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Evaluation of the Yemen's Agricultural Statistics and Information System

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1. Introduction

One of the main characteristics of the Yemen Economy is the dominance of the agriculture sector, which accounts for 19 percent of Gross Domestic Product (GDP) in 1994 down from 50 percent during the early 1970`s. The agriculture sector employs more than 50 percent of the labor work in the country in which women participation represents a considerable share of the total. Efficiency of agriculture production is markedly constrained by dominance of fragmented land holdings. The number of land holding is estimated to be around 800 thousand, widely spread into small fields. Nearly 90 percent of holdings are smaller than 5 hectares and nearly 60 percent are smaller than 1 hectare.

Another common feature of the agriculture sector is the rapid growing of *qat* trees, which consume at least 25 percent of the irrigation areas, and employ around 16 percent of the labor work. However, information and statistics about *qat* have been totally excluded from official data base, despite its importance on employment, production, use of water, and farm income.

The agriculture sector currently supplies the domestic market with most of its needs of vegetables, but comes up short in meeting the excess demand for cereals, pulse and fruits. Over the last twenty years, the agriculture production has been subject to great fluctuations and

disturbances, which resulted in relative deterioration of the share of the agriculture sector in overall domestic production.

In addition, the agriculture sector faces a limited access to accurate and reliable information and statistics which can be used for effective agricultural planning and researches. The importance of agricultural statistics and information comes from the fact that formulating public policies, preparing monitoring and evaluating development plans and projects related to agriculture and rural development should be based on comprehensive and detailed analysis of the structure and performance of agricultural sector.

The agricultural information and statistics system faces severe financial, human, and institutional resource limitations. Not only this, but it also faces structural constraints such as the fragmentation of the cultivated land, and the small holdings scattered in terraces and valleys. To give reliable agricultural statistics, the collection, processing, analyzing and dissemination of the data require trained personal, organization, transport and related facilities and srevices, since such process is costly and time consuming. Moreover, the collection of data and creation of information not relevant to current or future policies and plans would be worthless and waste of resources. In general the statistics must be made available on time, otherwise, they lose their values in the decision making process if presented late or lagged one or two periods.

The current agricultural statistics in Yemen have severe shortcomings which make their accuracy and efficiency questionable. The published data lack the scientific methodology for collection and verification process, and are limited to some annual and aggregated variables. The agricultural data need to be more comprehensive and to be disaggregated to include key variables such as the cost of production factors, sale prices of agriculture outputs, and the level of female participation comparing to male in the agricultural sector. Moreover, a high percentage of trading - possibly more than 60 percent in agriculture inputs and outputs - had usually been conducted by the informal sector, and does not go through the official channels; such phenomena should be reflected in the agricultural statistics.

Many requirements have to be conducted and established in the short and the long run to maintain a sound agricultural statistics and information system. These requirements include the need for comprehensive census, regional offices for agricultural statistics, and adequate training programs for the current and potential employees of the Department of Agricultural statistics (DAS).

The objective of this paper is to shed light on the current status of the agricultural statistics with regard to the collection process, evaluation of the collected data, the importance of agriculture data for economic policies and plans, capabilities and constraints of the agricultural information system, and finally recommendations to develop the current agricultural information and statistics to be vital element in the planning and development process in the country.

2. The Collection Process of Agricultural Statistics :

The collection process of the agricultural information and statistics in Yemen has gone through many changes and developments. During the 1960`s and 1970`s, the data collection was totally based on personal opinion and estimation. those types of data covered some of the agricultural variables such as cultivated areas, crops, yields and numbers of livestock.

For the northern Governorates, the agricultural statistics were compiled primarily by the Department of the Agricultural statistics. in the late 1970`s a project for developing agricultural statistics was established with the purpose to insure the flow and consistency of agricultural information needed for planning and research in the agriculture sector. Other institutions and concerns compile agricultural statistics as a result of their substantive functions. Among these can be mentioned the Department of Agricultural Marketing, which collects information on prices of agricultural products at urban markets; The Department of Animal Wealth compile statistics on numbers of livestock, and other regional agricultural projects and authorities which

collect information on specific crop and province for the purpose of researches and studies.

During the 1980`s the collection of the agricultural statistics depended on different techniques and methods: (i) several sampling surveys were conducted to set up the data base for the agricultural statistics. Those surveys covered the cultivated areas and yields of crops, fruits and vegetables, and the number of livestock. (ii) Annual collections of data relating to the area and production of various crops which were based on personal judgments. (iii) Data on sale prices were collected and covered some agricultural products such as cereals, cash crops, vegetables, fruits, and livestock.

2.1 Sampling Surveys: It should be mentioned that so for as agricultural statistics are concerned the system of collecting data are in a period of transition to new methodologies so that some of the surveys refered to below are mainly of historical interest while others may mark the beginning to new system of obtaining information or remain as attempts in search for such system.

The first attempt to conduct collection of agricultural statistics was undertaken in the northern governorates during the period from 1978 to 1983. Series of agricultural sampling surveys were conducted progressively, province by province in the following order : Dhamar (season 1977 / 78), Hodiedah, Hajja, and Mahweet (season 78 / 79), Taiz and Ibb (season 79/80),sadda and Albida (season 80/ 81), Sanaa (season 81/ 82), and finally Marib and Aljawf (season 82/82). During the same periods two experimental sampling surveys were conducted in the provinces of Dhamar and Hodiedah. The objectives of these series of sampling surveys and experiments were to establish the bench mark for the basic and current agricultural information and statistics. Those data were related to cultivated areas, number of holdings and holders, corps production and the number of livestock.

It is standardized that the time reference for agricultural sampling survey could be a month, season, or a full year depending on

the coverage of the surveys, the types of collected information and the capabilities of the statistics system. However, it is noticed that the time period to conduct the sampling surveys in the northern governorates continued for almost six years; The first sampling surveys would definitely make the collected data unreliable for comparative analysis and plans.

The second sampling survey was undertaken to compile statistics on vegetables and covered the provinces of Sanaa, Taiz, Ibb, Hodeidah, Albida, and Dhamar. The time reference of the survey continued for almost one year and a half (from 1983 to 1985). In the survey, data are requested on vegetables with reference to area planted, number of holdings, methods of cultivation and irrigation, fertilization, and machinery use. For the rest of the provinces, (Hajja, Mahweet, Sadda, Aljawf and Marib) The required information and statistics related to vegetables were recorded from the previous sampling surveys that conducted during the period from 1977 to 1983.

The third sampling survey was conducted to collect basic agricultural statistics for fruits. The survey covered the provinces of Sanaa, Taiz, Ibb, Hodeidah, Aljawf and Marib. The time reference of the survey lasted for one year, (during 1985). For the remaining provinces (Sadda, Hajja , Mahweet, Dhamar, and Albida) the required information were recorded and estimated from previous sampling surveys. The obtained information for fruits covered the area planted, number of holdings and holders, methods of irrigation and fertilization and machinery use.

Finally, sampling survey was conducted during the period from March 1989 to March 1990. under the supervision of American experts with financial and technical support of the USAID. The primary motive for conducting that survey was the need to update data concerning area for cereals, cash crops, pulses, fooder, vegetables, fruits other permanent crops, number of permanent trees and number of livestock. The survey also included data on number of parcels in each holding and its effect on agricultural operation. In addition, the survey covered the legal status of the holding , irrigation and water withdrawal systems

and bee hives, number of cells and production. Finally the sampling survey included data on chemical and pesticides use, labor, animal and machinery use in agricultural operations and problems facing the farmers.

The initial preparation for the survey started in early 1989. It included: creation the sampling frame, and designing the questionnaire. The field work for collecting data started at the province of Hodiedah in March 1989 and finished at the province of Sanaa in March 1990. After entering the data into the computer certain tests were performed to check the accuracy of the original data enters. Finally, the data were tabulated and published in volume in 1991.

The results of all those sampling surveys and experiments were considered to be the data base for the agricultural statistics. The annual publication of the data by the Department of Agricultural Statistics (DAS) treated the survey data as bench mark and tried manipulate their number to come up with a new number for the current year for every province. The process of collecting the annual data will be discussed in the next section.

For the Southern Governorates, the main sources of the agricultural statistics were the official institutions that run the agricultural sector. These institutions consisted of the state and governmental farms, the agricultural cooperations, other nominal institutions, and the private sector. They differ in their importance and contribution in the agricutural sector. The first three institutions used to run and control over 80% of the agricultural area and production. The agricultural data was officially collected from those institutions and there was no need for sample survey or field experiments. On the other hand, the private sector used to operate about 20 percent of the cultivated land. Therefore, the collection of data related to the private sector was done by personal estimation.

The first attempt to establish a reliable data base was in 1985, when the comprehensive agricultural census was conducted with the technical and financial help of the United Nations Development

Program (UNDP), and the Food and Agriculture Organication (FAO). The purpose of the census was to collect agricultural information related to holdings and holders, cultivated areas, irrigation method, crops production, number and production of livestock, etc.

2. 2 Annual Collection Data on Area and Production: The collection process of the annual data on area and production of various crops follows a baised and unreliable methodology. The Department of Agricultural Statistics had designed a form to be sent to different provinces in the country. The form contains a list of the crops and their areas and production. The crops breakdown according to the standard classification is as follows : (1) - cereals (sorghum, wheat, maize . .) (2)- vegetable (potatoes, tomatoes, onions . .), (3)- fruits (grapes, bananas, papaya . .), (4)- cash crops (sesame , coffee, cotton . .)

The required information is about the area and production of the current year relative to the area and production of the last year. In the form, it is assumed that the area and production of the last year to be 100 percent each. The only question is whether the area and production of this year has beed changes relative to the area and produstion of the last year respectively. The form would be sent to different provinces in the country, and could be filled out by officials at the regional agriculture offices and projects, by individuals at the cooperative associations, and by some farmers. Those institutions and individuals would send back their answers to the Department of Agricultural Statistics in Sana`a for conducting the estimation process of the current areas and production of the various crops.

It is noticed that the current method of the agricultural statistics lacks the reliable and scientific mechanism for collection, verification and estimation of the obtained information. The process does not involve any kind of random sampling techniques for collecting data to represent the total population.

Statistically speaking, the sample frames should be specified in terms of the size, the distribution, and the time for conducting the collection process of the data. Since the obtained data would cover

many samples represent various provinces. The mean and the standard deviation of each sample should be compared with each other, and tested to come up with an average number that represent the total population. Such basic techniques would give unbiased estimation for the collected data, and make the verification process of the data more reliable.

The forms that are distributed to collect information about area and production of the crops contain vague questions which technically lead to unclear answers. Consequently all the responses would be subject to human judgment which definitely would lead to unreliable information. Therefore, these forms should be replaced by questionnaires contain specific questions about specific variables that are mostly needed for research and planning in agriculture sector.

2. 3 The Annual prices Data: The Department of Agricultural statistics (DAS) is also publishing annual price data of cereals, vegetables, fruits and animal products for every province in the country. The process of collecting the sale prices of agricultural products follows an approach similar to that of collecting data on area and production of crops. The DAS hired fifty reporters assigned to observe and record prices in fifty weekly rural markets scattered all over the country. The DAS also designed a form contained list of the various cereals, fruits vegetables and livestock products to be sent to the reporter`s who are required to record the sale prices of the different agricultural products that are weekly sold in the rural markets and send their recording every three months to the DAS office in Sanaa in which the data would be reevaluated and be published on annual basis.

It is noticed that the process of collection and publication of annual statistics on prices follow a very biased method for many reasons:

(1) There is no sampling frame of questionnaire for collecting data so that the obtained information can be tested and verified by using analystical tools such as the means and the standard derivations of

every sample. Then the .collected prices can be aggregated over time space and qualities by averaging methods.

(2) The current collection of price data is subject to personal judgement from the beginning to the end. The data are collected on weekly basis and aggregated to be annual which make the accuracy of the published data questionable.

(3) The prices of vegetables and fruits always fluctuate on a daily, and a weekly basis. The published data on prices should reflect such fluctuation and instability in prices which have significant meaning with regard to marketing, researches an planning.

3. Evaluation of the Collected Data :

The first unified publication of the Department of Agricultural Statistics was in June 1991, covered the basic agricultural data of area and production of cereals, vegetables, fruits and number of livestock for the unified Yemen. The main motive to publish such pamphlet was to unify the basic agricultural data of the northern and southern provinces of the country. Basically, the data were collected by summing up the area and production of certain crops from the available data in both parts of the country. It is noticed that the pamphlet appeared with many mistakes and discrepancies due to the quick preparation.

The available agricultural statistics for the northern governorates were published annually by the DAS. The latest publication was in March 1990, and included time series data for the year 1985 to 1989. The volume contains of eight chapters. Chapters 1, 2 and 3 cover the area and production for cereals the animal production and vegetables and fruits respectively; chapter 4 covers the animal production and number of livestock in every province, chapter 5 covers the annual prices for cereals and cash crops, vegetables, fruits and animal production. The last chapters (6, 7 and 8) cover the exports

and imports of agricultural products, rainfall and seed and seedling production respectively.

3.1 Crops Area and Production Data: The current published data on crops area and production do not follow the sampling techniques for collection and verification. The whole process rather depends on personal opinion and judgment which leads to inconsistency and discrepancies in the published data. For example the data show that the crops area for some cereals and cash crops (i.e. sorghum, millet, cotton, tobacco, and sesame) were constant in all the provinces over the years 1985 and 1986. The same thing repeated for some of the vegetables (i.e. potatoes , radish, beans, lettuce, eggplant and cabbage). From these data one would conclude that the growth rate of the cultivated land for such crops was to be zero in 1986, which is unlikely to happen in all the provinces of the country.

Thus, one of the essential work needed to be done is to follow sampling method to collect data on crops area and production because collecting data by sampling is one of the most widespread techniques in many countries and organizations. The sampling survey can make substantial savings in resources, time and money. The sampling techniques require many steps especially those relating to: (i) the frame, accuracy and completeness, area sampling versus list sampling ... etc.; (ii) multi stage scheme, stratification, type of enumeration units and method of selection; (iii) size of sample, methods of estimation and sampling errors.

However, the major problems of sampling are to learn how to select samples that enable the investigator to make reliable statements about the population and to learn what kind of statements can be made.

For the purpose of planning and research, the data on crop areas, yield and production have to be disaggregated in various ways in order to satisfy the needs of the different users. The data have to be disaggregated according to :
a- regions : to facilitate regional planning ;

b- time: to show the crop rotation from year to year and the succession pattern within the year.
c- the different types of inputs: water (rainfed , and irrigation), types of seeds (local and improved), types and amount of fertilizer treatments, types of mechanical tools, and labor inputs.
d- the size of holdings and the legal status of holdings and holders which are essential in planning and development for agricultural sector and rural areas.

It is obvious that the process of collecting reliable information and statistics on crops and production has to be organized on a continuos basis by the Department of Agricultural Statistics and other concerned institutions and regional authorities. The statistics have to be published periodically (monthly, quarterly, ... etc.) and have to be on time to satisfy the need of planners, policy - makers and researchers.

3.2 Crops Prices Data : The current published data on crop prices lack the scientific methodology of collection and verification because personal opinion and judgment is considered to be an important factor in the collection process. Accordingly, the current data give distorted facts about the pattern of changes in prices and can mislead policy - makers and researchers in the agricultural sector.

The published price statistics show that the rural market prices of a unit (kilogram) of cereals, cash crops, vegetables, and fruits were on avereage constant and in some cases were declining during the period of 1985 to 1989. Such statistics do not capture the fluctuations that always characterize the prices of crops, specially the prices of vegetables. For example, the prices of a unit (kg) of tomatoes in the rural market change rapidly every day and every week . Thus the published prices do not capture such volatility. On the contrary, they reflect unreal pattern and trends. By calculating the inflation rate for the prices of tomatoes, we would conclude that it was on average negative during the period of 1985 - 1989. Such conclusion certainly contradicts the reality of the domestic market in which inflation was one of the major phenomena over the last ten years.

Table 1: Precentage Change of Tomatoes Prices

year	Price YR \ KG for Tomatoes	% Change
1985	9.24	-
1986	9.38	- 9.3
1987	9.54	+ 13.8
1988	9.26	- 2.9
1989	7.00	- 24.41

Source : The Agricultural Statistics Yearbook , 1989 , Ministry of Agriculture and Fisheries, Sanaa - Yemen

In addition the statistics do not show the responses of crop prices to changes in exchange rate. Over the last six years, the exchange rate of Yemen Rial in terms of US Dollars has been increased over 1000 percent, which lead to inflationary pressures on the prices of imported commodities and on the prices of domestic outputs. The prices of inputs in the agriculture sector have greatly increased matching the increase in the wholesale prices in the economy.

The crop prices statistics have to be disaggregated to meet the need of policy - makers and planner according to the following classification :

(i) prices received by farmers: those prices are the production prices which are normally observed at the first point of sale of agriculture products (i.e. the prices of cereals, vegetable, fruits, livestock product and fishery products). Those prices could be obtained from selected framers, purchasers of markets on daily, weekly monthly or quarterly basis, and can be aggregated over time space and qualities by averaging methods.

(ii) prices paid by farmers: which correspond to local retail sales of various inputs including seeds, fertilizers, pesticides, fuels, construction materials, machinery and general supplies. The price can be obtained from three types of sources who are the most common and feasible source of price data, farmers and retail markets.

The two types of prices should be collected more frequently because of the importance of such prices to marketing and planning.

3.3 Other needed Statistics: The current published data completely excluded information and statistics on some of the main variables which can be identified as :

i) The labor force employed in the agriculture sector,
ii) The role of women in the agricultural activities,
iii) The production and consumption of Qat.

The labor force data can be obtained by conducting a special survey with the purpose to establish data on employment in the agriculture activities. In this regard the population census can be utilized to collect detailed information about the status of labor force in agriculture. The data should be disaggregated to include many indicators such as :

(i) permanent and occasional agricultural workers who can be classified by sex (male, female), age (children, adults, . . . etc.)
(ii) the cost of labor which can be defined by the wages paid to permanent and occasional workers and the wages paid to male and female workers.

On the other hand the agriculture statistics have to include detailed information on the status of Qat with regard to : - the area and production of Qat, - number of qat trees in every province, - the cost of production and marketing, and the consumption expenses.

In addition the agricultural statistics have to include data on the most inportant voriable that has a great effect on a gricert, That is water resources and soil. The data should inculed fishery products, machinery and equipment.

4. The Agricultural Statistics and Economic Policies and Analysis

The responsibility of the agricultural statistics system, in the unified Yemen, is to provide information to policy makers in the public and private sector who are concerned about food and agriculture development. Such information would help policy markers make better decisions in allocating scarce resources to meet objectives. The advancement and promotion of the agricultural sector is considered to be the major factor that influences the national development plans in the whole country. The major objectives of the agricultural sector can be summarized as follows :

1) to raise agriculture's share in GDP through increasing efficiency of agricultural production and support services;
2) to increase crops and livestock production to meet domestic demands and to expand exports;
3) to optimize resources utilization and to limit expansion in Qat production;
4) to insure supplies of adequate raw materials for agricultural processing industries.

The development plans set strategies for meeting these objectives which can be stated as follows :

1) raise farmers knowledge by developing the administrative and technical aspects of research, extension, demonstration and information services.
2) provide adequate supplies of inputs (fertilizers, chemicals, and machinery) for insuring increased production ;
3) establish a network of marketing facilities, expand wholesale markets and regulation, build cold stores,
4) encourage the private sector, and an importation of fruits and vegetables.

The realization of the objective and strategies would be tied up beside other factors to the availability of accurate and reliable information and statistics of food and agriculture and other related social and economic activities.

Thus, to identify the available natural resources and ensure their optimum use, the Ministry of Agriculture and Water Resources in general and the Department of Agricultural Statistics in particular would have to carry-out various activities with the aim to establish reliable data base for policy makers and researchers concerning food and agriculture in Yemen. The data base can be created by conducting various censuses and surveys such as :

1) agriculture census to collect data on the structure of agriculture including the availability of agricultural inputs for goods and services, and can be limited to the aspects of agriculture variables which change slowly over time under normal conditions.

2) annual agricultural production survey to be as the source of current statistics on agricultural production which are subject to periodical changes and were not included in the agriculture census.

3) periodicel price survey to include prices received by farmers, prices paid by farmers, whole sale prices, retail prices, export prices, and import prices.

4) livestock survey to collect data on both animal and holding of livestock. This survey is necessary to evaluate animal husbandry practices in the country including nomadic areas.

5) special agricultural surveys on particular subject such as: (i) land and soil to study land and soil classification, property mapping and the appropriate methods (ii) Water resources survey to prepare the hydrological map needed for water resources management, and to help introducing modern irrigation system for new areas. Finally, machinery and equipment survey and fishery survey.

4.1 Statistics and Economic Policy : The agricultural statistics should be organized and classified in a way that help formulating economic and development policies. This generally requires comprehensive and coherent information of all aspects of agricultural activities. One of the major concern to policy makers is food supply and price stability for agricultural products. Thus, the agricultural statistics system should provide to policy makers useful information on time, relating to the magnitude of food shortages or surplus and the economic cost and

benefits to adopt a certain policy whether to rely on private market or on public interventions to reduce fluctuations in the food supply.

In some cases, the domestic shortfalls in certain food commodities could be as a result of pests, poor irrigation system, inefficient marketing or financial limitations. If information and statistics about these variables were not available on time, it would be uneasy task to determine the causes that lead to the decline of the production of such commodities. In the absence of the necessary information the government might turn to importing that commodity from abroad to satisfy the domestic excess demand. Such policy option would cause deterioration in the country foreign exchange and finally to balance of payments problems.

On the other hand, if problems affecting the level of production of the scarce food commodity were identified through the availability of information, the government would react differently by fighting crops diseases, improving irrigation and marketing systems or providing credit to farmers to ease the financial constraints. Such policy options would lead to the raise in production, at the same time the policy option to import food commodities would be ruled out. Consequently, problems facing balance of payments would be less harmful.

4.2 Statistics and Economic Analysis : The other thing illustrates the importance of agricultural statistics is the need for such statistics for the purpose of economic analysis and researches relating to agricultural activities. The analysis of demand and supply for certain food commodity enables both researchers and policy makers to evaluate the current situation with regard to commodity prices, the excess demand or the excess supply and the market adjustment.

For example, to evaluate the status of demand and supply for sorghum in the Yemen market, many variables should be identified, and there should be available information relating to each variable. On the demand side, the needed variables can be either quantitative or qualitative. The measurable variables include: i) The quantity of

sorghum consumed in the domestic market. ii) The price of a unit (i.e. kilogram) of sorghum. iii) prices of competing commodities (i.e. prices of wheat, maize, rice ... etc.) iv) The general price level. v) The level of income of consumers. vi) subsidies or grants provided by government to households.

On the supply side, the measurable variables include : i) the quantity of sorghum produced domestically ; ii) the prices of competing of complementary commodities, which can be represented by prices received by farmers. iii) the current prices of a unit of Sorghum (kilogram) . iv) the prices paid by farmers such as prices of fertilizer, machinery, labor, pesticides and other inputs, v) government subsidy of grants.

The qualitative variables can be identified as :

- Capital inputs or infrastructure such as irrigation capacity roads, transportation ..etc.
- level of technology (i.e. productivity indicator.)
- other factors on which producers has little or no control on them in the short run such as weather, pests, diseases .. etc.

In summary, the availability of detailed information about social and economic variable related to agricultural activities is one of the essential requirements in formulating public and private policies for agricultural sector.

5 Problems Facing the Agricultural Statistics System :

The ultimate goal of the agricultural statistics system is to provide on a regular schedule, timely and credible statistical information about agriculture. However, the agricultural statistics system in Yemen is currently facing many difficulties which can be summarized as follows :

1. Small holdings of farmland is one of the most severe and intractable problems that is facing the agricultural statistics. The sampling survey conducted in 1989 showed the structural problem of fragmentation as indicated below :

Table 2: Percentage Distribution of Holding Size

Holdings size (Hectare)	% of cultivated area
less than 0.25	20.7
0.25 - 0.5	20.0
0.5 - 1.0	20.4
1.0 - 2.0	15.8
2.0 - 5.0	14.9
5.0 - 10.0	5.5
10.0 - 20.0	1.9
20.0 - 50.0	0.6
more than 50	0.2

Source: MAF, 1989, " Agricultural Statistics Yearbook ", Sana'a, MAF, DAS.

In other words, nearly 91.7 percent of holdings are smaller than 5 hectares and nearly 60 percent are smaller than 1 hectare.

2. The holdings are not small in size but also are fragmented in many places. The survey also showed the following :

Holdings	percentages
one piece	15.1 %
two pieces	23.0 %
3-5 pieces	41.1 %
6-10 pieces	14.1 %
more than 10 pieces	6.4 %

In addition, the agriculture terraces represent around 60 percent of the total cultivated land. This could make the estimation of the area very difficult and questionable.

3. The shortage of human, financial and institutional capabilities considered is considered one of the main constraints on the current

agricultural statistics. The availability of such resources and capabilities will defenitly help overcoming the other obstacles such as fragmentation of farmland and farm holdings.

6 Capabilities of the Agricultural Statistics System :

Before the unification of the two parts of Yemen, the capabilities of the agricultural statistics and information system in the northern provinces differed from that in the southern provinces. For the former ones, the collection and publication of the agricultural data were conducted by the following institutions:

- The Department of Planning and Statistics at the Ministry of Agriculture was the official source of most of the agricultural data.
- Other regional agricultural projects and institutions: i.e. Tihama Development Authority, Southern Uplands Rural Development Unit, Central Highland Agricultural Development Project, Sadda and Hajja Agricultural Rural Development Authority, Eastern Region Agricultural Development Authority Agricultural Research and Extension Authority.

These institutions frequently conduct collection of agricultural data for their researches and experimental field work. Such data could be limited to subjects and specific crops and could be repeated in other institutions. Most of the time, the obtained data remain within the boundaries of the institution and can not be circulated among other institutions, or passed to the Department of Agricultural Statistics.

For the Southern governorate, the collection and publication of the agricultural statistics was the job of the Central Organization for Statistics. However, after the unification the responsibility of agricultural statistics was assigned to the Directorate of Agricultural Statistics at the MAWR. The duty of this Directorate is to (i) establish a comprehensive system for agricultural information and statistics, (ii) conduct the collection and publication of statistics and information related to the different agriculture products (planted, livestock, fish) and to the activities of the agricultural institutions. Coordinate with Authorities and projects for the purpose of setting the general plans

and annual programs in terms of the flows of statistics and information.

The available capabilities (human, material technical and institutional) are short enough to achieve the new underlined goals and objectives. Those capabitiles can thesummarized as follows :

- Human capabilities: The Department of Agricultural Statistics employees 32 individuals with different levels of education and training. The staff can be classified according to the level of education as follows: 11 with university degree, seventeen with high school degree and 4 drivers. Some of the staff have received basic training related to the field work of collecting information and analyzing statistics while the others are clerical works.
- The managerial capabilities consist of : * nine cars in good shape, which are used for transportation and for field work, * seven personal computers, only one is installed, and is used for word processing, *one copy machine, and two stencil machines.

In addition, the department possesses old furniture, equipment for measuring areas and other equipment. The annual budget of the department is around 2 million Yemen Rials. The department used to be supported by us AID project, but the fund stopped because of the Gulf crisis.

The offices of the department are jointly located the same building with the Arab Organization for Agricultural Development and the Agriculture Office for Sanaa province. This situation would make the performance of the department questionable.

7. Requirements for Developing Agricultural Statistics Systems :

The collection of agricultural information and statistics is huge and continuous process. Since such data are always changing, They need to be updated periodically. On the other hand, the flow of agricultural data should be collected at one time, otherwise they could be worthless, especially if they were published lagging one or two periods. The efficient and consistent information system needs a highly

sophisticated network and capabilities to achieve reasonable job in making the data accurate and on time. The basic requirements can be summarized as follows :

1. Conducting comprehensive agricultural census to create a very confidential base for the agricultural information system. Such census would help all the institutions relating to the agricultural sector, and make credible information available for researchers and experts in the agricultural affairs. In addition, the obtained data would be the basic inputs that the government and the MAWR would need in their planning process for developing the agricultural sector in the country. The credible and accurate data would be a good incentive for the private sector to start investigating the agricultural sector rather than divert their capital to other industries or services. The census should emphasize on the disaggregated data as well as aggregated ones. Moreover, it should avoid the shortcoming of the previous ones. I should cover the most needed data such as the cost of production, the male and female participation in the agricultural labor forces and the areas, production and consumption expenses of Qat.

2. Establishing regional offices for the agricultural statistics all over the country. As a first step, the country can be divided into six zones, in order to establish regional offices for every zone as follows :

i) Hadramout Office - to cover the provinces of Hadramout, Shabwa, and Almahra
ii) Lahj Office - to cover the provences of Lahj, Aden, Abyan and Albida
iii) Ibb Office - to cover the province of Ibb, Taiz and Dhamar
iv) hodeidah Office - to cover the provinces of Hodeidah, Hajja and Al- mahweet
v) Sadda Office - to cover the provinces of Sadda, Marib and Aljawf
vi) The head office in Sanaa - to supervise the regional offices and cover the province of Sanaa.

Every regional office should have the necessary human, technical and material needs. Those needs initially can be as follows :

- Manager, majoring in statistics with experience in the field of agricultural information.
- Three to five technicians to handle the work of collection and verification of data, and the work on computers.
- One to two cars to facilitate the transportation between provinces, villages and rural markets.
- Telephone and Fax machine to facilitate the communications between the head office and the regional offices, and between the regional offices themselves.
- Other supplies such as computers, stationeries, furniture, etc.

3. The current agricultural statistics relies entirely on a list frame sampling which is based on information obtained from the province, district and village level. The methodology seems to have the problems of baisness and double accounting. In addition, the list frame needs time and effort to be conducted monthly, seasonally and annually. Therefore, the agricultural statistics system can get benefit from the advanced and available technology by selecting another method for collection process of information. This alternative is the area frame sampling. This method is expensive to construct, but it is economically feasible for several years with very little modification.

The area frame is constructed by taking comprehensive photographs for all the provinces in the country. The area frame would considerably improve the quality of data on crop acreage and livestock number.

The USAID took the initiative in conducting the feasibility study of this project, and started financing the first stage of it by photographing the Dhamar province. However, because of the Gulf crisis the project stopped operating.

4. The Department of statistics needs better offices space, because it has requirements other departments do not have. The building should be designed to be suitable for the job nature of the department. for example, the building should contain the following :

- Compute network. The questionnaire of the annual survey, or the comprehensive agriculture census require organized for data entry, data processing and statistical analysis.
- Storage : To store questionnaires, data tapes and reports. If area frame technology is to be implemented, storage is needed for maps and photography used in area frame construction.

In this regards, USAID has agreed to fund the construction of a new Agricultural Statistics building. The implementation of the agreement was delayed because of the Gulf crisis. Recently, the MAWR and USAID have agreed to start executing the project.

5. Training is the key elements to develop an efficient agricultural statistical system. Hence, it is required to establish training program for the staff presently employed at the Department of Agricultural Statistics, and for the potential ones. In the training, staff should have the chance to obtain some knowledge of statistical methods and techniques, computer usage and office management.

In addition, a number of individuals should be identified and enrolled in long term statistics training program in a good Arabic universities or non-Arabic ones. This program should be oriented in the areas of statistical computer packages for the improvement of the analysis and presentation of national statistics.

8. Conclusions and Recommendations :

The agricultural statistics are considered to be a permanent requirement for planning decision making process and research in agricultured sector and other related sectors of the economy. However, the published agricultural statistics in Yemen are not prepared to cover the needed information for every concern of the agriculture activities. The available data are limited to some aggregated variables, such as area and production of crops, number of livestock, and crops prices. Moreover, Those data have some shortcomings with regard to methods used for collection and dissemination. It is noticed

that the mechanism for collecting the annual statistics does not involve sampling survey techniques, but it is subject nather to personal opinion and estimation.

The agricultural statistics have to be improved and standardized to meet the international classification of the FAO. The data should include key variables which were completely ignored in the previous statistics such as labor force in agriculture sector, qat production and consumption Fishery products etc.

In addition the data should be disaggregated to provide detailed information with regard to prices (paid or received by farmers), crops area (irrigated, rainfed ...), labor force (age, sex, type, ... etc.), so that the statistics could be useful for policy makers and researchers.

The agricultural statistics system faces financial, institutional and human limitations which make the efforts to develop the current statistics unsatisfactory. The improvements of the agricultural information and statistics require substantial efforts by MAWR to over come the financial, human and institutional constraints. The requirements for developing sound agricultural system can be summarized in the following part.

Recommendations

1) The published agricultural statistics were found to be limited to some aggregated variables which do not give detailed information about the whole agriculture activities. Therefore, it is recommended to conduct a comprehensive agricultural census to cover the unified Yemen with the objectives (i) to collect data on agricultural structures that do not change rapidly over time ; (ii) to obtain detailed information on agriculture labor force characteristics, cost of inputs used for agricultural production and other related variables.

2) Another priority area to develop the agricultural statistics is to establish annual sampling survey program to provide more current agricultural statistics include rural labor force, livestock production,

crops prices, agricultural services establishments, qat production and consumption, soil and water resources and other related subjects.

3) The collection and publication of agricultural statistics are solely conducted by the Department of Agricultural Statistics at the MAWR in Sanaa with little or absence of collection operation on the community and regional levels. Therefore, there is a need for establishing regional offices for the agricultural statistics. The country can be divided to number of zones where regional statistics offices can be established and operated. In addition, the head office of the Department of Agricultural Statistics needs better office space to be suitable for the job nature of the department.

4) The collection, processing and publication of the agricultural statistics should be conducted with full coordination with other concern departments and institution at the MAWR such as Marketing Department, Animal Wealth Department, and the other regional agriculture authorities and projects. Such coordination would help utilizing the limited human and information of agriculture activities and minimimg the cost of collection data and information an agriculturad activities.

5) Training is one of the key elements to develop efficient agricultural statistical system. Therefore, it is required to establish training program for the present employees and for the potential ones to the Department of Agricultural Statistics. In the training program, the staff should have the chance to obtain some knowledge of statistical methods and techniques, computer usage and office management.

6) It is important that financial resources be allocated and be stable over time to ensure effective and efficient operations and results of the agricultural statistics.

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