensuring dialogue and transparency on methods and sources of data is the first step towards avoiding disputes on CoP estimation methods. Consequently, in Tunisia, the creation of a CoP programme should include the National Commission, non-governmental entities, including research entities, as full partners in dialogue, data collection and estimation methods.

4. Financial issues related to CoP data collection and analysis: Tunisia is proposing a national pilot to review cost-effective options for CoP data collection. A hybrid approach is being proposed, one which promotes innovation and representativeness in the generation of CoP estimates. The objective of this is to ensure sustainability in data collection and in a broader context, up scaling and sharing lessons and best practices in the Maghreb region.

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Ministry of Agriculture
General Directorate of

Cereal Cost of Production Survey
Crop-year 2014/15

Questionnaire n°:	Date :
Enumerator code:	……..

1. Farm location

	Governorate	District	*Imada*	village
Nam				
Code				

2. General Information

2.1 Legal status of the farm ……

|_____| (please write in the box the corresponding code related to the enumerator's answer)

Legal person	1
Natural person	2

2.2. If legal person please indicate:

…… |_____| (please write in the box the corresponding code related to the enumerator's answer)

SMVDA	1
UCPA	2
Société	3
Agro-combinat	4
Other (please specify)	5

2.3. If natural person please indicate:

Farmer's First Name and Last Name	Age	Gender			
		M		F	

2.4 Educational level..……

|_____| **(**please write in the box the corresponding code related to the enumerator's answer**)**

Out of school	1
Primary school	2
High school	3
Agricultural education	4
Higher Agricultural Education	5
Non-agricultural Higher Education	6

2.5 Professional activity ……

|_____|

(Please write in the box the corresponding code related to the enumerator's answer. In the case of several activities please align the corresponding codes noting first the code of the main activity and then the code or codes of secondary activity and always note the codes in ascending order within each activity)

Main activity		**Secondary activity**	
Farmer/ breeder	1	Farmer / Breeder	11
Worker	2	Worker	22
Tradesman	3	Tradesman	33
Private sector	4	Private sector	44
Official/civil servant	5	Official / Civil servant	55
Other	6	Other	66

3. Number of workers on the farm and wages

	A_ Permanent labour			
	Family labour	*Non family labour*		
	Number	Number	Net pay (DT/year)	Social security costs (DT/year)
Engineer				
Technician				
Advisor				
Administrator				
Driver				
Qualified worker				
Non-qualified worker				
Other				

	B_ Seasonal labour			**Wages DT/day**			
	Family labour	*Non family labour*		*Season 1*	*Season 2*	*Season 3*	*Season 4*
	Number	Number	Net pay (DT/year				
Engineer							
Technician							
Advisor							
Administrator							
Driver							
Qualified worker							
Non--qualified worker							
Other							

4. Plot structure

Plot N°	Acreage (ha)	Land Status / Tenure			Rent price per year (If rented (DT))	Yearly land use	Crop management [3]		Previous crop
		Owned	Rented	other			Non irrigated	Irrigated	
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
TOTAL									

5. Farm buildings

Type	Surface in m^2	Year of construction	Current status[1]	Construction cost (DT)	Maintenance cost (DT/an)
Shed					
Storage building					
Silos					
Housing					
Other (please indicate)					
Other (please indicate)					

[1] good, average, bad

6. Machinery and farm equipment

a. Tractors, combines and other self-propelled machines

	Number
Tractor	
Combine	
Straw baler	
Pick up	
Truck	
Van	
Other ……	

Other ……						
	Power	Year of purchase	Purchase price (DT)	Insurance and administrative costs. (DT/an)	Maintenance cost (DT/an)	Current state[1)]
Tractor1						
Tractor 2						
Combine						
Straw baler						
Pick up						
Truck						
Van						
Other						
Other….						

(1)Good, average, bad

b. Towed machines

	Purchase year	Purchase price (DT)	Maintenance costs (DT/an)	Current state[(1)]
Disc plow 1				
Disc plow 2				
Mouldboard plow				
Mouldboard plow				
Disc sprayer				
Rotavator				
Harrow				
Ground roller				
Muck spreader				
Mower				
Dockage tester				
Seeder				
Metal plow				
Other				

(1) Good, average, bad

d. Irrigation equipment

Public area				
	Irrigation source	*Tick the box*	Total irrigated surface (ha)	Cereal irrigated surface (ha)
1	Drill			
2	Dam			
3	Dam/hillside lake			
4	Shallow Well			
5	Pumping from a oued[11]			
6	Treated wastewater			
7	Spreading waters			
8	Other			
		Total		
Public area				
	Irrigation source	*Tick the box*	Total irrigated surface (ha)	Cereal irrigated surface (ha)
1	Drill			
2	Dam			
3	Dam/hillside lake			
4	Shallow Well			
5	Pumping on oued			
6	Treated wastewater			
7	Spreading waters			
8	Other			
		Total		

[11] A oued or wadi is a generic term used to describe a river in the desertic or semi-desertic regions of North Africa, characterized by an irregular hydrologic cycle.

Irrigation equipment

	Power/ Size/number	Year of purchase / construction	Cost of purchase / construction (DT)	Maintenance expenses (DT/year)	Current condition[(1)]
Well 1					
Well 2					
Well 3					
Motor pump 1					
Motor pump 2					
Motor pump 3					
Electric pump 1					
Electric pump 2					
Electric pump 3					
Pivot sprinkler					
Sprinklers					
Pipes / channels type 1					
Pipes / channels type 2					
Pipes / channels type 3					
Other (please specify)					

[(1)] Good, average, bad

7. Crop management and operating system

Cereals	Crop[(1)]	variety	Total area planted (ha)	Area Harvested (a)

([(1)] Blé dur= 1, Blé tendre = 2, Orge =3)

Fields to check	Area seeded (ha)	Area harvested (ha)

(Select a representative field around which the following questions will be asked. Preferably the field on the farm)

a. Input utilization

	Unit	Quantity	Unit purchase price (DT)	Value (en DT)
Seeds				
Selected purchased	Quintals			
Ordinary purchased	Quintals			
Ordinary self-produced	Quintals			
Fertilizers				
DAP	Quintals			
SUPER 45	Quintals			
SUPER 16	Quintals			
Ammonitrate				
Potash	Quintals			
Pesticides (herbicides, insecticides, fungicides)				
Total herbicide				
Anti-grass herbicide				
Anti=dicot herbicide				
Multipurpose herbicide				
Fungicide				
Irrigation water	m^3			
Other input (please specify)				
…….				
…….				
…….				

b. Towed operations

Operation	Machine			Duration of the operation (hour)	Rent price (if relevant) (DT/hour)	Fuel consumption if the machine is owned
	Owned	Rented	Other			
Deep ploughing						
Backcrossing						
Seeding						
Fertilizer spreading						
Passage 1						
Passage 2						
Passage 3						
Plant protection						
Passage 1						
Passage 2						
Passage 3						
Irrigation						
Harvest/mowing						
Press ball						
Transport						
Other						

c. Labour

Operation	Labour									
	Family labour		Permanent labour		Seasonal labour (non specialized)			Seasonal labour (specialized)		
	Number	Labour input hour/day/person	Number	Labour input hour/day/person	Number	Days of work / person	Wage DT/day	Number	Days of work / person	Wage DT/day
Deep ploughing										
Backcrossing										
Seeding										
Fertilizer spreading										
Passage 1										
Passage 2										
Passage 3										
Treatment										
Passage 1										
Passage 2										
Passage 3										
Irrigation										
Harvest/Mowing										
Press ball										
Transport										
Other										

8. Credit, subsidies and other costs

a. Credits

a. Credits	Type (Investment/seasonal credit)	Funding sources (Bank or other)	Amount (DT)	Time to pay back	Interest rate
Credit 1					
Credit 2					
Credit 3					

b. Subsidies

Subsidy	Type (Investment/ Operating subsidy)	Subsidy provider	Value / Quantity	
			Amount (DT)	In kind (quantity)
Subsidy 1				
Subsidy 2				
Subsidy 3				

c. Insurances

Subscriptions	Premium (DT) (or contribution rate)	Reimbursement (if any) (DT)
Anti Hail		
Anti fire		
Other		

d. Other costs

Cost	Type (description)	Amount (DT)
Cost 1		
Cost 2		
Cost 2		

9. Production and trade

Products	Produced Quantity (Ql)	Own consumption. (Ql)	Sailing point 1						Sailing point 2					
			Sold quantity (Ql)	Buyer	Unit price (DT)	Total value (DT)	Transport cost (DT)	Other trade related costs(DT)	Sold quantity (Ql)	Buyer	Unit price (DT)	Total value (DT)	Transport cost (DT)	Other trade related costs (DT)
Durum wheat														
Wheat														
Barley														
Wheat Straw														
Barley Straw														
Other (please indicate)														
……														
……														
……														

Ministry of Agriculture

General Directorate of …

Dairy Production Survey

2014/15

Questionnaire n°:	Date :
Enumerator code:	……

1. Farm location

	Governorate	District	*Imada*	village
Nam				
Code				

2. General Information

2.1 Legal status of the farm ……

|_____| (please write in the box the corresponding code related to the enumerator's answer)

Legal person	1
Natural person	2

2.2. If legal person please indicate: ……

|_____| (please write in the box the corresponding code related to the enumerator's answer)

SMVDA	1
UCPA	2
Company (Société)	3
Combine (Agro-combinat)	4
Other (please specify)	5

2.3. If natural person please indicate:

Farmer's first name and last name	Age	Gender			
		M		F	

2.4 Educational level..……

|_____| (please write in the box the corresponding code related to the enumerator's answer)

Out of school	1
Primary school	2
High school	3
Agricultural education	4
Higher Agricultural Education	5
Non Agricultural Higher Education	6

2.5 Professional activity ……

|_____|

(Please write in the box the corresponding code related to the enumerator's answer. In the case of several activities, please align the corresponding codes noting first the code of the main activity and then the code or codes of secondary activity and always note the codes in ascending order within each activity)

Main activity		**Secondary activity**	
Farmer / Breeder	1	Farmer / Breeder	11
Worker	2	Worker	22
Tradesman	3	Tradesman	33
Private sector	4	Private sector	44
Official / Civil servant	5	Official / Civil servant	55
Other	6	Other	66

10. Labour and wages

	A_ Permanent labour			
	Family labour	*Non family labour*		
	Number	Number	Net pay (DT/year)	Social security costs (DT/year)
Engineer				
Technician				
Adviser				
Administrator				
Driver				
Qualified worker				
Non-qualified worker				
Other				

	B_ Seasonal labour			Wages DT/day			
	Family labour	*Non family labour*		*Season 1*	*Season 2*	*Season 3*	*Season 4*
	Number	Number	Net pay (DT/year				
Engineer							
Technician							
Adviser							
Administrator							
Driver							
Qualified worker							
Non-qualified worker							
Other							

11. Plot structure

Plot N°	Acreage (ha)	Land status / Tenure			Rent price per year (If rented (DT))	Yearly land use	Crop management [3]		Previous crop
		Owned	Rented	other			Non irrigated	Irrigated	
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
TOTAL									

12. Herd (for the specific season)

Type	Number
Cows	
Lactating cows	
Purchased cows	
Cull cows	
Dead cows	
Heifers in production	
Purchased heifers	
Sold heifers	

Female veal on farm	
Female veal sold	
Calves dead at birth	
Breeding bulls	
Bulls on the farm	
Sold bulls	
Dead calves	
Calves on the farm	
Sold calves	

13. Farm buildings

Type	Surface in m^2	Year of construction	Current status(1)	Construction cost (DT)	Maintenance cost (DT/an)
Shed					
Storage building					
Livestock building					
Feed storage building					
Milking building					
Housing					
Farm silos					
Other (please indicate)					
Other (please indicate)					

(1)good, average, bad

14. Machinery and farm equipment

a. Tractors, combines and et other self-propelled machines

Type	Number
Tractor	
Combine	
Straw baler	
Pick up	
Seeder	
Truck	
spreader	
Van	
Other ……	

Other ……						
	Power	Year of purchase	Purchase price (DT)	Insurance and administrative costs. (DT/an)	Maintenance cost (DT/an)	Current state[1)]
Tractor1						
Tractor 2						
Combine						
Straw Baler						
seeder						
Pick up						
spreader						
Truck						
Van						
Other						
Other….						

[(1)]Good, average, bad

b. Towed machines

	Purchase year	Purchase price (DT)	Maintenance costs (DT/an)	Current state[(1)]
Disc plow 1				
Disc plow 2				
Mouldboard plow				
Mouldboard plow				
Disc sprayer				
Rotavator				
Harrow				
Ground roller				
Muck spreader				
Mower				
Dockage tester				
Seeder				
Metal Plow				
Other				

[(1)] Good, average, bad

c. Irrigation equipment

Public area				
	Irrigation source	*Tick the box*	Total irrigated surface (ha)	Cereal irrigated surface (ha)
1	Drill			
2	Dam			
3	Dam/hillside lake			
4	Shallow Well			
5	Pumping on oued			
6	Treated wastewater			
7	Spreading waters			
8	Other			
		Total		
Public area				
	Irrigation source	*Tick the box*	Total irrigated surface (ha)	Cereal irrigated surface (ha)
1	Drill			
2	Dam			
3	Dam/hillside lake			
4	Shallow Well			
5	Pumping on oued			
6	Treated wastewater			
7	Spreading waters			
8	Other			
		Total		

(1) Good, average, bad

d. Milking equipment

	Power/size/number	Year of purchase	Purchase price (DT)	Maintenance cost (DT/year)	Current state (1)
Cistern					
Milking pot					
Sampler					
Transport pot					
Bowls					

14. Feedstuff

Feed consumption

Aliments	Unit Kg=1 Ql=2	Consumption /day/cow /use of the feed											
		J	F	M	A	M	J	J	A	S	O	N	D
Concentrate													
Barley grains													
soybeans													
Malt													
Bran													
Oat													
Fresh grass													
Silage													
Hay													
Straw													
Minerals													
Other													
Other													

Price for bought-in feedstuff

Feedstuff	Purchase price in DT	1= Kg 2=Qt 3=T 4=bales	Purchase location (in the village=1 neighbouring village=2 other=3)	Transport cost in DT
Concentrate				
Barley grains				
Soybeans				
Malt				
Bran				
oat				
Fresh grass				
Silage				
Hay				
Straw				
Minerals				
Other				
Other				

16. Specific operations for the dairy enterprise

a. Labour

Operation	Labour									
	Family labour		Permanent labour		Seasonal Labour (non-specialized)			Seasonal Labour (specialized)		
	Number	Labour input hour/day/person	Number	Labour input hour/day/person	Number	Days of work / person	Wage DT/day	Number	Days of work / person	Wage DT/day
Cleaning										
Feeding										
Supervision										
Milking										
Other (please indicate)										
Other (please indicate)										
Other (please indicate)										

Towed operations

Operation	Machine			Duration of the operation (hour)	Rent price (if relevant) (DT/hour)	Fuel consumption if the machine is owned
	Owned	Rented	Other			
Cleaning						
Transport of feed						
Other						

17. Veterinary costs and other costs

Products	Total annual costs in dinars	Costs for the dairy enterprise
Animal semen		
Sanitary products		
Medicines		
Veterinary costs		
Electricity		
Drinking water		
Detergents		
Fuel		
Others		

18. Forage production

Forage	**Planted variety**	**Planted area (ha)**	**Harvested area (ha)**	**Number of cuts per year**
	Produced quantity (tonne)	**Consumed quantity (Tonne)**	**Sold quantity (Tonne)**	

a. Input utilization

	Unit	**Quantity**	**Unit purchase price (DT)**	**Value (en DT)**
Seeds				
Selected purchased	Quintals			
Ordinary purchased	Quintals			
Ordinary homemade	Quintals			
Fertilizers				
DAP	Quintals			
SUPER 45	Quintals			
SUPER 16	Quintals			
Ammonitrate				
Potash	Quintals			
Pesticides (herbicides, insecticides, fungicides)				
Irrigation water	m^3			
Other input (please specify)				

a. Towed operations

Operation	Machine			Duration of the operation (hour)	Rent price (if relevant) (DT/hour)	Fuel consumption if the machine is owned
	Owned	Rented	Other			
Deep ploughing						
Backcrossing						
Seeding						
Fertilizer spreading						
Plant protection						
Irrigation						
Harvest/mowing						
Press ball						
Transport						
Other						

b. Labour

Operation	Labour									
	Family labour		Permanent labour		Seasonal labour (non specialized)			Seasonal Labour (specialized)		
	Number	Labour input hour/day/person	Number	Labour input hour/day/person	Number	Days of work / person	Wage DT/day	Number	Days of work / person	Wage DT/day
Deep ploughing										
Backcrossing										
Seeding										
Fertilizer spreading										
Plant protection										
Irrigation										
Harvest/mowing										
Press ball										
Transport										
Other										

3. grain production

Grains	Planted variety	Planted area (ha)	Harvested area (ha)	Number of cuts per year
	Produced quantity (tonne)	Consumed quantity (Tonne)	Sold quantity (Tonne)	

a. Input utilization

	Unit	Quantity	Unit purchase price (DT)	Value (en DT)
Seeds				
Selected purchased	Quintals			
Ordinary purchased	Quintals			
Ordinary homemade	Quintals			
Fertilizers				
DAP	Quintals			
SUPER 45	Quintals			
SUPER 16	Quintals			
Ammonitrate				
Potash	Quintals			
Pesticides (herbicides, insecticides, fungicides)				
Irrigation water	m^3			
Other input (please specify)				

b. Towed operations

Operation	**Machine**			**Duration of the operation (hour)**	**Rent price (if relevant) (DT/hour)**	**Fuel consumption if the machine is owned**
	Owned	Rented	Other			
Deep ploughing						
Backcrossing						
Seeding						
Fertilizer spreading						
Plant protection						
Irrigation						
Harvest/mowing						
Press ball						
Transport						
Other						

c. Labour

Operation	Labour									
	Family labour		Permanent labour		Seasonal labour (non specialised)			Seasonal labour (specialised)		
	Number	Labour input hour/day/person	Number	Labour input hour/day/person	Number	Days of work / person	Wage DT/day	Number	Days of work / person	Wage DT/day
Deep ploughing										
Backcrossing										
Seeding										
Fertilizer spreading										
Plant Protection										
Irrigation										
Harvest/mowing										
Press ball										
Transport										
Other										

4. Silage production

Silage	Planted variety	Planted area (ha)	Harvested area (ha)	Number of cuts per year
	Produced quantity (tonne)	Consumed quantity (Tonne)	Sold quantity (Tonne)	

a. Input utilization

	Unit	Quantity	Unit purchase price (DT)	Value (en DT)
Seeds				
Selected purchased	Quintals			
Ordinary purchased	Quintals			
Ordinary homemade	Quintals			
Fertilizers				
DAP	Quintals			
SUPER 45	Quintals			
SUPER 16	Quintals			
Ammonitrate				
Potash	Quintals			
Pesticides (herbicides, insecticides, fungicides)				
Irrigation water	m^3			
Other input (please specify)				

b. Towed operations

Operation	Machine			Duration of the operation (hour)	Rent price (if relevant) (DT/hour)	Fuel consumption if the machine is owned
	Owned	Rented	Other			

c. Labour

Operation	Labour									
	Family labour		Permanent labour		Seasonal labour (non-specialized)			Seasonal labour (specialized)		
	Number	Labour input hour/day/person	Number	Labour input hour/day/person	Number	Days of work / person	Wage DT/day	Number	Days of work / person	Wage DT/day

5. Credit, subsidies and other costs

b. Credits

c. Credits	Type (Investment/seasonal credit)	Funding sources (Bank or other)	Amount (DT)	Time to pay back	Interest rate
Credit 1					
Credit 2					
Credit 3					

d. Subsidies

Subsidy	Type (Investment/ Operating subsidy)	Subsidy provider	Value/quantity	
			Amount (DT)	In kind (quantity)
Subsidy 1				
Subsidy 2				
Subsidy 3				

e. Insurances

Subscriptions	Premium (DT) (or contribution rate)	Reimbursement (if any) (DT)
Anti-Hail		
anti-fire		
Other		

f. Other costs

Cost	Type (description)	Amount (DT)
Cost 1		
Cost 2		
Cost 2		

6. Production and marketing

Products	Produced Quantity (Ql)	Own consumption (Ql)	Selling point 1						Selling point 2					
			Sold quantity (Ql)	Buyer	Unit price (DT)	Total value (DT)	Transport cost (DT)	Other trade-related costs (DT)	Sold quantity (Ql)	Buyer	Unit price (DT)	Total value (DT)	Transport cost (DT)	Other trade related costs (DT)
Milk														
Calves														
Manure														
Green forage														
Silage														
Grains														