
UNIT 2 HOW DO WE PLAN FOR GROWING OUR FOOD

Food is one of the basic needs of man and from times immemorial he has been discovering and sometimes inventing various ways and means to produce food. In this unit modern ways of production and the factors affecting production are discussed with emphasis on kitchen gardening.

Structure

- 2.0 Objectives
- 2.1 Introduction
- 2.2 Classification of Foods Based on the Source
- 2.3 Foods from Land (Food Crops)
- 2.4 Foods from Animals (Livestock)
- 2.5 Foods from Water (Fish)
- 2.6 Kitchen Garden (Horticulture Crop)
- 2.7 Let Us Sum Up
- 2.8 Glossary
- 2.9 Answers to Check Your Progress

2.0 OBJECTIVES

After going through this unit, you should be able to

- define food production
- list the factors to be considered for planning food production
- explain the importance of kitchen gardening in food production and
- plan a kitchen garden for your family.

2.1 INTRODUCTION

We shall first understand what are the most important requirements for producing food. In fact, food has a very vital relationship with the size and movement of population. This has been proved since the beginning of human civilisation. Man has migrated from place to place in search of food and settled mostly on river banks where food can be grown well. Hence, the requirements of food production are directly linked to the level of population.

2.2 CLASSIFICATION OF FOODS BASED ON THE SOURCE

In Course II we have classified food into three groups based on their functionality. As already seen in Unit I of this course you need different types of food. Your food needs range from basic cereals like wheat, rice, jowar, etc., to pulses, oils, sugars, vegetables and fruits, milk, eggs, meat, fish, etc. You know that each type of food for its production needs different types of resources. Let us try to understand in brief

what these resources are. You can broadly classify the foods into three groups based on the most important requirement to produce them. They are:

- a) Foods which require land,
- b) Foods which require animals (livestock), and
- c) Foods which require water

Such a classification helps us to simplify our production policies.

2.3 FOODS FROM LAND (FOOD CROPS)

The foods which require a piece of land to produce them are the crops which you grow. Examples of these are rice, wheat, pulses, vegetables and fruits, etc. Since you require a large variety of crops grown as food for your consumption, you will need to produce all of them. However, the land available for cultivation (growing) purposes is always limited. This is because the **geographical** boundaries are limited. For instance, you cannot own lands in other countries such as Pakistan or Bangladesh. Secondly, from out of the available **geographical** area, you have to provide land for housing, industries, trade, etc. Hence, the total land available for growing crops in a country will always be limited. Further, due to the nature of production of different crops and the duration of their growth, you can put the same plot of land to use more than once a year. But, such multiple use of land requires additional facilities like irrigation. So you see that it requires detailed planning even to decide on how much area is available for cultivation.

Next, you have to plan your production based on your need of different crops. For example, how much of rice is needed, wheat, pulses, sugarcane, groundnut and other foodstuffs. In different parts of our country, people have different food habits. It is our duty as planners to fulfill all their requirements. Each crop will have a particular level of productivity (in general terms this is called yield per hectare). Based on the total requirement of a crop and its productivity, you have to plant the particular crop on specific area of land. The following illustration will clarify the point:

Hypothetical (assumed) data:

Requirement of rice in India for the year 1987-88	:	80 million tonnes
Yield per hectare of rice (Average)	:	2 tonnes
Area required for production of rice	:	$\frac{80 \text{ million tonnes}}{2 \text{ tonnes}}$
		= 40 million hectares

Another criterion must be considered while planning for growing food. This refers to the area to be planted under irrigated area and rainfed area. Because of various biological factors, it is seen that the productivity of a crop is more under irrigated conditions than under rainfed conditions. Also all land available for cultivation cannot be irrigated because of the limitation of ground water available and the high costs involved in irrigating the land. Hence, careful planning has to be done to decide how much area should be planted under each crop to fulfill your production requirements.

Plants, after all, cannot grow very well just because land and water are available. Since they are also biological beings, nursing them well will increase their productivity just like a well nursed child will be healthy and good-looking. The nourishment you give to the crops to facilitate their growth is termed as providing inputs. Inputs come in different forms. The most important input for growth of a crop is seed. "As we sow, so we reap". For a good crop, you have to sow good seeds. The production of seeds should be planned in such a way that the requirements of seeds by the farmers must be fulfilled. Otherwise, the farmers will not be able to produce sufficient crops. Usually, the farmers use the crop grown in the previous season/year as seed. Nowadays, because of improvements in the quality of seeds, the farmers buy their seed requirements from seed producers. So you see that even production of seeds must be planned well. Let us now understand how seed production can be planned.

Continuing our previous example of rice production, 40 million hectares of area was needed for cultivation of rice. Let the seed requirement for rice be 100 kg per hectare. The total amount of seeds required for planting rice on 40 million hectares, therefore, is 40 million hectares \times 100 kg = 400 million kg or 4 million tonnes.

However, not all farmers go in for buying improved varieties of seeds. Therefore, while planning for seed production, you should keep in mind what percentage of farmers, and what percentage of area will be covered by the improved seeds and what will be the total requirement of improved seeds. Thus, you will be able to produce the actual requirement of seeds. Such planning is required to be made for all the crops.

Fertilisers play a very important role in increasing the productivity of crops. They supply the vital nutrients for growth of crops. Most of the fertilisers produced supply the three most important nutrients needed viz., Nitrogen (N), Phosphorus (P) and Potash (K). You often see the fertiliser bags with different brand names mentioning the contents of NPK in them. For instance, if you see a fertiliser bag Suphala 17:17:17, it means 100 kg of suphala contains 17 kg of N, 17 kg of P and 17 kg of K. However, different commercial brands of fertilisers contain different combinations of one or more of these nutrients. It is upto the farmers to decide what they want to buy. Another very important source of nutrients for the plants is the organic manure available on the farmer's fields. Night soil, cowdung, plant wastes, leaves of some plants, etc., are all fermented into compost and applied to the soil (land) to form good organic manure. Farmers use them in a large measure to fertilise the soil. Manures help in revitalising the soil fertility and thereby help in increasing the productivity of crops. In fact, the use of chemical fertilisers has been largely responsible for increasing agricultural production in our country from the mid sixties.

Different crops need different levels of nutrient application for their growth. This depends upon the soil type, the crop, the agro-climatic zone, irrigated or otherwise etc. The agricultural scientists throughout the country will conduct research on the fertiliser requirements for different crops in different locations and recommend the levels of application of fertilisers. These recommendations for individual crops can be considered for working out the requirements of each crop and thereby the total fertiliser requirements for the whole country. There are some other minor, though important, nutrients like zinc, iron, etc., which have to be applied to the soil for improving its productivity. All these factors must be taken into consideration to work out the total fertiliser requirements and production must be properly planned to meet these requirements.

If you are not able to produce all your requirements at home, then you can import some of them in required quantities from other countries. Potassic fertilisers, for instance, cannot be produced in India since we do not have the necessary inputs. So we import them from abroad.

Besides fertilisers and manures, you need plant protection chemicals. These are needed for protecting the crops from the attack of various pests and diseases. Without them the crop yields will be low. Hence, they must be used in required quantities; their production, therefore, needs to be planned well. At present, in our country, the farmers are using these plant protection chemicals only for major commercial crops like sugarcane, cotton, groundnut, etc and some major foodgrain crops like rice and wheat. Hence, our requirements of these plant protection chemicals are at a very low level as compared to the vast agricultural area in the country.

The other very important input for the agriculture sector is labour. Labour consists of human labour and animal (draft) labour. Most of the labour requirements in the agricultural sector are met by the family members themselves. In the case of some peak periods like sowing, harvesting etc., labour will be hired on the farms. It is a general feeling and experience that the agricultural sector has a surplus labour force. Most of these labourers are said to be underemployed i.e. they are not gainfully employed for the entire year. Similarly, the available animal labour force also does not find gainful employment throughout the year. However, the agriculturists especially the small farmers, do not find the labour force adequate for their agricultural operations.

The other important inputs for agricultural production include various machinery like implements, pumpsets, tillers, tractors, etc. Based on the actual requirements, the production of these implements must also be planned.

Another important factor you should keep in mind about some food articles is that you cannot consume them as they are produced on the land. Examples of these are sugarcane (sugar and gur), groundnut (oil), mustard (oil), coffee (powder), tea (leaves, dust), etc. Hence, in these cases, you will have to first estimate how much of consumable product (e.g. sugar) is needed. Based on the amount of raw product (sugarcane) needed for each unit of the consumable product, you have to plan for producing the raw product (sugarcane is our example). The following example illustrates the point:

Let the amount of sugar needed
for consumption in India for one year be : 85 lakh tonnes

Let the recovery rate in sugarcane be
(100 kg of sugarcane converts into 8.5 kg of sugar) : 8.5 percent

So, to obtain, 85 lakh tonnes of sugar, the amount of sugarcane to be produced is given by

$$\frac{85}{8.5} \times 100 = 1000 \text{ lakh tonnes}$$

or 100 million tonnes of sugarcane.

Thus, you can see that the planning for production of your food requirements is a detailed process involving a detailed analysis of individual requirements and production possibilities.

Check Your Progress

- 1 Write a brief note on different sources from which you can obtain food. List atleast two foods you can get from these sources.

.....
.....
.....

- 2 Given the following data, estimate the area under which wheat should be planted to achieve the required production.

Requirement of wheat : 50 million tonnes
Yield of wheat (in kgs per hectare) : 2500

.....
.....
.....
.....
.....
.....

- 3 List the resources needed for farm crops in agriculture.

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

To sum up: the process of planning for food production starts with the level of the population, the requirements of food (of different types) by individuals (per capita requirements) and the total requirement of each food article. Based on the requirement of each crop, you should plan the area under cultivation for each crop. Based on the area under each crop, you have to plan for production of seeds, fertilisers and other chemicals, etc. Such planning will help you produce the required amount of food articles for the population.

The following table shows the production of various food items in our country in 1983-84.

TABLE: 3.1 Production of Food Crops in India During 1983-84 (In million tonnes)

Crop	Production	Crop	Production
Rice	59.8	Total food grains	151.5
Wheat	45.2	Groundnut	7.3
Jowar	11.9	Rapeseed & mustard	2.6
Bajra	7.6	Major oil seeds	11.3
Maize	7.9	Sugarcane	177.0
Other cereals	6.5		
Pulses	12.6		

Source: Seventh Five Year Plan 1985-90, Vol. II, Planning Commission

2.4 FOODS FROM ANIMALS (LIVESTOCK)

The productive resource in these types of food is the animal itself. Hence, the animals which are used for production are referred to as livestock—meaning the stock of resources consisting of live animals.

Livestock form a very important source of production of food. The types of food consumed from them include milk, eggs and meat. Each of these foods form an important component of the human diet. As is well known, these foods supply the most vital proteins for the body. In most of the Western countries, livestock (in the form of meat) form the staple food. In our country, we use milk and eggs mostly to meet our requirements.

The animals which supply different foods are cattle (cows and buffaloes), poultry birds, sheep and goats, pigs and other minor animals. Hence, the major factor which decides the level of production is their population itself i.e. the total number of animals available. The information on the population of livestock is published by the Government of India every year. This is done based on the livestock census conducted once in five years. These data form the basis for planning the production in this sector.

Livestock will thrive on feeds and fodder. Hence, any planning for livestock products should include production of feeds and fodder. In fact, the 1987 drought in our country (which was widespread) had shown that without sufficient production of fodder, the survival of cattle would become a very difficult proposition. Similarly, poultry birds need different types of feeds which have to be available in sufficient quantities.

It has been a practice to leave the cattle for grazing on grass lands for a long time. Also the farmers feed the straw of the crops to the cattle. In this way, the cost of feeding the animals will be low. However, with a number of improvements in the breeds of cattle and other animals and also with the farmers becoming more commercial, the use of concentrates as feed for animals is becoming more important. Based on the total livestock population and their requirement of feeds and fodder, you have to plan the production of the feeds and fodder.

Milk is the mainstay of livestock products in our country even today. Though it forms a supplementary food for adults, it is the main food for children and the aged. Even in the case of adults, you need milk for the consumption of beverages. Milk production (dairy enterprise) was, until recently, treated as a supplementary

enterprise by the farmers. This was because farmers used to rear cattle to supplement their incomes. They were not very concerned about the improved breeds, concentrates, etc. But now, with the support of different government programmes for milk production, the farmers with dairy enterprises have become more business minded. We shall discuss the different programmes later in unit 6.

So, you see that it is important to foresee the requirement of milk for the whole country based on the needs of individuals, plan for the total livestock required, their feed and fodder requirements so that the needs of the population can be met. Similarly, the poultry programmes need careful analysis. However, since eggs and broilers are not consumed by the entire population, their total production requirements will be less than those of milk and other important crops like rice and wheat. We shall study these in detail in unit 5.

Regarding the food supplies in the form of meat and its products, the major source of their supply comes from sheep, goats and piggery. It is very difficult to obtain centralised data. However, you should remember that these items form a very important source of nutrition in the diet of the non-vegetarian population. Please recall that we have already included these items in our family budget in the previous unit.

2.5 FOODS FROM WATER (FISH)

Fish is the only major food you can obtain from water. There are also other minor foods which you get from water but they are not in extensive use (crabs for example). The art/science of growing and harvesting fish is called Pisciculture.

There are two major sources of fish viz., Marine fish and Inland fish. Marine fishing is the activity of fishing undertaken in the seas for which international boundaries are very well defined. Inland fishing, on the other hand, is cultivating and harvesting fish in the inland waters. This includes rearing of fish in artificial lakes and ponds.

The eating habits of our country are so wide ranging, specially regarding fish eaters, that the proportion of fish eaters varies from about 6 per cent in Maharashtra to about 96 per cent in Kerala. Hence, you see a wide fluctuation in the demand for fish through the length and breadth of the country. You also observe that the preferences of the people are very varied. Traditionally, fishing was limited largely to off-shore fishing and fishing in rivers. Now fishing activities are extended to artificial rearing and harvesting too. We shall study the pattern of demand for the supply of fish in unit 5.

2.6 KITCHEN GARDEN (HORTICULTURE CROP)

Growing plants in your backyards which yield products which can be gainfully used is called kitchen gardening. The most popular plants grown in the kitchen gardens are those yielding vegetables and some fruits. The extent of plants grown in the kitchen garden depend upon the extent of the area available in your backyard.

Uses of a Kitchen Garden

- 1 Kitchen gardening provides aesthetic pleasure for the family. It is a good way of spending free time.
- 2 It provides a clean atmosphere around the house.
- 3 It helps the family to save money on some items of expenditure like vegetables, fruits and flowers.
- 4 In some cases, it serves as a supplementary source of income to the family (you may observe in your neighbourhood that people sell curry leaves, fruits, coconuts, etc. which are grown in their compound).

Plants which can be grown in a Kitchen Garden

The usual plants which are planted in the area around the house depend upon the preference of the family members. You usually see that people prefer to have some

perennial plants like fruits which yield for a long period of time. Trees which produce coconuts, guava, papaya, sapota, citrus plants (lime), etc. all find an important place in backyards. These plants, when planted, keep on yielding fruits. Maintenance costs on these plants are very low. Coconuts and lime will be used for cooking in the family almost every day and you will be able to cut down your expenditure on these items. As a matter of fact, when you calculate the amount of money saved, it adds up to a large sum in a year.

The fruits like sapota, guava, papaya on the other hand, provide nutritious and fresh commodities to the family. Children enjoy these fruits which are grown at home. They can get their requirements almost at will. By growing them at home, you can also avoid buying poor quality and stale fruits from the market. Flowers which are usually grown in the garden are roses, jasmine, chrysanthemums, tube roses, etc., depending upon the location of the house and the preference of the family. You might have observed that ladies in some parts of our country are very fond of wearing flowers. Also, flowers have a very important place in the performance of puja, decorations for festivals and other functions. In fact flower farming has become a very profitable proposal in our country. Recently we are also exporting flowers to different countries on a large scale. But, as far as kitchen gardening is concerned, you can grow flowers only to meet your own requirements.

Next in order of importance is a kitchen garden, and perhaps most important from our point of view of providing food to the family, is growing vegetables in your garden. Vegetables take a short time to yield, they are seasonal in their growth and the extent of care (and hence the cost) needed to grow them is also low. Almost any kind of vegetable can be grown in a kitchen garden. The type of vegetables you grow in your garden depends upon your liking for them and the season in which you want to grow them. Though it is very convenient to grow the vegetables in the rainy season, you may also grow them in the other seasons by providing them with small quantities of water for their growth. Usually the vegetables which are grown in a kitchen garden are beans, tomatoes, brinjal, carrot, radish and spices like chillies, coriander and curry leaves. Remember, a combination of more than one vegetable can be grown in a kitchen garden because these can be grown on small patches of land as well.

The most important utility of a kitchen garden is that you get fresh vegetables for your consumption. Also, these days when vegetables are very expensive, you can reduce your expenditure on food without sacrificing your nourishment. You can also get the vegetables of your choice. Since there are different types of vegetables like creepers, roots, leaves, etc., they can be well planned for a better combination to serve different purposes. Hence, you need a careful planning of the vegetable garden depending upon your preferences and the area available for gardening.

These days, where housing is being taken up as a commercial activity, you hardly find any place for a kitchen garden. This is very true in major cities and metropolitan centres. However, in smaller places like big towns and semi-urban areas, there will be a place around the houses for gardening, where a kitchen garden is possible. However, careful analysis and planning is required if you have to take the best advantage of the limited area available for gardening.

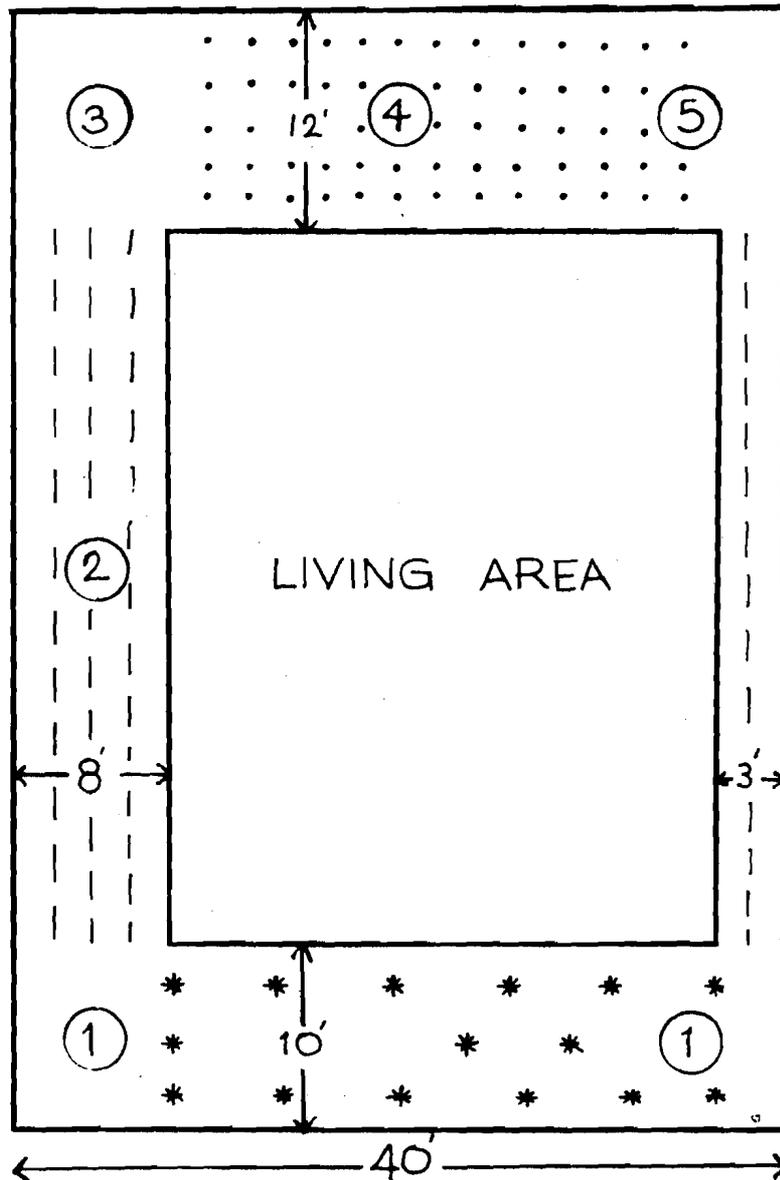
The Departments of Horticulture of different State Governments provide a number of incentives under their development programmes to encourage kitchen gardens. These include providing free improved seeds, giving technical guidance, providing other kits free of cost, etc. You can make the best use of these incentives after making due enquiries from the concerned departments in the place you live.

Planning for a Kitchen Garden

The basis for planning a kitchen garden is the area available for gardening. You should also be aware of your priorities and preferences like whether you want perennial plants or seasonal plants, fruits or flowers, etc. Perennial plants must be given top priority. This is because once they are planted they cannot be removed for a very long time. The rest of the area can be planned for growing seasonal crops.

A major factor which has to be kept in mind in planting is the spacing between the plants. It is very important to maintain the required spacing between the plants for their good growth and better yields. The extent of spacing required between the

FIG. 2.1 MODEL KITCHEN GARDEN



LEGEND

□•• SPACE FOR SEASONAL VEGETABLES

□|| SPACE FOR CREEPERS

□* SPACE FOR FLOWERS AND ORNAMENTAL PLANTS

① COCONUT TREES

② PAPAYA

③ MANGO

④ SAPOTA

⑤ LEMON

6 List the different types of plants which can be planted in a kitchen garden.

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

7 How do you fix the priorities to grow plants in a kitchen garden ?

.....
.....
.....
.....
.....
.....
.....

2.7 LET US SUM UP

In this unit you have learnt what food production is and how to plan for food production. You have also learnt how the resources for the food sector are produced and allocated. Further, you have been familiarised with the importance of the kitchen garden and planning for the same.

2.8 GLOSSARY

Cultivable Land	: Area available exclusively for cultivation
Fertilisers	: Chemicals which supply the basic nutrients to soils for plant growth
Food Production	: Production of food ranging from basic cereals like wheat, rice, jowar, etc. to pulses, oils, sugars, vegetables & fruits, milk, eggs, meat, etc.
Geographical Area	: The total land available within the set boundaries (Country, State, Village, etc.)
Inland Fishing	: Fishing in ponds, lakes, tanks etc.
Irrigation	: Providing water to crops
Kitchen Garden	: Growing plants useful for consumption in backyards
Livestock	: Animals of different types used for producing food and for other purposes
Marine Fishing	: Fishing in the sea

- Perennial Plants** : Plants which yield output year after year
- Pisciculture** : The art/science of rearing and harvesting fish
- Productivity** : Yield per hectare of a crop
- Resources** : The necessary ingredients (raw materials) needed to produce output
- Resource Inputs** : Requirements to reproduce a particular type of food such as foods grown on land, foods of animal origin and foods obtained from water

2.9 ANSWERS TO CHECK YOUR PROGRESS

1 The different sources from which one can obtain food are:

- i) Land—For example foodgrains, pulses, sugarcane, tea, etc.
- ii) Farm animals—For example milk, eggs, meat, chicken, pork, etc.
- iii) Water—For example fish, prawn crab, etc.

2 Requirement of wheat	50 million tonnes
Yield of wheat/hectare	2500 kgs. or 2.5 tonnes
Area required for production of wheat	<u>50 million tonnes</u> 2.5 tonnes
	20 million hectares

Wheat should be planted in a 20 million hectare area to achieve the production of 50 million tonnes.

3 The resources needed for agriculture are as under:

- Land
- Water
- Seed
- Fertilisers
- Organic manure
- **Plant protection chemicals**
- Labour
- Machinery like implements, pumpsets, tillers, tractors, etc.

4 Livestock means farm animals. The productive resource in foods of animal origin is the animal itself. Hence the animals which are used for producing food are referred to as livestock—in other words, the stock of resources consisting of live animals,

Livestock provide foods like milk, eggs, meat, pork and chicken.

Different foods require different animals for their production. For instance, milk is supplied by cattle (cows and buffaloes), eggs and chicken by poultry birds, mutton by sheep and goat, and pork by pigs. The major resource required for the **production of these foods is the population of the animal itself, i.e. the number of animals available.** Since livestock thrives on foods and fodder, these are important resources for the production of foods of animal origin.

5 Growing plants in the backyard which yield vegetables and fruits is called kitchen gardening. The most important utility of a kitchen garden is that one gets fresh vegetables for consumption. The kitchen garden also helps the family to save money on foods like fruits and vegetables. In some cases it can even serve as a **supplementary source of income** (in case the produce is much more than the requirement of the family and the same is sold). It provides a clean atmosphere around the house and offers pleasant recreation for the family members.

- 6 The different types of plants which can be planted in a kitchen garden are:
Trees like coconuts, guavas, papayas, sapotas, citrus plants (Lime), etc.

Seasonal vegetables like brinjal (baingan), Ladies finger (bhindi), cucumber (kheera kakri), radish (mooli), carrot (gajar), bittergourd (karela), coriander leaves (dhania), mint (pudina), fenugreek leaves (methi), tomato (tamatar), cauliflower (phool ghobi) & cabbage (Patta gobhi) etc., root vegetables like potatoes and onions. Creepers like calabash, cucumber ghia/kaddu, bottlegourd (tori), etc.

Various kinds of flowers like roses, jasmine, sunflowers, calendulas, etc.

- 7 Priorities to grow plants in a kitchen garden are fixed according to one's preference for the perennial plants (fruit trees), seasonal plants or flowers. Perennial plants are given top priority because once they are planted they cannot be removed for quite a long time. The rest of the area can be planned for growing seasonal vegetables and flowers. Perennial plants require a spacing of about 3.5 meters while seasonal vegetables require about 1 meter spacing. Creepers require sufficient space to spread around.

Practical Exercises

- 1 Collect data on the production of different food crops in India from 1980-81 to 1984-85.

Hint : You can get this data from the following publications.

- 1) Area and production of principal crops in India from Directorate of Economics and Statistics, Government of India, New Delhi.
 - 2) Economic survey (different years) Government of India
 - 3) Handbook of Indian Agriculture as in 1) above.
 - 4) Other journals dealing with Indian Agriculture.
- 2 Prepare a plan of a model kitchen garden. Give details of the different plants that can be grown in different seasons of the year.

Note: (Your plan must be different from the one shown in the notes)