CHAPTER 8

PROGRAMME IMPLEMENTATION

Food and agriculture encompass complex interactions of physical, climatic, biological, economic and social processes in (a) the production, processing, distribution and utilization of food and agricultural commodities, (b) rural development and agrarian reform, and (c) the nutritional status of a country's population. Given a country's endowment of soil and water resources and climate, these processes are carried out by individuals, households and other production and consumer units with some degree of government intervention (Chapter 2).

Each country is unique in its stage of social, economic and technical development, the extent to which its government intervenes in the above spheres of activity, and in its progress in developing an information system to aid both private and public decision making. The national information system for decision making in food and agriculture must be carefully pursued in the context of the country situation. Thus, specific activities presented in this chapter on programme implementation are not recommended for all or for any specific country. Such details do, however, illustrate the kind of activities most countries will want to consider. And, taken together, the selection and organization of such activities illustrate the systematic planning, monitoring, development, evaluation and improvement process that every country needs.

This manual is directed at the statistical programme component of a national information system for food and agriculture. However, this purpose is pursued within the broad structure of the more general information system within which the successful national statistical programme must be planned and implemented. General programme implementation guidelines are provided. For planning and conducting a specific statistical activity - such as developing socio-economic indicators for monitoring and evaluating agrarian reform and rural development, conducting an agricultural census or food consumption survey, constructing commodity supply/utilization accounts, or deriving economic accounts for agriculture - additional, more specific programme development guidelines should also be used. FAO either has, or plans to issue, Programme Development Guidelines manuals in these and other important areas.

There are a large amount of both agricultural and non-agricultural data and information not dealt with in this manual. For example, non-agricultural information relating to such areas as urban development and national defence, agricultural extension and market news services are not covered. The sub-domain of information toward which this manual is directed is generally limited to aggregate and, as appropriate, per capita data series in the farm production sector; agricultural trade; agricultural inputs and services; agrarian reform and rural development; food supplies, prices, and distribution; consumption and nutrition; fisheries and forestry as they relate to food supplies and land use; and related population, national income and general price level information.

Although much of the statistics and analyses produced by the information system dealt with in this manual are useful to private decision makers, the programme described is directed primarily at the information needs of public decision making in food and agriculture.

8.1 Summary of the Information System Approach

Information in general, and statistics in particular, have extrinsic value. That is, they are useful only as a means of analysis and decision making. This utilitarian perspective calls for the national statistical programme in food and agriculture to be developed within the larger context of national decision making. Decision making with respect to managing governmental intervention in food and agriculture is a continuous, cyclic process of indentifying problems, formulating and analysing alternative solutions, making decisions, observing and evaluating results, and then identifying the new problem situation. The process is iterative in that any of the several stages may be repeated based on information gained at later stages (Chapters 3 and 4). Thus, the national information system is basically a macro application of the individual problem-solving or managerial process.

Chapter 2 presents an approach to conceptualizing the complex technical, economic and social interrelationships in food and agriculture, while Chapter 3 discusses many of the complexities of decision making with respect to policy goals, instruments and performance indicators. These important dimensions of decision making in food and agriculture are placed in an information system context in Chapter 4, and operational concepts for measurement and analysis are categorized in Chapter 5. Some important points can be summarized as follows:

1. The scope of food and agriculture encompasses such a wide range of complex phenomena and interacting forces that most policy concerns are multi-perspective and multi-objective.

2. To adequately serve national decision making in food and agriculture, therefore, an information system must provide statistics on the technical, economic and social dimensions of policy instruments and their performance indicators.

3. Policy makers, planners, statisticians and economists should cooperate in developing the same conceptual understanding of the food and agricultural complex to use as a basis for defining operational concepts for data collection and analysis.

4. The statistical programme should be a timely and efficient integration of censuses, surveys, and use of administrative records and community level statistics, giving balanced attention to basic data collection, data processing and statistical analysis.

5. The analytical programme must be capable of projecting, over time, the behaviour of the technical, economic and social variables in food and agriculture as well as the impact on these same variables and other performance indicators of policy instruments relative to policy goals and objectives, where objectives are defined as quantitative future target values of performance indicators.

6. Although statistical and analytical activities based on aggregate data series, available at the national level on both a total and per capita basis, are adequate for many policy concerns relating to growth, adjustment and stability, most policy concerns relating to equity require data series and analyses disaggregated by socio-economic group and, often, geographic region.

7. Once concepts, definitions and procedures are institutionalized in a national statistical programme, they tend to become static, whereas the real-world phenomena they represent are usually constantly changing. Thus, the conceptualization of food and agriculture and the operational definitions and concepts used to quantify or represent real-world phenomena, and consequently the statistical and analytical programmes, must be continually monitored, evaluated and revised.

8. Since most national governments are decentralized - with ministries, bureaus, agencies, departments and/or divisions separated according to disciplinary, programmatic or

regional concerns while the technical, social and economic phenomena in the target world to be managed are interdependent - coordinating the information system for decision making in food and agriculture across governmental organizations is a difficult task requiring special and continuing attention at the highest policy level.

8.2 Implementation Guidelines

The information system is conceptualized in Chapter 4 as having five interdependent component processes: (a) conceptualization, (b) operational definition of concepts, (c) observation and measurement, (d) interpretation and analysis, and (e) decision making and implementation. These processes, along with the more basic steps of problem solving, translate into the following five programme implementation phases:

A. Policy and programme setting

1. Policy concerns
2. Evaluation of alternatives
3. Decision making
4. Programme implementation
5. Monitoring and evaluation

B. Conceptualizing and operationalizing an understanding of food and agriculture

C. Integrated statistical programme

D. Analytical programme

E. Reporting

As with problem solving and the phases of the information system, the programme implementation phases are interrelated and iterative. Before policy decisions are made, iterations through conceptualization of concepts, statistical and other information development, processing, analysis and reporting, as contained in Phases B through E, are necessary based on a statement of policy concerns resulting from previous such cycles. The monitoring and evaluation sub-phase of the Policy and Programme Setting phase is concerned with the information system itself as well as the real-world policy concerns. Thus, the Policy and Programme Setting phase is actually an "executive level" decision-making cycle within the larger information system cycle.

Whereas the programme implementation phases are listed vertically above, in actual practice various time lags exist between related activities across phases, as illustrated in Figure 8.1. With respect to the processing of any single policy concern (I in Figure 8.1), the various time lags between target completion dates t_i, i=1, 2, ..., 5, can vary from a few hours, to weeks, months, and even years. Further, a very large number of policy concerns are being worked through the information system at any given point in time. Thus, the real, complete and detailed programme implementation programme for any country is probably too complex to picture as in Figure 8.1 for any significant time period. Yet, it is useful for a country to develop a written programme implementation plan for the major activities of the information system and to continually revise it at periodic intervals, not to exceed one year.

Table 8.1 (at the end of this chapter) illustrates how a multi-year plan for developing and operating an integrated programme of food and agricultural statistics in the context of a national information system can be constructed. In general, such a programme involves several annual or biennial repetitive cycles of the above five programme phases, but a pre-programme planning phase is also required. For purposes of these guidelines, a ten-year programme covering the period 1986-1995, divided into five biennial cycles, is presented. Some people may prefer a more formal programme evaluation and review technique (PERT) or critical path analysis approach over the simple presentation of Table 8.1.

8.2.1 Pre-Programme Planning

A pre-programme planning period is required, consisting of the following five steps.

(1) Establish, review, and/or strengthen the government co-ordinating mechanism, including the participation of both data users and producers, for overseeing the planning and implementation of the multi-year programme of work.

(2) Assemble, organize and disseminate to appropriate participants all relevant material on the country's food and agricultural complex and on the government's role in it.

(3) Organize and conduct a national workshop, or series of workshops, to:

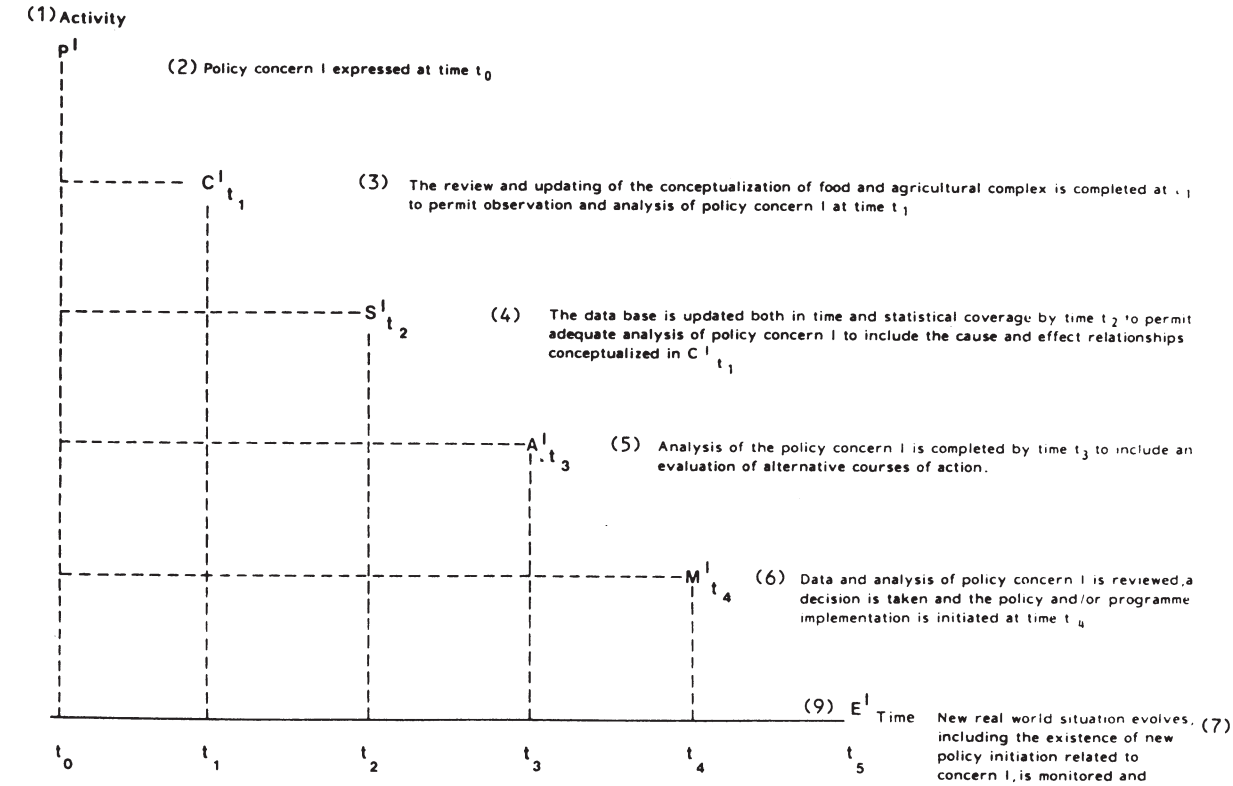

Figure 8.1 - Illustration of time lagged programme implementation cycle with respect to a single policy concern

a) Review the material from (2).

b) Conceptualize the relevant variables and relationships at work in the country's food and agricultural complex and the government's role in it, including an explicit statement of policy concerns, objectives and possible instruments that are or could be used to achieve policy goals and objectives.

c) Develop operational definitions for every variable identified in (b).

d) Identify statistical and analytical activities required to develop a simulation of the technical, economic and social relationships conceptualized in b), using the statistics operationally defined in c). This can be a very simple model at the beginning (see Section 8.2.3 below and Chapter 7).

(4) Develop a long-term plan (up to 10 years) that will produce the statistical and analytical activities identified in d) according to a time schedule and with adequate detail and specifications to satisfy the policy needs identified in (3) b). This plan should include estimates of staff and training requirements; needs for office space, vehicles, computer services, survey equipment and other fixed overhead or infrastructure costs, as well as annual operating expenses; and necessary changes in institutional organization. The programme budget should indicate that part of the financial needs to be borne by the sponsoring governmental unit and that part for which outside donor assistance will be needed.

5) The coordinating body established in (1) meets to approve the long-term development plan formulated in (4).

8.2.2 Policy and Programme Setting

We assume that the major policy concerns in food and agriculture centre around food security, agricultural adjustment and agrarian reform and rural development. Food security is a continuing concern across all programme cycles and implicitly includes desires for continued and efficient growth of agricultural, and especially food, output and the economic viability of the farm production sector. Concerns relating to agricultural adjustment are in keeping with the guidelines and targets for international agricultural adjustment adopted at the 1983 FAO Conference. Major government emphasis on agrarian reform and rural development is programmed in such a way as

to not only meet national concerns but also to conform to the recommendations of the World Conference on Agrarian Reform and Rural Development and to the FAO's reporting of progress in agrarian reform and rural development at every other biennial FAO Conference, beginning in 1983 (FAO 1981; FAO 1983, pp.21-25). During each programme cycle, specific areas of concern relating to agrarian reform and rural development - such as nutrition, poverty alleviation, landlessness and the quality of life in rural areas - receive special attention.

Considerable time, staff and budgetary resources are required to develop basic data and statistical and analytical capabilities and to conduct analyses of government programme options and their potential impacts. It is important, therefore, that the national policy agenda be projected a considerable number of years into the future so that pre-requisite statistical and analytical activities can evolve in a timely and efficient manner.

8.2.3 Conceptualizing and Operationalizing an Understanding of Food and Agriculture

This is perhaps one of the most overlooked aspects of developing statistical and analytical programmes to support government policy needs in food and agriculture. Each year, appropriate staff activities are developed and planned to review and update the conceptualization and operational definitions of food and agriculture. For example, a standing national review committee may be created, with representation from agricultural, planning and other interested government agencies. Such a committee would be charged with reviewing the adequacy of concepts and operational definitions with respect to current and anticipated situations and policy needs. It would also have the power to implement necessary changes.

Conceptualization should include explicit attempts to develop causal loop flow diagrams and cross-impact matrices of all important technical, economic and social relationships at work in food and agriculture. This, in turn, can provide a consistent, sector-wide blueprint for guiding development of basic data collection, processing and statistical analysis activities and for the gradual building up of a simulation capability for the food and agricultural sector. Although, initially, such simulation activities will very likely be informal and, when quantified, of an extremely partial nature, they will, over time, add up to an internally consistent simulation of the food and agricultural sector which contributes to the information and analysis required for policy making and planning.

8.2.4 Integrated Statistical Programme

It is important that the national statistical programme in food and agriculture gives a balanced emphasis over time to basic data development, such as capabilities for agricultural censuses and surveys, data processing and statistical analysis. A schedule of censuses and surveys should be established consistent with recommendations in Chapter 6 (Table 6.2). In addition, a programme of activities should be formulated to develop administrative and locality records and to identify needs for international publications and sources of technical research information.

One of the earliest and most efficient activities is to establish and/or update an agricultural sample survey frame from the population and/or agricultural census. Thus, if the population census provides an adequate identification of agricultural holders, a country may elect to replace the agricultural census with a sample survey of the structure of the agriculture production sector. Further, the population census should be conducted in such a way as to provide estimates of the size of the country's various socio-economic population groups, information which is especially critical for monitoring and evaluating agrarian reform and rural development. When a country has advanced beyond the most rudimentary statistical capability in food and agriculture, it should consider the feasibility of constructing an aerial frame sample survey capability.

The agricultural census or agricultural structure sample survey should provide estimates of the number and size distribution of agricultural holdings by type of enterprise. This is especially important for analysing the causal relationships between the structures of the farm production sector and policy goals relating to agricultural adjustment, food security and such agrarian reform and rural development concerns as landlessness and poverty.

The annual sample survey programmes in the various cycles illustrated in Table 8.1 thus provide the more current food and agricultural statistics. In keeping with the primary policy concern of food security, agricultural production surveys are conducted annually.

The second priority area for sample survey data collection is food consumption, with two food consumption surveys being scheduled in the first and fourth programme cycles. Here it should be possible to link food consumption and household income and expenditure surveys

with smaller sample segments covering other, more costly, data collection in such areas as anthropometrics. It is most important that sample surveys on food and agricultural data relating to consumption and other household centred activities be coordinated and made an integral part of the country's UN Household Survey Capability Programme.

Other subjects for which data is collected through surveys include soil, farm management, agricultural service establishments, rural labour force, demographics and livestock, as well as agricultural prices and other special subjects.

It is essential that the basic data collection, processing and early statistical analysis activities be completed in an efficient and timely manner to facilitate use of the data in more comprehensive analytical programmes in support of policy deliberations. Capabilities for data processing and statistical analysis should be planned, developed and tested before field enumeration is begun. Data should become machine readable as early in the collection and processing stage as possible, and the data bank should allow for both statistical report writing and, later, a more detailed analytical use of the data.

8.2.5 Analytical Programme

The various analytical activities illustrated in the five programme cycles of Table 8.1 are only a small subset of the many such activities needed to fully exploit the data that should flow out of the integrated statistical programme and that is needed to support the several important policy concerns. Here again, an important aspect of scheduling analytical programmes is that they are timed to take advantage of current agricultural censuses and surveys and are completed in a timely manner with respect to policy needs.

The analytical activities outlined in Table 8.1 illustrate the strategy of beginning with simple analytical activities, such as looking at trends and percentage changes in statistics over time relative to both base periods and target values. Then, moving on to basic correlation and regression analysis, price and income elasticities of demand and price elasticities of supply should be estimated when the preprequisite data on production, consumption and prices become available. At this point, composite indicators of agrarian reform and rural development may be derived. These quantitatively oriented activities should gradually combine and evolve into a more comprehensive simulation model of the technical and economic relationships at work in the food and agricultural

complex. Initially, such simulations can be partial commodity or subsector studies, but should eventually represent a comprehensive model of the food and agricultural sector with important linkages to the general country and world economies. Some additional intermediate steps include the development and annual updating of commodity supply and utilization accounts, food balance sheets and economic accounts for agriculture.

8.2.6 Reporting

Generally, two types of reports are recommended in Table 8.1. After initial data processing, analysis and dissemination are completed, it is useful to issue staff reports on the various policy concerns. This provides for early and continuous interactions of the social scientist with policy makers and sets the scene for issuing national reports depicting the government's concern, role and impact on effecting improvements in the food and agricultural complex. Further, reports should be scheduled to both capitalize on recent statistical and analytical developments as well as provide for policy needs. Two special staff reports are scheduled in programme cycles I, III and V to facilitate the monitoring and evaluation of progress and problems in agrarian reform and rural development, including reporting at the 1987, 1991 and 1995 FAO biennial Conferences.

8.3 Conclusion

In conclusion, the concepts and guidelines presented in this manual are applicable to any country, at any stage of development, from the least developed to the most industrialized. All that is required is an interest in, and commitment to, ensuring that the information available to public decision makers in food and agriculture, including its statistical and analytical components: a) is relevant to current policy issues, b) accurately reflects the current state and direction of the target world system, and c) reaches its users when and where needed. The path is the same, but different countries will enter that path at different places depending on their own unique needs and resource endowments.

The first step for a country is to assess its current human, institutional, natural and financial resources with respect to food and agricultural decision-making capacity. Then, it should identify its needs and goals in that regard and plan a programme of activities to reach those goals and satisfy those needs. Finally, there remains only to implement the plan and evaluate its progress.

We close where we began, by asserting that countries following the guidelines contained in this manual will find that the information base supporting economic development and other policy concerns in food and agriculture will be more relevant and useful, that policy efforts will thus be more successful, and that, as a consequence, government intervention in food and agriculture will be more effective and better understood and appreciated.

Table 8.1

A Hypothetical National Ten-Year Plan for Developing an Integrated Statistical Programme for Policy Needs in Food and Agriculture

Programme Phase	Programme Cycle I (1986-87)
A. Policy and Programme Setting	1. Food security (1986-87) 2. Agrarian reform and rural development, general (1986-87) 3. Coordinating group meetings to review progress and plans (1986-87)
B. Conceptualizing and Operationalizing an Understanding of Food and Agriculture	1. The conceptualization and operational definitions of food and agriculture are reviewed and updated as necessary (1986)
C. Integrated Statistics Programme	1. Define and estimate population Programme in selected socio-economic groups from most recent population census (1986) 2. Update agricultural sample survey frame (1986) 3. Conduct sample surveys on i) agricultural production (1986-87); ii) food consumption (1986); iii) soil (1986-87); iv) farm management (1987); and v) agricultural service establishments (1987)

D. Analytical Programme	1. Select socio-economic indicators, estimate benchmarks and set targets based on policy statements in A.2 (1986) 2. Estimate number of people below the poverty line, by socio-economic group, based on C.1 and C.3 (1987) 3. Initiate or improve system of price and production index numbers (1987) 4. Initiate or improve system of commodity supply/ utilization accounts and food balance sheets (1987)
E. Reporting	1. Develop staff report for policy considerations based on completed statistical and analytical activites (as needed and appropriate) 2. Provide FAO with a progress report on agrarian reform and rural development for use at the 1987 FAO Conference (1986) 3. Issue national report on agrarian reform and rural development (1987)

Table 8.1 (continued)

Programme Phase	Programme Cycle II (1988-89)
A. Policy and Programme Setting	1. Food security (1988-89) 2. Nutrition (1989) 3. Comprehensive agricultural legislation or 5-year plan (1989) 4. Coordinating group meets to review progress and plans (1988-89)
B. Conceptualizing and Operationalizing an Understanding of Food and Agriculture	1. The conceptualization and operational definitions of food and agriculture are reviewed and updated as necessary (1988)
C. Integrated Statistics Programme	1. Conduct surveys on (i) agricultural production (1988-89); (ii) income and expenditures (1988); (iii) soil (1988-89); (iv) rural labour force (1989); (v) livestock (1988)

D. Analytical Programme	1. Estimate per capita food consumption relative to requirements, by socio-economic group (1988) 2. Estimate relationships between food consumption, nutrition and income, by socio-economic group (1989) 3. Develop 5- to 10-year commodity, aggregate farm output, price, and income projections (1988)
E. Reporting	1. Develop staff report on nutrition for policy considerations (1988) 2. Issue national report on nutrition (1989) 3. Issue staff report on comprehensive food and agricultural legislation or five-year plan (1988) 4. Issue national report on comprehensive food and agricultural legislation or five-year plan (1988)

Table 8.1 (continued)

Programme Phase	Programme Cycle III (1990-91)
A. Policy and Programme Setting	1. Food security (1990-91) 2. Poverty alleviation (1990) 3. Agrarian reform and rural development, general (1991)
B. Conceptualizing and Operationalizing an Understanding of Food and Agriculture	1. The conceptualization and operational definitions of food and agriculture are reviewed and updated as necessary (1990-91)
C. Integrated Statistics Programme	1. Conduct population census (1990) 2. Conduct agricultural census or farm structure survey (1991) 3. Conduct sample surveys on (i) agricultural production (1990-91); (ii) soil (1990-91); (iii) demographics (1990-91)
D. Analytical Programme	1. Estimate matrices of price elasticities of demand and supply (1990) 2. Estimate income elasticities of demand (1990) 3. Establish a system of economic accounts for agriculture (1991)

E. Reporting	1. Provide FAO with a progress report on agrarian reform and rural development for the 1991 FAO Conference (1990) 2. Issue national report on agrarian reform and rural development (1991) 3. Issue staff report on poverty for policy considerations (1990) 4. Issue national report on poverty alleviation (1991)

Table 8.1 (continued)

Programme Phase	Programme Cycle IV (1992-93)
A. Policy and Programme Setting	1. Food security (1992-93) 2. Structure of the farm production sector and landlessness (1992)
B. Conceptualizing and Operationalizing an Understanding of Food and Agriculture	1. The conceptualization and operational definitions of food and agriculture are reviewed and updated as necessary (1992)
C. Integrated Statistics Programme	1. Conduct sample surveys on (i) agricultural production (1992-93); (ii) farm management (1993); (iii) agricultural service establishments (1992); (iv) soil (1992-93); (v) household income and expenditures (1993) (vi) rural household industries (1993) 2. Review agricultural sample frame and estabish area frame sampling programme if appropriate (1992-93)

D. Analytical Programme	1. Analyse food supply/requirements situation, including production, carry-over stocks, expected imports, vulnerable socio-economic groups and contingency plans to meet possible shortfalls; update quarterly (1992-93) 2. Estimate individual causal relationships required of a rather complete food and agricultural sector simulation model (1992) 3. Update 5- to 10-year commodity, aggregate farm output, price, and income projections (1993)
E. Reporting	1. Issue staff report on the structure of the farm production sector, including a special chapter on landlessness for policy considerations (1992) 2. Issue national report on the structure of the agricultural production sector, with special attention to landlessness (1993)

Table 8.1 (continued)

Programme Phase	Programme Cycle V (1994-95)
A. Policy and Programme Setting	1. Food security (1994-95) 2. Rural infrastructure, inputs, marketing and level of living in rural areas (1994) 3. Comprehensive agricultural legislation or 5-year plan (1995) 4. Agrarian reform and rural development, general (1995)
B. Conceptualizing and Operationalizing an Understanding of Food and Agriculture	1. The conceptualization and operational definitions of food and agriculture are reviewed and updated as necessary (1994-95)
C. Integrated Statistics Programme	1. Conduct sample surveys on (i) agricultural production (1994-95); (ii) food consumption (1994); (iii) special subjects (1995)
D. Analytical Programme	1. Combine individual causal relationships within the food and agricultural sector into a simulation model, test and revise (1994-95)

E. Reporting	1. Issue background report to FAO on agrarian reform and rural development for the 1995 FAO Conference (1994) 2. Issue national report on agrarian reform and rural development (1995) 3. Issue staff report on food security (1994) 4. Issue national report on food security (1995) 5. Issue staff report on comprehensive food and agricultural legislation or five-year plan (1994) 6. Issue national report on comprehensive food and agricultural legislation or five-year plan (1995)