
UNIT 15 CAPITAL FORMATION IN INDIAN AGRICULTURE

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15.0 OBJECTIVES

After going through this unit you will be in a position to:

- explain the concept of capital formation and its types;
- explain the role of capital formation in agriculture;
- identify the demand for and supply of capital in agriculture;
- explain the system of accounting of capital formation; and
- identify the trend of private and public capital formation in Indian agriculture.

15.1 INTRODUCTION

Agricultural sector has always remained short of capital, especially in developing countries like India. It is mainly because most of the farm operators do not invest

adequate amount of money needed in farming business. Successful farming depends upon adequate provision of capital input as it enables the farmer to carry out agricultural operations efficiently. Any inadequacy of capital supply or its malfunctioning is bound to have serious repercussions on agriculture.

Indian agriculture has witnessed major technological breakthroughs and undergone progressive commercialization during the past few decades. Several programmes including Intensive Agricultural District Programme (IADP) (started in 1963-64) and Intensive Agricultural Areas Programme (IAAP) (started in 1964-65) have emphasized on modern technology in agriculture. Moreover, the high yielding varieties (HYV) seeds programme and introduction of green revolution during the late 1960s envisaged packages of superior inputs and assured supply of such inputs to the farm sector. With the introduction of such technological innovations, the importance of capital in agriculture in India has increased remarkably.

15.2 WHAT IS CAPITAL?

You may be aware that capital input is defined as a produced means of production. In this sense capital is quite different from other inputs such as land and labour. Different economists have defined capital in different ways. To some, it is simply 'a tool of production'. Though such an explanation is concise and communicable, it approximately designates one of the prime characteristics of total capital, i.e., its use in production. For some others, capital means only tangible items such as physical plants, equipment, machines, etc. But this is only a part of capital. T. W. Schultz remarks that investment in human beings through education, technical training and managerial knowledge also forms part of capital, particularly human capital. The contribution of human capital ranges between two-third and three-fourth of the total output growth of the developed countries.

In its simplest form capital can be defined as an input in production. But simplicity is not the only characteristic of a good definition. Let us look at some other definitions.

- 1) Capital refers to all man-made goods and services, which are used for further production. – Murray and Nelson.
- 2) Capital goods are those goods produced by the economic system to be used as productive inputs for further production of consumption and other goods and services. – Paul A. Samuelson.
- 3) Capital consists of produced goods and services saved for consumption and used by, or as a part of human agent in further production. - Kenneth E. Boulding.

15.3 TYPES OF CAPITAL IN AGRICULTURE

We can classify capital in agriculture into various categories as given below.

15.3.1 Working and Investment Capital

Agricultural capital is usually of two kinds: i) operating or working capital, and ii) fixed or investment capital. The first refers to the expenses incurred on inputs like seeds, fertilizers, wages and irrigation charges. On the other hand, the second represents investment in fixed assets such as land, machinery and construction of wells. Working capital relates to short-run investments while investment capital represents long-term farm investments.

15.3.2 Private and Social Capital

Capital may also be classified as private or social capital. Any capital owned by private individuals such as agricultural farms, land, draught animals, tractors, pump

sets, etc. can be classified as private capital. Public expenditure incurred by local, state or other public agencies for dams, canals, and barrages belong to the social capital category. Both kinds of capital help in the socio-economic development of a region.

15.4 CAPITAL FORMATION: BASIC CONCEPTS

We discuss below some of the basic concepts related to capital formation.

15.4.1 Gross and Net Capital Formation

Gross capital formation refers to the total addition to capital stock, both fixed capital and inventories, in a year. It includes gross fixed capital formation and change in stocks. Net capital formation denotes the extent of addition to capital stock after allowance for capital consumption or depreciation, i.e., fixed capital stock used up in the process of production during the year. Thus, net capital formation is obtained after deducting depreciation from gross capital. Depreciation represents the amount of fixed capital used up in the production process. It depends on the expected economic life of individual assets and is designed to cover loss in value due to normal wear and tear as well as due to foreseeable obsolescence.

15.4.2 Fixed Capital Formation

Fixed capital can be of two types: gross and net. If we deduct depreciation from gross fixed capital we obtain net fixed capital. Let us find out the components that are included in gross fixed capital. First we include the outlays (i.e., purchases and own account production) on addition of commodities to their stocks of fixed assets by i) industries, ii) government, and iii) private non-profit organizations. Secondly, we include the net additions (i.e., purchase minus sale) of second-hand and scrapped goods. Thirdly, we include i) acquisitions of reproducible and non-reproducible durable goods (except land, mineral deposits, timber tracts, fisheries and the like) for civilian use, ii) work-in-progress on construction projects, capital repairs, iii) outlays on improvement of land, and on the development and extension of timber tracts, plantations, vineyards, etc., and iv) the acquisition of breeding stock, draught animals, dairy cattle and the like, and transfer costs in connection with purchase and sale of land, mineral deposits, timber tracts, etc. Fourthly, similar outlays by households on residential construction are also included. However, remember that we exclude the outlays of government services on durable goods for military use.

15.4.3 Household Capital Formation

Household capital formation refers to i) the acquisition of new capital by households, ii) increase in stock of producer households, and iii) acquisition of *new* residential buildings by households (purchase of a secondhand building is not included). Household sector includes: i) individuals, ii) non-government non-corporate enterprises such as farm and non-farm business, iii) unincorporated establishments like sole proprietorship and partnership, and iv) non-profit institutions like charitable trusts, religious endowments and educational institutions.

15.5 ACCUMULATION OF CAPITAL

Measurement of capital in real terms is quite ambiguous. A simpler approach is to measure it in terms of money. However, remember that capital is not money itself. Like money, accumulation of capital is the result of savings or borrowings. There are several ways in which farmers may obtain major part of the capital they use in their farm operations. The important ones under Indian conditions are:

- Personal savings,
 - Contracts, and
 - Borrowing from various lending institutions.
- 1) **Savings:** Capital accumulated through savings forms the backbone of farm finance and provides risk-bearing ability. As you know, saving is the surplus income over consumption. Farmers generally set aside a part of their produce and/or farm income in the form of seeds, grains, etc. It is used in the next crop season to purchase inputs and manage farm operations.
 - 2) **Contract farming:** Contract farming has gained special significance in recent years in agricultural sector. Under this system, tie-up arrangements are made between farmers and contracting firms for production and purchase of a specific product. Contract farming is quite common in agricultural commodities used as inputs in processing industries such as sugarcane, oilseeds, fruits and vegetables, plantation crops, etc. Farmers are provided with information, quality planting materials, other material inputs, technical guidance, marketing facilities and financial support by the contracting firms. The contracting firms supply necessary capital to farmers under the agreements. A purchase contract thus provides another method of supplementing farmer's capital.
 - 3) **Borrowing:** The word 'borrowing' means to receive something with the understanding that either the same or its equivalent will be returned. In other words, borrowing means the ability to command capital or services currently for a promise to repay at some future date. In India, the system of borrowing capital is very common. Capital can be borrowed from (i) institutional lending agencies such as commercial banks, regional rural banks, and co-operative banks, and (ii) non-institutional lending agencies like moneylenders, traders, middlemen, friends and relatives. Though second source is the easiest way of getting money, it is rather costly because often the interest burden is very heavy, especially when borrowed from moneylenders.

Check Your Progress 1

- 1) Explain the concept of capital in agriculture.
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- 2) Distinguish between the followings:
 - a) working capital and physical capital
 - b) private capital and social capital.....
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3) What are the important sources of capital in agriculture?

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15.6 ROLE OF CAPITAL FORMATION IN AGRICULTURE

When we use the terms farm and farming, we think of such things as land, crops, seeds, fertilizers, pesticides, draught animals, pump sets and tractors. The idea of capital hardly comes to mind. But it is a fact that all these things – whether land or machine, animal or crop – are nothing but *physical capital* and for acquiring these items, capital investment is required. Similarly, expenses are incurred before the farm produce is ready for sale. The fields are prepared, seeds are sown, water and fertilizer are added, weeding is done, crop is harvested, threshed, bagged and stored or sent to the market for sale. For all these operations, services of labour are needed and for that wages have to be paid. All these expenses together constitute *working capital*. Therefore, without capital (physical and working) it is impossible to run a farm.

The concept of capital formation in agriculture comprises investment in agriculture, land development, soil conservation, rural roads, agricultural machinery, storage and other items. The return from such investments is expected over a period of time. In the developed countries even the investment made on research, education and technical training for the development of human capital is also included in capital formation as it increases the efficiency of the operator and output of the farm. There is considerable literature putting forward numerous hypotheses regarding capital formation in underdeveloped countries. For example, Ragnar Nurkse points out that the supply of capital is governed by the ability and willingness to save; the demand for capital is governed by the incentives to invest. Arthur Lewis attributes low investment to low saving which in turn is due to the small ratio of profit to national income. According to H. W. Singer, it is the lack of investment opportunities, which inhibits peoples' desire to save and invest. Dearth of entrepreneurship and institutional barriers are among the other factors usually mentioned for low capital formation.

Capital formation is an important factor in economic development. Nurkse has rightly pointed out that the *vicious circle of poverty* in underdeveloped countries can be broken only through capital formation. It is capital formation that leads to further utilization of available resources and thus increase in output, income and employment. Since agriculture is the predominant sector in Indian economy capital formation in agriculture plays a crucial role in the economic development of the nation.

Use of adequate amount of capital increases productivity in agriculture and allied sectors. India has been far behind developed economies in per capita consumption of food, milk and other edibles. Adequacy of capital formation in agriculture not only will augment production and availability of food items but also can add to the purchasing power of farmer households in the country.

Capital formation leads to *technical progress*, which helps economies of large-scale production. With the advancement of farm technologies come several benefits such

as: i) increase in yield, ii) timely completion of farm operations, iii) maximum possible land utilization, iv) innovations in crops and cropping pattern, and v) diversification of agriculture.

Capital formation leads to expansion of market. Since capital formation results in higher production it leaves more *marketable surplus* with the farmer, which can be sold in the market. In a state of increasing population, as is the case of India, capital formation is quite important for increasing agricultural production.

Capital formation can also help in improvement of the quality of the produce. This in turn can augment the scope for exporting and entering the world market. It has the potentialities to improve the balance of payments of a country. Since India has very large land area and labour force under agriculture, the nation can play a major role in global market for farm products. Role of capital formation in agriculture is inevitable for this.

Capital formation in agriculture can lead to self-sufficiency in the country in farm produce and consumables. This ultimately can dispense with the need for foreign aid and minimize the burden of foreign debt.

The strain of inflationary pressure can be removed through adequate capital formation. As we know, use of capital leads to increase in production. In the long run capital formation can bring price stability and remove price fluctuations. This can be instrumental in making food available at a low price and in reducing poverty.

The process of capital formation helps in raising gross domestic product (GDP). Thus capital formation is the principal instrument to enhance per capita income and push the economy away from a state of underdevelopment.

Capital formation not only helps in income generation, but also enlarges the capacity of an economy to produce. The magnitude of increase is determined by the *incremental capital output ratio* (ICOR). For example, suppose ICOR is 4 and we invested Rs.4 crore, then output will increase by Rs.1 crore.

15.7 DEMAND FOR CAPITAL IN AGRICULTURE

The need for capital in Indian agriculture can be explored by asking a question: “When and how much capital is employed in agriculture?” This can be judged from two viewpoints: i) from the farmer’s point of view, and ii) from the point of view of agriculture as a whole. The two viewpoints have many things in common. The farmer needs capital for meeting the fixed and operating expenses, such as investment in machinery, livestock, crops, real estate and household furnishings. However, the nation needs other forms of capital, which are required by the farming community, but the farmers do not like to invest. Examples are roads, canals, road side plantation, irrigation projects, warehouses, cold storages, agricultural research, etc. On the whole, the demand for capital for agriculture should be examined from the standpoint of (i) the needs of individual farmers, (ii) the need for investment in human capital, (iii) the needs of firms marketing agricultural products and inputs, (iv) community needs, (v) the need for accumulating capital in the form of new technology, and (vi) the need for agro-based industries as a whole.

Significant amount of capital is used in agriculture for the development of new technology, community facilities and the marketing of farm products and inputs. The

capital used to support these activities comes from various sources. Support for the development of new technology is largely provided by government and suppliers of farming inputs. Both private and public funds are used in financing community facilities. In the case of firms engaged in the marketing of agricultural products or inputs, the sources of capital are similar to those generally available to business in other parts of the economy.

Rural credit needs can be classified on the basis of purpose and duration. Accordingly, it is classified as agricultural credit and non-agricultural credit. On the other hand, it can be short-term, medium-term and long-term credits.

15.7.1 Agricultural Credit Needs

- i) **Short-Term Credit:** The short term agricultural credit is given for seasonal agricultural operations directed towards raising of crops on land, including reasonable amount for the maintenance of the farmer and his family. Short-term loans are generally made for 12 months. They are given for purchasing seeds, manure, fertilizer, and pesticides or for meeting labour charges. Such loans are to be repaid after the harvest of the crop.
- ii) **Medium-Term Credit:** Medium-term loans are given for a period ranging from 12 months to 5 years for purposes such as land reclamation, bounding and other land improvements, purchase of live stock, machinery and other implements, orchard plantation, sinking of wells and construction of pucca drain in the field, etc.
- iii) **Long-term Credit:** The long term credit is given for a period ranging between 5 to 20 years for purposes such as the redemption of land, liquidation of debt, purchase of tractors, installation of tubewell and improvement of permanent nature in land.

15.7.2 Credit for Non-farm Business

Such credit is provided to meet the working capital requirements of non-farm business such as: i) purchase of transport equipment and furniture, ii) purchase/construction and repair of buildings, iii) purchase of non-farm equipment, and iv) establishment of cottage and small scale industries. It is of long-term nature and repayment takes place between 5 to 20 years period.

15.8 SUPPLY OF CAPITAL TO AGRICULTURE

The supply of capital to agriculture is solely dependent on the total or aggregate supply of capital for the entire economy. The determinants of total amount of capital that a society is willing to hold and the amount it is willing to add to these holdings each year are complex. A list of these determinants would include such items as: i) national income and its distribution, ii) the structure of institutions, customs, values of the people, and iii) interest rates. The major variable among these determinants is the interest rate or the price that people will pay for the use of the capital.

Suppliers of capital to agriculture can be broadly classified into two categories: (i) individual or non- institutional (moneylenders, relations, etc.), and (ii) institutional (commercial and rural banks, land development banks, cooperatives, life insurance companies, etc).

15.8.1 Institutional Capital

India follows multi-agency approach in supply of rural and agricultural credit. This means more than one institutions are involved in supply of rural credit. The important institutions are: i) cooperatives, ii) commercial banks, and iii) regional rural banks. Moreover, the National Bank for Rural Development (NABARD) provides refinance facilities to the above three institutions towards credit advanced for agricultural and rural development.

Cooperative Banks

The cooperative banking structure provides short term credit for agricultural production operations and long term credit for improvement in farming. The short-term cooperative structure is generally a three-tier system in most of the states comprising of State Cooperative Bank (SCB) at the state level, District Cooperative Central Banks (DCCB) at the district level and Primary Agricultural Credit Societies (PACS) at the village level. On the other hand, long-term credit needs of farmers are met by Cooperative Agricultural and Rural Development Banks (formerly Land Development Banks). You can find from Fig. 15.1 that there are 30 SCBs with 831 branches and 367 DCCBs with 12560 branches. You will be introduced to the functioning of cooperative banks in Units 17 and 18.

Commercial Banks

Scheduled commercial banks have turned out to be a major source of agricultural credit in India. Before nationalisation of commercial banks, credit flow from this source was not substantial. However, with nationalisation the commercial banks have entered into agricultural financing in an important way. These banks have met the long term credit needs of the farmers for purchase of tractors, pump sets, installation of tubewells and other improvement of permanent nature. Moreover, allied activities such as animal husbandry, dairy farming, pisciculture, piggery, poultry farming and horticulture, etc. have also been financed by commercial banks. As we observe from Fig. 15.1, there are 100 commercial banks with more than 20 thousand rural branches that provide agricultural credit.

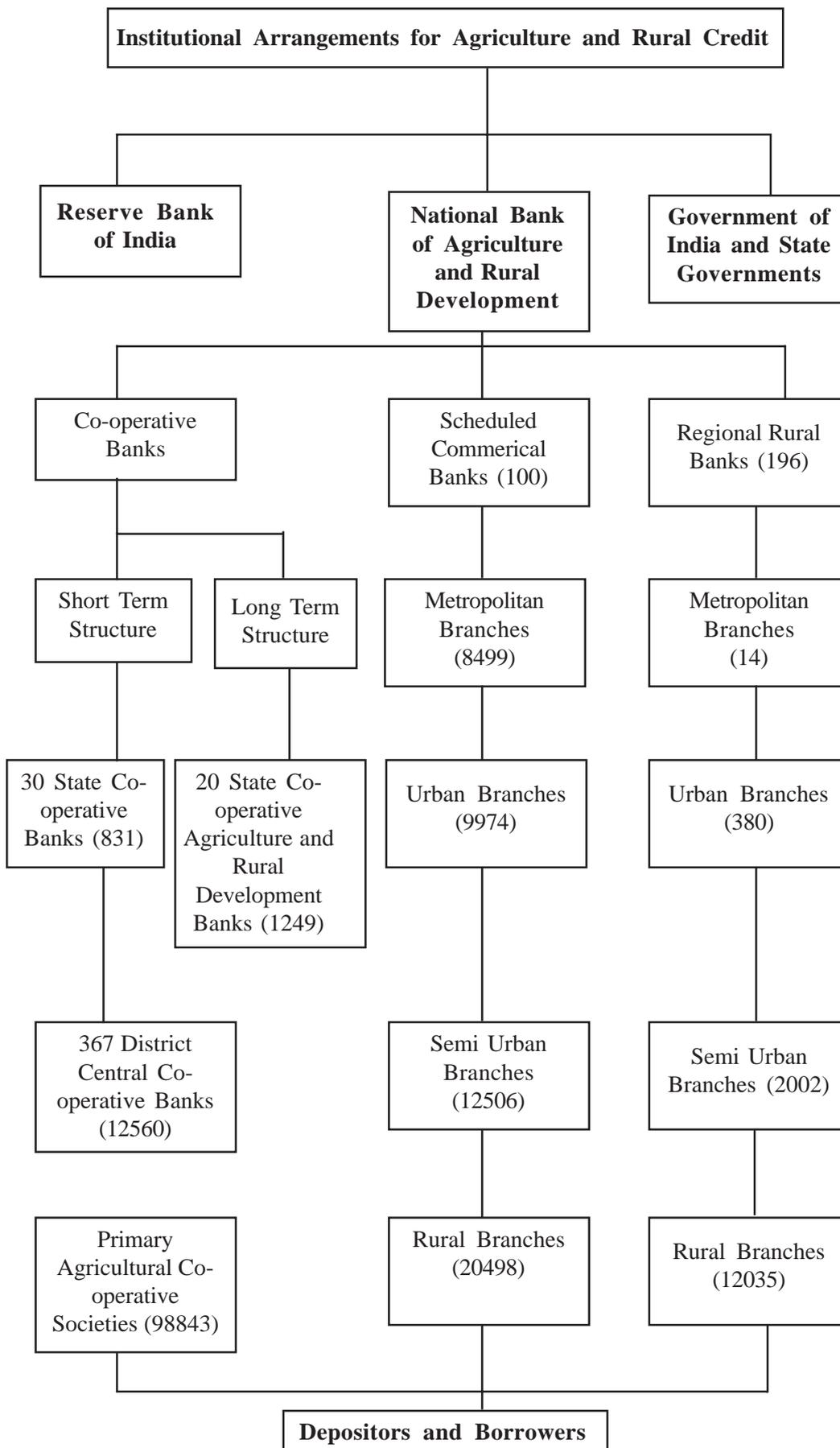
Regional Rural Banks

In order to provide adequate credit to the agricultural sector the Lead Bank Scheme was introduced in 1974. Under this scheme a particular nationalised commercial bank was made responsible for credit disbursements in an identified district. The concerned bank was directed to have branch expansion in rural area and provide credit to the farmers to the maximum extent. Due to high operational cost in rural areas and urban oriented attitude the commercial banks were not in a position to face the challenge. In order to overcome the difficulties and provide adequate institutional arrangements in rural areas especially where co-operative credit delivery system was weak, the Regional Rural Banks (RRB) were set up in 1975.

The RRBs are expected to provide low cost banking services in rural areas, particularly to the weaker sections. The RRBs were established with the objective that they would 'combine the local feel and the familiarity with rural problems which the cooperatives possess and the degree of business organization, ability to mobilize deposits, access to central money markets and modernized outlook which the commercial banks have'.

From a modest beginning with 6 RRBs in 1975, as many as 196 RRBs were operating in 500 districts with a network of 14,313 branches as on 31 March, 2001 excluding satellite branches and extension counters. The branch network comprises 6 metropolitan,

348 urban, 1875 semi-urban and 12,084 rural branches. RRBs have a large branch network in the rural area, which forms nearly 37% of the total rural branch network of all scheduled commercial banks.



Note: Figures in parentheses indicate the number of branches. The position is as of 31 March 2001.

Fig. 15.1: Institutional Arrangements for Rural Credit

National Bank for Rural Development (NABARD)

The NABARD is an apex institution, accredited with all matters concerning policy, planning and operations in the field of credit for agriculture and other activities in rural areas in India. It was established in 1982 ‘for providing and regulating credit and other facilities for the promotion and development of agriculture, small scale industries, cottage and village industries, handicrafts and other rural crafts and other allied economic activities in rural areas with a view to promoting integrated rural development and securing prosperity of rural areas’.

The functions of NABARD can be summarized as follows:

- i) It serves as an apex refinancing agency for the institutions providing investment and production credit for promoting the various developmental activities in rural areas;
- ii) It takes measures towards institution building for improving absorptive capacity of the credit delivery system, including monitoring, formulation of rehabilitation schemes, restructuring of credit institutions, training of personnel, etc.
- iii) It co-ordinates the rural financing activities of all institutions engaged in developmental work at the field level and maintains liaison with Government of India, State Governments, Reserve Bank of India (RBI) and other national level institutions concerned with policy formulation.
- iv) It undertakes monitoring and evaluation of projects refinanced by it.

NABARD’s refinance is available to cooperative banks, commercial banks and regional rural banks. It operates throughout the country through its Regional Offices and District Offices.

15.8.2 Non-institutional Capital

The non-institutional credit suppliers include professional moneylenders, relatives and personally known individuals. Though the credit is often available without much difficulty, with minimum paperwork and at a short span of time, particularly from the professional moneylenders, it carries exorbitant rate of interest. The government has placed several restrictions on such operations such as registration of business, and regulation of interest rates. However, the professional moneylenders continue to be an important source of credit especially among the rural small farmers. Though no correct statistics are as yet available, during the early 1950s this sector was contributing above 90 percent of rural credit. Its share decreased to 81. 3% in 1961-62 and further down to 69. 7% in 1970-71. The factors responsible for the decline in non-institutional credit are: i) nationalization of commercial banks, ii) opening of branches in rural areas, and iii) augmenting awareness and education of rural people.

Check Your Progress 2

- 1) What is the role of capital in agriculture?

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2) What is the need for credit in agriculture?

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3) What are the major institutional sources of capital in agriculture?

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15.9 SYSTEM OF ACCOUNTING CAPITAL FORMATION IN AGRICULTURE

The practice of accounting capital formation is generally standardized by the United Nations System of National Accounts (UNSNA), which gets revised from time to time with better understanding and improvement in the techniques of data collection. The guidelines under USSNA were released first in 1953, revised in 1968 and then in 1993. It has facilitated many countries to adopt a standardized system of estimating national income. While nearly all the nations have adopted the system as given by the United Nations, there are variations across countries in the methodology of compiling estimates. The departure emerges due to differences in organizational functioning of services in many sectors classified. Nonetheless the methodology is gradually coming closer to the United Nations standards. The Indian System of National Accounts (ISNA) is said to broadly follow the UNSNA, but there are some minor deviations at sector-specific level.

As per the UNSNA, the economy is divided into eleven industries, all of which fall under the primary (agriculture and allied activities), secondary and tertiary sectors. Classification of these industries closely follows the International Standard Industrial Classification (ISIC) of all economic activities. The estimates of Gross Capital Formation are classified into three categories. The estimates are set in as per (a) Product Classification (types of capital goods which are acquired), (b) industrial uses to which these capital goods are put, and (c) institutions that have undertaken the capital outlay. In each of the categories, separate account is presented for fixed asset formation and change in stock. A sketch of the broad items covered under each classification is given in Table 15.1.

In India, capital formation in the SNA is defined as investment in physical goods that result in creation of income over a longer period of time. Construction and machinery equipments are the two physical assets that are considered to be capital in nature. Generating statistics on capital formation is a joint effort of two organizations, Central Statistical Organization (CSO) and Reserve Bank of India (RBI). At the first instance, estimates are made for the whole economy according to the assets, viz, construction and machinery, and equipment and change in stocks/inventories using commodity flow

approach, except for change in stock. These are, then, categorized into two institutional categories, viz, public and private sectors where the latter encompasses the corporate and the household sectors. The estimates by industry of use are derived by using expenditure approach for each of the institutional sectors.

Table 15.1 : Estimation of Gross Capital Formation

Capital Formation	Product Classification	Institutional Classification	Institutional Classification
Fixed asset Formation	<p>a) Reproducible tangible fixed assets: residential buildings, non-residential buildings, other construction works, land improvement, plantations and orchards, machinery & equipment, transport equipment, etc.</p> <p>b) Non-reproducible tangible assets : land, subsoil assets, water resources, biological resources, timber tracts and forests, fisheries, etc.</p>	<p>a) Agriculture, forestry, fishing</p> <p>b) Mining and quarrying</p> <p>c) Manufacturing,</p> <p>d) Construction</p> <p>e) Electricity, gas and water works</p> <p>f) Transportation, storage and communication</p> <p>g) Wholesale and retail trade, hotels and restaurants.</p> <p>h) Ownership of dwellings</p> <p>i) Public administration and defense</p> <p>j) Banking, insurance and real estate</p> <p>k) Other services like social, community and personal services</p>	<p>a) Private enterprises: incorporated and unincorporated</p> <p>b) Public corporations: incorporated and unincorporated</p> <p>c) Government enterprises</p> <p>d) General Government</p>
Change in Stocks	<p>i) Raw materials,</p> <p>ii) Finished goods held for sale,</p> <p>iii) Work in progress for livestock and other fixed assets, etc.</p>	<p>i) Agriculture, forestry and fishing: livestock and other</p> <p>ii) Wholesale trade</p> <p>iii) Retail trade</p>	<p>a) Private enterprises: incorporated and unincorporated</p> <p>b) Public enterprises: incorporated and unincorporated</p> <p>c) Government enterprises</p> <p>d) General government</p>

In the Indian System of National Accounting, nine industries of use are defined. The estimates of capital assets are used to arrive at the capital account and the originating industry or establishment engaged in the production of goods and services under consideration. The classification or grouping of industries into nine groups in the system is independent of whether the activity is carried out by the household, private or public sector in the economy. The capital assets are valued at market price. The transacted assets are then allocated as per the industry of use and the sectors of purchase. The value of the capitalized item in the year of purchase and its apportionment according to the capital consumption allowance (or depreciation) over the life of the asset is done in the accounts of each of the industries. The allocation of physical capital produced in an industry of use is carried out as per the designated role of a particular industry. The capital formation as a result of construction activities is allocated as per the establishment approach. For example, if construction is for creating a dam for irrigation purposes then, it is considered as part of agricultural sector on public account. Similarly, if construction is towards creation of a fertilizer plant, then, it is accounted for in the manufacturing sector. In the case of machinery and equipment purchased by the households, end use or service approach is the

criterion for allocating that asset into a particular sector. For example, thresher and tractor used for cultivation of land and generator purchased for running an irrigation well by a household are considered as part of agriculture sector, irrespective of the fact that their production takes place in the manufacturing sector. In some cases, instead of direct consumptive use approach, establishment approach as based on industry of use is followed. The final output, thus obtained with the use of inputs from different industries is a result of combined effort of all the capital assets used in the process.

Estimates of capital assets, which form gross capital formation (GCF) in agriculture and allied activities as well as other sectors, are also made separately for three institutions under the capital account, viz., i) public, ii) private corporate, and iii) households. The public sector comprises: i) Departmental Commercial Undertakings (DCUs), ii) Non-Departmental Commercial Undertakings (NDCUs), and iii) administration. While estimating GCF all the commercial activities carried out in the economy are categorized under the DCUs. An activity is considered commercial, if there is production of some good/services in the process. Examples are irrigation, electricity, communication, railways, currency and coinage, civil aviation, manufacturing, radio and television broadcasting, road and water transport, etc. Of these activities, irrigation works and forestry are two such activities that are charged for and form part of the DCUs under the agriculture sector. The non-departmental commercial undertakings comprise financial and non-financial enterprises, in which the Central or the State government companies have not less than 5 per cent of the paid-up capital.

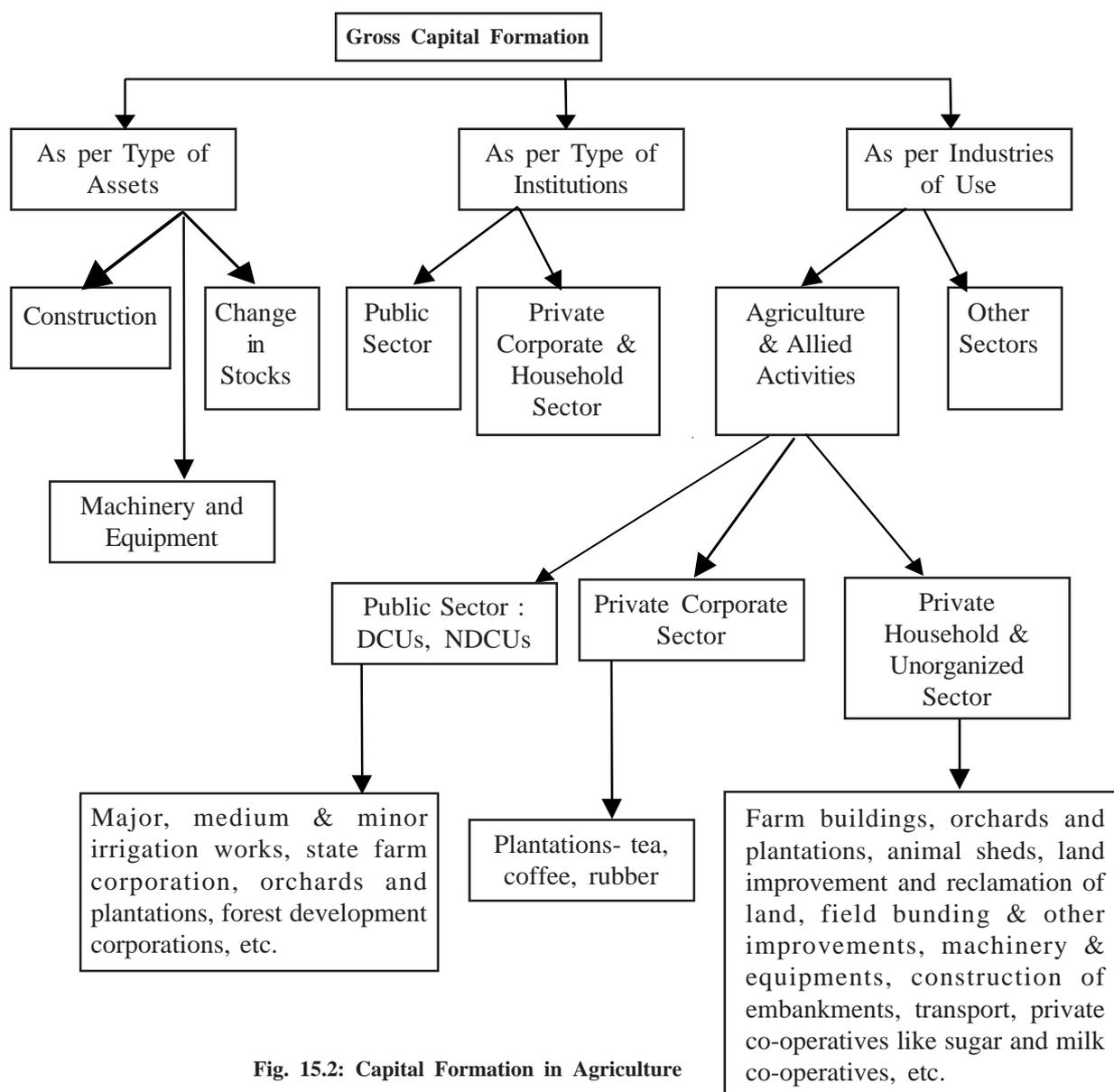


Fig. 15.2: Capital Formation in Agriculture

15.10 TREND OF CAPITAL FORMATION IN AGRICULTURE IN INDIA

15.10.1 Structure of Private Sector Investments in Agriculture

Private sector investment in agriculture comprises primarily investments in the corporate sector and household sector. Corporate sector in India is normally categorized into organized and unorganized segments. The organized segment contains big firms primarily in the plantation sector, and their estimates of capital formation are available in their accounting books. The unorganized sector, however, does not have any such systematic information. They are basically private co-operatives (sugar, milk, poultry, etc.) and other very small and cottage agricultural enterprises (dairy, agricultural implements, etc.). Information on their contribution to capital formation in agriculture is diverse and diffused. It is accounted through surveys conducted by the Central Statistical Organization (CSO) at regular intervals. Similarly, for households' component, CSO along with Reserve Bank of India (RBI) conducts surveys (All India Debt and Investment Surveys, popularly known as AIDIS) once in ten years to estimate their contribution to capital formation in agriculture. For the intervening years, estimates are *interpolated* using the combined index of agricultural production and industrial production. Additions to livestock, which are treated as fixed assets, are extracted from data on number of livestock given in the Indian Livestock Census. Their *interpolation* on annual basis is done with the help of geometric rate of growth from the given quantitative data.

Within the private sector, the organized corporate component accounts for less than five per cent of the capital formation in agriculture at the all India level during 1990s. The overwhelming share is that of the household sector, which may include the share of unorganized corporate sector and private co-operatives as well.

National Accounts Statistics do not provide detailed information on the type of investment undertaken or the assets created in the agriculture sector on public and private accounts. However, within private accounts such information at the household level is given in the All India Debt and Investment Survey (AIDIS). In all, household fixed capital formation in agriculture is categorized into six major components. These are: (i) land reclamation, bunding and other land improvements, (ii) orchards and plantations, (iii) wells and other irrigation, (iv) agricultural implements, machinery and transport equipment, etc., (v) farm houses, barns and animal sheds, and (vi) other capital expenditure.

The distribution and share of these fixed expenditure heads by the rural and urban agricultural households together with total fixed capital expenditure at the all India level for three reference periods are given in Table 15. 2.

Table 15. 2 : Percentage Distribution of Fixed Capital Expenditure of Households in Agriculture

Components	1971-72	1981-82	1991-92
Machinery, equipment & transport	43. 20	51. 95	47. 80
Wells and other irrigation sources	26. 80	20. 45	24. 70
Land improvements	16. 50	15. 25	12. 71
Farm houses & animal sheds	10. 50	4. 55	3. 47
Orchards and plantation	1. 80	2. 80	5. 06
Other capital expenditure	1. 20	5. 00	6. 26
Total	100. 00	100. 00	100. 00

We see from Table 15.2 that for the household sector, agricultural implements, machinery and transport equipment constitute the most important item of fixed capital formation in agriculture. It accounts for nearly half of the total capital formation in farm sector by both rural and urban households at the all India level as well as across states. The second important item of fixed capital formation is investment on wells and other irrigation works. It accounts for a high share ranging from 20 to 27 per cent in the total investment. Over the period, there has been an increase in the shares of orchards and plantations and other investments in total fixed capital.

Across states, investment in wells and other irrigation works was highest in agriculture-dominated states like Andhra Pradesh, Gujarat, Haryana, Madhya Pradesh, Karnataka, Maharashtra, Rajasthan and Tamil Nadu, excluding Punjab, where there has already been maximum exploitation of irrigation potential. The percentage share of expenditure on improvement and reclamation of land/buildings in total fixed expenditure in agriculture in 1991-92 was highest in Andhra Pradesh, Assam, Bihar, Kerala, Orissa and West Bengal. The share of this category in the total fixed capital formation in agriculture varied between 27% and 61.5%. The share of agricultural machinery and transport equipment in total investment was high in almost all the major states, except in Kerala and Maharashtra. These two states along with Jammu and Kashmir, however, had more investment in orchards and plantations. Household investment in farmhouses was relatively more in Haryana, Himachal Pradesh, Jammu and Kashmir, Assam and West Bengal.

15.10.2 Structure of Public Sector Investments in Agriculture

As far as behaviour of public sector investments in agriculture is concerned, both at the all India level as well as for states, the trend has been declining in most cases since 1980s. There are variations across states in these trends. But the fact remains that public sector investment in agriculture has been declining since early 1980s. The decline continued almost till 1993-94, and thereafter there are some signs of marginal recovery. Before we venture into the reasons behind this decline and its likely consequences for agricultural growth, it may be worth looking into the structure of public sector investments in agriculture.

Public sector investment in agriculture is estimated through investments by Departmental Commercial Undertakings (DCU) and Non-Departmental Commercial Undertakings (NDCU). The NDCU consist of agriculture, irrigation and water resource development corporations (like tubewell corporations), tea corporations and plantation and development corporations, etc. owned by the central and the respective state governments. Further, public sector investment in agriculture and allied activities is also decomposed into three sub-sectors, viz., i) agriculture proper, ii) forestry, and iii) fishery. Investments by the public sector in fisheries have been almost negligible, less than half a per cent of the total investment in agriculture. It is agriculture proper, which accounted for almost 94% of the investments in agriculture and allied activities during 1980s. Its share marginally came down to about 88% by the mid 1990s, but rose to 90.7% during 1996-97. Accordingly, the share of forestry, which hovered around 5% in 1980s increased to about 9% by the late 1990s. In both the cases of agriculture proper and forestry, the overwhelming share is that of DCU. Also, within the forestry sector plantations and orchards occupy bulk of the share in total Gross Capital Formation. In the total public sector investments in agriculture and allied activities, the share of irrigation (basically on major, medium and minor schemes) investment being incurred through DCU is the most dominant. It accounts for as much as 90% (Table 15.3). The NDCU accounts for about 10% of total public sector investment in agriculture and allied activities.

Table 15.3 : Percentage Share of Public Investment in Agriculture by type of Enterprise

(1993-94 prices)

Years	Aggregate			DCU		NDCU		
	Agri-proper	Forestry	Fishing	Agri-proper	Forestry	Agri-proper	Forestry	Fishing
1980-81	94. 93	5. 02	0. 05	92. 45	4. 86	2. 48	0. 16	0. 05
1981-82	94. 77	5. 18	0. 05	90. 90	4. 84	3. 87	0. 34	0. 05
1982-83	92. 97	6. 99	0. 04	90. 95	5. 36	2. 02	1. 63	0. 04
1983-84	91. 30	8. 62	0. 08	89. 26	6. 29	2. 04	2. 33	0. 08
1984-85	91. 98	7. 91	0. 11	89. 47	6. 28	2. 51	1. 63	0. 11
1985-86	92. 93	6. 93	0. 14	90. 75	5. 70	2. 18	1. 23	0. 14
1986-87	92. 00	7. 83	0. 17	90. 46	7. 25	1. 54	0. 58	0. 14
1987-88	92. 40	7. 48	0. 12	90. 80	6. 71	1. 60	0. 77	0. 17
1988-89	91. 87	8. 08	0. 06	90. 27	7. 62	1. 60	0. 46	0. 12
1989-90	89. 11	10. 80	0. 09	87. 74	9. 66	1. 37	1. 14	0. 06
1990-91	88. 01	11. 93	0. 06	86. 52	10. 58	1. 49	1. 35	0. 09
1991-92	88. 42	11. 50	0. 08	87. 49	10. 92	0. 93	0. 58	0. 06
1992-93	89. 82	10. 13	0. 05	88. 65	9. 84	1. 17	0. 29	0. 08
1993-94	90. 83	9. 11	0. 06	90. 00	8. 87	0. 83	0. 24	0. 05
1994-95	92. 11	7. 89	0. 00	90. 37	7. 50	1. 74	0. 39	0. 06
1995-96	91. 14	8. 84	0. 02	72. 09	8. 23	19. 05	0. 61	0. 02
1996-97	90. 70	9. 28	0. 02	83. 23	8. 78	7. 47	0. 50	0. 02
1997-98	89. 68	10. 30	0. 02	82. 09	9. 69	7. 59	0. 61	0. 02

There has been a slowdown in the rate of public sector investment in agriculture, especially during 1980-91. However, there has been some marginal improvement during 1990s. The private sector investment in agriculture also decelerated during 1980-86, but started recovering after 1986 (Table 15. 4). In fact, in the later half of 1980s and early 1990s, private sector investments showed not only remarkable improvements, but also rising behaviour even when public sector investments in agriculture was either going down or stagnating (Fig.15. 1). This raised several questions in the Indian literature on the subject in the late 1980s through 1990s, and the debate is still on. The questions being posed are: Is there any relation between the public and private sector investments in agriculture? Do they complement or compete with each other? How is deceleration of investment in agriculture likely to affect growth in agriculture? Why is public sector investment in agriculture declining so fast?

Table 15. 4 :Gross Capital Formation in Agriculture, Forestry and Fishing

(Rs. Crore)

Years	At 1993-94 Prices			At Current Prices		
	Public Sector	Private Sector	Total	Public Sector	Private Sector	Total
1981-82	7130	6949	14079	2041	2263	4304
1982-83	7092	7437	14529	2263	2636	4899
1983-84	7196	7529	14725	2466	2902	5368
1984-85	6921	8027	14948	2678	3413	6091
1985-86	6213	7919	14132	2818	3768	6586
1986-87	5864	7844	13708	2895	4033	6928
1987-88	6045	8249	14294	3304	4642	7946
1988-89	5699	9063	14762	3442	5577	9019
1989-90	4972	8452	13424	3354	5833	9187
1990-91	4992	11424	16416	3628	8596	12224
1991-92	4376	10589	14965	3653	9000	12653
1992-93	4539	11602	16141	4175	10804	14979
1993-94	4918	10331	15249	4918	10331	15249
1994-95	8369	11416	16785	6002	12381	18383
1995-96	5322	12367	17689	6762	14605	21367
1996-97	5150	13176	18326	7296	17119	24415
1997-98	4503	13802	18305	6921	19101	26022
1998-99	4421	14543	18964	7549	21174	28723
1999-2000	NA	NA	21388	NA	NA	33755

GCF in Agriculture in India
(1993-94 prices)

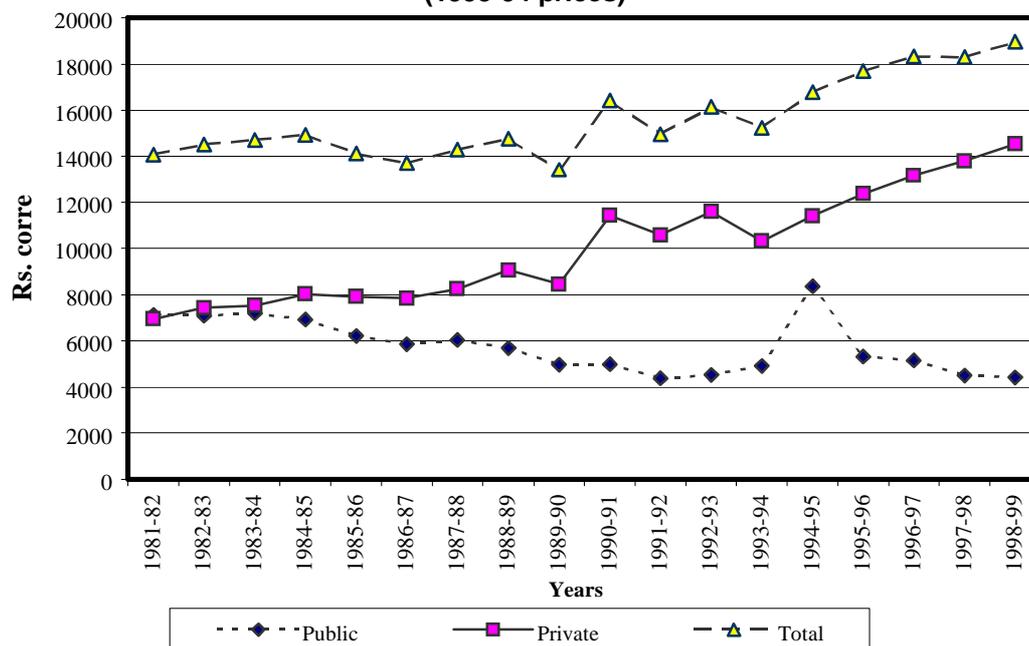


Fig. 15.1: Trend of Public and Private Capital Formation in Agriculture in India

15.10.3 Public and Private Sector Investments in Agriculture: Complementary or Competitive?

Several scholars have responded to this question with empirical analysis of data. The research works resulted three different thoughts. One group opined that the private sector investment in agriculture was dependent on public sector investment and support from institutional credit. Neglect of public sector investment in agriculture is likely to affect growth of agriculture in due course. The followers of this group accepted that public and private sector investments are complementary to each other.

The complementarity between public and private capital formation in agriculture was examined on the basis of direction of movement of both public and private investments and the statistical relationship between the two. A recapitulation of macro data on real public and private capital formation in agriculture indicates that from 1960s to late 1970s the movement of both the investments was in the same direction. Such positive association between public and private investments in agriculture over a long period was interpreted as having complementarity effects.

Some studies established that public investment had an inducement effect on private investment and hence there is a 'complementarity' between public and private investments in agriculture. It also contented that public investment creates conditions for private investment in agriculture. In other words, private investment is contingent upon public investment. For instance, one rupee of public investment in agriculture induces private investment of more than a rupee. The stimulating role of public investment on private investment was observed while public investments in canals and rural electrification had positive bearing on the private household investment in machinery and construction of dug-wells, etc.

Since 1986-87, however, there has been divergent movement between public and private investments with the former falling and the latter rising steadily. This generated an intense debate regarding the subsiding effect of an established complementarity between public and private capital formation in agriculture. The second group of researchers therefore, advocated for only a weak complementarity between public and private sector investments. The proponents of third view however challenged that there was no apparent complementarity between public and private sector investments in agriculture. The validity of any kind of relation between public and private investments in agriculture was questioned on conceptual, methodological and factual issues.

15.10.4 Impact of Investment Deceleration on Agricultural Growth

As a result of higher investments in the economy during 1990s, the annual growth rate in the GDP in the agriculture and allied activities has increased from 2.95 per cent during 1980s to 3.5 per cent during 1990s. Public investment has significant influence on growth in agriculture. The estimated elasticity for cumulative public GCFA in irrigation works, measured in financial terms, reveals that with an 10% increase in these investments, GDP from agriculture (GDPA) would increase by 2.53 %. More interestingly, activities under agriculture and allied activities also get affected by the decline in public investment. Data reveals that agricultural crop activities were affected more (75%) than the allied activities (25%) due to the fall in investments in agriculture during the 1980s.

Within the agricultural activities production of cereals, pulses, oilseeds, sugarcane, etc. were worse affected. This verifies that within the agriculture sector, the trend is towards diversification away from foodgrain crops. This fact is also corroborated by the falling growth rates in the area under production of wheat and paddy and a rising trend in the same for fruits and vegetables. This may be attributed to falling public investments in irrigation projects during the 1980s and early 1990s. This in turn has

dissuaded private investments in cultivation of irrigation-intensive crops such as cereals and pulses.

15.10.5 Reasons for Decline in Public Sector Investment in Agriculture

Various factors have been put forth behind the observed declining trend in the public gross capital formation in agriculture since the early 1980s. These are: i) increase in subsidies to agriculture, ii) adverse terms of trade, iii) decline in international price of rice and wheat, iv) steep rise in construction activities, v) reduction in resource flows from centre to states, vi) decline in capital outlays by the states, vii) slowing down of public expenditure on special rural and area development programmes, and viii) the state agricultural policies to augment private investments. The major factors for declining private investments could be: i) low growth rate of per capita income in agriculture, ii) squeezing of rural savings, iii) low net bank credit to agriculture, and iv) decline in profitability of investments in agriculture vis-à-vis other sectors.

Check Your Progress 3

1) Give some examples of reproducible tangible fixed asset.

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2) Bring out the complementary nature of private and public sector investments in agriculture.

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15.11 LET US SUM UP

Capital formation plays a crucial role in the development of an economy. It facilitates technological innovations, product diversification, optimal allocation of resources, product diversification and commercialization in agriculture. The relevance of capital formation in agriculture is more prominent in a predominantly agrarian economy like India. There was a steady increase in the capital formation during 1950s to early 1970s. But unfortunately capital formation in agriculture has remained low in India. It has been declining since the early 1980s in the public sector. The complementarity of public and private sector investments in agriculture and the induced effects of the former on the latter is a debatable issue. The reasons for decline in capital formation are cited as slowing down in public expenditure on agricultural sector, low profitability of farm sector compared to other investments and low per capita income of farmers.

15.12 KEY WORDS

- Capital accumulation** : Capital as an input remains in use for a longer period although its productive capacity depreciates over time. Therefore, capital input accumulates and increases as we invest year after year.
- Marketable surplus** : It indicates the surplus output of the farmers after consumption. For small and marginal farmers almost the entire agricultural output produced is for self-consumption. Thus the marketable surplus in their case is nil. The case of big farmers may be different as they are in a position to sell after retaining output for self-consumption.
- Marketed surplus** : It indicates the amount sold by the farmers in the market. Marginal and small farmers sell part of their produced output immediately after harvest to meet their non-food requirements. Later on they purchase foodgrains from the market for consumption. In this case there is a 'marketed surplus' but the 'marketable surplus' is zero.
- Vicious circle of poverty** : Due to low level of investment the production technology in an economy is low. Such low technology results in low levels of productivity and output. Low level of output gives rise to low income, low consumption and low saving. Due to low savings investment is low again. Thus the economy moves in a vicious circle of poverty.

15.13 SOME USEFUL BOOKS

Desai, B. M. (ed.), *Agricultural Development Paradigm for the Ninth Plan under New Economic Environment*, Oxford & IBH Publications, New Delhi.

Economic and Political Weekly Research Foundation, 2003, *National Accounts Statistics 1950-51 to 2000-01*, Mumbai.

Government of India, 1996, *Capital Formation and Savings in India: 1950-51 to 1979-80*, Report of the Working group on Savings, Central Statistical Organisation, New Delhi.

Government of India, 2001, *National Accounts Statistics 2000*, Central Statistical Organisation., New Delhi.

15.14 ANSWERS/HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

- 1) See Section 15.2 and answer.
- 2) See Section 15.3 and answer.
- 3) See section 15.5 and answer.

Check Your Progress 2

- 1) Capital formation in agriculture leads to an increase in productivity through technological progress. The indirect effects are increase in marketable surplus, exports and self-sufficiency in foodgrains. See Section 15.6 for details.
- 2) Credit is required for agricultural production activities and for non-farm business. Credit needs could be short-term, medium-term or long-term.
- 3) The major institutional sources of credit are commercial banks, cooperatives and regional rural banks.

Check Your Progress 3

- 1) Examples of reproducible tangible fixed assets are buildings, construction works, plantations, machinery and transport equipments.
- 2) Go through Sub-section 15.10.3 and answer.