UNIT 13 STRATEGIES TO COMBAT PUBLIC NUTRITION PROBLEMS - II

Structure

13. INTRODUCTION

In Unit 12, we studied about some of the strategies such as food based approaches (for example, dietary diversification, food fortification and horticultural interventions) to combat inalnutrition. We continue our study of strategies in this unit. The unit will focus on five other different strategies, namely, immunization, supplementary feeding, genetic/ food biotechnology, improving water and sanitation services and food and nutrition security to combat malnutrition. As you read through this unit, you will get the perspective that a single strategy may not be sufficient to alleviate large problem of malnutrition in our country. We may require more than one strategy, if we really want to make an impact in alleviating malnutrition.

Objectives

After studying this unit, you will be able to:

- enumerate the immunization schedule available in om country to prevent the spread of major diseases,
- describe India's major supplementary feeding programmes and some of the successful programme strategies that have worked,
- explain the latest available facts regarding genetic foods and how to distinguish between benefits and non-benefits of genetic foods,

- describe the importance of clean water and improved sanitation as an important strategy to combat malnutrition, and
- elaborate on the efforts made by India to improve food production and the challenges that remain.

13.2 IMMUNIZATION

Immunization, you might already know, is a process that increases an organism's reaction to antigen and therefore improves its ability to resist or overcome infection. Antigen can be any substance (as a toxin or enzyme) that stimulate the production of antibodies. In this section, we will focus on the different aspects specific to immunization i.e. what is the importance of immunization? What are the common vaccine preventable diseases? What is the national immunization schedule? Let us start our study of immunization by first understanding why immunization is important.

13.2.1 Importance of Immunization

You have learnt in Unit 3 that infection contributes to malnutrition in children by affecting growth. Therefore, it becomes very important to prevent infection in children so that they grow well. Immunization is one of the most cost-effective methods of preventing infections and a critical strategy to combat public nutrition problems.

Immunization protects against several dangerous diseases by increasing body's ability to fight these diseases. Thus, immunization prevents:

- life long physical and mental disabilities, and
- death from dreaded diseases

What are these dangerous diseases which can be prevented through immunization? Let's find out.

13.2.2 Common Vaccine Preventable Diseases

The diseases which are prevented by immunization are known as *Vaccine Preventable Diseases*. Most common diseases which are prevented by immunization are: Tetanus, Poliomyelitis, Diptheria, Pertussis, Measles and Child Tuberculosis. Let us learn about these diseases. We will start with Tetanus first.

- ***Tetanus:*** Tetanus is caused by a toxin produced by the bacillus – *Clostridium tetani.* The organism is generally found in animal faeces. The disease is common in the age group of 5-40 years as this age group is predisposed to all kinds of injuries and the risk of acquiring tetanus is higher. In India and other tropical countries, tetanus of the new born infant is very common due to bad hygiene practices followed during delivery, particularly, for cutting the umbilical cord by the untrained traditional midwives (dais). Women, particularly those in the reproductive age group of 15-45 years, are at a higher risk, especially after abortions and deliveries conducted under primitive conditions in the rural and tribal areas.

  Let us learn about poliomyelitis next.

- ***Poliomyelitis:*** Poliomyelitis is an acute communicable disease caused by a virus. It is principally an infection of the alimentary tract but affects the central nervous system often leading to paralysis. It is essentially a disease of infancy and childhood. The most vulnerable age is between 6 months and 3 years.

  Let us go over to diptheria now.

- ***Diptheria:*** Diptheria is an infection of the throat, nose or larynx and is caused by the bacteria, *Corynebacterium Diptheriae*. It is most common in infants and children but adults can also be infected with the disease. In the most common form of disease, a thin membrane is formed in the throat. The infection can cause complications in heart and nervous system.

  Let us now discuss pertussis.

- ***Pertussis:*** Pertussis or Whooping cough is caused by the microorganism *Bordetella pertussis* or the *pertussia bacillus*. Whooping cough is an acute highly communicable infection of the respiratory tract. It is primarily a disease of infants and children. The disease takes a serious form in malnourished children and may lead to death.

  Let us move on to measles.

- ***Measles:*** Measles is an acute communicable viral disease, and is the most serious of the common childhood diseases. Usually it causes a rash, high fever, cough, runny nose and watery eyes lasting 1 to 2 weeks. It is responsible for many child deaths because of complications from pneumonia, diarrhoea and malnutrition.

  Lastly let us get to know about tuberculosis.

- ***Tuberculosis:*** Tuberculosis is ***a*** chronic disease caused by *Mycobacterium tuberculosis*. It causes cough, fever and weight loss. It is transmitted by droplets from sputum of infected persons particularly during coughing. Although it can occur at any age, it is more prevalent among males over 45 years of age belonging to low income group. It is an important cause of disability and death in many parts of the world.

From the description about the common diseases you can see that these can be very fatal. Therefore, vaccines against these dreaded diseases are given to all the infants and children. Tetanus vaccine is given to pregnant women. Let us now get to know the immunization schedule as is being adopted in our country.

13.2.3 National Immunization Schedule

You must have heard about your friends and relatives taking their children to the doctors or health centers for immunization. There is a certain schedule of immunization which they have to follow. So what do we mean by an immunization schedule. *The schedule that tells us when and how many doses of each vaccine should be given is called an immunization schedule*. It is important for us to know that the vaccines must be given to individuals (infants, children and women) at the right age and in the right dose. Full course must be completed to give the best possible protection to the beneficiaries.

You would realize that each country follows its own immunization schedule depending upon the disease/disorders prevalent in that country. In India, we follow an Immunization schedule, as is given in Table 13.1, under which two doses of tetanus toxoid (TT) are given to pregnant women, three doses each of oral polio vaccine (OPV) and a triple injection of diptheria, pertussis and tetanus (DPT) and one dose each of BCG and measles are given to infants. Look up Table 13.1 carefully and check the age, vaccine and dose provided.

In Table 13.1, you would also notice few booster doses included at specific ages. What is a booster dose? A *booster dose is an additional dose that makes sure that the first dose was effective*. Booster closes of vaccines are given to children to ensure full protection. Booster doses of OPV and DPT is given around the age of 16-24 months and a booster dose of DT is given around 5-6 years of ages. In addition, two TT doses are given at the ages of 10 and 16 years.

Besides the vaccines for infectious diseases, oral prophylactic dose to prevent certain nutrient deficiency disorders is also given. For example, oral prophylactic

dose of vitamin A is given at 9 months along with measles vaccine. Thereafter, 6 monthly dose of vitamin A is given to children till 3 years of age. You may recall reading about administration of Vitamin A doses under "National Prophylaxis Programme for Prevention of Blindness due to Vitamin A deficiency" earlier in Unit 10 of this course.

Table 13.1: National immunization schedule

To Whom	When	Vaccine	Number of doses
Women	Pregnancy	TT	2 (one in early pregnancy and other one month later)
Infants	At birth	BCG	1
		OPV	"0" dose
	6 weeks	DPT	1
		OPV	1st
		BCG (if not given at birth)	I
	10 weeks	DPT	2nd
		OPV	2nd
	14 weeks	DPT	3rd
		OPV	3rd
	9 months	Measles	1
		Vitamin A prophylaxis*	1"
	9-18 months	Measles, Mumps, Rubella (MMR)	1
	16-24 months	DPT	booster
		OPV	Ist booster
Children	5-6 years	DT	2nd booster
	10 years & I6 years	TT	2

* Given 6 monthly till 3 years **of** age (total **5** doses)

Another aspect, we need to highlight is that immunization is absolutely essential. Minor illnesses, including mild fever coughs and colds, as well as, malnutrition, are not a contraindication to immunization. Immunization should be postponed only if children are seriously ill or have high fever as any aggravation in the condition of the child may be attributed to immunization. The children should, however, be immunized as soon as they recover. The longer the immunization is delayed, remember the longer the child is exposed to the risk of infection.

In this section you learnt about, immunization as a strategy to combat malnutrition. If the children are protected from diseases by immunization, they would be healthier and less likely to become malnourished. In the next section, **we** would learn about the second strategy to combat malnutrition, that is, supplementary nutrition. how before we move on to this section let us recall what have learnt so far.

Check Your Progress Exercise 1

1. Explain the term "immunization' and its relevance as a strategy to combat malnutrition.

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2. Name the six common vaccine preventable diseases.

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3. Fill in the blanks:

   a) Pregnant women receive two doses of ..... toxoid.

   b) BCG is given to infants at .....

   c) Infants receive triple injection of ..... along with oral ..... dose at 1½ months, 2½ months and 3½ months, respectively.

   d) Measles vaccine is given to infants at the age of ..... months,

   e) A booster dose of DPT and polio is given to children at ..... months to give added protection from diseases.

Let us now move on to the next strategy i.e. supplementary feeding to combat public nutrition problems.

13.3 SUPPLEMENTARY FEEDING PROGRAMMES

Supplementary feeding in literary terms means extra food or the food which makes up for a deficiency in the normally consumed diets of individuals. In this section, we will learn about what supplementary feeding means as a strategy to combat malnutrition and why it is required? In Unit 10, we have already learnt about various nutrition intervention programmes where supplementa~yfeeding is an important component. Here, we will briefly review the supplementa~yfeeding component of these national programmes. Before we discuss this, let us first understand what is meant by supplementary feeding.

13.3.1 Supplementary Feeding

Supplementary feeding, is the food provided to pregnant, lactating women and children, adolescents to fill the gap between the average calorie intake and national recommended dietary allowances. It addresses the problem of food and nutrition security in the vulnerable population and provides extra calories and nutrients for growth and development at the critical stages of life cycle. You should remember that supplementary feeding aims only at supplementing and not substituting the family food. Let us look closely as to why, at all, we need to provide supplementary feeding to vulnerable population.

You have learnt in Unit 9 that National Nutrition Monitoring Bureau conducts dietary surveys in the country on a regular basis. Surveys from National Nutrition Monitoring Bureau show that about 30% of households in India consume less than 70% of energy requirements. Diets of children under the age of 5 years are far more inadequate than those of adults and are well below the recommended dietary allowances. Dietary

surveys also show that diets lack in micronutrients such as iron and vitamin A. About 80% of the individuals consume diets which provide less than half of recommended allowances. Problems of inadequate dietary intake are more pronounced in the low income households.

So what are the outcomes of consuming a nutritionally poor diet and benefits of food supplementation, especially in vulnerable population, like pregnant women? Various research studies in developing countries have shown that in pregnant women, a reduction in dietary intake below the habitual levels and increased workload above the habitual levels are associated with deterioration in maternal nutritional status and reduction in birth weight of infants. Research has also shown that in such cases if the pregnant women are given adequate continuous food supplementation and antenatal care, there is substantial improvement in the outcome of pregnancy including birth weight and neonatal mortality. Similarly for children (1-6 year old), "catch *up growth*" is possible with food supplementation. The term "catch up growth"', of course, means that the child catches up on the growth that could not be achieved earlier. If we provide the children (in the age group of 1-6 years) with right inputs, that is extra food, clean water and hygienic conditions, it is possible for these children to make up for the earlier deficits in growth and development.

It is for these reasons that government of India has included food supplementation as an integral component in some of its major programmes so that pregnant women, lactating women and young children can benefit from food supplementation. You have already learnt about these programmes in Unit 10. In this unit, we will consolidate our knowledge and recapitulate the supplementary feeding component of various intervention programmes.

13.3.2 Intervention Programmes to Combat Undernutrition

We already know that there are many programmes in the country run by non government and government organizations which have supplementary nutrition as an integral part of their intervention activities to combat malnutrition. In this section, wc would discuss seven such programmes. We would learn about three major government programmes and four large Research Action Programmes (RAPs). Research action programmes are those whose strategies have worked for the ICDS and have been integrated into state level or regional level ICDS programme. Of the three government programmes, two are implemented through anganwadi centers (a grassroot infrastructure based in the community) and the other one is implemented in the schools. These are listed in the Table 13.2.

Table 13.2: Supplementary food programmes

Implemented through anganwadi centers	Implemented through schools	Research action programmes
1) Integrated Child Development Services (ICDS)	National Mid Day Meals Programme	1) Project Poshak (1970-75) 2) The Integrated Nutrition And Health Project (INI-IP) in Eight States of India (1996-2006)
2) Pradhan Mantri Gramodhya Yojana (PMGY)		3) The Bal-Poshan Project, Rajasthan (1993-2003) 4) The Regular Incorporation of ARF in The Ready-To-Eat Complementary Food for the 'Under 3s' in the ICDS of Karnataka, Tamil Nadu, Andhra, Kerala, and the Union-Territory of Pondicherry (1992-Continuing)

Let us study about the supplementary feeding components of each of these programmes. Let us start with government programmes implemented through anganwadi centers. We will start with ICDS.

A. Programmes implemented through anganwadi centers

Integrated Child Development Services

In Unit 10 we studied about the objectives, target group and services provided by Integrated Child Development Services (ICDS). In this section we will once again recapitulate the supplementary feeding component of ICDS.

The supplementary feeding component of the ICDS, we learnt, aims at providing food supplements to the vulnerable groups. The objective of pruviding supplementary food is to supplement the home diet i.e. add extra food to the home diet of the individuals so as to fill the gap in energy and protein intake and meet the RDI's for these individuals. The type of food supplements in the ICDS programme varies from state to state, from ready-to-eat food to hot cooked meals at the anganwadi. The caloric and protein content of ICDS food supplements is given in the Table 13.3.

Table 13.3: Calorie and protein content of food supplements providcd at anganwadis

S.No.	Recipients	Calories	Protein gm
1.	Children 6 months to 6 years	300	**8-10**
2.	Adolescents*	500	**20-25**
3.	Pregnant and lactating woinen	500	20-25
4.	Malnourished children (at or below grade 3rd and 4th)	Double the daily supplements provided to other children i.e. 600 and/or special nutrients on medical recommendation	16-20

* Supplementary feeding provided to adolescents in some states only

In Table 13.3, you would note that adolescent girls are also included as beneficiaries for supplementary food but in practice supplementary food is provided to adolescents in some states only. This is not a routine practice. In the ICDS programme, the emphasis was initially on providing cooked food through on-the-spot feeding in the anganwadi because it was believed that:

- this would ensure that the targeted child would get food supplements, which would not be shared between other members of the family, and
- the anganwadi centers would provide practical nutrition education to women on cooking and feeding young children.

However, on-the-spot cooked food feeding programme are found to huvc several disadvantages as well.' These are:-

- children especially those in the age group of 6-36 inonths could not consume the entire amount of food provided because of a small stomach capacity,
- even if older children do eat the food provided in the anganwudis, this acts mainly as a substitute, and not an addition, to home food,
- the most needy segments viz., children in the critical 6-36 month age group and women, were not able to come to the anganwadis daily and receive the food.
- providing food supplements only to the children from Below the Poverty Line (BPL) families or those with undernutrition was not possible as it was difficult to feed one child and withhold food from another in the same anganwadi,

- coolting food, feeding the children and cleaning the vessels at the anganwadi took up most of the time of the anganwadi workers and helpers, leaving them little time for other important activities such as growth monitoring, nutrition education, or preschool education,
- in any mass cooking and feeding programme, the monotony of the food provided and relatively poor quality of the preparations was a problem,

  cooking in poor hygienic conditions and keeping left-over food resulted in bacterial contamination of food, and
- undernourished children, even those in the 3-6 year age group, if given double rations, did not consume all the food at one sitting in the anganwadi.

So as for today, the supplementary food in most cases is, ready to eat, which is distributed at the anganwadi centers.

Let us move on to the next programme i.e. Pradhan Mantri Gramodhaya Yojana.

o Pradhan Mantri Gramodhaya Yojana

Pradhan Mantri Gramodhaya Yojna (PMGY), aims to achieve the sustainable human development at the village level. It provides for basic minimum services of rural roads, primary health, primary education, shelter and drinking water and nutrition in order to focus on these priority areas. The nutrition component of PMGY specifically provides food supplementation to children *6* months - 3 years of age *through take home ration* as this age group is not able to attend anganwadi centers on a daily basis. The guidelines for provision of calorie and protein content of food supplement are same as those for ICDS, since it supplements the ICDS scheme. The nutrient contribution of the supplement is given in Table 13.3. There is a shift in focus from providing cooked food at anganwadis to take-home food supplementation under the PMGY. Undoubtedly, the take-home food supplements provided will be shared with the family, but that would add to household food security. When coupled with nutrition education, the undernourished persons may get their due share.

Let us now learn about the research action programmes whose strategies have worked for ICDS. These are the programmes which had been or are being implemented in the country. Let us gel to know about these programmes now.

B. Research **Action** programmes

• *Project Poshak, Madhya Pradesh (1970-1975)*

Project Poshak was a macro integrated nutrition pilot study that was conducted in 517 villages in 12 districts of Madhya Pradesh (MP) during 1971-1975. The project aimed to test the operational feasibility, cost effectiveness and nutritional impact of a "Take-Home" food supplement, health case services, and childcare education through 88 PHCs and 210 SHCs to tribal and rural children (6-36 months of age) and pregnant/ lactating women.

The major executing partners of the project were the Departments of Public Health and Family Planning (GOMP) and the Department of Tribal Welfare in MP (TWD), and CARE-Delhi and CARE-MP. The major funder was USAID, New Delhi. UNICEF, Delhi provided some financial support for the childcase education component. The Ministry of Social Welfare and the Planning Commission of Government of India evinced a keen interest in the progress and outcome of this pilot study. What was the rationale behind starting the Project Poshak? Lets find out.

In 1969, the Secretary (GOMP) suggested to CARE-MP that it would be of great benefit to the tribal and rural mother and child (MCH) groups if a nutrition programme could be introduced through the PHCs and SHCs of the State's 17 tribal districts. Since the tribals in particular lived in far flung hamlets, it would not be possible to

have a traditional "On-site" or "Spot Feeding" that was in vogue in the then ongoing national Special Nutrition Programme (SNP). The only alternative was to offer a "Take-Home" where the MCH group would have to come in only once a week or once a fortnight to collect the ration. By doing so they would be introduced to the various other PHC services including family planning. It would also be the most graphic and practical way of offering both the "providers" (PHC/SHC staff) and the "receivers" (recipient communities) Nutrition Health Education (NHE) on the need to ***feed sufficient quantities of food*** to the "below threes", pregnant and lactating women. Even at the planning stage cognizance was taken of the possibility of ***sharing*** of the "Take-Home Food". The "Take-Home-Food" ration component of the programme consisted of 200 g for the pregnant/lactating woman and 100 g for the child beneficiary of Instant Corn Soya Mixture or ICSM (sweetened and containing a vitamin-mineral premix) per day for 14 days. The cost of delivering "Take-Home Food" and other Poshak Inputs/child/annum was about Rs.110 only for "Take-Home Food" under realistic programme conditions. It increased to about Rs.200 with more supervision and the delivery of health care and educational inputs. However, the cost was about Rs.300 if the food collection was "On-Site" and not a "Take-Home".

Let us now move on to another research action programme i.e. The Integrated Nutrition and Health Project .

The Integrated Nutrition and Health Project (INHP) in Eight States of India (1996-2006)

The Integrated Nutrition and Health Project (INHP) is a ten-year project (1996-2006, with two phases of 5 year each) implemented by CARE with the goal of achieving "sustainable improvement in the nutrition and health status of women and children". The project is implemented in partnership with the Women and Child Development and the Health and Family Welfare Departments of Government of India, Non-Governmental Organizations and Community Based Organizations with support of United States Agency for International Development (USAID). The INHP works with families having pregnant women, lactating women and children under 2 years of age (Under 2s) in eight Indian states reaching approximately 100,000 *Anganwadi Centers* (AWC). The programme is so designed as to strengthen and complement the ICDS programme.

The review of the first phase of the project highlighted two unique features of the INHP. These were take home rations and convergence of health and nutrition services at the anganwadi centes. Let us look at these in detail:

*"**Take-Home-Rations" or** THRs*: The review highlighted that the THR strategy for children, the pregnant and lactating mothers had several advantages. It showed that THR strategy:

- had very high geographical reach,
- covered the majority of "under 2s",
- was convenient for the mothers ,
- was less expensive than 'fed-on-site',
- minimized cross infections,
- treated undernutrition in its milieu,
- provided more emotional security to the child as child was fed in her/his home,
- was the most practical 'child-care-education' for the mother, and
- most importantly ensured weight gain inspite of 'sharing' of the THR.

Let us look at the other feature.

Convergence** of Health and Nutrition **Services** at the **Anganwadi: It provided for convergence of health and nutrition services at the Anganwadi on a pre-specified date and time. The nutrition and health days were usually held twice a month or once a week. The supervisor, Anganwadi Worker (AWW), the helper, Auxiliary Nurse Midwife (ANM), the community change agent were present on *nutrition and health clays.* On these days, THR rations were distributed, the 'under 2s' are weighed, and nutrition and health education was given. The mothers willingly helped and participated.

"The INHP version of the ICDS" has reached programme scale in 2003.

Let us now move on to the third research action programme.

- ***The Bal-Poshan Project, Rajasthan (1993-2003)***

The Bal-Poshan Project was an improved ICDS model implemented in five districts of Rajasthan from 1993 to 2003. The project involved the participation of Self Help Groups (SHGs) who made the Amylase-Rich-Food (ARF) from wheat grains and sold it to ICDS who distributed the 'ARF-Packets' in their weekly THR. Now what is amylase rich food? Well, amylase rich food is germinated cereal flour which is rich in an enzyme "Amylase". ARF reduces the viscosity of cereal based gruel by breaking down the starches present in it. Thus, if added to a cereal based food for an infant, ARB will make the Food thinner so that the infant can consume it easily.

The unique features of Bal-Poshan project were:

- The responsibility for caring for the children under 3 years of age was transferred to the parents. In the weekly TI-IR, paediatric iron-folate-tablets, deworming tablets (if required), the weekly ration of staple grains and oil were also given.
- Simple information - education-communication was incorporated in the project regarding the use of the various components of the THR namely, ARF, iron folate tablets, grains/oil etc.
- The Anganwadi center was ensured to have adequate stocks of common medicines such as ORS, anti-malarials, and deworming tablets.

You can see for the first time how SHGs were involved in preparing nutritious supplement for under 3 children in the ICDS programme. So in the true sense, Bal-Poshan project contributed to providing supplemental food to ICDS.

Let us look at the fourth research action programme.

- ***The Regular Incorporation of ARF in The Ready-To-Gat Complementary Food for the 'Under 3s' in the ICDS of Karnataka, Tamil Nadu, Andhra, Kerala, and the Union-Territory of Pondicherry (1992-Continuing)***

The regular incorporation of ARF in the Ready-To-Eat complementary food for children under 3 years of age (U3s) in the ICDS centres of Karnataka, Tamil Nadu, Andhra, Kerala, and the Union-Territory of Pondicherry began in 1992. This research action programme, as the name suggests, involves adding ARF to ready to eat complementary food for children under 3 years of age. The underlying principle of this programme is that 'U3s' need both their macro as well as their micronutrients day-in and day-out. An infant of one year of age requires half of what his father eats, or about 1,200 Kcal / day. He/she needs nutrient dense yet low bulk foods that will satisfy his macro hunger for calories and protein, and his micro-hunger for vitamins and minerals. Hence, a THR of grains will not do for this special category. She / he need a RTE-THR. This helpless and hapless child is in a chronic state of hunger. Further an infant born of an undernourished mother, suffers even more from iron, zinc, vitamin A, B-complex and vitamin C deficiencies. The miracle of ARF is that it literally 'liquefies' as an almost solid to semi-solid-gruel which the 'U3s' usually get.

The various factories making the RTE food for the 'U3s', routinely add 5 to 7% ragi malt to the RTE - processed and precooked complementary food-powder. Actually, barley malt is the most powerful ARF, where only 1 to 2% of the malt needs to be added to the RTE - complementary food. However, since the procedu e for sprouting ragi is well-known in South India, the Karnataka Agro Corporation (Ltd.) (one of the companies making RTE) sub-contracts self help groups (SHGs) to sell them the ragi-ARF. However, it is important to know that while preparing RTE complementary food, the use of safe water is essential in the sprouting process. This has been one of the problems of SHGs, namely, lack of hygiene and lack of safe water. It is, therefore, essential that the entrepreneurs or SHGs set up safe and hygienic units and evaluate the same from time to time with Hazard Analysis Critical Control Point (HACCP).

There are some recommendations which flow from the experience of implementation of this programme. These are:

- Social production, social marketing and social advertising should be our war cry and slogan for promotion of complementary foods.
- The need of the hour is the manufacture of sachets (like a shampoo sachet) for say, Rs.2/sachet. This sachet or sprinkler (as it is called in the USA) would contain recommended daily requirements (RDA) of vitamins / minerals for the 'U3s' +just 2g of a hygienically produced barley malt. Such a sachet / sprinkler (packed in aluminium laminate) has a shelf-life of upto 3 years.

Let us now review the national programme implemented in the school.

C. National Programme Implemented in Schools

- National ***Mid-Day Meals Programme (NMDM)***

We studied about National Mid Day Meals Programme in Unit 10. We will briefly review the supplementary feeding component of the programme now.

We learnt that the supplementary feeding component of the programme consists of:

- 100 gram food-grains (wheat or rice) per child per school day where cooked meals are served,
- 3 Kg food grains per student per month where food grains are distributed.

You are probably aware that as of yet, not all the states provide cooked meals under the programme, although they are in the process of doing so. As of now, only 14 states and 7 UTs provide cooked meals to all primary school children, while 9 states provide cooked meals in some areas only. Four states are distributing food grains under the programme. According to a Supreme Court ruling in 2002, all states should provide cooked meals under NMDM. However, in the interim, until the institutional arrangements are made for providing cooked meals, states are providing food grains.

Since it is such a big programme, it will be good to learn about the systems set up in the country to monitor the food component of the programme. GOI has developed a computerized Management Information System with the assistance of the National Informatlon Centre, New Delhi. The system provides for recording data on enrolmenl, eligible beneficiaries for NMDM, quantity of food grains allocated, lifted and utilized in each block. However, no State or UT has been able to sufficiently master the computerized format as yet.

Thus, we saw how different programmes in the country provide supplementary nutrition to children, pregnant and lactating women. Of course, there is a lot to learn from these and there is also a scope for improving these programmes.

Check Your Progress Exercise 2

1. Explain the term "Supplementary feeding" and its relevance as a strategy to combat malnutrition.

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2. Enumerate the target group, calories and protein provided by ICDS food supplement?

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3. What are the research action programmes whose strategies have worked for ICDS?

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4. Read the following statements carefully. Indicate whether each is true or false. Correct the false statement.

   a) Bal Poshak project in Rajasthan was a unique project, in which self help groups were involved in preparation of food supplements for young children.

   b) One of the disadvantages of on the spot cooked food feeding programme in ICDS is the poor out reach of 6-36 months old children.

   c) NMDM has helped to boost enrolment in primary schools.

   d) PMGY specifically provides food supplementation to children 3-6 years of age.

   e) Project Poshak was pilot tested in Rajasthan.

In the above section, we learnt about supplelnentary feeding and how various supplementary feeding programmes form an important strategy to combat malnutrition. Let us now move on to the next stralegy to combat public nutrition problems. This strategy focuses on how we can improve the quality of food or nutritional value through genetic or food biolechnology.

13.4 IMPROVING THE QUALITY OF FOOD PRODUCED BY GENETIC APPROACHES

Genetic or food biotechnology is a plant breeding science, It means the transfer or the implantation of a gene(s) that is abundant in another plant or living organism species to the one that is to be enriched. Genetic or food biotechnology can help us to improve the nutritional situation of people in two ways. First, this approach can help us to improve the nutritional quality of staple foods. Secondly, it can help us to produce crops which have greater resistance to external harmful agents (e.g. pests etc.).

Certain staple foods Iike wheat, rice and potato can be enriched with β carotene, iron, zinc and the amino acid - lysine - using genetic/food biotechnology. Genetic approaches have been successful in producing β-carotene-rich wheat, β-carotene-rich maize, β-carotene-rich potato, β-carotene-rich-sweet-potato, β-carotene-rich cassava. Action-research is required to assess producer (farmer), manufacturer, and consumer acceptance.

Food biotechnology can help in enriching the vitamin, mineral and amino acid content of certain staple foods. Let us look at the second aspect of food biotechnology in

improving nutritional situation, that is, how it can be used to show improved resistance to external harmful agents.

Genetically modified foods have been shown to exhibit improved resistance to several harmful agents such as virus, insects and herbicides. They have also shown improvement in the shelf-life. There are many advantages which have been demonstrated in genetically or biotechnologically modified crops. The Malaysian Agricultural Research and Development Institute, Malaysia has done excellent work with respect to rice, papaya and palm oil. Some of these advantages are:

- rice strains are more resistant to the tungro spherical form vims,
- rice strains are more resistant to the bacilli form virus,
- rice strains are more tolerant to herbicides,
- rice strains are more resistant to insects,
- papaya strains are more resistant to ring-spot virus,
- papaya strains have an improved shelf-life,
- oil palm strains have oil quality improvement,
- oil palm strains, have resistance to herbicides,
- oil palm strains have resistance lo insects, and
- oil palm strains have resistance to fungus.

Thus, we studied that genetic modification of food can go a long way in combating the problem of malnutrition in India. However, policy makers, implementers, producers and consumers should be educated about the merits and demerits of genetically modified foods.

In the above section, we learnt about how genetic/food biotechnological approaches can help to improve the quality of food and offer great opportunity to reduce malnutrition in India. In the next section, we will learn how improving water and sanitation is an important strategy to alleviate malnutrition. Let us move on to this strategy.

13.5 CLEAN WATER, SANITATION, STREET FOODS AND STRATEGIES TO IMPROVE THE STREET FOODS

Access to clean water and sanitation is a very important stsategy to combat malnutrition. If the clean water and proper sanitation are not available to families and communities, the individuals can suffer from water borne infections. Infections, as you know, cause malnutrition. You have already read about vicious cycle of malnutrition and infection in Unit 3 under causes of malnutrition. Thus it is impo tant to provide clean water and proper sanitation to people, so that people are prevented from these infections and stay in good health.

This section is divided into three parts. In the first part, we will learn about the importance of clean water, how water gets contaminated and the harmful effects of contaminated water. We will also learn as to how we can improve the quantity and quality of water supply in our country.

In the second part, we will learn about sanitation and some strategies to improve urban sanitation in India. We will also review some success stories, which have helped to improve sanitary services in India.

In the third part, we will learn about street foods and review two case studies, which demonstrate how street foods can be made more hygienic and safe.

Let us begin by understanding the importance of water, how the water gets contaminated and the harmful effects of contaminated water.

13.5.1 Importance of Clean Water, Reasons for Water Contamination and its Harmful Effects

Water is essential for life. In fact, one can survive without food for weeks but not without watec Water is a macronutrient made up of two elements, namely hydrogen and oxygen. Vegetables contain 70% to over 90% water, so do fruits. Even cereals contain over 10% water. If the food we eat is grown on contaminated soil (chemical effluents, or containing large amounts of human excreta), then, the roots of the food-plants or crops will suck up this contaminated water and in turn infest or infect the human beings who consume these plant foods. This is becoming a perennial problem in our 21" Century. As for the water we drink, the source of water in most urban areas is neither clean nor safe. Very often the mains (large tubes conveying water from the source) and tubes, are contaminated with sewerage mains. Water contaminated with faecal matter forms the single most important factor in the spread of gastro-intestinal diseases (diarrhoea, dysentery or even cholera). Tube-wells are a common sight these days. They also are the culprit for the spread of gastrointestinal disease. Here again sewerage can easily enter shallow tube wells.

Let us now move on to how we can improve the quantity and quality of water supply in our country.

Quantity *of* ***Water:*** It has been predicted that by mid-century (2050) water will become so scarce that wars will be waged for water. India is fortunate in that it has a perennial source of water from the Himalayas. We also have an extensive coast-line where future technology can also transform or convert sea water to drinking or potable water as in Israel. However, what is little realized is that the quantity required for drinking / cooking / washing purposes is just about 10 to 15% of the total quantity of available water. Most of the water is used in irrigation. Here again, genetic or biotechnology, can create seed strains that require much less water. Drip irrigation is another avenue to save water.

Quality of Water: India has constituted the Rajiv Gandhi Water Commission in 2000 to make improved quality of drinking water and sanitation services available to people. In the urban setting, the Water Boards (who oversee the distribution of water) could do the following:

- Replace all water and sewerage mains.
- Oversee and regulate the depth that tube-wells should be bored. They should be community, colonies and habitations-specific,
- Set-up water purification plants at the source from where water will be drawn and distributed.
- Continuously test water, samples at source (rivers tanks) and at end delivery points, namely, public taps or tube-well taps. Take immediate and necessary action.
- Levy a small fee for water management to all i.e. slums, to the High Income Groups (HIGs).
- Control the huge inflow of rural population pouring into urban areas. Set-up 'migrant-shelters' on the fringe of urban settlements, Provide safe water (quantity and quality).
- Set-up washing areas in our 'mandi' markets and mandate that only clean and washed vegetables and fruits will be sold.
- Encourage rain-water harvesting wherever possible, starting with Public Institutions, eg. Government Offices.
- Provide micro-finance to the women in slums and Lower Middle Income (LIG) housing colonies to manage their own water requirements.

- Monitor the water and sanitation position during the rainy season.
- Make village Panchayats responsible for ensuring enough water (quantity and quality), the maintenance of taps and bore-wells and for rain-water harvesting.
- Encourage Food-for-Water-Management Schemes which can employ the youth of the village.
- Water and sanitation go hand-in-hand, especially in rural India where the concept of sanitation barely exists.
- Mandate that rural housing loans will incorporate the basics of water and sanitation.
- Since times immeinorial rural populations have been contaminating their water-sources. Hence, institute an appropriate Information-Education-Communication (IEC), starting with the Panchayat to the village school.
- Monitor water and sanitation position during the rainy season, monsoons.

You can thus see that Government of India is taking several measures to improve the quality and quantity of water supply.

Let us now learn about sanitation and some strategies to improve urban sanitation in India.

13.5.2 Urban and Rural Sanitation and Strategies to Improve Sanitation

Sanitation has to be viewed as a package, namely, personal hygiene, family hygiene, community and environmental cleanliness. Sanitation is deplorable for the migrant population, the abjectly poor and the low income group (LIG) in India. Unless the communities who need it the most agitate for sanitary latrines and maintain it, the situation cannot improve.

Let us review some strategies to improve urban sanitation:

- The slums should come forward and demand improved sanitation services.
- The Media should play an active role and influence the public and policy makers to provide for improved sanitation services.
- Women, especially those who stay at home, are the most affected and should be trained in the construction and maintenance of low cost latrines.
- As stated earlier, it is the migrant population who should be kept out of city limits, but provided with minimum levels of water and sanitation.
- Research development and technology is urgently needed for specific low cost latrines to suit different geo-hydrological conditions.

Now let us proceed to some success stories in India.

The *Sulabh* Sanitary *Latrines* are now *a* common features in all our big cities and towns. The concept of 'pay and use' has come to stay.

- SEWA in Ahmedabad, advances *micro-credit to cvomen* in the urban informal sector (Cart pullers, street-food vendors, construction workers) for housing which has to include a certain amount for water and sanitation.
- *Ahmedabad Parivartan:* Over 1000 slums (informal settlements) and nearly 1500 chawls (tenements), housing approximately 300,000 families had little or no access to basic urban services. In response to this growing problem, the Ahmedabad Municipal Corporation launched Parivarthan (meaning transformation) an ongoing programme which brings affordable and sustainable basic infrastructure services,

including water and sanitation, to these slums and chawls of Ahmedabad. The project brought together target communities, local NGOs, and the private sector in a meaningful partnership.

- *SWAJAL – Uttar Pradesh*: This World Bank - assisted SWAJAL project has improved the rural water supply and sanitation services of over 10 lakhs people living in 1000 villages in the UP hills and Bundelkhand. The community willingly pays for operational and maintenance costs.

The Rajiv Gandhi National Drinking Water Mission of the Government of India, has implemented national 58 district pilot project. This will help the rural poor in India to gain access to improved drinking water and sanitation services. Partnerships between NGOs, the Private Sector and the Water Mission have been formed in several districts.

Thus, we have several successful projects aimed at improving sanitation services in India. These need to be taken to scale before we could see significant improvement in sanitary conditions in India.

Let us learn now about street foods and review two case studies, one from Bangalore and the other from Kolkata, which demonstrate how street foods can be made more hygienic and safe.

13.5.3 Street Foods and Strategies for Improvement

What are Street Foods? The term street foods describes a ***wide*** *range of ready to eat foods and beverages sold and sometimes prepared in public places, notably streets*. Street food vending is spreading rapidly all over the world. The popularity of street foods is due to several reasons viz. the modern life style compels both men and women to go to work giving less time to cook at home, easy accessibility of street food, the variety it offers, affordable costs etc. However, in several cases, street foods can become the cause of food borne disease due to unhygienic practices of the vendors and vending areas. Hence, all efforts have to be made to make street foods more hygienic and safe. The two recent case studies, one from Bangalore and the other from Calcutta, will demonstrate how this can be done.

Let us review the case studies now.

Case study from Bangalore

Improving the hygiene of street ***foods*** *in Bangalore city – replicable strategy:*

The Foundation of Food Research and Enterprise for Safety and Hygiene (FRESH), Bangalore, an NGO established with the sole objective of creating food safety at all levels has initiated work related to food safety among street foods, canteens, hotals, restaurants and industries. FRESH has executed a project financed by WHO through the Ministry of Health, Government of India and has developed a successful Replicable Model to improve the hygiene of street foods.

Water used for drinking and washing was found to be contaminated in random samples with coliforms (faecal matter). Cut fruits had a high range of coliforms. Pathogens such *Salmonella, Shigella and Vibrio* were found to be present in both the samples of cut and fresh fruit. The presence of pathogens in mobile jamoon vendor was quite alarming indicating possible contamination from the vehicle used for carrying the sweetmeat and possibly improper washing of the container. Among snack items, the food analyzed were tomato rice, chitranna, dosa, onion chutney, bean sambar, Idli, and mobile dosa. All the samples were bought from the vendor as would be sold to the consumer, in order to get an indication of the microflora of all the hand contact surfaces, such as hands, plates, chutney etc. Chutney was a potential carrier of contaminants. Pathogens were found in almost all the samples of chutney analyzed. Pani puri and bhel puri form a very important group as the use of vendor's hands was

rampant in this category. Chinese foods though generally heated to moderate temperatures were found to carry high counts of coliforms indicating insufficient heating and also mixing by hands could not be ruled out.

A consumer preference survey was also conducted to determine the consumer views/ thoughts/reactions on street foods and its vending process.

The outcome of the Bangalore Study resulted in certain actions. The study was successful in:

- Convincing the City Municipality to set-up 'Food courts' with adequate water and sanitation facilities.
- In establishing that the food handlers, water and chutneys were the most contaminated.
- Strategizing "Hands on Training" as a positive tool towards improving the hygiene of street foods.

We will now look at another case study from Calcutta.

Case study from Kolkata

Street food: safety, risks und *nutrition potentials:*

In order to assess the quality of street foods and its management process, a study was conducted by the All India Institute of Hygiene and Public Health in collaboration with the Kolkata Municipal Corporation and the Kolkata Police supported by Food and Agriculture Organization of the United Nations. Based on the study an action plan was developed covering all sectors of street food vending viz., quality, management, environment, traffic control, pedestrian control, garbage disposal etc. for improvement of the quality of street foods in Kolkata. This eventually led to the Kolkata Model on Street Foods, which is being replicated in different cities of Asia and Africa.

The broad findings of the study were:

- Clientele ranged from low income to middle to high income groups,
- Number of customers varied at different timings of the day,
- Each stall catered to approximately 65-70 customers a day,
- Fifty different varieties of foods and beverages were commonly sold at a cost ranging from 0.50 paise to Rs.8/- per serving,
- Customer preference was mainly for coffee, tea, bread, biscuits, cake, ghugni, chapatti / paratha with curly, futchka, churmur, idli, dosa, vada, samber, also highly preferred by customers,
- Nutritive value of street foods was satisfactory,
- Economically most viable viz. 1000cals were available for Rs.5/- or 200cals being derived from Re.1/-,
- Appearance, quality, smell and taste were satisfactory,
- Foods did not have any excessive amounts of fifth, dirt or dust,
- Chemical contamination was mainly through artificial food coloms,
- Microbiological quality of food and water sample was not satisfactory, which indicated the prevalence of coliform, E.Coli, Salmonella, *Shigella*, Vibrio *Cholerae*, *Klebsiella*, *Pneumonae*, *Bacillus* species in different foodstuffs.

Based on the above observations, a city plan of action was prepared with some important recommendations. These recommendations are - listing of vendors, identification of hawking areas, area-wise layout plan, proper coordination between Kolkata Municipal Corporation, Kolkata Police and Government of West Bengal, license to vendors, provision of potable water, garbage and waste water disposal facilities, awareness generation among regulatory bodies, vendors and consumers, regular analysis of food and water sample, traffic and pedestrian movement etc.

Thus, improving the hygiene of street foods, accessibility to clean water and sanitation services remain important strategy to combat malnutrition.

Check Your Progress Exercise 3

1. What is meant by genetic or food biotechonology?

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2. Answer the following briefly

   a) Five different foods which have been successfully produced with enhanced content of β carotene through genetic/food biotechnology.

   .....

   .....

   b) Two important minerals that have been added to wheat and rice through geneticlfood biotechnology.

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   .....

3. What are the harmful effects of consuming contaminated water?

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   .....

4. Answer the following briefly:

   a) Four main activities, which the water boards could take up to improve, water quality in the country.

   .....

   .....

   b) Three important strategies to improve urban sanitation.

   .....

   .....

5. Read the following statkments carefully. Indicate whether each is true or false. Correct the false statement.

   a) World bank assisted SWAJAL project has improved the rural water supply and sanitation services of over 10 lakhs people living in 1000 villages in the UP hills and Bundelkhand.

   b) Street foods can become the cause of food borne disease due to unhygienic practices of the vendors and vending areas.

c) In India, we have an excellent system to regulate the hygiene condition of the street foods.

d) In the Bangalore study on Street foods, it was found that water and cut fruits were contaminated with coliforms.

e) Based on the findings of Kolkata study on street foods, a city plan of action was prepared to improve upon hygiene situation of street foods.

In the above section, we learnt how improving drinking water and sanitation services is critical to combat malnutrition. Let us now review the last strategy, namely improving food and nutrition security to combat public nutrition problems.

13.6 IMPROVING FOOD AND NUTRITION SECURITY

We have studied in detail about food and nutrition security in Units 2, 5 and 10. You have realized by now that improving food and nutrition security remains a very important strategy to combat malnutrition. People should have food accessibility and availability at all times, so that they have enough food in their homes to meet their energy requirements. In addition they should also consume foods of adequate nutritional quality. You also learnt in Unit 10 that for low income population, Public Distribution System (PDS) and Targeted Public Distribution System (TPDS) are important strategy to provide food at low prices. We also know that food and nutrition security is affected by regular food supply in India. Thus, we would learn how India has sustained its food production, but still, there are current problems, paradigm shift, and challenges that remain in this area. Although our government has made consistent efforts to improve availability of food for poor since the beginning of the first national plan, we would learn about specific efforts made by the government in the tenth national plan to ensure adequate availability of foodstuffs for the poor. You should remember that we should not always be dependent on the government to improve food and nutsition security. The community should also make efforts to improve the same. Thus, we will learn about innovative local efforts by the community and how these can contribute to achieving nutrition security for the poor population.

13.6.1 Sustainable Food Production to Meet Nutritional Needs

India has made great strides in improving food production in last 50 years and one of the major achievements in the last 50 years has been the green revolution and self-sufficiency in food production. Food grain production has increased four-fold, The Green Revolution ensured that the increase in food production stayed ahead of the increase in population. The country has moved from chronic shortages to an era of surplus and export in most food items. The country is self sufficient in food grain production and currently there is a buffer stock of over 60 million tonnes. Along with the steps to achieve adequate production, initiatives were taken to reach foodstuffs of the right quality and quantity to the right places and persons at the right time and at an affordable cost. Over the years, there has been improvement in access to food through the PDS, the food for work programme has addressed the needs of the vulnerable out-of-work persons. The ICDS programme aimed at providing food supplementation for pre-school children, pregnant and lactating women, nearly covers all blocks in the country. The mid day meal programme aimed at improving dietary intake of primary school children and reduction in the school drop out rates has been operationalized.

However, now there is a paradigm shift from household food security and freedom from hunger to nutrition security. Although the food grain production has continued to increase steadily, there has been a decline in the production of pulses. Per capita consumption of fruits and vegetables also remains low. These items are also not

available at affordable prices to poor. Poor people continue to have diets which are of low nutritional quality. Box 1 gives the progress achieved, current problems paradigm shift and challenges in the area of food production. Our challenge is, therefore, ensuring that adequate quantities of pulses or other protein rich foods such as milk, eggs, or meat, which are also in short supply, must become more widely accessible, requiring increased production and improved distribution and consumption.

Box 1 **Progress Achieved, Current Problems Paradigm Shift and Challenges in the Area of Food Production.**

FOOD PRODUCTION

Progress Achieved:

- The country has achieved self-sufficiency in food grains to meet the needs of the growing population.
- There are ample food grain stocks.

Current Problems:

- 'Green Revolution Fatigue' in some areas.
- Productivity remains low.
- Improved food grain availability has not resulted in eradication of hunger or reduction in under-nutrition especially in vulnerable groups.
- Very little attention is being paid to achieve integrated farming systems that will ensure sustainable evergreen revolution essential for appropriate dietary diversification to achieve nutrition security.

Paradigm shift needed:

- From self-sufficient in food grains to meet energy needs to providing food items needed for meeting all the nutritional needs.
- From production alone to reduction in post harvest losses and value addition through appropriate processing.
- From food security at the state level to nutrition security at the individuals level.

Challenges:

- Continue to improve food grain production to meet the needs of the growing population.
- Increase production of pulses and make them affordable to increase consumption.
- Improve the availability of vegetables at an affordable cost tliroughout the year in urban and rural areas.

Opportunities:

- Achieve substantial improvement in nutrition security.
- Achieve decline in macro - and micronutrient under-nutrition.

So you learnt that although we have achieved good progress in achieving self sufficiency in food grains, we are still faced with many challenges and opportunities to improve food and nutrition security . So what does our government do to improve food and nutrition security of the people. Our government has come up with certain measures to improve food security in the national tenth plan. Let us review these now.

13.6.2 Interventions Initiated during the National Tenth Plan to Improve Food and Nutrition Security

You probably know that our governtnent has made consistent efforts to improve food production since the first national plan after independence. Let us specifically look at what the government plans to do in the tenth plan to ensure adequate availability of foodstuffs for the poor. These measures are listed below:

- Ensure production of cereals, pulses and vegetables to meet the nutritional needs.
- Making them available at affordable cost through out the year to urban and rural population through reduction in post harvest losses and appropriate processing.
- More cost effective and efficient targeting of the PDS to address macro - and micronutsient deficiencies (such as providing coarse grains, pulses and iodized/ double fortified salt to below poverty line (BPL) families through the targeted PDS (TPDS).
- Improving people's purchasing power through appropriate programme including food for work schemes.

Thus, these are some of the measures which government is taking to improve food security of Indian people. However, we should not always be dependent on the government to improve food and nutrition security situation, community should also make efforts to improve the same. Let us learn about some innovative local efforts by the community and how they have contributed to achieving nutrition security for the poor population. One of the examples of innovative efforts is community food banks. Let us learn about this next.

13.6.3 Community Food Banks

Innovative local efforts can go a long way in improving nutrition security especially for the poorer segments of the population living in vulnerable areas. Formation of local food grain banks under the supervision of the panchayati raj institution (PRIs) to help in achieving nutrition security for all and insulating the economically and socially deprived sections of the community from seasonal food insecurity has been suggested. M.S. Swaminathan Reseasch Foundation, Chennai has proposed a Community Food Security System, and its diagrammatic representation is shown in the Box 2.

Box 2	**Features of Community Food Bank**

Community **Food Bank**

Main features of the proposed food bank are:

- One bank for every village or cluster of villages with population ranging from 2000 to 5000.
- Supervised by a society or council chosen by the gram sabha.
- Managed by a stakeholder council, with different operations assigned to different self-help groups.
- To be implemented with honesty, political neutrality, fairness, absence of discrimination based on religion, caste, class, gender and political belief.

Box 2 gives main features of a community food bank and shows how a community food bank is managed, supervised and implemented by community. Food bank thus becomes a source of food for government and other agencies with the distribution operations managed by the self help groups.

Thus, in this unit we learnt about various strategies to combat malnutrition and how they have been contributing to reduction of malnutrition in the country.

Check Your Progress Exercise 4

1. What i s meant by Public Distribution System (PDS) and Targeted Public Distribution System (TPDS).

   .....

   .....

2. Read the following statements carefully. Indicate whether each is true or false. Correct the false statement.

   a) Our country is self sufficient in food grain production and currently there is a buffer stock of over 60 million tonnes.

   b) Improved food grain availability has not resulted in eradication of hunger or reduction in under nutrition especially in vulnerable groups.

   c) We need a paradigm shift to improve food security at the state level to nutrition security at the individual level.

   d) The production of pulses has been rising steadily in India.

   e) Community food banks are innovative local efforts which can improve nutrition security, especially for the poorer segments of the population living in vulnerable areas.

3. What are the progress achieved, current problems, and opportunities in food production?

   .....

   .....

   .....

   .....

4. List the interventions initiated during the Tenth plan to improve food and nutrition security.

   .....

   .....

13.7 LET US SUM UP

In this unit, we learnt about five different strategies to combat malnutrition. These strategies are immunization, supplementary feeding, genetic/food biotechnology, improving water and sanitation services and food and nutrition security. Immunization is a very important strategy to protect the children from diseases. All children should be immunized against the most common six vaccine preventable diseases. In our country, we have comprehensive national programmes which provide supplementary foods to children in addition to other services. We also have research action programmes which provide/have provided supplementary foods to children. We need to learn from these research action programnies and integrate their best practices into national programmes in order to improve upon them. Genetically modified crops offer a great opportunity to reduce malnutrition in India. Nutritional quality of staple foods can be improved through genetic/food biotechnology. Policy makers, implementers and consumers need to be made aware of the demerits and merits of genetically modified foods. Great efforts are required in India to iinprove the availability of drinking water and sanitation services especially in urban population. There are some

successful projects that have demonstrated how these services can be improved. These projects need to be replicated and taken to scale to make an impact on overall situation in the country. Street food vending is spreading rapidly all over the world. These can become the cause of food borne disease due to unhygienic practices of the vendors and vending areas. Research projects in the country suggest some recommendations which should be implemented in order to make the slrect foods hygienic and safe. The country has achieved self-sufficiency in food grains to meet the needs of the growing population and we have ample food grain stocks. But improved food grain availability has not resulted in eradication of hunger or reduction in under-nutrition especially in vulnerable groups. In order to improve food accessibility to vulnerable population, subsidized food grains are provided to people below the poverty line under TDPS. There is also a paradigm shift now to move from food security to nutrition security.

13.8 GLOSSARY

Action research : systematic enquiry designed to yield practical results capable of improving a specific aspect of practice and made public to enable scrutiny and testing.

Antigen : a substance that can trigger an immune response, resulting in production of an antibody as part of the body's defense against infection.

Antibody : proteins produced by immune system of human and higher animals in response to the presence of a specific antigen.

Herbicide : any chemical substance that is toxic lo plants; usually used to kill specific unwanted plants, especially weeds.

Viscosity : internal property of a fluid that offers resistance to flow.

13.9 ANSWERS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress Exercise 1

I. Immunization is a process that increases an organism's reaction to antigen and therefore improves its ability to resist or overcome infection. Infection contributes to malnutrition in children by affecting growth. Therefore, it becomes very important to prevent infection in children so that they grow well. Immunization is one of the most cost-effective methods of preventing infections and a critical strategy lo combat public nutrition problems.

2. The common vaccine preventable diseases are: Tetanus. Poliomyelitis, Diptheria, Pertussis, Childhood tuberculosis and measles

3. Fill in the blanks:

   a) tetanus

   b) birth.

   c) DPT, polio

   d) 9

   e) 16-24.

Check Your Progress Exercise 2

1. Supplementary feeding, is the food provided to pregnant, lactating women and children and adolescents to fill the gap between the average calorie intake end

national recommended dietary allowances. It addresses the problem of food and nutrition security in the vulnerable population and provides extra calories and nutrients for growth and development at the critical stages of life cycle.

2. The target group, calories and protein supplied by ICDS supplementary food is given in the table as follows.

Target group, calorie and protein content of ICDS food supplements

S.No.	Recipients	Calories	Protein gm
1.	Children 6 months to 6 years	**300**	8-10
2.	Adolescents*	**500**	20-25
3.	Pregnant and lactating women	*500*	20-25
4.	Malnourished children (at or below grade 3rd and 4th)	Double the daily supplements provided to other children i.e. 600 and/or special nutrients on medical recommendation	16-20

* Supplementary feeding provided to adolescents in some states only

3. Four Research Action Programmes whose strategies have worked for ICDS are:

- Project Poshak (1970-75)
- The Integrated Nutrition and Health Project (INHP) in Eight States of India (1996-2006)
- The Bal-Poshan Project, Rajasthan (1993-2003)
- The Regular Incorporation of ARF in The Ready-To-Eat Complementary Food for the 'Under 3s' in the ICDS of Karnataka, Tamil Nadu, Andhra, Kerala, and the Union-Territory of Pondicherry (1992-Continuing)

4. a) True

b) True

c) True

d) False, PMGY specifically provides food supplementation to children 6 months to 3 years of age

e) False, NSPE does not provide health package to school children. Although it has been strongly recommended that it should provide a health package in addition to supplementary foods to school children.

Check Your Progress Exercise 3

1. Genetic or food biotechnology is a plant breeding science. It means the transfer (transgenic) or the implantation of a gene(s) that is abundant in another plant or living organism species to the one that is to be enriched.

2. a) Genetic approaches have been successful in producing β-carotene-rich wheat, β-carotene-rich maize, β-carotene-rich potato, β-carotene-rich-sweet-potato, β-carotene-rich-cassava.

b) Two minerals which have been added to staple foods through genetic / food biotechnology are iron and zinc.

3. Water contaminated with faecal matter forms the single most important factor in the spread of gastro intestinal diseases (diarrhoea, dysentery or even cholera)

4. a) Four activities which the water boards could take up to improve water quality in the country are:

   i) Set-up water-purification plants at the source from where water will be drawn and distributed.

   ii) Continuously test water, samples at source (rivers tanks) and at end-delivery points, namely, public-taps or tube-well-taps. Take immediate and necessary action.

   iii) Make village panchayats responsible for ensuring enough water (quantity and quality), the maintenance of taps and bore-wells, and for rain-water-harvesting.

   iv) Encourage Food-for-Water-Management Schemes which can employ the youth of the village.

   b) Three important strategies to improve urban sanitation are:

   i) The Media should play an active role and influence the public and policy makers to provide for improved sanitation services.

   ii) Women should be trained in the construction and maintenance of low-cost-latrines.

   iii) Migrant population who should be kept out of city limits, but provided with minimum levels of water and sanitation.

5. a) True

   b) True

   c) False, In India, we do not have a regular system to regulate the hygienic condition of the street foods.

   d) True

   e) True

Check Your Progress Exercise 4

1. The Public Distribution System (PDS) & Targeted Public Distribution System (TPDS) are food subsidy programmes implemented by Govt. to provide food security to the poor people in India. PDS supports grain prices and assures buffer stocks when supplies fell short. PDS provides cereals and other essential items to card holders at subsidized rates. TPDS was introduced in 1997 by the Govt. Under this system, subsidized food grains are provided only to people below the poverty line.

2) **a)** True

   b) True

   c) True

   d) False- The production of pulses has been falling steadily. We need to increase production of pulses and make them affordable to increase consumption.

   e) True

3. The progress achieved, current problems, paradigm shift, challenges and opportunities in food production are presented as follows:

   Progress Achieved: the country has achieved self-sufficiency in food grains to meet the needs of the growing population, there are ample food grain stocks.

Current Problems: 'Green Revolution Fatigue' in some areas, productivity remains low, improved food grain availability has not resulted in eradication of hunger or reduction in under-nutrition especially in vulnerable groups, and very little attention is being paid to achieve integrated farming systems that will ensure sustainable evergreen revolution essential for appropriate dietary diversification to achieve nutrition security.

Opportunities: achieve substantial improvement in nutrition security, and achieve decline in macro and micronutrient under-nutiition

4. Interventions initiated during the Tenth plan to improve food and nutrition security are:

- Ensure production of cereals, pulses and vegetables to meet the nutritional needs.

  Making them available at affordable cost through out the year to urban and rural population though reduction in post harvest losses and appropriate processing.

- More cost effective and efficient targeting of the PDS to below poverty line (BPL) families through the targeted PDS (TPDS).

- Improving people's purchasing power through appropriate programme including food for work schemes.