658.7063
H815

PN-ABJ-191

THE AGRICULTURAL COMMODITY SYSTEM:

A Multi-purpose Tool for Managing Agricultural Development in LDCs

Agricultural Commodity System:A Multi-Purpose Tool for..
658.7063 Agency for International Development. NTIS
H815 Office of Development Administration.
The Agricultural Commodity System: A Multi-Purpose Tool for Managing Agricultural Development in LDCs. Gerald F. Horne. Mar. 1973.
1 v.

1. Agricultural development. 2. Management planning. 3. Agricultural commodities. I. Horne, Gerald F. II. Title.

12635
PN-ABJ-191

Gerry Horne Gerald F.
Programming Staff Paper
Office of Development Administration

No. 2
March, 1973

DRAFT

A COMMODITY SYSTEMS APPROACH TO AGRICULTURAL DEVELOPMENT IN THE LDCS

THE BASIC PROBLEM - Generalized

> Producing quality crops or agricultural commodities in quantity, for a price that consumers can afford to pay and at a cost which allows the producers and participa ting intermediaries a reasonable return on their investments and risks is probably the LDCs' most urgent problem for the 1970s--and perhaps for the remainder of this century.

In those countries where significant progress toward resolving this problem has been made, combinations of modern technology and modern management have been integrated in both the public and private sectors. Such integrated efforts, in turn, have been most effective and least costly when they have been undertaken as total "systems" which include the entire seed-to-consumer stages designed specifically for the particular commodity involved and for the environment within which it is to be carried out. These systems have been sufficiently rigid to mainta in necessary order and control, yet flexible enough to accomodate accumulating knowledge, experience and changing circumstances.

In sum, there is ample evidence that agricultural development does takes place where there is a practical "delivery system" which can channel modern technology and management throughout the entire seed-to-consumer stages in such a way that the producers and intermediaries can continue to produce quality crops, in quantity, for a price consumers can afford to pay and at a cost which gives the producers and intermediaries a reasonable return on their investments and risks. Conversely, there is also abundant evidence that where there are gaps or serious deficiencies in this delivery system for modern technology and management, agricultural

development takes place slowly--if at all.

We have come to accept these proven concepts and methodologies as virtual truisms in the industrial sector--for the manufacture and marketing of automobiles, household appliances, wearing apparel and so on--we seem to have difficulties in accepting them for agricultural development in the LDCs.

This document is intended as a preliminary working paper for outlining these concepts and some methodology/guidelines for developing, testing and using practical delivery systems for selected agricultural commodities in LDCs, with special emphasis on the operational levels in both the private and public sectors. Comments and suggestions which might make it more useful would be appreciated.

INHERENT ISSUES - Categorized

While the basic agricultural problem for LDCs, as stated above, seems simple enough, approaches to its solution involve awesome complexities and seemingly innumerable interdependent issues, the untimely or inadequate resolution of which could negate the entire development effort for the crops involved.

Many of the most complex issues are common to most of the LDCs; others stem from or are peculiar to circumstances which are in large measure unique to each of the countries. Issues common to most LDCs might be categorized as:

1. Inadequate diets and poor health
2. Low levels of literacy and skills
3. Extensive unemployment and underemployment

4. Low per capita income and maldistribution of income
5. Low productivity per capita and per acre
6. High population growth rates
7. Massibe urban migrations
8. Inadequate institutions and infrastructures
9. Limited capital and borrowing capacity
10. Primitive technology and management.

Issues unique to or specific to individual LDCs might be categorized as:

1. Climate and geography
2. Population and resources
3. Socio-economics and politics
4. Institutions and infrastructures
5. Customs and values
6. Perceptions of needs and desires
7. Acceptance/rejection of foreign assistance
8. Capacity for self-sustained growth
9. Capacity for coordination and cooperation within and among the public and private sectors and with neighboring countries.
10. Potential for short-term and long-term development.

MANAGEMENT - By Systems

Given the enormous array of common and unique issues cited in the above illustrative categories, which must be continuously orchestrated so that exacting kinds and amounts of inputs are infused at precise time periods throughout the entire seed-to-consumer stages of each agricultural commodity in order to solve the "basic agricultural problem" in the LDCs,

it is understandable that the technical and managerial problems involved are likely to be complex. Experience has shown that most complex and interrelated tasks can be performed faster, at less cost and more efficiently if they are planned, organized, programmed, coordinated, controlled and evaluated, i.e. if they are "managed in an orderly and systematic way.

In the developed countries, and particularly in their industrial sectors, modern management has evolved more or less concurrently with modern technology. In recent years, and especially in the United States, many of the industrial management concepts and techniques have been adapted in the agriculture sector. One of the most promising of these concepts, together with its supporting methodologies, is management by "systems". There is no definition of this term that is accepted completely by either the theoreticians or the practicioners in the field. As used in this paper, it is intended to mean simply " that aggregation of resources and actions required to produce a desired end product during a prescribed time period". The desired end product in this case is resolution of the "basic agricultural problem for the LDCs" cited at the beginning of this paper--"producing quality agricultural commodities, in quantity, for a price consumers can afford to pay and at a cost which allows the producers and participating intermediaries a reasonable return on their investments and risks".

The Agricultural Commodity System

Conceptually, the commodity system for improving the management dimension of the agriculture sector in the LDCs is considered herein as an aggregation

AGRICULTURAL COMMODITY SYSTEM - (Private Sector Component) - LDCs

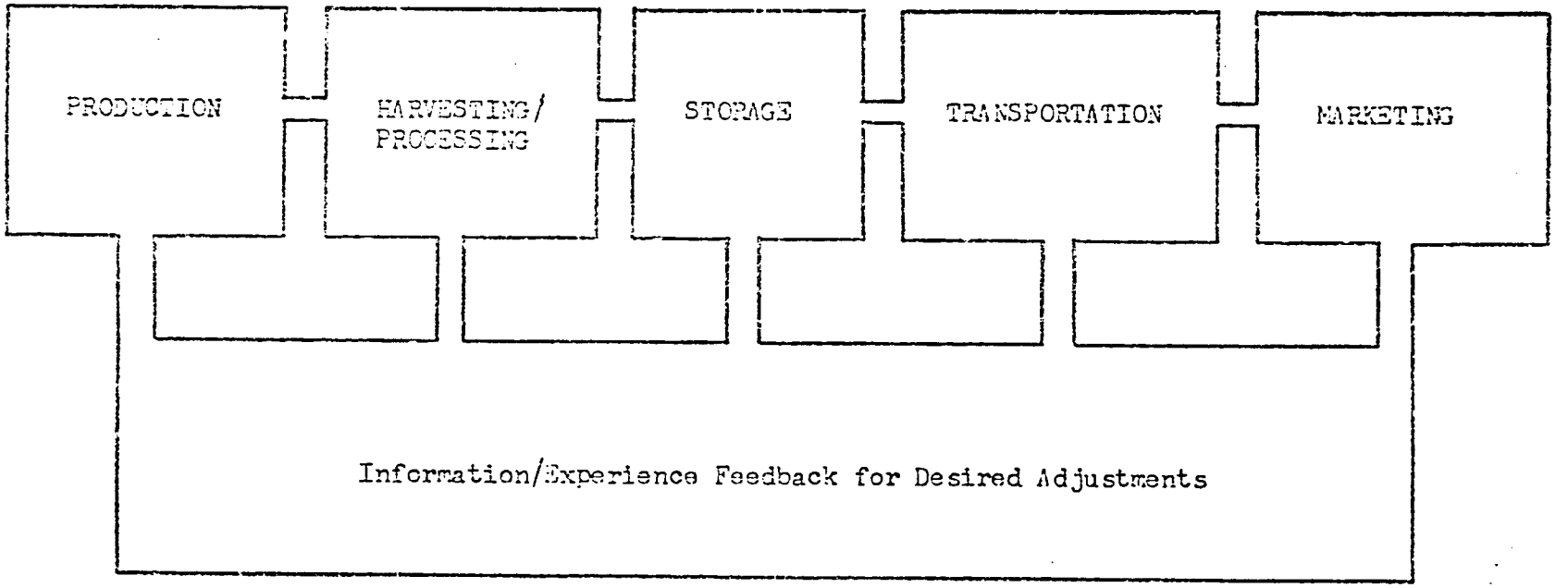


Figure 1.

AGRICULTURAL COMMODITY SYSTEM - (Public Sector Component) - LDCs

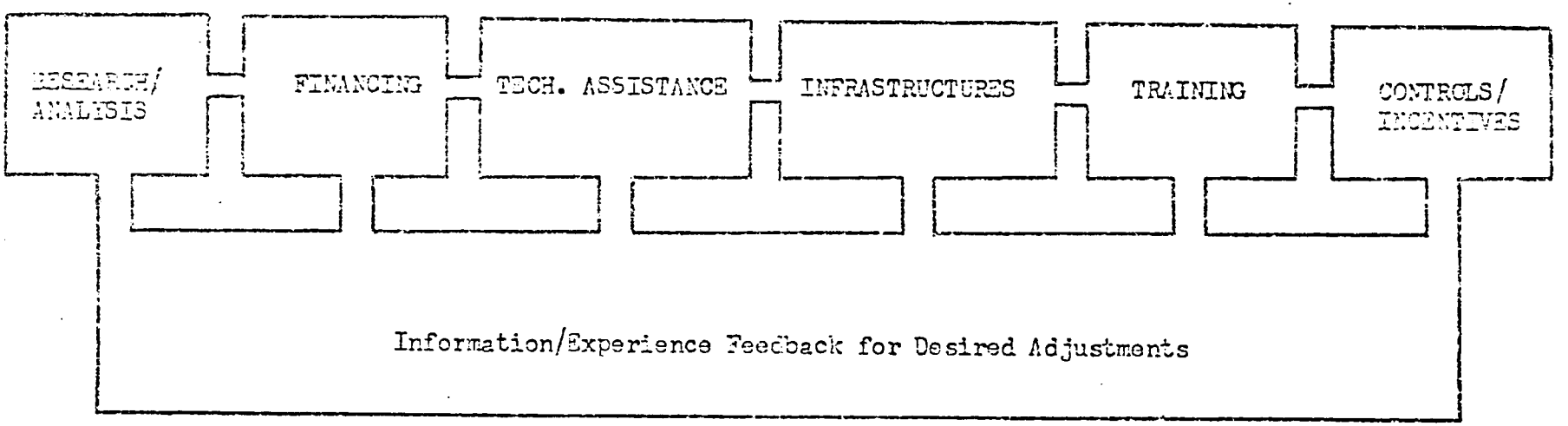


Figure 2.

AGRICULTURAL COMMODITY SYSTEM - Modern Management Component) - LDCs

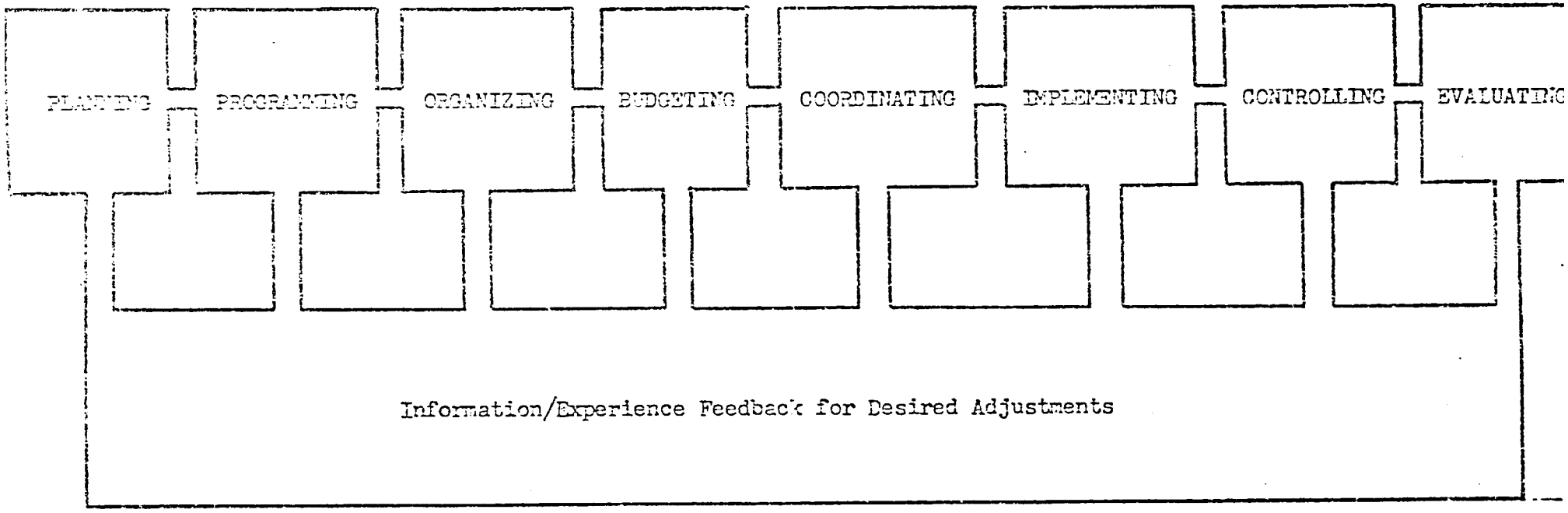


Figure 3.

AGRICULTURAL COMMODITY SYSTEM - LDCs (Vertical Integration)

(Pvt. Sector)	PRODUCTION	HARVESTING/ PROCESSING	STORAGE	TRANSPORTATION	MARKETING	
(Management)						
PLANNING						
PROGRAMMING						
ORGANIZING						
BUDGETING						
COORDINATING						
IMPLEMENTING						
CONTROLLING						
EVALUATING						
(Public Sector)	RESEARCH/ ANALYSIS	FINANCING	TECH. ASSISTANCE	INFRASTRUCTURES	TRAINING	CONTROLS/ INCENTIVES

Figure 4.

of three major components:

1. In the private sector - providing the necessary kinds and quantities of inputs at the required time periods - (see Figure 1);

2. In the public sector - providing the necessary kinds and quantities of support services and resources at the required time periods (see Figure 2); and

3. Providing the modern management services and resources necessary to orchestrate the many interdependent components of the private and public sectors' inputs which, collectively, make up the total "system" (see Figures 3 and 4).

Each of the major elements of the Private Sector, the Public Sector and the Modern Management Components of the Agricultural Commodity System illustrated by Figures 1, 2 and 3 respectively, require continuous "horizontal" integration and coordination to maintain the kind of balance and harmony required to make the system function effectively. For example, in the Private Sector Component, any substantial increase in production of a crop, without simultaneously providing for adequate and timely capacities for transporting, storing and marketing the increased production could result in spoilage and/or reduced prices and therefore, losses, rather than profits, for the producers. Conversely, increases in transportation, storage and/or marketing facilities in excess of increased production could cause increases in production costs and higher prices for consumers and probable losses for producers and/or intermediaries. Similarly, in the Public Sector Component, significant increases in the Research/Analysis element without appropriate and timely increases in Financing, Technical Assistance, Training and other elements, would probably delay or prevent effective utilization of the findings of the Research/Analysis and thereby continue costly and inefficient technology.

And, of course, in the Management Component itself, excessive emphasis in Planning or any one particular element at the expense of other elements such as Programming, Organizing, Budgeting, Coordinating, Implementing, Controlling or Evaluating, would probably contribute to inadequate and/or untimely use of any available modern technology inputs and skilled support services, thereby negating the potentials of these costly resources.

Except for the largest and self-sufficient agricultural enterprises in the LDCs, The Private Sector Component of the Commodity System requires an array of support services from public sector institutions to achieve any effective horizontalcoordination in the production-through-marketing cycles.

As illustrated in Figure 5, the production element, and each of the other elements as well, usually requires support services from one or more public instutions, including:

1. Analysis/Research - from the Ministry of Agriculture, Ministry of Education/Universities, or Ministry of Finance;
2. Technical Assistance/Extension - from the Ministry of Agriculture or Ministry of Health;
3. Credit - Ministry of Finance, National Banks;
4. Training - Ministry of Education or Ministry of Agriculture;
5. Roads and Infrastructures - Ministry of Public Works, Ministry of Finance, Ministry of Interior;
6. Import Authorizations - Ministry of Interior, Ministry of Finance;
7. Quality Standards/Controls - Ministry of Health, Ministry of Interior;
8. Marketing Information - Ministry of Interior, Ministry of Education, Ministry of Information, Ministry of Agriculture.

TRANSPORTATION

Research (MinPubW/MinInt)

Extension (MinAg/MinEd/Pvt)

Training (MinEd/MinPubW/Pvt)

Credit (MinF/MinInt/Banks)

Freight Rates (MinInt/MinF)

Quality Stds. (MinH/MinInt/MinAg)

Infrastructures (MinF/MinH/MinInt/MinPubW)

Taxes/Duties (MinInt/MinF)

Imports (MinInt/MinF)

Exports (MinInt/MinF/MinPubW)

MARKETING

Research (MinAg/MinF/MinInt/Univ)

Extension (MinAg/MinEd/MinInt/Pvt)

Training (MinEd/MinInt/Pvt)

Credit (MinF/MinInt/MinAg/Banks)

Price Policies (MinF/MinInt)

Market Info. (MinAg/MinInt/MinInfo)

Quality Stds. (MinH/MinInt/MinAg)

Infrastructures (MinPubW/MinF)

Taxes/Duties (MinInt/MinF)

Exports (MinInt/MinH/MinF)

LDC AGRICULTURAL COMMODITY SYSTEM - Public Sector Support Services

PRODUCTION	HARVESTING/PROCESSING	STORAGE
Research (MinAg./Univ.)	Research (MinAg./MinInt/Univ.)	Research (MinAg/MinInt/Univ.)
Extension (Min.Ag./Univ./Pvt.)	Extension (MinAg/Pvt.)	Extension (MinAg/Pvt.)
Training (MinAg./MinEd./Univ.)	Training (MinEd/Pvt.)	Training (MinEd/MinAg/Pvt.)
Credit (MinAg./MinF./Banks)	Credit (MinF/MinAg/Banks)	Credit (MinF/MinAg/Banks)
Price Policies (MinF./MinAg.)	Market info. (MinInt/MinF)	Price Policies (MinF/MinAg)
Market Info. (MinAg./MinInt./MinInfo.)	Quality Stds. (MinInt/Minag)	Market Info. (MinAg/MinInfo)
Quality Stds. (MinAg./MinInt./Pvt.)	Roads (MinPubW/MinF)	Quality Stds (MinInt/MinH/MinAg)
Roads (MinPubW./MinF.)	Taxes (MinF/MinInt)	Roads (MinPubW/MinF)
Taxes (MinF./MinInt.)	Imports (MinInt/MinAg/MinF)	Taxes (MinInt/MinF)
Imports (MinInt./MinAg./MinF.)	Exports (MinInt/MinF/MinH)	Imports (MinInt/MinAg)

to provide all of the kinds and quantities of the necessary inputs from both the public and private sectors at each of those decision/action points at the appropriate time and in the required sequence, there is a high degree of risk that the system will be inefficient, or inoperative, and that the venture will not yield a profit.

It is not enough that the LDC farmers are supplied with better seed, fertilizers, insecticides and so on. Nor is it enough that they also be instructed in the proper use of these modern inputs and technology for each of their crops. It is equally important that the inputs, including the support services, be available in the kinds and quantities needed and at the time and in the sequence required for their most effective use at the least cost so that prices of the crops produced can be kept at levels acceptable to consumers while allowing reasonable returns for the growers and intermediaries. Such efficiencies and economies require detailed advance planning for each commodity for most favorable purchases of inputs and services, including transportation; scheduling of planting and harvesting to harmonize with storage facilities and markets; and to accomodate available support services capabilities. Effective implementation of the advance planning, in turn, requires systematic orchestration of all these related actions necessary to produce and market the commodities.

In sum, sound management throughout the operations levels, i.e., at the farm and in the services institutions working directly with the farmers on each crop is necessary if the benefits of research, modern technology and skilled support services are to be realized in the form of increased net profits for the farmers and greater quantities of quality products at reasonable prices for consumers.

A specific example of a situation which illustrates the LDC producers' needs for multiple public sector support services is an extensive insect infestation or disease in a crop. In such a situation, the producer would need help and resources from one or more of the following:

1. Ministry of Agriculture - to identify the kind of insect or disease, and to recommend the kind and amount of agro-chemicals and equipment required for control measures;

2. Ministry of Health - to determine any potential health hazards in the use of the recommended chemicals;

3. Ministries of Interior and Finance - for authorization to import needed chemicals and equipment and credit for their purchases;

4. Ministries of Education and Agriculture - for training personnel in the use of the chemicals and equipment;

5. Ministry of Labor - for information on wages, benefits and working conditions for labor; and

6. Ministry of Public Works - for transport and/or storage of the chemicals and equipment.

Delays of even a few hours, or other deficiencies in the delivery or use of any one of the many essential inputs and/or support services indicated in the above partial listing could, and frequently does, result in disastrous losses for the producer and/or other investors in the enterprise.

This illustrative example involves only one (Production) of the several production-through-marketing elements in a crop cycle in an LDC. Similar operational problems requiring equally critical public sector support services are also common in the harvesting, processing, storage, transportation and marketing elements. The potential for losses due to any delay or deficiency in availability of such services are also equally great.

Both the private and public sector components also require continuous and concurrent "vertical " integration and coordination of the essential inputs and support services for each element. For example, if private sector production inputs such as land, labor, capital, water and equipment, and public sector support services such as technical assistance, credit, research and infrastructures are to be provided in adequate and timely kinds and quantities, these needs must be planned, programmed, organized, budgeted, coordinated, implemented, controlled and evaluated continuously as shown in Figure 5. That is, they must be "managed" if each of the elements and the entire component are to function effectively.

Information/Communications in Management by Systems

Horizontal and vertical integration and coordination of the several elements which make up the agricultural commodity system require that decision-makers and managers have adequate data to make operational decisions for:

1. Anticipating future needs;
2. Coping with current situations; and
3. Evaluating and adjusting ongoing and future plans, programs as may be required as a result of accumulating experience and changing circumstances.

Continuous two-way exchanges of information throughout the system are thus a pre-requisite of sound management decisions and an effective management process.

The test of the effectiveness of the management decisions and of the management processes in the commodity system is usually reflected very quickly in the profit, or losses, in the private sector component;

it is less apparent in the public sector.

The Agricultural Commodity System - Operational Level

The concept of the agricultural commodity system is generally understood by most senior officials of LDC public sector institutions. And, while the major elements of both the public and private sector components are recognized -- in aggregate -- the exacting order, discipline and coordination requirements among and between the interrelated individual inputs and support services within these elements are not usually recognized, nor are the consequences of delays or inefficiencies in the delivery of such inputs and services well understood by most public officials in the LDCs.

Managers of commercial-scale private enterprises, on the other hand, tend to have a good understanding of the operational aspects of the commodity systems and an appreciation of the complex management issues involved, including the consequences of any functional deficiencies.

Experience has shown that agricultural commodity systems are unique to each crop or commodity. Furthermore, there are also distinctive differences within the system for a given crop due to inherent genetic variations; geographic/climatic differences; cultural practices and so on. For example,

1. Some varieties of corn are more resistant to insects and diseases than others;

2. Many varieties have higher yields in temperate than in tropical climates;

3. Some have higher yields in lower than in higher elevations;

4. Some are more responsive than others to fertilizers, water and modern technology than others;

5. Many varieties vary considerably in texture, flavor and appearance; and

6. Some have different storage, processing and preserving qualities.

Other crops, such as certain fresh fruits and vegetables or meat products, require highly specialized packaging, refrigeration, transportation and storage facilities and services in order to maintain the exacting health, quarrantine and cosmetic standards demanded by regulatory institutions and consumers.

Finally, most crops have comparatively precise physilogical cycles or schedules which tolerate deviations of no more than a few hours without adverse effects on yield, quality and/or health standards. Illustrative examples include:

1. The optimal pollination period for some crops (e.g. cantaloupes) is usually about 24 hours;

2. The decay processes for most fresh fruits, vegetables and meat products begin immediately following harvest unless refrigeration or other preservative measures are taken;

3. Optimal quality for many crops (e.g. garden peas, okra, cucumbers et al) require harvesting within a range of a few hours.

Ordinarily, any appreciable reductions in the quantity of the yield or in the quality of the commodity are reflected in higher unit costs and lower profits.

Given the unique characteristics of each agricultural commodity, including distinctive differences between varieties of the same commodity, together

with the usually substantial adverse effects of failure to conform to the physiological cycle or schedule of the commodity involved, it follows that the commodity system must be designed specifically for each commodity, and its environment. It follows also, that operational management of the entire system must be equally exacting if the venture is to be successful (profitable).

An illustrative example of a commodity system for rice (paddy conditions; for small farmers) is shown in Figure 6.

For simplicity, in this schematic, the array of support services to be provided by the various public sector institutions are designated as "TECHNICAL ASSISTANCE". Such support services are intended to include those illustrated in Figure h and described on pages and .

In the design of a commodity system for a particular crop such as the one illustrated by Figure 6, it is usually possible to determine quickly and without prior commitment of policies or resources, its potential feasibility in a given environment, through a careful test of each of the decision/action points in the system against a five-point diagnostic criteria. That is, unless it can be established beyond any reasonable doubt that it is :

1. Technically possible;
2. Economically feasible;
3. Politically acceptable;
4. Operationally practical; and
5. Socially desirable

Individual commodity systems therefore, need to be considered within the framework and from the perspective of the entire agricultural sector (Figure), as well as such other sectors as nutrition, health, education and population.

Modern data gathering, processing and analytical tools and techniques make it possible to provide policy makers in LDCs with an array of alternative choices in the use of their resources, together with insights into the probable short-term and long range consequences of various choices or combinations of choices.

Traditionally the sectoral and multisectoral analyses have tended to be largely "economics oriented". More recently, however, with the development of more sophisticated analytical techniques, and in response to increasingly urgent needs, socio-political and environmental considerations are becoming important factors in plans, policies, strategies and procedures for development in the LDCs. As these additional factors are incorporated into plans, programs and projects, it is reasonable to expect that their implementation in both the individual commodity systems and in the total sectors will become more complex and that their "management dimensions" will likewise become increasingly significant.

Any detailed treatment of the sector-multisector issues are, of course, outside the scope of this document. They are identified here only for the purpose of noting the interrelationships of a given agricultural commodity system to the entire agricultural sector and to related sectors.

The ultimate test of analyses, policies, plans, strategies, procedures, and allocations/expenditures of resources is therefore at these "action" levels. It follows then, that the potential for success of such plans, policies, strategies and procedures--for national, sector, regional, village or project levels-- should be greater if they reflect actual needs, experience, desires and circumstances of these operating levels for each and every agricultural commodity involved. It seems eminently reasonable therefore, that if such policies, plans, strategies and procedures are intended for implementation, they should evolve as an aggregation of realistic data and experience from farmers and intermediaries involved in production and marketing, and their support service institutions.

There is abundant experience that indicates that most plans, policies and procedures for agricultural development in the LDCs are usually developed in comparative isolation at national or sectoral levels, with regional and lower level versions being little more than smaller-scale editions or disaggregates of the larger editions which do not in fact realistically reflect on-site situations.

The Agricultural Commodity System - Sector/Multisector Levels

Just as modern technology and support services per se are not sufficient for effective (profitable) agricultural commodity systems, so also are such systems in themselves not sufficient for long-term stability and growth of agriculture in LDCs. Many LDCs have learned that heavy reliance on a few very profitable crops such as coffee, sugar and bananas, can be disastrous when there are substantial declines in world market prices, when storms, diseases or other natural disasters occur, or when political events disrupt established trade patterns.

The Agricultural Commodity System - As a Multi-purpose Tool

While the agricultural commodity system, as already noted, is perhaps most useful as a mechanism for planning, organizing, coordinating, controlling and evaluating day-to-day operations of the total seed-to-consumer process at the action levels --on the farms and in the support service institutions in the LDCs--it also has potential for other practical uses in these countries:

1. As a "delivery system" which can serve as a vehicle for transferring relevant technology and management from the developed countries to LDCs, and as a focus around which the LDCs can organize a unity of purpose and a cohesion of efforts within and between their own institutions in formulating and implementing their own policies, plans, programs, strategies and procedures for development (see Figures and); 1/

2. As a diagnostic tool for determining specific kinds and amounts of manpower skills required for effective implementation of plans, programs and projects 2/;

3. As a teaching aid for training individuals and groups in the concepts and techniques of integrated or "systems" operations and management in short term and/or long term manpower development programs; 2/

4. As a diagnostic tool for predetermining the operational feasibility of prospective projects, programs and plans; for identifying constraints or bottlenecks in ongoing project operations 2/, and for evaluating the effectiveness of completed or terminated projects or programs; and

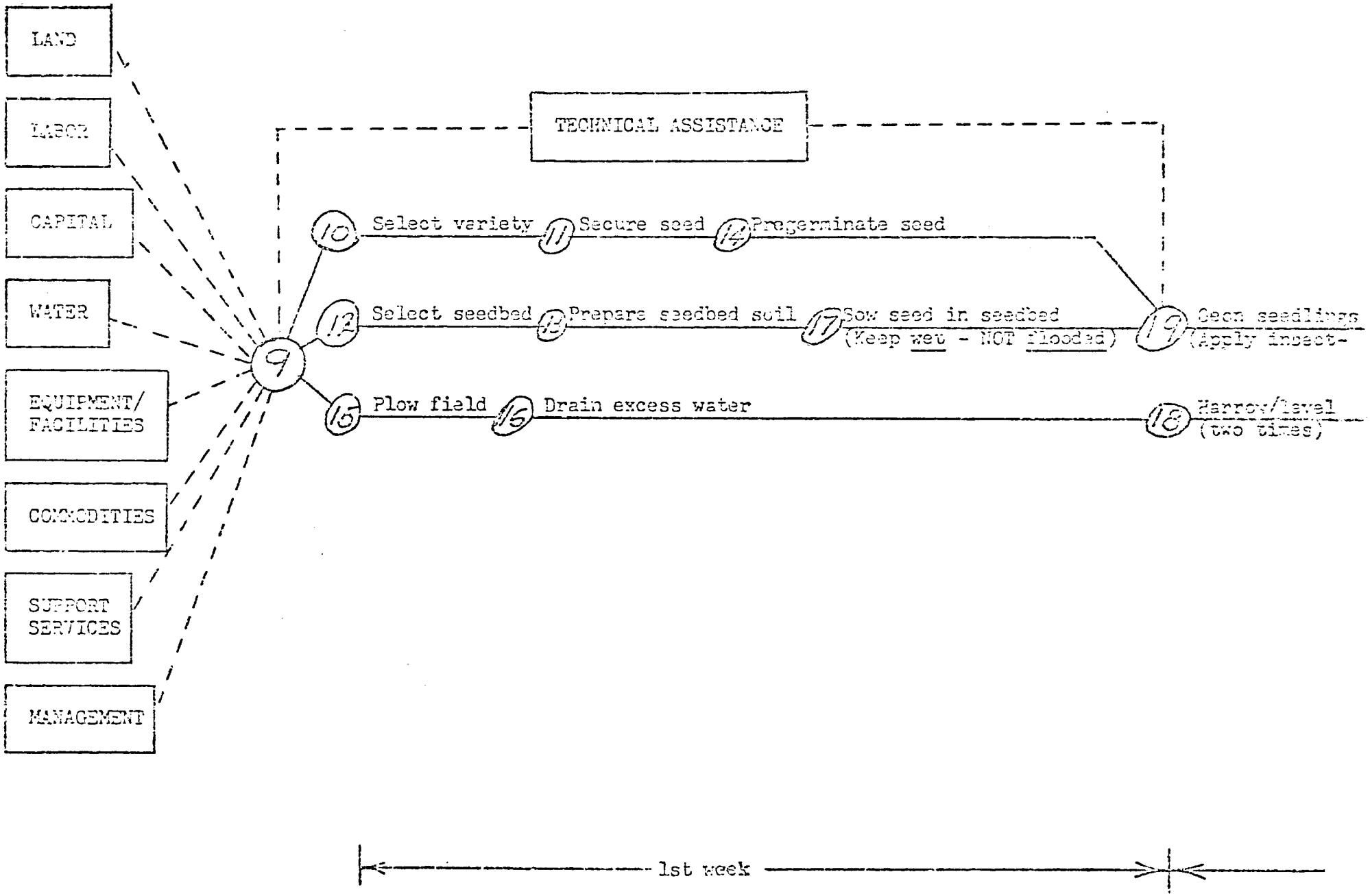
5. As a frame of reference for structuring or restructuring public support service institutions, including ministries and their component entities in LDCs, to improve their response capabilities, i.e., for institutional development. 3/

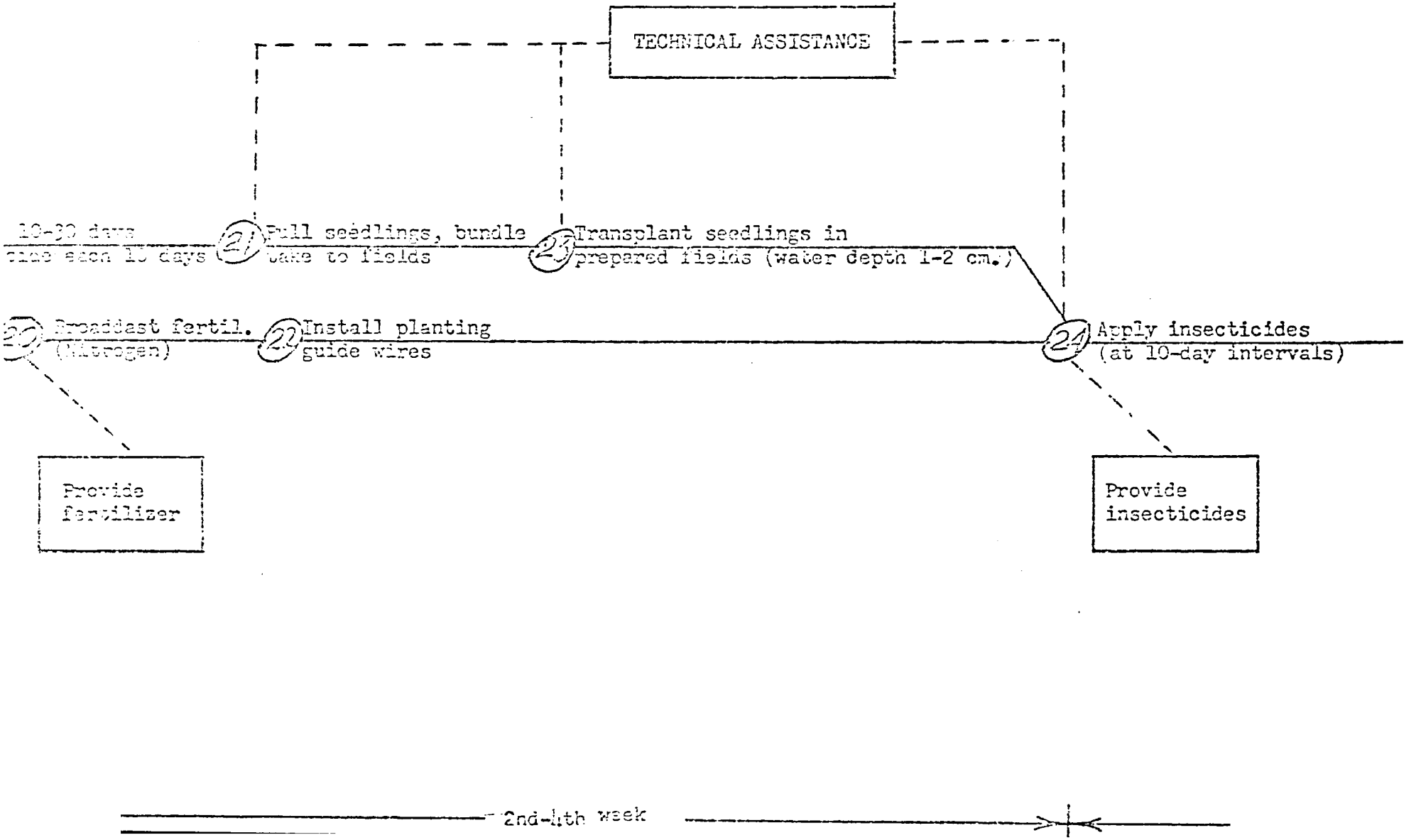
1/ A study now under way via contractual arrangements between TA/DA and the Governmental Affairs Institute (AID/csd 3630) will test this proposition.

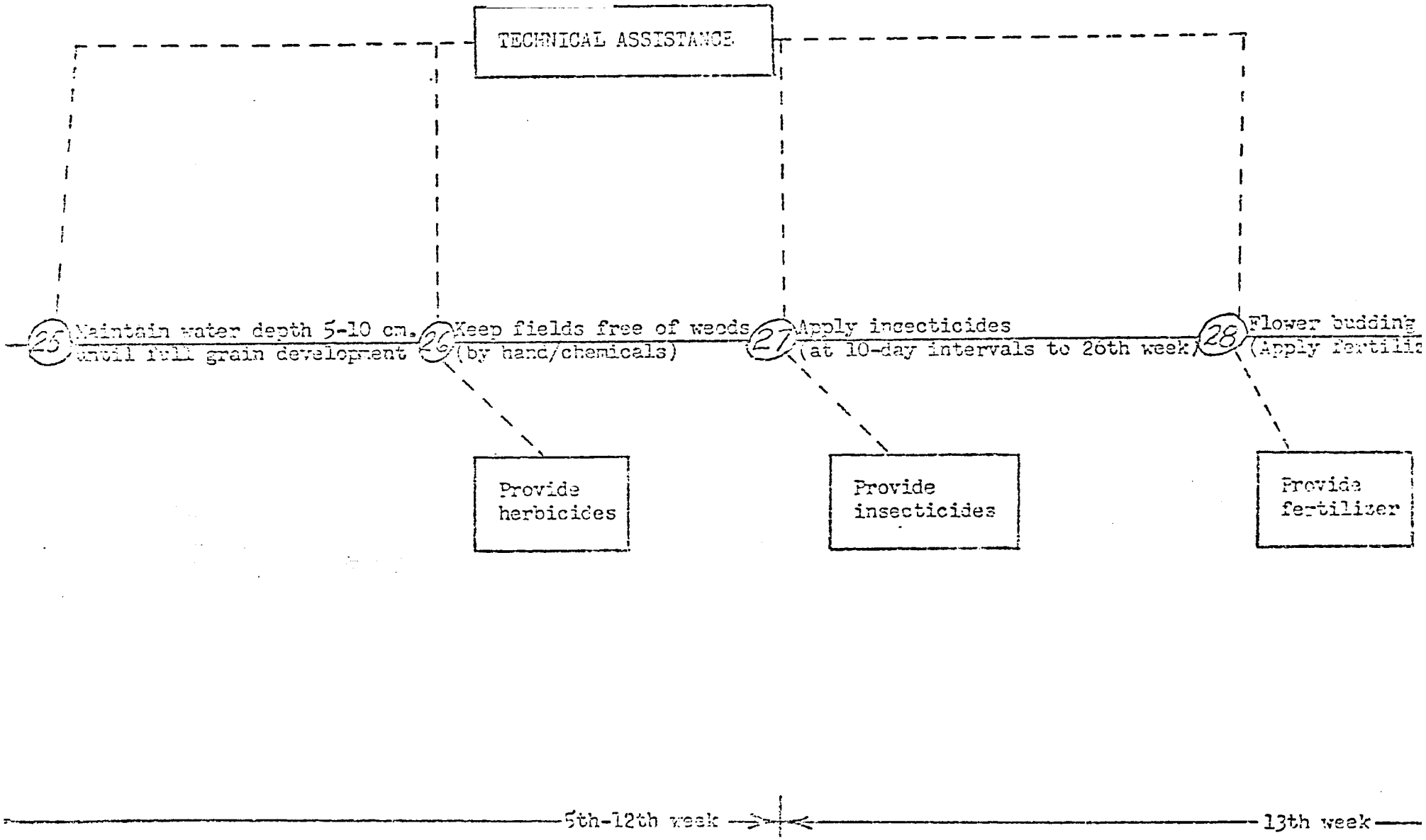
2/ Experience in Central America and studies by Harvard Business School, under contractual arrangements with TA/DA (AID/csd 3153) confirm this proposition.

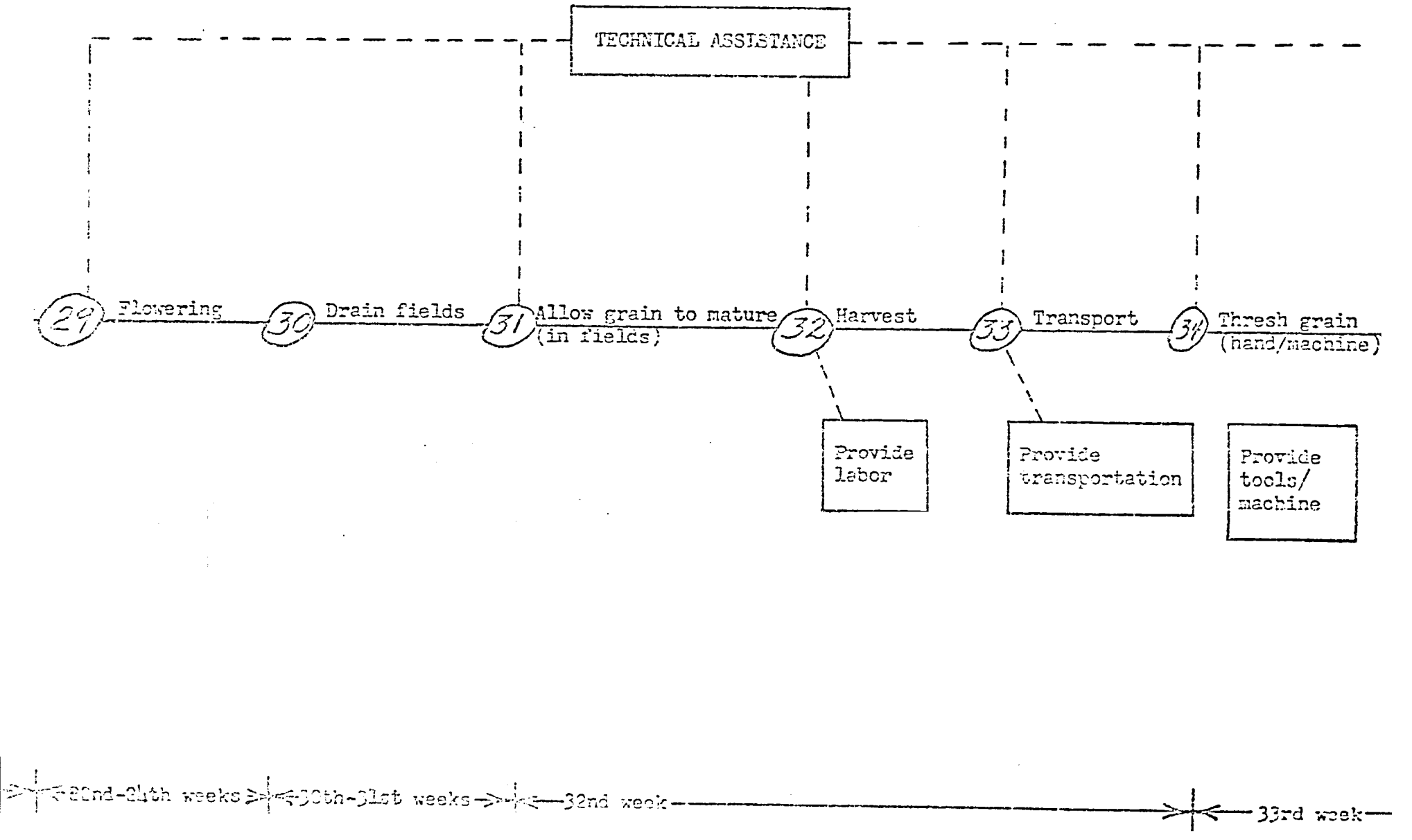
3/ An exercise now in progress (Ghana) with TA/DA collaboration will test this proposition.

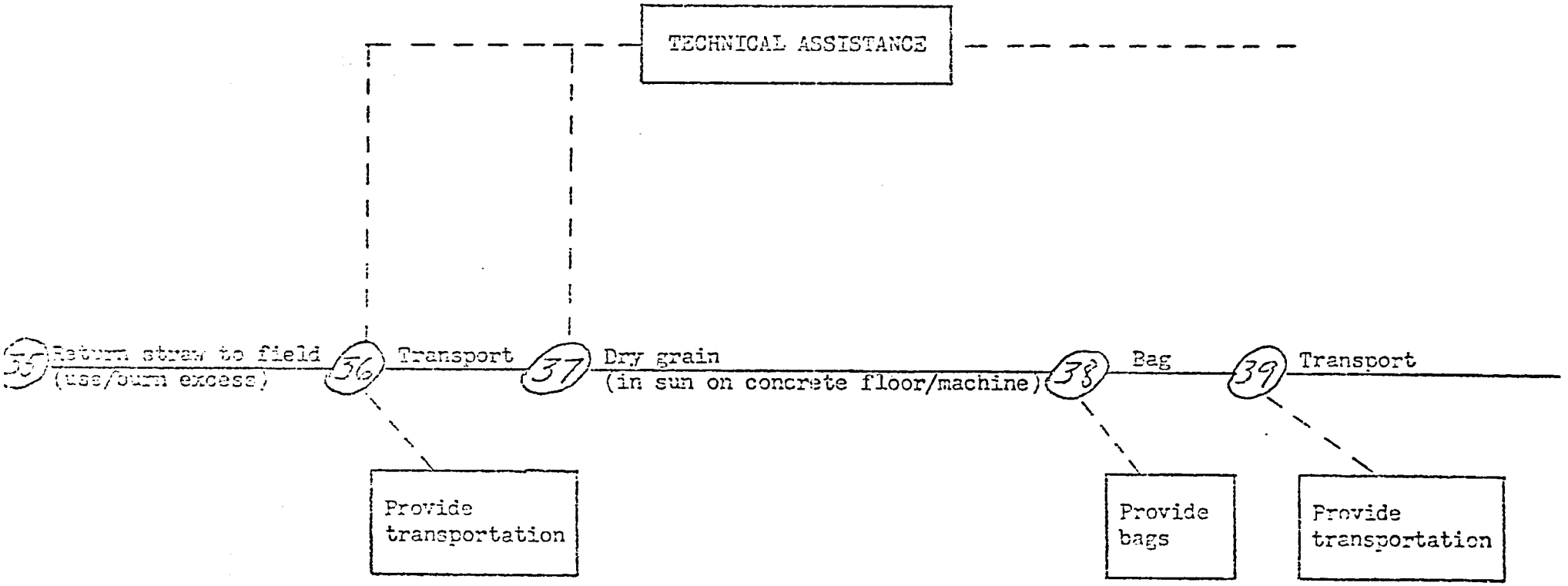
AGRICULTURE COMMODITY SYSTEM FOR RICE (PADDY)



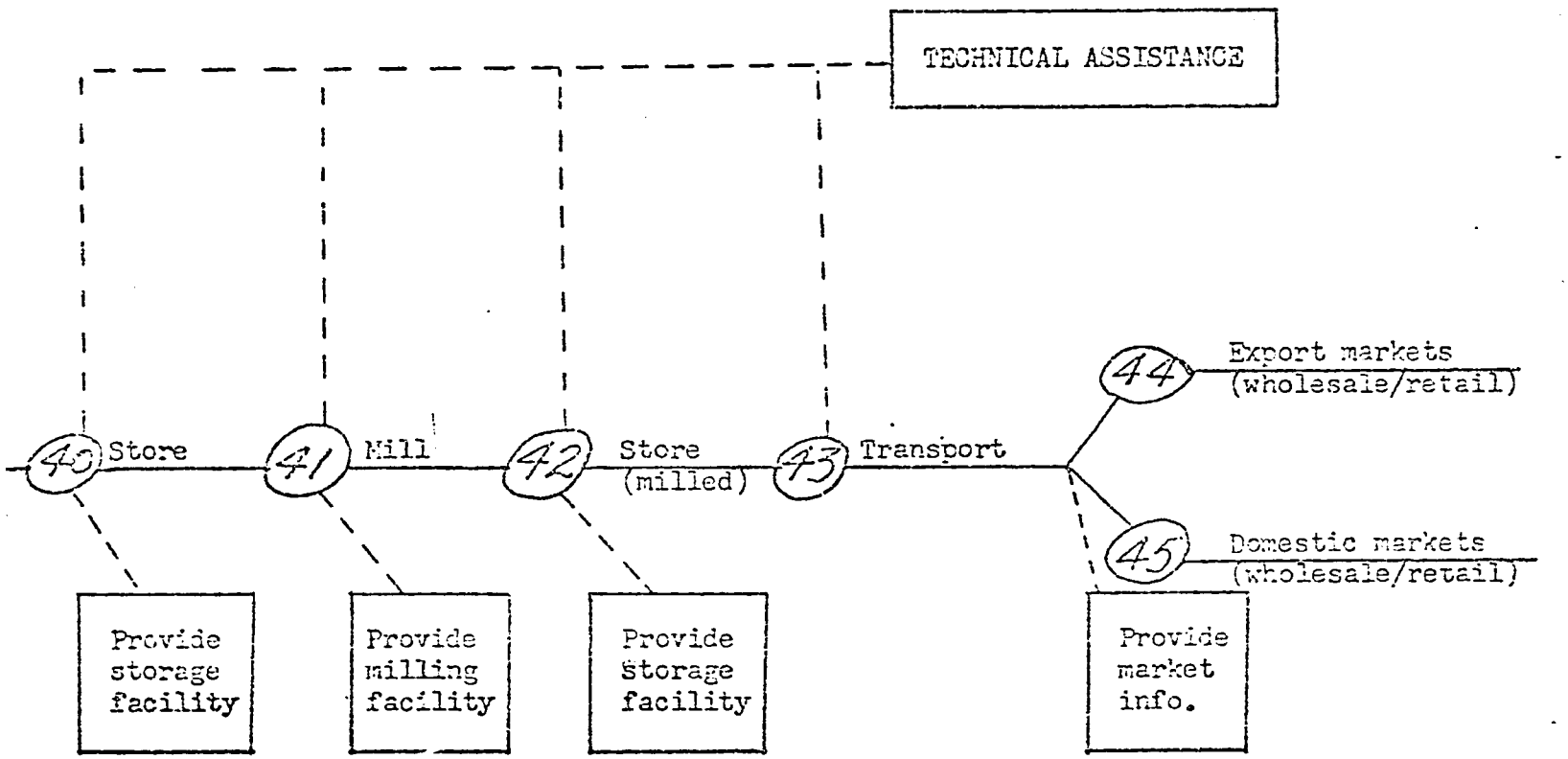

TECHNICAL ASSISTANCE
10-30 days
time each 10 days
21
Pull seedlings, bundle
take to fields
23
Transplant seedlings in
prepared fields (water depth 1-2 cm.)
20
Broadcast fertil.
(Nitrogen)
22
Install planting
guide wires
24
Apply insecticides
(at 10-day intervals)
Provide
fertilizer
Provide
insecticides
2nd-4th week


TECHNICAL ASSISTANCE
25
Maintain water depth 5-10 cm.
until full grain development
26
Keep fields free of weeds
(by hand/chemicals)
27
Apply insecticides
(at 10-day intervals to 26th week)
28
Flower budding
(Apply fertili
Provide herbicides
Provide insecticides
Provide fertilizer
5th-12th week
13th week


TECHNICAL ASSISTANCE
29
Flowering
30
Drain fields
31
Allow grain to mature
(in fields)
32
Harvest
33
Transport
34
Thresh grain
(hand/machine)
Provide labor
Provide transportation
Provide tools/ machine
20nd-24th weeks
30th-31st weeks
32nd week
33rd week


TECHNICAL ASSISTANCE
55
Return straw to field
(use/burn excess)
56
Transport
37
Dry grain
(in sun on concrete floor/machine)
38
Bag
39
Transport
Provide transportation
Provide bags
Provide transportation

34th week


TECHNICAL ASSISTANCE
40
Store
41
Mill
42
Store
(milled)
43
Transport
44
Export markets
(wholesale/retail)
45
Domestic markets
(wholesale/retail)
Provide storage facility
Provide milling facility
Provide storage facility
Provide market info.

34th week

LDC AGRICULTURE SECTOR - Schematic

TRADITIONAL EXPORTS

Bananas

Coffee

Cotton

Sugar

. . . .

BASIC FOODS CROPS

Beans
Cassava
Corn
Rice
Sorghum
Yams
Wheat
. . . .

LIVESTOCK

Beef
Fish/Shrimp
Poultry
Swine
. . . . . .

NON-TRADITIONAL EXPORTS

Flowers/Ornamentals
Fruits
Nuts
Vegetables
Wood Products
Textiles/clothing
. . . . . .

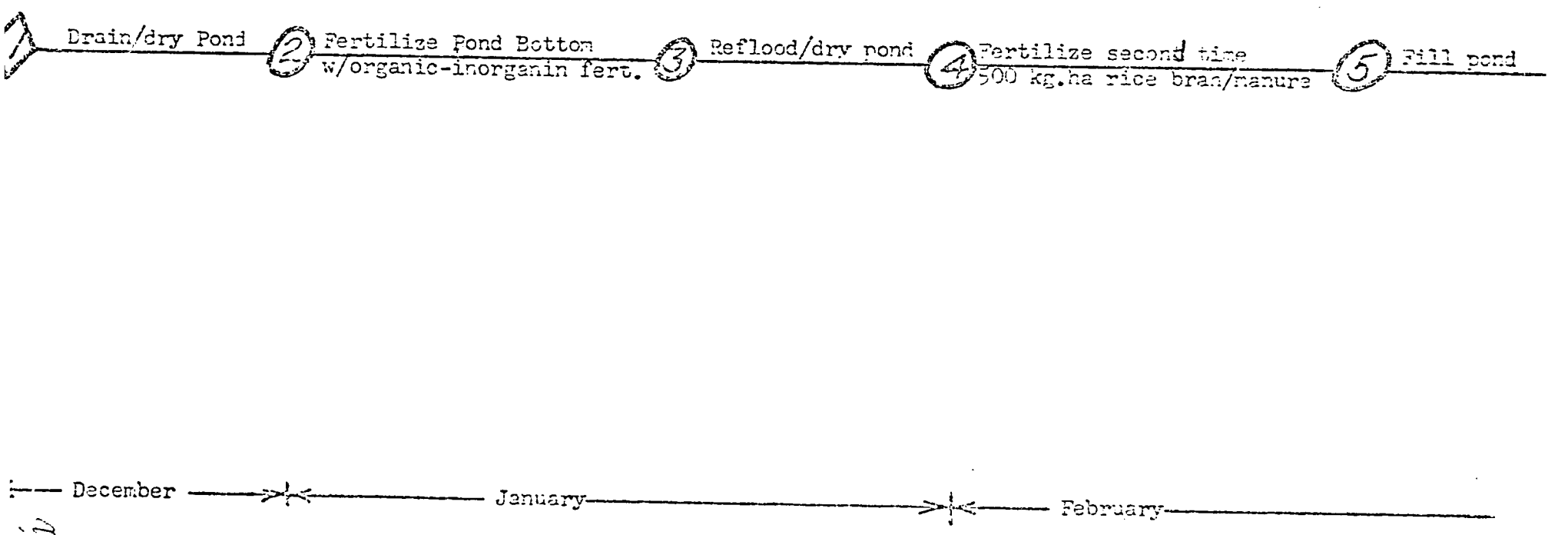
RESEARCH/EXTENSION/EDUCATION

LAND REFORM

RESOURCES/INSTITUTIONS
. . . . . .

INDUSTRIAL, TRANSFORMATION and Other Sectors

AQUACULTURE SYSTEM (POND) - TAIWAN (Milkfish)



c over-wintering ponds

November

10 Second harvest (gill nets)

11 Check benthic algae beds on pond bottom (if depleted, feed with rice bran)

12 Third (final) harvest (gill nets)

13 Transfer smaller fis

July — August-September — October

6 Kill wild fish (w/tea-seed cake)

7 Stock over-wintered fish from carry over ponds 2,000/ha each large, med.,small fingerlings

8 Add 2,000 additional fry

9 First harvest

March — April-May — June

This is not to suggest that a commodity system is a panacea for agricultural development, or that it can provide quick and easy solutions to all program and project management problems in LDCs. It does not, ipso facto, eliminate the economic, socio-political or institutional constraints that impede development and/or management, nor supply essential resources, incentives and motivations. It does offer a versitale and practical tool that managers, technicians and government officials can use to help farmers to produce quality crops in quantity, for a price consumers can afford to pay and at a cost which gives the producer a reasonable return on his investment and risks.