RAF/AFCAS/05-6.3 E

September 2005

联合国粮食及农业组织 | FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS | ORGANISATION DES NATIONS UNIES POUR L'ALIMENTATION ET L'AGRICULTURE | ORGANIZACION DE LAS NACIONES UNIDAS PARA LA AGRICULTURA Y LA ALIMENTACION | منظمة الأغذية والزراعة للأمم المتحدة

Agenda Item 6.3

AFRICAN COMMISSION ON AGRICULTURAL STATISTICS

Nineteenth Session

MAPUTO, MOZAMBIQUE, 24 - 27 OCTOBER 2005

NEW RESOURCES ACCOUNT AND RESOURCES QUESTIONNAIRE

1. Introduction and background

For about five decades now FAO has carried out statistical data collection on agricultural inputs such as land use, fertilizers, pesticides, agricultural machinery and trade, *et cetera* and disseminated such time series information through hard copy/FAO Statistical Yearbook and FAOSTAT website. These data have played important role in helping users to monitor the development capacities of countries for production, imports, exports of resources use in agriculture among others. In recent times the narrow focus on the use of the data for making sound policy decision related to the agricultural sector has shifted to cover a wider concept related to the total food and agriculture sector, including the rapidly changing markets and the multi-functional role of agriculture involving social, economic and environmental concerns.

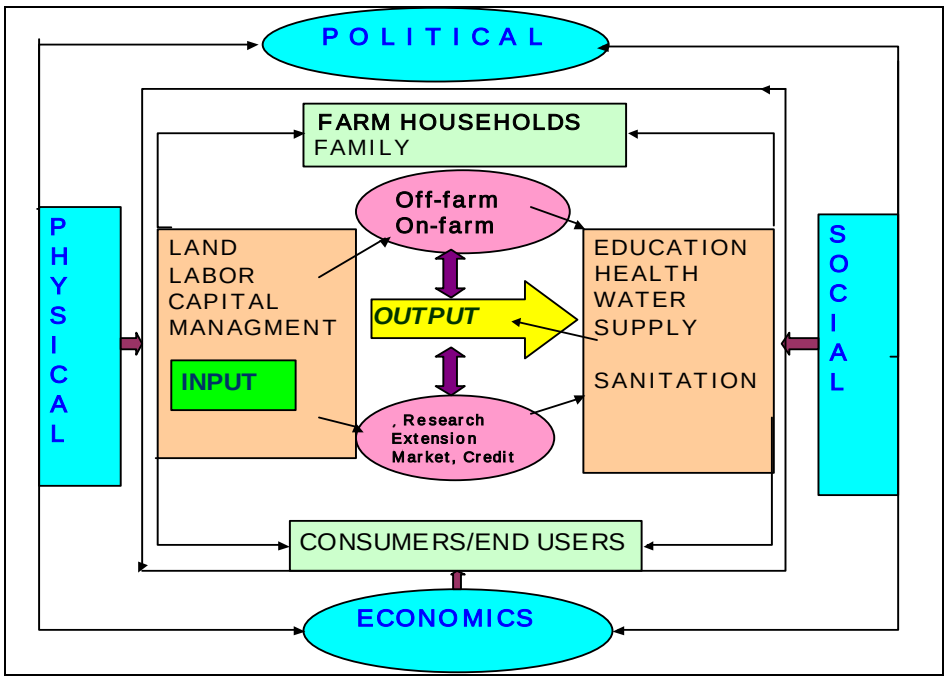
In many countries the increasing pressure (domestic and international) to use more effectively budgetary resources, the increased foreign competition and a need for diversified markets, among others, call for a better and rigorous use of data as well as for improvements in the way they are collected..

Today options are more constrained due to resource limitations while at the same time, countries and institutions are striving to have better understanding regarding performance of agricultural sector and the need for reliable and sustainable access to accurate and timely data on agricultural resources information has increased. Moreover, due to increase competition with globalisation of markets, farmers have become increasingly aware of the need to have access to new approaches and consolidated information that will enable them make efficient use of the available resources in order to produce the quantity and quality of agricultural products required by the market in the most sustainable and efficient manner (Figure 1).

Thus, FAO Statistics Division recognizes the need to re-engineer the processes of data collection, processing, analysis and dissemination and how the agriculture resource information system could be improved to provide the

adequate inputs for an agricultural information system for meeting the needs of policy makers to alleviate poverty and improve food security and livelihood in general, particularly in developing countries. In response to these on going changes, such as the integration of agriculture information into the global market economy, the FAO Statistics Division is undertaking a new approach in the compilation, processing, analysis and dissemination of statistics on agricultural resources. Information on resources will become part of the integrated conceptual objectives and design of the new version of FAO global database on agriculture FAOSTAT2 for providing relevant message to the national and international communities for decision making and policy formulation.

Figure 1_ Conceptual Framework of Production Process and the Environment.



2. Resource Accounts

The resource accounts will be an integral part of FAOSTAT2 Analysis Modules (Figure 2) and will attempt to consolidate diverse types of data requirements needed for policy formulation and decision making at national and international levels. The resource accounts will comprise of different statistical modules on land, water, labour, capital, intermediate consumption, energy and trade, among others to meet some basic requirements of FAOSTAT2 and CountryStat Project. The accounts will serve as a repository for a collection of consolidated, coherent and complete datasets based primarily on official data collections in an attempt to provide users with a comprehensive dataset essential for agricultural policy formation and analysis.

These related data modules within the resource accounts will assist in providing an overall view and dimensions of the absolute level of performance indicated by different resource types in the agricultural production processes, and as well as related to economic-social-environmental indicators.

- **Socio-economic indicators**

The resource accounts framework will attempt to provide inputs for some basic calculation of economic indicators such as agricultural value added, productivity, income, variable costs (fertilizer, seeds, pesticides, hired

labor, interest on operating capital, etc), fixed costs (depreciation, interest on fixed capital, insurance and taxes, etc), net profit, cost of production and annual/total value for the different level of resources ,etc.
Combining agricultural value added with homogeneous quantity of agricultural land (index that is calculated in the FAO system) it will also be possible to estimate an indicator of performance of agriculture, taking into account the natural endowment.

- **Agri- environmental indicators**

Agri-environmental indicators need a type of information that is usually obtained after complex modelling exercises. Nevertheless, some simple but useful indicators can be produced out of the new information that will be available, especially concerning pressure on some critical resources, as water, as well as on environmental potential damage as consequence of intensive use of pesticides.

3. New features of resource accounts

A) Inputs

The resource module will be structured to comply with the objective of collecting, analysing, interpreting and disseminating information relating to food, agriculture and nutrition. In this regard, the spectrum of agricultural inputs in view of FAOSTAT2 is broadened beyond the narrow concepts of agricultural production to include allied activities such as animal husbandry, forestry and fishing. The resources module will be take an integrated approach in view of relationship between physical inputs and physical outputs as they play very useful role in helping us accurately measure the performance and the efficiency of various agricultural sectors within the overall economy as follows:

a. Goods and services currently consumed in agriculture: Seeds, fertilizers (N, P, K and compound fertilizers), pesticides (fungicides, insecticides, herbicides, others), animal feed, and energy consumed (electricity, fuel, lubricant, etc.).

b. Goods and services contributing to agricultural investment: Agricultural machinery and equipment (tractors, combines, irrigation pumps, milking machines, etc.). Livestock used for breeding, milk or work, including draught animals.

c. Factor services; Rent paid for agricultural land, rental of agricultural machinery, interest rate and wages paid to agricultural labour

Intermediate consumption of all inputs into the agricultural units will cover all tradable items specified under (1) Goods and services currently consumed in agriculture and (2) Goods and services contributing to agricultural investment consumed in the production process. Feed is excluded from intermediate consumption since it is an item that is produced and as well consumed in the production process within the agricultural sector.

As broadly defined in the framework diagram (Figure 3) the resource accounts module will cover all available resources going into the production process associated with agriculture, forestry and fisheries as follows:

i) Land
ii) Labour
iii) Machinery
iv) Fertilizer
v) Chemicals
vi) Water Resource and Irrigation
vii) Livestock + maintenance costs
viii) Feed
ix) Seed
x) Energy
xi) Investment of Goods & Services

xii) Financial Capitals

The aim of the overview concept is to present a comprehensive picture of what the structure should cover if there are no constraints. However, in view of financial and human resources constraints, the concentration will focus on selected areas such as: land, labor, machinery, fertilizers, pesticides and water. The remaining components of the resources module will be part of future agenda for doing research activities.

Agricultural resources accounts as defined in the framework include statistics on factors of production (land, capital and labour, inputs) required for undertaking agricultural activities. These data-sets will also be required in physical and monetary terms to project level of their use vis-à-vis resultant output. The resource accounts framework for collection of these data-sets will be based on the System of Economic Accounts for Food and Agriculture (SEAFA) which has been designed using SNA 1993 structure to meet the requirements of planners and policy makers for dealing with the formulation of various plans and polices relating to food and agriculture. SEAFA provides detailed information needed for making recommendations on subject matters such as improved methods of production, improvement in processing, marketing and distribution of food and agricultural products, products for import substitution, improvement in the nutritional intake, requirement of credit, conservation of natural resources.

4. Physical Account

Physical Account –will be mainly an assessment of the physical units (quantities) of inputs or items used in the production process for the various sectors (Agriculture, forestry and fisheries). For examples data on the quantity/cubic unit of water, energy usage, area of cultivated land, number of kilogram of seeds, feeds, including related resources applied in the various sectors will be recorded in this account. The physical account will cover all items produced, exported or imported mainly for the purpose of agricultural production. It is worth to also mention that there is an important difficulty concerning physical accounts: the units of measurement are essentially heterogeneous. For accounting purposes as well as for comparative analysis, it is necessary to have commons units of measurement. This problem can be solved using homogeneous measures, even if it implies some degree of simplification. In the case of food accounts this procedure is employed since many years ago using calories as common unit of measure. It is possible that the more appropriate physical common unit of measure for measuring agricultural resources would also be an energy unit in some cases. Taking the specific case of fertilizer, the concept of nutrient unit is the appropriate one for accounting fertilizer use. In the case of land, an index of potential agricultural land productivity allows to convert a certain quantity of surface area in an equivalent of "high potential agricultural land surface". Without using a common unit of measurement, the utility of physical date is considerable reduced.

5. Monetary Account

Monetary Account - an assessment of the monetary value (market and non-market) of the physical unit (quantities) utilized in the production process. For example, if X amount of cubic water (quantity) is used in the agricultural sector per year, this will translate into $X (value) per year in the monetary account.

The monetary account valuation analysis will be calculated using the physical quantities and prices. Of course, there is an issue to solve concerning what prices should be used. Ideally the common practice adopted by farmers is price paid when they participate in the capacity as buyers of agricultural requisites at the far-gate or at the local village site depending on the prevailing situation [(Formerly, what was used was prices paid by farmers (farm-gate)]. This information was collected in national currencies. It should continue like this, but it will be necessary to use conversion indexes in order to have a common unit of measure for all countries.

6. Meta data

Metadata enhances understanding information on data documented on concepts and definition, classifications, methodology used in its collection, national contacts, etc. The usefulness of metadata information is essential for statisticians who compile, validate and analyse the data, as well as to the users, both internal and external to FAO, who access the data.

7. Concepts and definitions

The requirement for the compilation agricultural resource accounts data will need to follow internationally recommended definitions to enable desired level of aggregation for comparison. Some of the conceptual problems that might be encountered in the collection, compilation and presentation of data for building the agricultural resource accounts will therefore need to be addressed for providing clear understanding of the concept vital for compiling the relevant data necessary for making relevant calculation useful for policy formulation at both nation and international level. In this regard, it would be also significant to develop mechanism for harmonizing national concepts to be compatible with international standard concepts. An attempt is therefore been made to conceptually define some of the areas covered in the agricultural resources module to clearly define concepts for individual items as shown in figure 2.

Looking at the diagram in figure 2, it is possible to observe the necessity of using common unit measures in order to make this framework operational.

Figure 2.

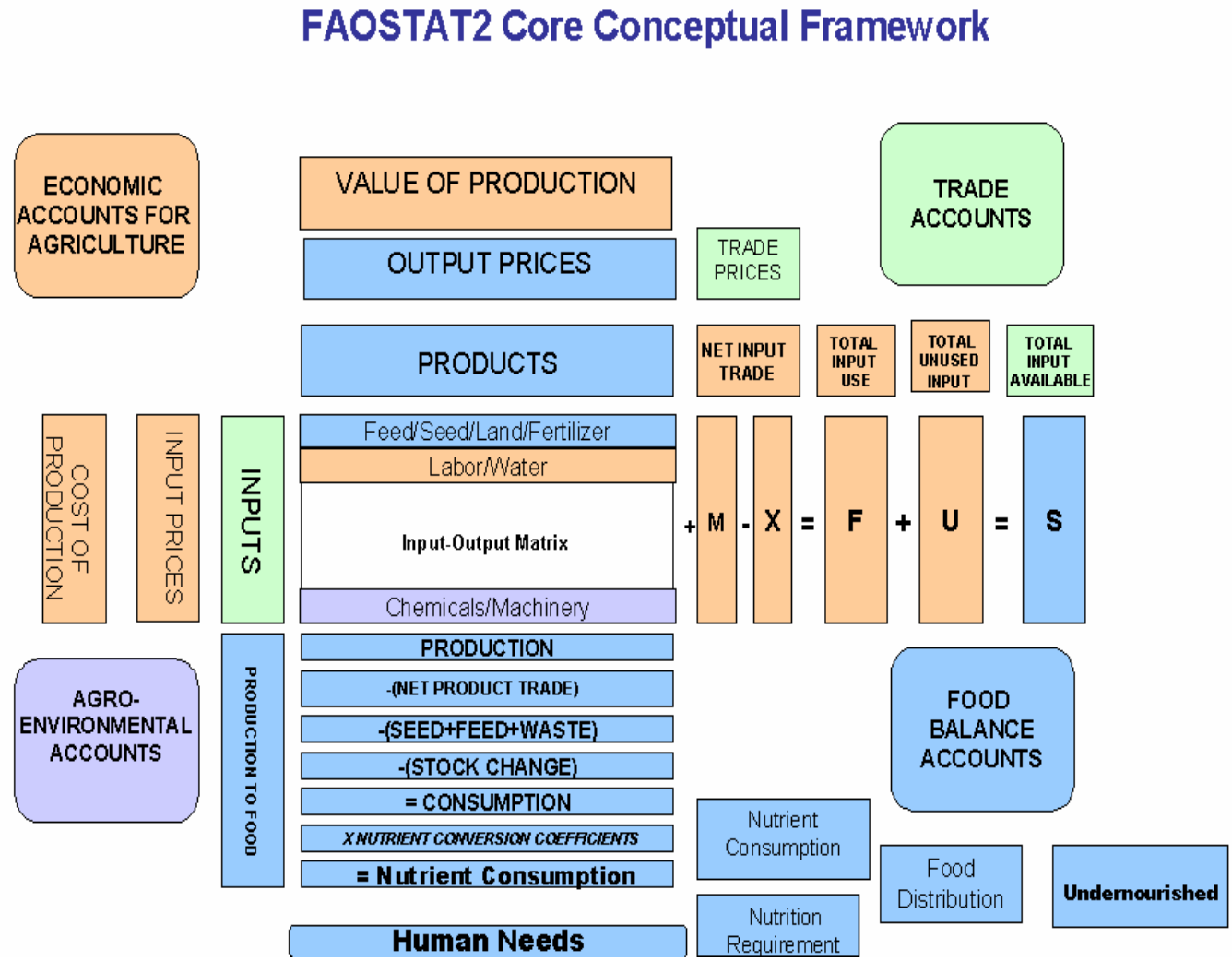


Figure3. Conceptual over-view of the Framework of the Agricultural Resource Accounts Module in the Context of FAOSTAT2

- Value of Output +Taxes (less Subsidies) minus (Intermediate Consumption+ Consumption of fixed capital) = [Net Income(Net Value Added)] = [Labor cost + Surplus]

LABOUR		LAND USE BY CATEGORY								INVESTMENT						WATER FOR IRRIGATION				INTERMEDIATE CONSUMPTION (INPUTS & OVERHEAD)						TRADE (Qty)	
Paid Worker by Gender	Unpaid workers and family labour by Gender	Forest	Pasture	Very suitable	Suitable	Moderately suitable	Marginally suitable	Non suitable	Area Under Green Houses	Permanent Crops	Livestock	Buildings	Irrigation Works	Tractors and Other Machinery	Others	Ground Water	Surface Water (Canals & rivers)	Reservoirs	Other Sources	Seed(Local and improved)	Fertilizers	Pesticides	Energy (Oil, petrol and electricity)	Services and Others	Feed	Import of Goods and Services	Exports of Goods and Services
Wages by Gender				Purchase Prices of Crop Land						Farmer Purchase Prices						Water Charges paid by Farmer				Farmer Purchase Prices						Trade Prices	
				Land Rent																							
										Consumption of Fixed Capital																	

Value of Output	+	Taxes *less* Subsidies	l e s s	Intermediate Consumption	l e s s	Consumption of fixed capital	=	Net Income (Net Value Added)	=	Labour cost	+	Surplus

- Cost of Production = Costs of Inputs + Cost of capital (Consumption of fixed capital) + Land rent + Labour cost

In summary, the resources accounts as seen in figure 3 will have link with other datasets provided by other modules within the FAOSTAT2 Core Conceptual frame work this will enable data interchange with several accounting or analytical frameworks such as quantities and trade items and as well as values of inputs into the production process among others.

8. Resource Questionnaire

The data for the resource accounts will be collected in numerous ways, primarily by issuing a new designed integrated questionnaires to send to member countries. The integrated resources questionnaire will be comprised of

several thematic module-Questionnaires (land, labour, water, etc).Depending the stages of development it is also possible that the land resource module questionnaire could be sent separately from the water resource questionnaire. Others areas of supplementary data collection would be through secondary sources such as those from international and national publications or yearbooks, agricultural yearbooks, pocket-books; periodicals; FAO Country Representatives' reports, country visits, etc.

The main body of the questionnaire will cover three sections described below.

1) Resource Production, Availability and Stock as follows:

- production, imports, exports and consumption of fertilizers
- agricultural machinery: number in use and trade
- imports, exports and consumption of pesticides

2) Resource Costs - Prices paid by farmers/Units/Shadow price covering following items:

- rent paid for agricultural land, irrigation charges, interest paid on loans, seed, animal feed, draught animal, energy.
- fertilizers
- machinery and equipment
- pesticides
- others

3) Resources Trade: Quantity and value of agricultural chemicals, machinery, etc.

The Agricultural Resources Questionnaire is attached for your review.

9. Data collection, HS and FAOSTAT code review

A new mechanism will be adopted and implemented in order to facilitate the collection, comparison and analysis of resource statistical data based on the Harmonized System (HS). For example, until now, the normal practice for most fertilizer trade statistics is at the 6 digits level, and no country reports such resource trade data by source and destination in nutrient terms. However, regarding the new resource accounts, extensions of the international HS for the collection and dissemination of resources statistics at details level will be introduced extending to 10 digits.

Thus information on data collection, compilation in resource accounts will be classified with new harmonized coding system to ensure correspondence and compatibility with other international statistics those used in International Harmonization System.

10. Data elaboration and dissemination

The resource collected data will be elaborated and incorporated into the FAOSTAT database to be accessed worldwide via FAOSTAT website system by various users such as statisticians, researchers, journalists, decision-makers politicians of both national and international, etc. The dissemination of time series information will also be available through hard copy/FAO Statistical Yearbook. Unlike the past FAO Yearbooks containing details information on resources statistics, the new FAO Statistical Yearbook will contain only aggregate information for selected number of items. The detailed information for related resource data will be available in the main database

In the following figures appear the type of elaborated data that will be produced. In this example, it will not be necessary for all countries to provide the information already in nutrients units, in the cases the Statistical National Services already do this conversions, the data will be collected in this form, in the cases in which the available information exists in quantities of specific products, the information will be collected for these products (i.e. urea,

ammonium nitrate, etc) and transformed in nutrient units. The collected data will be as those in the figure 4.2 but the elaborated data will correspond to those in figure 4.1

For elaborating the data that will be published and disseminated, it is necessary to perform different tasks. The collected data are a kind of "raw material" that needs transformation in order to obtain "produced information", meaningful for the potential users.

Let us take the example of Nitrogen fertilizers to illustrate this idea.

Quantities produced, imported, exported, consumed as well as prices in local currencies are the "raw material". The following operations will be performed to obtain the "elaborated data" or "produced information"

1 - transform the quantities of "product" in N units. For example, in the case of Urea, 100 T will be converted in 46 T of N units (conversion factor = 0.46)

2 - If the price of one T of urea = 2880 FRF, price of one T of N unit = 6260 FRF

3 - Using a common monetary unit, i.e. U$S and taking 1U$S = 6 FRF, we obtain the price of one N unit = 1043 U$S

This type of calculation will be done for other basic nutrients (P and K) and this will allow to estimate prices and values of these resources, both in comparable physical and monetary units.

Of course, in other cases it is necessary to follow more complex procedures, as in the case of complex fertilizers, but the result will be expressed in elaborated data, useful for different type of accounting systems and models.

Figure 4.1 New version of produced data

TABLE A.7	Total Fertilizer Consumption and Fertilizer Consumption of N, P and K							
	Français							
	Español							
	عربي							
	中国人							
	TOTAL FERTILIZERS					*N*	*P*	*K*
	(MT)					*(MT)*		
COUNTRIES	**1980**	**1990**	**2000**	**2001**	**2002**	**2002**	**2002**	**2002**
Afghanistan	51,126	44,500	5,000	18,400	20,800	20,800		
Albania	93,700	102,000	18,700	18,700	35,357	22,626	12,388	343
Algeria	235,700	127,000	92,300	105,300	98,000	48,000	28,000	22,000
Amer Samoa								
Angola	16,800	9,500	1,400	0	0			
Antigua Barb								
Argentina	115,568	165,500	862,983	861,991	739,526	432,628	283,300	23,598
Armenia			7,000	5,000	11,283	11,283		
Aruba								
Australia	1,162,443	1,163,700	2,275,000	2,383,300	2,279,590	972,300	1,077,290	230,000
Austria	407,300	303,300	216,242	217,700	208,300	118,000	47,000	43,300
Azerbaijan			4,100	11,900	17,692	16,692		1,000
Bahamas	1,200	100	300	800	800	400	200	200
Bahrain	0	602	346	300	100	100		

Figure 4.2 Old version of produced data

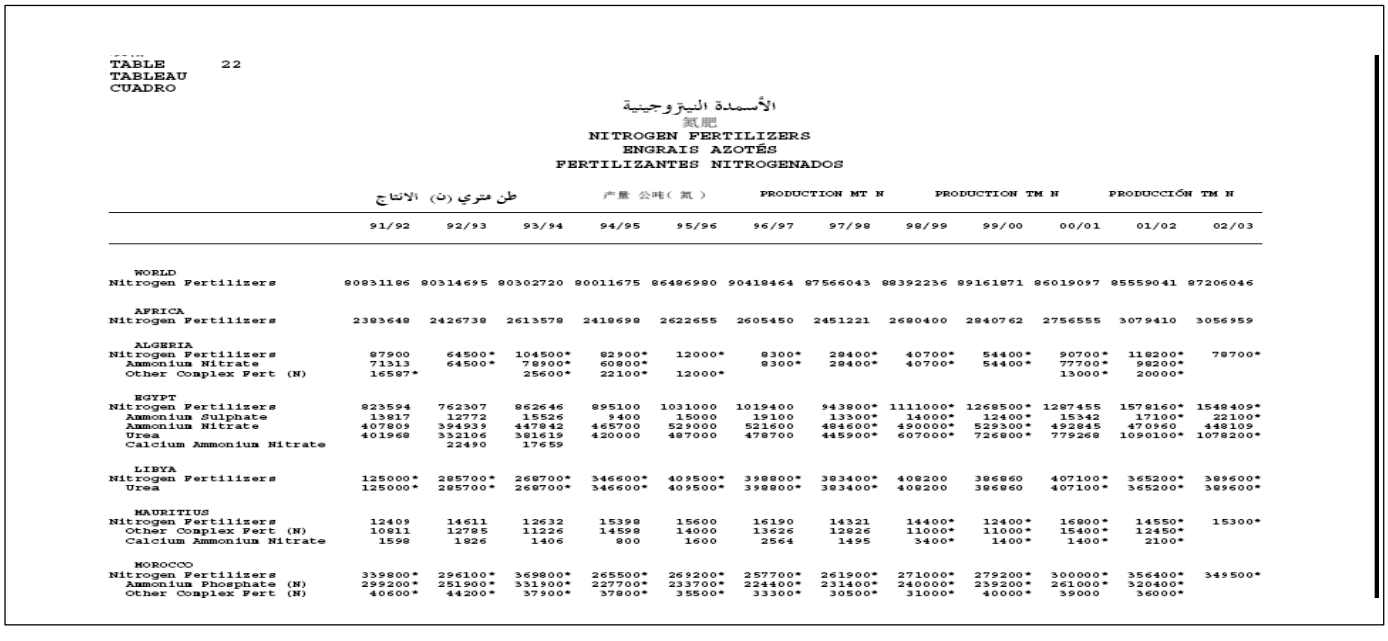


TABLE 22
TABLEAU
CUADRO

الأسمدة النيتروجينية
氮肥
NITROGEN FERTILIZERS
ENGRAIS AZOTÉS
FERTILIZANTES NITROGENADOS

	الانتاج (ن) طن متري			产量 公吨（氮）		PRODUCTION MT N		PRODUCTION TM N			PRODUCCIÓN TM N	
	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02	02/03
WORLD												
Nitrogen Fertilizers	80831186	80314695	80302720	80011675	86486980	90418464	87566043	88392236	89161871	86019097	85559041	87206046
AFRICA												
Nitrogen Fertilizers	2383648	2426738	2613578	2418698	2622655	2605450	2451221	2690400	2840762	2756555	3079410	3056959
ALGERIA												
Nitrogen Fertilizers	87900	64500*	104500*	82900*	12000*	8300*	28400*	40700*	54400*	90700*	118200*	78700*
Ammonium Nitrate	71313	64500*	78900*	60800*		8300*	28400*	40700*	54400*	77700*	98200*	
Other Complex Fert (N)	16587*		25600*	22100*	12000*					13000*	20000*	
EGYPT												
Nitrogen Fertilizers	823594	762307	862646	895100	1031000	1019400	943800*	1111000*	1268500*	1287455	1578160*	1548409*
Ammonium Sulphate	13817	12772	15526	9400	15000	19100	13300*	14000*	12400*	15342	17100*	22100*
Ammonium Nitrate	407809	394939	447842	465700	529000	521600	484600*	490000*	529300*	492845	470960	448109
Urea	401968	332106	381619	420000	487000	478700	445900*	607000*	726800*	779268	1090100*	1078200*
Calcium Ammonium Nitrate		22490	17659									
LIBYA												
Nitrogen Fertilizers	125000*	285700*	268700*	346600*	409500*	398800*	383400*	408200	386860	407100*	365200*	389600*
Urea	125000*	285700*	268700*	346600*	409500*	398800*	383400*	408200	386860	407100*	365200*	389600*
MAURITIUS												
Nitrogen Fertilizers	12409	14611	12632	15398	15600	16190	14321	14400*	12400*	16800*	14550*	15300*
Other Complex Fert (N)	10811	12795	11226	14598	14000	13626	12826	11000*	11000*	15400*	12450*	
Calcium Ammonium Nitrate	1598	1826	1406	800	1600	2564	1495	3400*	1400*	1400*	2100*	
MOROCCO												
Nitrogen Fertilizers	339800*	296100*	369800*	265500*	269200*	257700*	261900*	271000*	279200*	300000*	356400*	349500*
Ammonium Phosphate (N)	299200*	251900*	331900*	227700*	233700*	224400*	231400*	240000*	239200*	261000*	320400*	
Other Complex Fert (N)	40600*	44200*	37900*	37800*	35500*	33300*	30500*	31000*	40000*	39000	36000*	