

BUILDING CAPACITY FOR THE AGRICULTURE SECTOR'S RESPONSE TO AIDS

A TRAINING MANUAL FOR AGRICULTURE SECTOR WORKERS

4

MODULE

The Role of Nutrition in the AIDS Response



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AIMS

The aims of this module are the following:

1. To achieve a general understanding of the role of nutrition in responses to AIDS.
2. To understand ways of using the comparative advantage of the agriculture sector in promoting appropriate nutrition for people affected by or living with HIV.

OBJECTIVES

Upon completing the module, the learner should have a basic understanding of the following issues and practices:

1. The association between HIV and nutrition and the benefits of good nutrition for people living with HIV.
2. Nutrient needs for people living with HIV according to sex, age and disease stage.
3. Antiretroviral therapy interactions with food and nutrition and the nutritional management of these side effects.
4. Dietary management of HIV co-infections such as tuberculosis.
5. Impacts of HIV and AIDS on household nutrition.
6. Preparation of safe and nutritious food using low cost and labour-saving methods.
7. The role of the agriculture sector in supporting household and community-level responses for the nutritional needs of PLHIV, as well as the role of other sectors, such as education and health

QUESTIONS FOR REFLECTION

1. What is the role of the agriculture sector in nutritional care, treatment and impact mitigation for PLHIV?
2. What can other sectors such as health and education do? How can partnerships between agriculture, health, education and other relevant sectors be established, and what are their respective comparative advantages?
3. What factors does one need to consider when setting up or implementing suitable nutrition interventions to support PLHIV in urban and rural households?

INTRODUCTORY REMARKS

It has been found that improving nutrition and food security for people living with HIV (PLHIV) is an important aspect of the response to the epidemic. Nutrition is an area of comparative advantage that actors in the agriculture sector (e.g. FAO staff, Ministries of Agriculture and NGO staff have in responding to HIV. This module provides practical insights into how to integrate HIV issues into nutrition programmes. In addition, it serves as a useful guide for policy and programme development on nutrition issues, giving particular guidance on how to address HIV challenges. Evidence has shown important links between improved HIV outcomes and nutrition. Adequate nutrition is necessary to maintain the immune system, manage opportunistic infections, optimize response to medical treatment, sustain healthy levels of physical activity and support an optimal quality of life for people

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living with HIV (PLHIV) as well as their households. Good nutrition can also contribute to slowing the progression of the disease.

READINGS: AN OVERVIEW OF NUTRITION ISSUES AND HIV

1. Nutrition and HIV

Poor nutrition quickens the progression from HIV to AIDS while good nutrition slows it down. Adequate nutrition is necessary to:

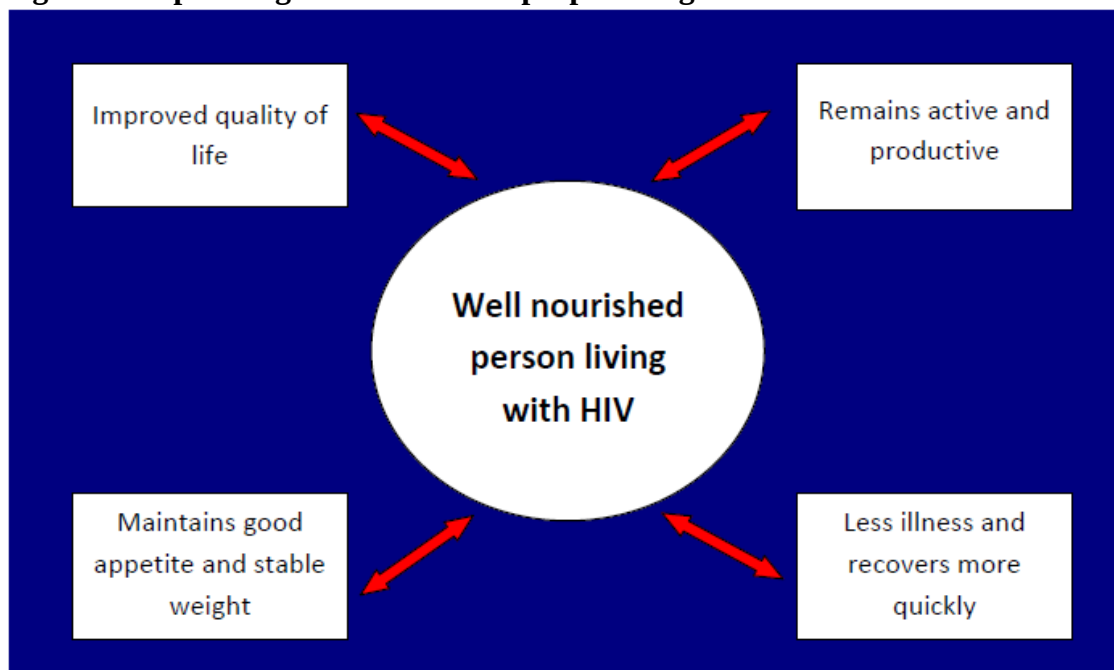
- Maintain the immune system
- Manage opportunistic infections
- Optimize the benefits of antiretroviral drugs and increase compliance with treatment regimens – both of which are essential to prolong the lives of people living with HIV and to prevent the transmission of HIV from mother to child
- Sustain healthy levels of physical activity
- Support optimal quality of life for a people living with HIV (PLHIV)

1.1 The role of nutrition in supporting people living with HIV (PLHIV)

People living with HIV who are well nourished are likely to:

- Have improved quality of life and thus able to work and contribute to family income
- Have prolonged good health and thus remain active and able to care for themselves and help with the care of children and other dependants
- Have reduced illnesses and recover more quickly from infections, therefore reducing costs for health care
- Maintain a good appetite and stable weight
- Children can go to school regularly, resulting in better education and development

Figure 1. Impact of good nutrition on people living with HIV



(Source: FAO and WHO, 2002)

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Evidence has shown important links between improved HIV outcomes and nutrition. Epidemiological studies show a strong relationship between micro-nutrients and HIV and progression, and the efficacy of ARV drug treatment is greatly increased by sound nutrition¹. Two studies, one from India and another from Kenya are provided below to illustrate the role of nutrition in the well-being of people living with HIV.

Box 1. Case study of nutritional therapy for HIV-positive people in India

A study conducted in India found conclusive evidence that providing micro and macronutrients to people living with HIV greatly improves their health and quality of life.

<i>Description of the study</i>	The 18-month study was undertaken in three centres, in India covering 10 districts that provide antiretroviral therapy (ART). It involved the supply of both micro and macronutrients to people, both adults and children, who were on ART as well as those who did not require it. The objective was to study how nutritional supplementation helped in improving the subjects' health, which in turn improved the socio-economic parameters. Macronutrient supplements (calories, protein, carbohydrate, fat and fibre) were provided to 10,780 people and micronutrient supplements (Vitamin A, B, C and folic acid, to name a few) in the form of tablets to 11,109.
<i>Results</i>	CD4 count showed most significant improvement in those on treatment. In the case of those on ART, the CD4 count that was 113 at the time of starting the study, shot up to 309 six months after the supplementation programme, and finally reached 402 at the end of the 18-month study period. In the case of those who do not require ART, the improvement was marginal — 494 at the start to 515 at the end of the study duration
<i>Delay progression</i>	For those already on ART, an improvement in CD4 count delays the onset of AIDS related health problems. Weight gain was 5 kg in the case of men and 4 kg in the case of women on ART; it was 4 kg in men and 2 kg in the case women who were not did not need treatment
<i>TB co-infection</i>	As the health of people improved, the rate of TB dropped. Most significant drop was seen in those on ART — from 25 per cent co-infected with TB at the start of the study to 5 per cent at the end of the study period. This is only to be expected as those on ART had a weaker immune system. In the case of those who did not need treatment, TB rate dropped from 10 to 3 per cent after 18 months. Other than TB, the major opportunistic infections affecting people with AIDS showed a drastic drop from 46 per cent to 10 per cent at the end of the study period. The drop was 20 to 10 per cent in the case of those who did not require ART.
<i>Percentage employed</i>	Nutritional supplementation improved health hence significant improvement in the number of people being employed. Greatest impact on those who were on ART — the percentage more than doubled from 30 at the start of the study to 62 after 18 months. In the case of those not on ART, the percentage increase was 48 to 64 at the end of 18 months. In addition the number of hours worked in a week shot up from 11 to 31 at the end of one year and then dropped to 27 at the end of 18 months in those on ART. The second group showed a steady increase from 19 hours to 27 hours for the same period. The increase in the number of hours worked thus resulted in more income generation in both groups — those on ART and those who were not. In the case of children, the school going status and attendance improved significantly

(Source: Prasad, 2008)

¹ Piwoz, E. and Preble, E. 2000. HIV/AIDS and nutrition: a review of the literature and recommendations for nutritional care and support in sub-Saharan Africa. Washington, Academy for Educational Development. (http://repository.forcedmigration.org/show_metadata.jsp?pid=fmo:3406)

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Box 2. Findings from a programme in Kenya: Academic model for the prevention and treatment of HIV (AMPATH)

In Kenya, as part of AMPATH, which started in 2002, nutrition support is being provided to patients lacking food security in 19 locations (as determined by the programme criteria). By the beginning of 2008, an estimated 50 000 people living with HIV were to have been reached. At any given site, an estimated 20-50 percent of people living with HIV are accessing food support through the HAART and Harvest Initiative of AMPATH. A review in 2006 found that patients enrolled in the nutrition supplement programme, while taking antiretroviral therapy reported greater adherence to their medication, fewer food-related side effects and a greater ability to satisfy increased appetites. The majority of patients experienced weight gain, recovered physical strength and were able to resume labour activities. Food is provided for individuals and their dependents for up to six months after the start of antiretroviral therapy. Patients unable to meet their food needs after this period can enter a weaning programme that provides food and training aimed at enhancing long-term food security.

(Source: Byron, Gillespie and Nangamib, 2006)

1.2 Nutrition requirements for PLHIV²

A nutritious diet is one that contains a variety of foods as no single food contains all the nutrients that our bodies need³. Eating a variety of different foods supplies the nutrients that are essential to our bodies⁴. “By taking care to choose foods that are in season and locally available, eating can be enjoyable, healthy and affordable.”⁵ A healthy diet, particularly for those living with HIV, can be achieved by choosing and eating a variety of foods that provide energy, proteins, vitamins, minerals and water. People living with HIV should choose and eat foods from different food groups at each meal. These food groups include the following:

Table 1. Food groups

Food group	Example	Explanation
1. Staple foods (Cereals, cooking bananas, roots and tubers)	Maize, rice, millet, wheat, sorghum; yams, cassava, potatoes; and cooking bananas (plantains)	Staple foods make up the largest part of a meal. These foods are relatively cheap and supply a good amount of energy and some vitamins, minerals and protein.
2. Legumes, nuts and foods of animal origin	Beans, peas, lentils, groundnuts (including peanut butter), soybeans, beef, poultry, fish, offal, pork, milk, milk products, eggs, peas, beans, peanuts and insects such as caterpillars or grasshoppers,	These foods provide a person with the proteins needed to develop and repair the body and also to build up strong muscles. This group contains food from both plant and animal sources. Plant sources provide good amount of protein vitamins, minerals and fibre and help to keep the immune system active. Animal sources provide an excellent quality of proteins, vitamins and minerals and extra energy.

² Information in this section is largely taken from: WHO. 2003. Nutrient requirements for people living with HIV/AIDS: report of a technical consultation, World Health Organization, Geneva, 13–15 May. Geneva. (http://www.who.int/nutrition/publications/Content_nutrient_requirements.pdf); Government of Kenya – Ministry of Health. 2006. Kenyan National guidelines on nutrition and HIV/AIDS. Nairobi. (http://www.fantaproject.org/downloads/pdfs/Kenya_Nutrition_Guidelines_2006.pdf).

³ Except for breast milk for babies up to the age of six months. See: FAO and WHO. 2002. Living well with HIV/AIDS: a manual on nutritional care and support for people living with HIV/AIDS. Rome, FAO. (<http://www.fao.org/docrep/005/y4168e/y4168e00.HTM>)

⁴ FAO. 2004. Family nutrition guide. Rome, Italy. (<http://www.fao.org/docrep/007/y5740e/y5740e07.htm#bm07>)

⁵ FAO and WHO. 2002. Living well with HIV/AIDS: a manual on nutritional care and support for people living with HIV/AIDS. Rome, FAO. (<http://www.fao.org/docrep/005/y4168e/y4168e00.HTM>)

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3. Fruits	Pawpaw, mangoes, oranges, tangerines, guavas, peaches, passion fruit, grapefruit, pineapples and baobab fruits	They are good sources of vitamins and minerals. These foods are especially important for people living with HIV to fight infection. Eat a wide variety as each one provides different vitamins and minerals.
4. Vegetables	Sweet potato leaves, cassava leaves, pumpkin leaves, amaranth, okra, carrots, pumpkins, tomatoes, spinach, eggplant, green peppers as well as indigenous vegetables	They provide vitamins and minerals. These foods are important for people living with HIV and AIDS to fight infection. Eat a wide variety as each one provides different vitamins and minerals.
5. Fats/Oils and sugar	Butter, lard, margarine, cooking oil (vegetable, coconut and palm oil), cream, and coconut cream. They are also found in avocados, oilseeds (sunflower, groundnut and sesame), fatty meat and fish. Sugars and sugary foods include honey, jam, table sugar, cakes and biscuits.	They are good sources of energy and can help one gain body weight, which can be particularly important for those living with HIV. They also add flavour to food, thereby stimulating appetite.
6. Water and other fluids	Drinking water, fruit juices, soups	Clean and safe water is important for life and is necessary every day. A person needs about eight cups of fluid per day which is equal to two and half litres of water per day.

(Source: Tanzania Food and Nutrition Centre, 2003)

Nutritious eating patterns and lifestyle strengthen the immune system. Nutrients have particular importance in maintaining a healthy immune system, especially for PLHIV. It is therefore necessary to eat a variety of foods to get adequate nutrients. Important nutrients, and specifications for PLHIV, include:

- Carbohydrates: provide a rich source of energy for all body functions. When a person does not eat sufficient carbohydrates the body will use its stored protein for energy. It is therefore important for PLHIV to meet their daily carbohydrate requirements so as to avoid the use of stored protein which is highly needed.
- Protein: when a person does not eat enough protein, the body begins to break down its muscle tissue, resulting in weight loss and muscle wasting. People living with HIV have increased protein requirements.
- Fats: provide a concentrated form of energy. “There is no evidence that total fat needs are increased beyond normal requirements as a consequence of HIV infection. However, special advice regarding fat intake might be required for individuals undergoing antiretroviral therapy.”⁶
- Vitamins and minerals: help build a strong immune system and keep the linings of the lungs and the gut intact. This makes it more difficult for germs to enter the body and cause infection. Vitamins A, C, E, selenium, zinc and iron act as antioxidants. They are associated with the prevention of body cell damage and protection from infections. Adequate intake of vitamins and minerals is best achieved through an adequate diet. HIV-infected adults and children should maintain healthful diets that ensure micronutrient

⁶ WHO, 2003.

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intakes at recommended levels. However, dietary intake of vitamins and minerals may not be sufficient to correct nutritional deficiencies in HIV-infected individuals. In settings where these intakes and status cannot be achieved, multiple micronutrient supplements may be needed for high-risk groups such as pregnant and lactating women. Nevertheless, there is evidence that some supplements e.g. zinc and iron, can produce adverse outcomes in HIV-infected people.

- **Dietary fibre:** food high in dietary fibre helps to promote bowel function and to prevent and treat constipation.
- **Water:** although water is not food, it may be regarded as the most important nutrient as it is the body's principal transporting agent and an indispensable agent in metabolic activities of all cells.

There are a range of factors that influence the nutritional requirements of people living with HIV – e.g. age, physiological changes (pregnancy, breastfeeding), physical activity, clinical stages of health, metabolism and viral load count. The stage of disease progression also influences nutritional requirements. For example, the absence or presence of symptoms such as fever, diarrhoea, weight loss, and wasting can determine the advisable intake levels.

Table 2. Daily nutrient requirements of PLHIV⁷

Category	Energy requirements	Examples of portions of food needed to meet energy requirements
Healthy HIV uninfected adult	1,999 to 2,580 Kilocalories	
Adult-infected (early/asymptomatic stage)	10% more energy (additional 210 kcal)	One fistful of phutu ⁸ or a cup of porridge taken during the course of the day.
Adult -HIV infected (late/symptomatic stage)	20% to 30% more energy (additional 420 to 630 kcal)	Two to three fistfuls of phutu or two to three cups of porridge taken during the course of the day.
HIV-infected children	10% more energy if asymptomatic 20 to 30% if symptomatic 50 to 100% for children losing weight.	

*The requirements for adults also apply to pregnant and breastfeeding women.

Specific requirements for children with HIV include:

- For HIV infected children (5-59 months) living in resource limited settings, periodic vitamin A supplementations (100, 000 IU for infants aged six-12 months) and 200,000 IU for children > 12 months).

⁷ Extracted from: Government of Kenya – Ministry of Health, 2006.

⁸ Phutu (pronounced "poo-too") is a traditional maize meal from South Africa. It is a crumbly or grainy type of pap or porridge eaten mainly by the Basotho, Bantu and Afrikaner people. It is cooked in cauldrons or *potjies* over an open fire, stirred with great effort until a consistency in texture is reached. It is often eaten with meat, beans, gravy and/or sour milk. In West Africa, corn meal *tuwo* (Hausa) or *toh* (Bamana) is very similar. In northern Italy, *polenta* is the traditional peasant equivalent.

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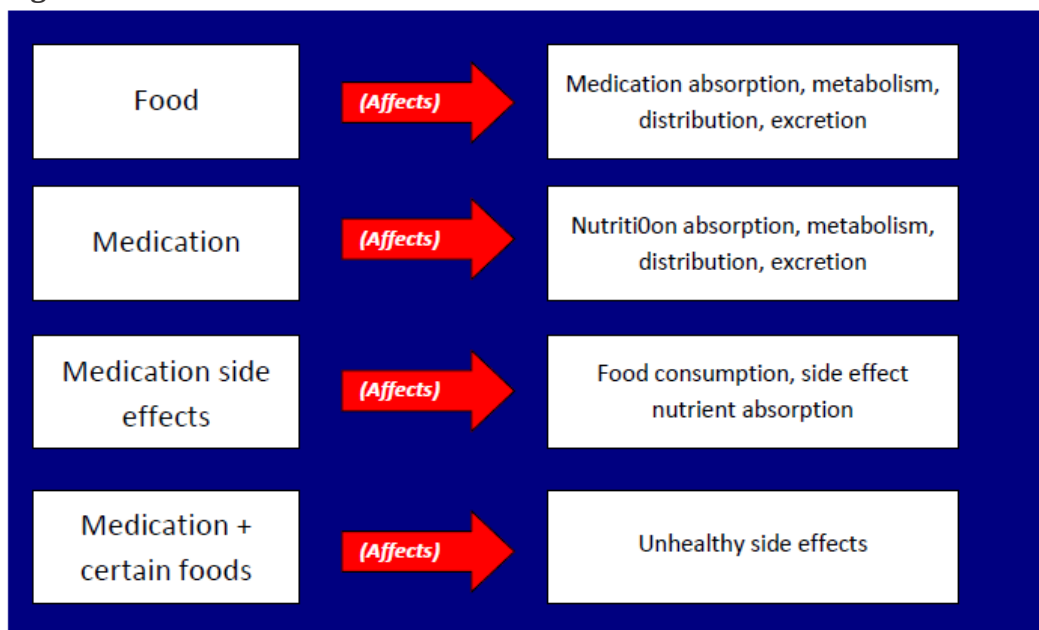
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- There are no data on the efficacy of other micronutrient supplements for HIV-infected children.
- To prevent anaemia, daily iron-folic acid supplementation (400 µg (microgrammes) and 60mg of iron) during 6 months of pregnancy and twice daily to treat severe anaemia. This applies to both pregnant women living with HIV or not.
- Daily vitamin A intake by HIV-infected women during pregnancy and lactation should not exceed the recommended levels. A single high-dose of vitamin A (200, 000 IU) is given to women as soon as possible after delivery, but no later than six weeks after delivery.

1.3 ART and nutritional requirements

Nutrition is an essential component of antiretroviral therapy (ART) interventions, particularly in resource limited settings. For ART to be effective there must be regular food supply, a good nutrition plan and continuous support to ensure healthy eating. Poor nutrition reduces the body's ability to absorb medication and individuals may find it difficult to cope with the side effects of ART. Good nutrition helps improve the effectiveness of ART, hence supporting the recovery of the defence system and improving overall well-being. "Interactions between antiretroviral therapy (ART) and food and nutrition can affect medication efficacy, nutritional status, and adherence to drug regimens."⁹ Drug-food interactions consist of the effects of food on medication efficacy, the effects of medication on nutrient utilization, the effects of medication side effects on food consumption, and negative side effects caused by medication and certain foods (see Figure 2).

Figure 2. Interactions between medications and food/nutrition



(Source: Castleman, Seumo-Fosso and Cogill, 2004)

⁹ Castleman, T., Seumo-Fosso, E. and Cogill B. 2004. Food and nutrition implications of antiretroviral therapy in resource limited settings. Food and nutrition technical assistance – Technical note No. 7. Washington, Food and Nutrition Technical Assistance Project, Academy for Educational Development.
http://www.fantaproject.org/downloads/pdfs/tn7_ARVs.pdf

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In order to address these implications resulting from the interactions, there is need to work with people living with HIV and caregivers to identify the specific food and nutrition requirements of the medications being taken and to develop feasible food and drug plans to meet these requirements. Programmes working with people taking ART may need to strengthen human capacity to address nutritional issues, establish linkages to food and nutrition programmes, incorporate information about drug-food interactions into communication materials and introduce staff training, orientation and supervision. Table 3 shows antiretroviral medicines (ARVs) and related food recommendations. It should be kept in mind that some drugs are to be taken with food and this could prove to be a challenge for resource poor settings. It is advisable to work closely with food support programmes such those supported by the World Food Program (WFP) or other local food aid support organizations.

Table 3. ARVs: possible side effects and food recommendations

Medication generic name (abbreviation)	Food recommendations	Avoid	Possible side effects
efavirenz (EFZ)	Can be taken without meals, except do not take with a high fat meal (A high fat meal reduces drug absorption).	Alcohol	Elevated blood cholesterol levels, triglyceride levels, rash, dizziness, anorexia, nausea, vomiting, diarrhoea, dyspepsia, abdominal pain, flatulence.
nevirapine (NVP)	Can be taken without food.	St. John's wort	Nausea, vomiting, rash, fever, headache, skin reactions, fatigue, stomatitis, abdominal pain, drowsiness, paresthesia, high hepatotoxicity.
abacavir (ABC)	Can be taken without food.		Nausea, vomiting, fever, allergic reaction, anorexia, abdominal pain, diarrhoea, anaemia, rash, hypotension, pancreatitis, dyspnea, weakness, insomnia, cough, headache.
didanosine (ddI)	Take 30 minutes before or two hours after eating. Take with water only (taking with food reduces absorption).	Alcohol. Do not take with juice or antacids containing aluminium or magnesium.	Anorexia, diarrhoea, nausea, vomiting, pain, headache, weakness, insomnia, rash, dry mouth, loss of taste, constipation, stomatitis, anaemia, fever, dizziness, pancreatitis.
lamivudine (3TC)	Can be taken without food	Alcohol	Nausea, vomiting, headache, dizziness, diarrhoea, abdominal pain, nasal symptoms, cough, fatigue, pancreatitis, anaemia, insomnia, muscle pain, rash.
stavudine (d4T)	Can be taken without food.	Limit the consumption of alcohol	Nausea, vomiting, diarrhoea, peripheral neuropathy, chills and fever, anorexia, stomatitis, anaemia, headaches, rash, bone marrow suppression, pancreatitis. May increase the risk of lip dystrophy.
tenofovir (TDF)	Take with a meal.		Abdominal pain, headache, fatigue, dizziness.
zidovudine	Better to take without food, but if it causes	Alcohol	Anorexia, anaemia, nausea, vomiting, bone marrow suppression,

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(ZDV/AZT)	nausea or stomach problems, take with a low-fat meal. Do not take with a high-fat meal.		headache, fatigue, constipation, dyspepsia, fever, dizziness, dyspnea, insomnia, muscle pain, rash.
indinavir (IDV)	Take on an empty stomach, one hour before or two hours after a meal. Or take with a light, non-fat meal. Take with water. Drink at least 1500 ml of fluids daily to prevent kidney stones.	Grapefruit. St John's wort	Nausea, abdominal pain, headache, kidney stones, taste changes, vomiting, regurgitation, diarrhoea, insomnia, ascites, weakness, dizziness. May increase the risk of lipodystrophy.
lopinavir (LPV)	Can be taken without food.	St John's wort.	Abdominal pain, diarrhoea, headache, weakness, nausea. May increase the risk of lipodystrophy. May increase the risk of diabetes.
nelfinavir (NFV)	Take with a meal or light snack. Taking with acidic food or drink will cause a bitter taste.	St John's wort.	Diarrhoea, flatulence, nausea, abdominal pain, rash. May increase the risk of lipodystrophy.
ritonavir (RTV)	Take with a meal if Possible.	St John's wort	Nausea, vomiting, diarrhoea, hepatitis, jaundice, weakness, anorexia, abdominal pain, fever, diabetes, headache, dizziness. May increase the risk of lipodystrophy.
saquinavir (SQV)	Take with a meal or light snack. Take within two hours of a high fat and high calcium meal.	Garlic supplements. St John's wort.	Mouth ulceration, taste changes, nausea, vomiting, abdominal pain, diarrhoea, constipation, flatulence, weakness, rash, headache, insomnia. May increase the risk of lipodystrophy.

(Source: Castleman, Seumo-Fosso and Cogill, 2004)

Some drugs only work well when taken at a specific time in relation to a meal. Other drugs will bring about side effects as shown in the previous table (table 3). Table 4 highlights the nutritional management of ARV side effects.

Table 4. Nutritional management of ARV side effects

Side Effect	Recommended nutritional management
Anorexia	Eat small and frequent meals. Eat favourite foods. Select foods that are energy dense. Avoid strong smelling foods.
Change or loss of taste	Use flavour enhancers such as salt, spices, or lemon. Chew food well and move around in mouth to stimulate receptors.
Constipation	Eat foods high in fibre content. Drink plenty of liquids. Avoid processed or refined foods. Exercise regularly according to capacity.
Diarrhoea	Drink plenty of fluids. Continue eating during and following illness. Prepare and drink rehydration solution regularly. Avoid fried foods.
Fever	Drink plenty of fluids. Eat energy and nutrient dense foods.
Flatulence	Avoid gas-forming foods, such as beans, cabbage, broccoli, and cauliflower.
High blood cholesterol	Eat a low fat diet and limit intake of foods rich in cholesterol and saturated eat. Eat fruits and vegetables daily. Exercise regularly according to capacity.
High triglycerides	Limit sweets and excessive carbohydrate and saturated fat intake. Eat fruits, vegetables, and whole grains daily. Avoid alcohol and smoking. Exercise

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	regularly according to capacity.
Nausea or vomiting	Eat small quantities of food at frequent intervals. Drink after meals and limit intake of fluids with meals. Avoid having an empty stomach. Avoid lying down immediately after eating. Eat lightly salty and dry foods to calm the stomach. Rest between meals.

(Source: Castleman, Seumo-Fosso and Cogill, 2004)

1.4 HIV and co-infections and the role of nutrition

When the immune system of a person living with HIV is weakened, they are more susceptible to opportunistic infections, such as tuberculosis, pneumonia, chronic diarrhoea and oral thrush. Vulnerability to infection is influenced by the nutritional status of an individual. It therefore becomes critical to support good nutrition in people living with HIV.

The role of nutrition in tuberculosis (TB):

Nutrition plays an important role in the aetiology, complications and therapy of tuberculosis.¹⁰ The combined burden and effect of TB and HIV co-infection is notable. In the context of TB and HIV, attention should be focused on specific symptoms, such as weight loss, diarrhoea, loss of appetite, nausea, as well as micronutrient deficiencies known to commonly occur among TB and HIV-infected individuals, and to cause adverse impacts in the short and longer-term. Factors that affect food intake, such as food availability, appetite, eating patterns, medication side effects, traditional food taboos, lifestyles (e.g. smoking, alcohol consumption, physical activity, caffeine intake, use of social drugs), psychological factors (e.g. stress and depression), stigma and economic factors are also very important to consider.

Drug-nutrient interactions:

Isoniazid is one of the most frequently used drugs to treat tuberculosis. The drug may cause Vitamin B6 deficiency and therefore adults should take daily B6 supplements¹¹. Children are not routinely given vitamin B6, but if their blood levels are low or if they take large doses of isoniazid, they will also get vitamin B6 supplements. Table 5 highlights the potential side effects of TB drugs and the drug-nutrient interactions.

Table 5. TB drugs: Potential side effects and drug-nutrient interactions

Drug	Guidelines for use	Potential Side Effects	Potential drug-food and nutrient interactions	Nutrition management
Isoniazid	- Take on empty stomach, 30 minutes before or 2 hours after meal. - Increased requirements for pyridoxine, folate, niacin) and magnesium	- Hepatitis, constipation, anaemia, fatigue - May decrease absorption of pyridoxine, calcium, vitamin D	May react with bananas, beer, pickled fish, yeast and yoghurt	Bananas, beer, pickled fish, yeast and yoghurt should be avoided

¹⁰ Gauss, H. 1936. Nutrition and tuberculosis. *Chest*, 2: 20-24.

(<http://www.chestjournal.org/content/2/7/20.full.pdf>)

¹¹ Consult national nutrition guidelines for supplements dosages.

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Rifampin	• Take on empty stomach, 30 minutes before or 2 hours after meal. • Supplement with 10mg vitamin B6 daily. • Not to be taken with alcohol	• GI irritation, anaemia, jaundice, pancreatitis	• Altered taste • Anorexia • May interfere with folate and vitamin B12	
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(Source: NICUS., 2000)

2. Nutrition and the household

HIV has an impact on household nutrition. When an adult becomes sick, the household faces increased spending for health care, decreased ability to carry out work and higher demand on time for care. The household may find itself without cash reserves and may become indebted and forced to sell livestock and other productive resources¹².

2.1 *Impacts of HIV and AIDS on household nutritional status*

Food consumption generally decreases in HIV-affected households. This is due to both a lack of food and the time and the means to prepare meals, particularly in situations where the mother dies. A study in Tanzania found that that “per capita food consumption decreased 15 percent in the poorest households when an adult died”, while in Uganda “food insecurity and malnutrition were foremost among the immediate problems faced by female-headed AIDS-affected households”¹³.

Households affected by HIV also face nutrition vulnerabilities as availability of, and access to, food declines. Also, as demand for care increases, households may be forced to reallocate labour from food preparation to patient care. Households facing labour shortages may replace valuable and nutritious crops that are labour-intensive with root crops that require less labour input and mature quickly. In addition as households face income shortages, they may not be able to purchase nutritious food. Household members therefore consume mainly starchy foods. High levels of malnutrition among children, especially orphans, likely stem from these changes in crops grown.¹⁴

Households facing income shortages may sell livestock to generate cash to meet medical expenses and to compensate for labour shortages. Some animals are slaughtered for food consumption, while others may die because of poor management and neglect. The sale and death of animals subsequently leads to declines in draught power, manure for fertilizer and milk. These factors negatively impact household food consumption and nutrition status.

¹² Egal, F. and Valstar, A. 1999. HIV/AIDS and nutrition: helping families and communities to cope. In J.L. Albert, ed. Food, nutrition and agriculture, pp. 20-26. Rome, FAO.
(<ftp://ftp.fao.org/docrep/fao/X4390t/X4390t04.pdf>)

¹³ FAO. 2001. *The impact of HIV/AIDS on food security*. Committee on World Food Security, Twenty-seventh Session. Rome. (<http://www.fao.org/docrep/meeting/003/y0310e.htm>)

¹⁴ Barnett, T. and Rugalema, G. 2001. HIV/AIDS – A critical health and development issue. In P. Pinstrup-Andersen and R. Pandya-Lorch, eds. *The unfinished agenda perspectives on overcoming hunger, poverty, and environmental degradation*. Washington, International Food Policy Research Institute.
(<http://www.ifpri.org/sites/default/files/publications/ufa.pdf>)

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Evidence from eastern and southern Africa reveals that households affected by HIV and AIDS not only eat fewer meals and consume nutrient-poor foods, but also tend to invest less in the health of surviving members.¹⁵ This can have knock-on-effects in terms of household livelihood and food insecurity and can drive some household members to engage in transactional sex to secure income and food, thus creating further vulnerability to HIV.

2.2 Improving the quality of household foods to enhance nutrition

Most staple foods are low in energy and important nutrients, and they generally need to be processed to make them digestible and to improve the absorption of nutrients. This is particularly relevant for people living with HIV due to their additional nutrient requirements and since HIV may affect food digestion and absorption. It is therefore important for HIV-affected households to get the most nutrients possible from the food they eat. For example, processing foods can improve the absorption of nutrients and can make it easier for food intake.¹⁶

Several steps can be taken to improve the quality of food:¹⁷

1. Enrich foods by adding other foods that are high in energy and nutrients (proteins and micronutrients):
 - High energy – e.g. oils, butter, margarine, ghee, sugar
 - High protein – e.g. groundnut paste, milk, milk powder, eggs
2. Add germinated and sprouted seeds to local foods to improve nutrient availability and digestibility:
 - Germinated and sprouted foods are easily digested and absorbed and help the body digest and absorb other foods.
 - Cereals such as maize, sorghum and millet can be germinated, dried and milled into flour which can be used to prepare porridge.
 - Legumes such as beans, cowpeas, chickpeas and green peas can be sprouted and prepared as vegetables to eat with other foods.
3. Use fermented foods:
 - Fermentation helps digestion and absorption.
 - If eaten with other foods, fermented foods help the body digest and absorb those foods.
 - Fermented foods include sour milk, yoghurt, sour porridge and sour water.
4. Use fortified foods:
 - Some cereal flour, cooking oils and margarine are fortified with nutrients.
 - Supplementary foods such as corn-soy-blend are fortified with vitamins and minerals.

¹⁵ de Waal, A. and Tumushabe, J. 2003. HIV/AIDS and food security in Africa, a report for DfID. (http://www.sarpn.org/documents/d0000235/P227_AIDS_Food_Security.pdf)

¹⁶ Some symptoms related to HIV (e.g. mouth sores, thrush, altered taste, nausea and vomiting) or side effects of ARVs require modifying foods to make it easier for PLHIV to chew and swallow them. Also, some patients may be too sick to eat solid foods.

¹⁷ Extracted from: Regional Centre for Quality of Health Care. 2008. Nutrition care for people living with HIV and AIDS: training manual for community and home-based care providers facilitators guide and participant handouts. Kampala. (http://www.fantaproject.org/downloads/pdfs/CHHNHM_FacilitatorsGuide_2008.pdf)

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5. Preserve nutrients during cooking:
 - Steaming vegetables, fish, potatoes, bananas, etc., helps preserve nutrients in the food and is cheaper than boiling or frying.
 - Wash vegetables and cut using a sharp knife. After cutting, cook immediately in very little water (or steam) and add a little oil. Eat immediately after cooking.
6. Improve taste and flavour to manage altered tastes or increase appetite:
 - Sprout, ferment or roast food to improve the taste.
 - Add avocado or lemon to improve flavour.
7. Use spices:
 - Add spices to food or drinks to increase appetite.
 - Some spices (e.g. ginger, garlic, cinnamon, cardamom, turmeric and onions) can help digestion.
 - Use hot pepper sparingly, as it may irritate the stomach.
8. Change the texture of food for people who are sick:
 - Mashing or pureeing food makes it easier to chew, swallow and digest.
 - Pounding meat before preparation makes it soft and easy to eat.
9. Reduce cooking time and fuel:
 - Soak beans overnight.
 - Hull cereals such as dry maize.
 - Ferment foods.

2.3 Food safety and hygiene

As part of good nutrition, it is important that the food people eat and the water they drink is safe from harmful germs. Food and water can be contaminated with harmful bacteria, viruses, fungi (called germs) and sometimes chemicals like pesticides. Food poisoning and infection can range from mild to severe bouts and in some cases can even be fatal. Contaminated food can harm the body and cause infection that can be severe in PLHIV. Agriculture extension workers and other actors working on nutrition should be provided with updated information agricultural practises that ensure production of safe food, including on improving hygiene in food processing and conservation.

Because HIV affects the immune system and the body's resistance to disease, people living with HIV are more vulnerable to infections and therefore have to be more careful with the food they eat and the water they drink, since any illness (including those caused by food and water) could further weaken their immune system. They have to strictly observe food and water safety and hygienic practices since unhygienic preparation, handling and storage of food and water can lead to contamination and infection¹⁸. Table 6 summarizes important considerations for good hygiene and safer food, while table 7 highlights some indications of poor quality food.

¹⁸ FAO and WHO, 2002.

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Table 6. Considerations for food safety and hygiene

Faeces disposal	PLHIV and other household members should dispose of faeces safely – using a toilet or latrine is the best way. Latrines and toilets need to be cleaned frequently. Latrines should be kept covered and toilets should be flushed. All household members should wash their hands thoroughly with soap and water or ash and water after contact with faecal matter, particularly before touching food and before feeding children. Local governments and NGOs should help communities build sanitary latrines by giving advice on the design and construction of low-cost latrines.
Use safe water	PLHIV should be advised to only use water that is derived from a safe source or water that is purified. Water containers need to be kept covered to keep the water clean. An adequate supply of clean water and knowledge of how to keep it free of germs reduces the chance of germs and therefore reduces illnesses. If water is not clean it can be purified by boiling or filtering. Clean water sources include properly constructed and maintained piped systems, tube-wells, protected dug wells and springs. Water from unsafe sources (such as ponds, rivers, open tanks and step-wells) can be made safer by boiling. Water should be stored in a covered container and care must be taken during collection and storage to prevent contamination to keep it free from contamination.
Personal hygiene	PLHIV and other household members should always wash their hands with clean water and soap or ashes before, during and after preparing food or eating, and after visiting the toilet. People should: (1) use a clean cloth or towel to dry hands; (2) cover all wounds to prevent contamination of food during preparation and handling; (3) use safe clean water from protected sources (as discussed in the previous cell).
Hygiene in the kitchen	PLHIV and other household members should: (1) keep all food preparation surfaces clean; (2) use clean dishes and utensils to store, prepare, serve and eat food; (3) wash vegetables and fruit with clean running water; (4) cover food to prevent both flies and dust from contaminating the food; (5) keep rubbish in a covered bin (and empty it regularly) so as to reduce bad smells and flies, which can contaminate food with germs.
Cooking and storage of food	Germs multiply more quickly in warm food and therefore storing food in a refrigerator or cool place slows down their growth. Cooking on high heat can also kill most germs. PLHIV and other household members should be advised to eat food as soon as it is cooked. If there are leftovers, they should be covered and stored in containers away from insects, rodents and other animals. Fresh food should be stored in a cool place or refrigerator if available (see Box 3). Raw and cooked foods should not be stored together – containers should be used to avoid contact between them.
Animal foods	Meat and fish have to be cooked well (meat should have no red juices). Utensils and surfaces that have come in contact with animal products have to be washed with hot water and soap before preparing other foods. Meat and fish have to be kept separate from other foods. Eggs should be hard boiled. Do not eat soft-boiled eggs, raw eggs, cracked eggs or any foods containing raw eggs.

(Source: FAO and WHO, 2002; UNICEF *et al.*, 2002)

Table 7. Signs of poor-quality food

Cereals and other dry foods	• Contain insects and dirt • Looks or smells damp or mouldy • Bag is broken • Legumes are wrinkled • Flour is lumpy
Roots	• Soft, sprouting, bruised and damaged • Rotten spots
Meat, poultry and fish	• Bad smell or colour • Fish have dull eyes or loose scales • Uninspected meat, liver, etc. may contain dangerous parasites
Fresh milk	• Smells bad • Is (or has been) exposed to dirt and flies
Canned foods	• Can is swollen, rusty or damaged

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	• Food has leaked out • Food looks, smells or tastes bad • Any of these signs means the food may be very poisonous
➤ People should check “sell by” (and “use by”) dates on labels and should not to buy (or use) foods after this date.	

Box 3. Storage of fruits and vegetables in resource-constrained settings: Clay pot fridge

➤ This simple and hygienic device is used for keeping vegetables fresh.

Materials needed

- Clay pot
- Basin of water
- Cloth

Method

1. Wet the pot and the cloth.
2. Place the pot in the basin of water.
3. Put vegetables inside it and cover the pot with the wet cloth.
4. Place one corner of the cloth in the basin of water, so that water is continuously sucked into the cloth as it dries out. Vegetables can be kept for up to one week provided that clay pot fridge is kept under normal room temperature.

(Source: Food and Nutrition Council of Zimbabwe, FAO and UNICEF, 2007)

Households should take into consideration the following:

- Buy fresh foods, such as meat and fish. Look for signs of poor quality of food (Table 7). Poor-quality food has little nutritional value and poses the risk of causing food poisoning, hence increasing the risk of infection in people living with HIV.
- Wash all raw fruits and vegetables thoroughly with safe water before use.
- Dry cereals and legumes thoroughly and store them in dry place to avoid mould from growing. Mouldy cereals and legumes contain “aflatoxin” that can make people seriously ill.
- Be aware that food may also be contaminated from the point of production.
- Avoid tasting any food that may be spoiled.
- Some foods are poor value for money because they contain few nutrients – e.g. sodas (bottled fizzy drinks), ice lollies and sweets, which are mainly sugar. These foods should be kept as treats, and not eaten regularly.

3. Building the capacity of communities and households

Nutritional support for people living with HIV should be provided in a holistic manner that strengthens all three of the main preconditions of good nutrition – food security, health and environmental services and care. Various sectors, such as agriculture, health and education, have important roles to play in promoting good nutrition. Improving nutrition and food security for people living with HIV is a major aspect of the comparative advantage that organizations working in the agriculture sector have in responding to AIDS.

3.1 Role of the agriculture sector

Countries with high HIV prevalence can face challenges in ensuring adequate nutrition among the population. This is due to supplementary nutritional requirements of people living with HIV, coupled with reduced numbers of people fully active in agriculture, and hence diminished production. In other words, this can result in a reduced agricultural labour force facing difficulties meeting the increased food requirements. Nutrition policies and programmes need to address this issue further, while looking at the specific situation in countries.

The agriculture sector is in a strong position to assist in both the prevention of HIV and in mitigating impacts of the epidemic. Moreover, it has a responsibility to those who depend on agriculture for subsistence. The sector should continue to encourage and strengthen the use of appropriate labour-saving technologies (e.g. low-input agriculture, lighter ploughs and tools that can be used by older children, women and the elderly). Further areas of intervention can include the promotion of improved seed varieties that require less labour for weeding, intercropping and minimal tillage. These types of interventions promote food production and thus enhance household nutrition. Particular attention must also be paid to improving the nutrition of those living with HIV.

- Support training and awareness at community level: Training and awareness raising at community level should also involve home-based care givers, particularly those providing nutritional care and support for people living with HIV. Capacity to effectively manage food and nutrition implications of HIV is essential in ensuring the success of care and support initiatives for PLHIV in resource-limited settings. Therefore, there is need to build the capacity of service providers and groups (including home based care givers) at community level on nutritional care and support. FAO and WHO are working in this area in several countries in Southern Africa.
- Raise awareness on HIV and nutrition linkages and promote nutritional care for PLHIV: FAO and WHO have produced "Living well with HIV/AIDS: A manual on nutritional care and support for people living with HIV/AIDS"¹⁹. This manual provides home care agents and local service providers with practical recommendations for a healthy and well balanced diet for people living with HIV, emphasizing local solutions and home-based care and support. FAO and Ministry of Agriculture staff should work together to develop information communication materials to enhance people's knowledge on the nutritional needs of different age groups and to disseminate information on nutrition and HIV using appropriate channels (e.g. leaflets, posters and rural radio).
- Strengthen community-based initiatives to support HIV-affected households: It is important to conduct gender-sensitive training for extension staff and health and nutrition personnel on promoting food and nutrition for PLHIV. Possible strategies could include: home and community gardens; use of improved crop management and plant varieties; use of small ruminants for consumption, sale and manure; and nutrition education. In addition, special strategies must ensure that basic agricultural skills are transmitted to orphans and that local knowledge, including biodiversity and gender-specific skills are preserved.

¹⁹ FAO and WHO, 2002.

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Ensuring food and livelihood security can reduce the need for widows and orphans to engage risky behaviours (e.g. commercial sex) to acquire food.

- Promote equitable access to land and resources: Effort must be made to reduce sex-based differences in access to and control of resources and livelihood assets – in particular, access to land, credit, employment, education and information.

All of these strategies require the agriculture sector to be more creative and responsive in the delivery of services and necessitates multi-sector partnerships. The subsequent sections look at some examples of what the agriculture sector can do in response to nutritional concerns, in particular in the context of HIV.

3.2 Advocate for strengthening the role of nutrition in HIV care, treatment and impact mitigation

Major actors in the agriculture sector, including FAO, ministries of agriculture, agricultural institutions and related agencies need to promote awareness of the role of nutrition in responding to HIV. For example in Zimbabwe, the Agriculture Sector Strategy on HIV and AIDS puts forth strengthening the role of nutrition as a key priority area.²⁰ The Tanzania Agriculture strategy for HIV and AIDS and other related chronic diseases also prioritizes the need to improve food and nutrition security²¹. The inclusion of nutrition concerns in agriculture strategies on HIV is essential in the response to the epidemic. This emphasis also provides a starting point for advocating for the importance of food and nutrition security in AIDS responses within the agriculture sector.

3.3 Increase access to micronutrient-rich foods

The agriculture sector should promote the production and consumption of diversified diets with particular attention to special nutritional requirements for people living with HIV. This can be facilitated through continued support in the setting up and running of home, school and community nutrition gardens²². Fish farming and small livestock raising should also be encouraged. Evidence suggests that such interventions are effective in increasing micronutrient intake and status, in particular when coupled with effective behavioural change and communication interventions. “In northeast Thailand, for example, production of green leafy vegetables in home gardens – combined with social marketing – increased vitamin consumption among the poor.”²³

There is a need for appropriately-designed strategies in order to ensure that interventions are successful and sustainability. Strategies should also address the possible risk of trade-offs between income gains from selling home-produced products and dietary gains from consumption. On a larger scale, a recent agricultural approach to micronutrient malnutrition is

²⁰ Zimbabwe Ministry of Agriculture. 2006. Zimbabwe Agricultural Sector Strategy on HIV and AIDS. Harare, Zimbabwe Ministry of Agriculture and FAO.

²¹ United Republic of Tanzania. 2006. Agriculture Sector Strategy for HIV/AIDS and Other Related Chronic Diseases. Dar es Salaam, Ministry of Agriculture, Food Security and Cooperatives and FAO.

²² This is discussed further in Section 4.

²³ Hawkes, C. and Ruel, M.T. 2006. Agriculture and nutrition linkages: old lessons and new paradigms. In C. Hawkes and M.T. Ruel, eds. *Understanding the links between agriculture and health*, brief 4. Washington, IFPRI. (<http://www.ifpri.org/2020/focus/focus13/focus13.pdf>)

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through the production of biofortified crops²⁴. “Biofortification complements other interventions and is a means to provide micronutrients to the most vulnerable people in a comparatively inexpensive and cost-effective way, using an agricultural intervention that is sustainable.”²⁵ In Mozambique, for example, a biofortification programme has begun to show some positive nutritional outcomes through the development and dissemination of vitamin A-rich, orange-fleshed sweet potatoes (see Annex 2 for more information about orange-fleshed sweet potatoes).²⁶

3.4 Empower women

It is widely acknowledged in agricultural development that women play a critical role in ensuring household nutrition, in particular providing nutrition to their children. Therefore, increased effort should be made to ensure the participation of women in agricultural development strategies while also recognizing the importance of facilitating women's continued involvement in household management and childcare. A successful intervention in Mozambique, for example, showed that support for production of orange-fleshed sweet potatoes among women increased consumption, while nutritional outcomes were greatly improved when accompanied by strategies to promote appropriate child feeding and caring practices²⁷.

A gender approach should be used, in which men are informed of the benefits of such interventions and strategies to themselves, their children and the entire household. Naturally, such an approach needs to be culturally sensitive. To begin with, emphasis can be placed on teaching children about the value and importance of food-related tasks. For example, the role of cooking in promoting health through better nutrition should be emphasized, in addition to the value of related knowledge and the importance of both boys and girls learning such skills. Such approaches and learning can be supported by schools and extension workers. In Junior Farm Field and Life Schools (JFFLS), both boys and girls learn the same things (e.g. about nutrition and medicinal plants) and carry out similar tasks, without a division of labour, and this is accepted by the communities.

4. Promoting home and school gardens

Home and school gardens are essential to improving the nutrition security of households (in particular those affected by HIV), and are a feasible response to nutrition challenges in communities. Home and school gardens should be part of a comprehensive nutrition strategy for people living with HIV in rural areas as they are a source of nutrition security and play an important role in supporting livelihoods of PLHIV and their households.

²⁴ The process of biofortification entails breeding micronutrients into staple crops.

²⁵ Bouisa, H.E. and Welch, R.M. 2010. Biofortification—A sustainable agricultural strategy for reducing micronutrient malnutrition in the global south. *Crop Science*, 50: S-20-S-32.
(http://crop.scijournals.org/cgi/content/full/50/Supplement_1/S-20)

²⁶ Low, J. Uaiene, R., Andrade, M.I. and Howard, J. 2000. *Orange-flesh sweet potato: promising partnerships for assuring the integration of nutritional concerns into agricultural research and extension*. Results from the Department of Policy Analysis, MARD-Directorate of Economics, No. 20E.
(<http://www.aec.msu.edu/fs2/mozambique/flash/flash20e.pdf>)

²⁷ Ibid.

4.1 Home gardens

Well-tended and structured home gardens do not only complement the protein-energy requirements of PLHIV, but can also provide them with the necessary antioxidants to boost their health and immune systems. Apart from providing health and nutrition for PLHIV, home gardens can serve as an excellent source of livelihood. With proper referrals and marketing practices, surplus produce could be sold, providing additional and much needed income. Home gardens help to address the difficulties faced by many PLHIVs in accessing affordable, locally available, nutritional foods. There are different types of small gardens (see Figure 3): kitchen gardens, sack gardens, tyre gardens, pot or wall container gardens, hanging gardens conventional double dug organic gardens, square foot gardens. These methods are low-cost and locally available and thus viable for households facing resource and labour constraints (see Box 4). Gardens are usually located at the back of the homestead. This allows one to tend to the garden easily during breaks in daily chores (e.g. caring for children, cooking, washing clothes and house cleaning).

Figure 3. Examples of small home gardens



(Source: FAO, 2009; Philips)

Box 4. HIV and homestead gardening: livelihoods recovery through agriculture programme (LRAP), Lesotho

In Lesotho, where adult HIV prevalence rates had reached 29% by the end of 2003, agricultural support is increasingly focused on HIV and AIDS-affected households with limited labour or capital, or both. LRAP is a joint project between the Ministry of Agriculture and Food Security and CARE that supports homestead vegetable production through the provision of inputs, extension and marketing support. Homestead vegetable production is less physically demanding than maize production in distant fields (which requires draught power). It also provides a wider range of foods for home consumption.

(Source: Slater and Wiggins, 2005)

Other benefits of home gardens include being able to recycle household waste into organic manure and they can serve as an income generating activity for PLHIV. By selling surplus production for income, PLHIV can help support their livelihoods. Income generated from home gardening can help households meet expenses so that they do not have to resort to selling household assets or engage in risky livelihood alternatives.

4.2 Challenges in implementing home gardens for PLHIV²⁸

There are several challenges encountered when implementing home garden projects for PLHIV. One key issue is the lack of sufficient land to grow enough vegetables to continuously meet household requirements. There is also the possibility of allergic reactions – especially by people taking anti-retroviral treatment – to the chemicals used in pesticides and fertilizers. A possible response to this is the promotion of organic farming techniques.

Potential difficulties may also relate to integrating home garden projects with livelihoods opportunities. People may require financial support to start up such endeavours, however, may face challenges in accessing government loans and other credit. Another concern is that growing vegetables for daily subsistence is a time-consuming activity and thus households facing labour shortages (e.g. related to HIV morbidity and mortality) may face difficulties. Finally, attention is required to ensure that households have access to water for irrigation and can access extension services and expertise on selecting appropriate vegetables, procuring quality seeds and using appropriate and effective gardening methods.

4.3 Labour-saving technologies, gardening methods and livestock practices

Labour-saving technologies are an important support for nutrition interventions for PLHIVs and their households in light of reduced labour availability stemming from HIV-related morbidity and mortality. The labour-intensive nature of rural livelihoods means that people spend a significant amount of time fetching water and firewood, preparing land, weeding and food processing, etc. In order to reduce the burden of labour shortages, the agriculture sector can promote technologies and practices that reduce or spread labour inputs, thus supporting HIV-affected households.²⁹ The following suggestions are useful for households facing reduced labour availability or capacity (e.g. with people living with HIV, or where children and the elderly must take on additional housework and agricultural tasks)³⁰:

1. Reducing the burden of work in the home:

- Fuel-efficient stoves – reduce the amount of fuel required;
- Woodlots, agro-forestry, trees and shrubs – plant on fallow land to improve access to fuel;
- Domestic roof water harvesting – improve water supplies for household consumption;
- Donkeys and carts – save time and energy transporting goods;
- Small-scale, simple food processing equipment, operating at either household or community level (e.g. village mills).

²⁸ This section is largely drawn from: Ghosh, G., Ganguly, E.M.R.R, Anuradha, T. N. and Nabeel, M. K. 2009. Query: 'home gardens as a source of nutrition to PLHIV – experiences; referrals. Solution exchange: food and nutrition security community – AIDS community. New Delhi, Knowledge Management Partnership Project of UN Country Team in India. (<http://www.solutionexchange-un.net.in/en/Food-Nutrition/Browse-Consolidated-Replies.html>)

²⁹ FAO. 2004. Labour saving technologies and practices for households. Rome.
(<ftp://ftp.fao.org/docrep/fao/007/ae502e/ae502e04.pdf>)

³⁰ Ibid.

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2. Reducing the burden of work in crop production:

- Light-weight high quality hand hoes – hoes should meet basic quality standards so that households do not waste money buying poor quality tools;
- Encourage and support local manufacturers and small artisans to meet local requirements in tool design;
- Planting basins and raised planting beds once formed they remain as permanent features, only requiring light work to replenish the mulch cover and minimal weeding.

3. Reducing time and energy required specifically for weeding:

- Weed at the right time – before weeds become established and damage the crops;
- Row planting and appropriate planting patterns – ease the task of weeding;
- Crop rotation – to break support for dominant weed species;
- Recommend seed varieties – some varieties are weed tolerant;
- Crop residues – left between the planting rows to cut sunlight and prevent weed seeds from germinating and developing;
- Mulch cover – place additional cover on the field to suppress weed growth (the additional labour required initially is offset by the reduced time spent weeding).

4. Switching to less burdensome cropping systems:

- Choose less labour-intensive crops – take care this does not compromise the nutritional value of the diet;
- Plant crops with different seasonal requirements;
- Plant high value crops on a small area – maximize the value of labour input;
- Opt for a low-cost irrigation system.

5. Reducing the burden of working with livestock:

- Tether or fence livestock, or cut and carry fodder – saves time herding animals;
- Choose less labour-intensive livestock – switch from cows to goats;
- Fodder – integrate food production with crops, on-farm conservation or agro forestry.

4.4 School Gardens³¹

One response to the impacts of HIV and AIDS on children is the promotion of garden-based learning in schools. These gardens seek to educate children about food production and natural resource management for good nutrition and improved life and livelihood prospects. Revival or re-orientation of school gardens for these purposes however faces conceptual, practical, and social challenges mainly with regard to the purpose of the school garden, its image, its links to good nutrition, agricultural approaches and resources, its relationship to the mainstream curriculum, and its perception in the community.

³¹ This section is largely extracted from: FAO. 2007. Garden-based learning for improved livelihoods and nutrition security of school children in high HIV-prevalence areas in southern Africa. Workshop Report, 12 – 14 June 2007. Harare, FAO Regional Emergency Coordination Office for Southern Africa.
(http://www.fao.org/fileadmin/templates/tc/tce/pdf/Regional_Gardens_Workshop_Report_Part_I.pdf)

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Potential of garden-based learning:

- Increase the relevance and quality of children's education by introducing them to food and nutrition-related knowledge and skills.
- Provide children with practical experience in food production and natural resource management.
- Introduce innovations and techniques that children can take home to their families and apply in their own household gardens and farms.
- Improve pupils' nutrition by supplementing school feeding programmes with fresh micronutrient and protein-rich products, and increasing children's nutrition knowledge and skills to the benefit of the whole family.
- By enhancing food and nutrition security and livelihood prospects, contribute to the mitigation of the health and social impacts of HIV and AIDS.

FAO guidelines on school gardens:

- Children are the primary direct beneficiaries;
- The main purpose of school gardens is learning for children;
- School gardens are not intended to provide commodities for school feeding;
- School gardens are not an exit strategy for school feeding;
- Schools use locally-adapted crops, including indigenous crops;
- Poultry and other small animals can be raised in school gardens;
- School gardens use organic gardening techniques;
- No dangerous chemicals should be used in school gardens.

In countries with high HIV prevalence and many orphans and other vulnerable children (OVCs), the agriculture, health and education sectors have the potential to provide nutritional support to infected or affected school children through agricultural activities. Two examples of how the agriculture sector can respond are highlighted in the following two sections: Junior farmer field and life schools and forming partnerships with other sectors.

4.5 Junior farmer field and life schools (JFFLS)³²

When parents fall sick and die due to HIV-related causes, their children may be marginalized and vital agricultural knowledge and life-skills may not be passed down. This can leave these children facing food and livelihood insecurity, both in the short and long term. In response to this issue, junior farmer field and life schools (JFFLS) were developed in several countries in eastern and southern Africa to improve children's agricultural and life skills for livelihood support and food security.³³ The JFFLS approach incorporates a range of creative and expressive activities appropriate to the local culture. It uses a participatory methodology to pass on agricultural knowledge and life skills to boys and girls between the ages of 12 and 18. The one-year learning programme follows the crop cycle and pays particular attention to linkages between agriculture, nutrition, gender equality and life-skills knowledge so that

³² This section is largely extracted from: FAO. *Junior Farmer Field and Life Schools*. Best Practices. Rome. (http://www.fao.org/bestpractices/content/11/11_04_en.htm); FAO. 2009. *Junior farmer field and life schools inventory*, by F. Dalla Valle. Rome. (<ftp://ftp.fao.org/docrep/fao/012/ak595e/ak595e00.pdf>)

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young participants learn to grow nutrient-rich crops while making informed decisions for leading healthy lives.

Nutrition education should include a range of information, including: how food is obtained, processed, prepared and eaten; how it is digested, absorbed and used by the body; and how it influences people's well-being. JFFLS teach children that food consists of different nutrients (e.g. carbohydrates, proteins, fats and micronutrients, including vitamins and minerals) and by the end of the first year children gain knowledge about how a good diet can help people living with HIV delay the progression of the virus, support drug treatments and prevent malnutrition. This includes introducing and examining locally available remedies, such as herbs and spices, that can be used to ease HIV-related symptoms.

Children participating in JFFLS also learn the importance of a nutritious and balanced diet for their growth, functioning, development and health. In this regard, they learn which crops are rich in energy and what key nutrients are important for good health. Given that the nutrient content of food depends on the processing, preservation and preparation methods used, the JFFLS curriculum may also include sessions in which boys and girls are directly involved in cooking, food processing and preservation.

4.6 Partnerships between agriculture and other sectors

AIDS responses should be mainstreamed across key sectors, including agriculture, health and education. Based on their own comparative advantage, these sectors should work in collaboration, maximizing synergies.

A good example of this is the World Bank, who is focusing on developing stronger links between education and other sectors (e.g. health) to mainstream HIV into new programmes. This promotion of sectoral collaboration involves making resources available for HIV in the sectors. Similarly, FAO has recently teamed up with UNICEF to begin projects in Malawi and Lesotho that aim to encourage orphans and other vulnerable children to attend school and receive a basic education, while benefiting from school feeding and other incentive programmes. These projects will also support children's needs for life skills and vocational training, particular as it relates to food, nutrition and agriculture. The two examples in box 5 illustrate partnerships between agriculture, education and health.

Box 5. Collaboration among agriculture, health and education sectors in Malawi and Lesotho

In Lesotho and Malawi, a project was implemented by FAO on protecting and improving food and nutrition security of orphans and HIV and AIDS affected children. The project had many positive impacts:

Improved education status of the orphaned and vulnerable children: UNICEF successfully assisted Ministry of Education and Training in developing and incorporating life-skills into the school curriculum. Teachers trained in life-skills education provided instructions in roof-water harvesting techniques, sewing, weaving, lamp-making from cow horns, and bottling of peaches to help in earning cash to purchase food. Ministry of Agriculture and food security extension agents assisted in training the students in keyhole gardening and planting of fruit trees with the aim of improving micronutrient intake of orphans and HIV and AIDS affected children. See Annex 4 for a description of keyhole gardens and their usefulness in HIV and AIDS-affected settings.

Improved access to health care and nutrition education for OVCs and HIV affected families: Through National AIDS Commission (NAC) staff and support groups, assistance in health care was provided to the terminally ill and OVCs and their families. In collaboration with NAC and the Ministry of Health,

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support groups were trained on home-based care and primary health care messages to extend to target communities. The project facilitated nutrition education training for support groups and other community members to complement the health education activities and to improve the understanding of the link between illness and nutrition. Because nutrition education in primary health care centers was virtually non-existent, project staff conducted training needs assessment for staff in project area clinics. Following the assessment, nutrition training workshops were conducted for nursing assistant students. These trainees were highly motivated and brainstormed numerous ways of including nutrition information into their sessions with clients.

(Source: FAO, 2008)

LEARNING REINFORCEMENT ACTIVITIES

Activity 1: Developing strategies on nutrition and HIV for national and international partners

Based on your personal knowledge and the knowledge that you have acquired from this module, sketch a multisectoral HIV programming initiative that incorporates effective food and nutrition interventions as a way of reducing vulnerability to HIV infection and increasing resilience to AIDS impacts. Tailor your initiative to specific contexts such as school feeding, home or communal gardens, cash transfers, income-generation activities and actions to increase agricultural production using labour-saving technologies and methods.

Include the following elements in your strategy outline:

- The sectors involved (in addition to agriculture).
- The organizations involved (or types of organizations to consider)
- The types of interventions and activities to be developed and implemented. For example:
 - Base-line surveys and needs assessments
 - Consultations among partners to agree on objectives and activities
 - Technical assistance, training and institutional capacity building.
- How the initiative could be funded and supported
- A monitoring and evaluation component. Identify nutrition indicators in HIV monitoring and evaluation activities, including links to the monitoring and evaluation of the national AIDS strategy.

Write down your answers on paper. If in a group, prepare a flip-chart page or PowerPoint presentation to present your observations to the group.

Activity 2: Policy dialogue

1. You have just finished presenting your country's policy brief on agriculture and AIDS and you have incorporated the role of nutrition in care and treatment of people living with HIV. The majority of people in the meeting seem to not agree with this suggestion. How will you convince them to agree with your proposal and the importance of nutrition in AIDS responses?
2. In your meeting with an organization working in the agriculture sector (e.g. the ministry of agriculture or another ministry, an international or national NGO) you discover that nutrition services are not part of their strategies on care and treatment of PLHIV. You are knowledgeable on various activities that the agriculture sector should do to support nutrition in AIDS responses. How will you explain this?
3. In conducting a survey, you find that health centres give clients ARVs without any nutrition information. You try to ask and they respond that "it is not important to know about nutrition information if you know your dose". What action will you take? How would highlight the importance of providing nutrition information?

SUMMARY REMARKS AND LESSONS LEARNED

This module comprises four main themes. The first theme, Nutrition and HIV, provided a basic understanding of the importance of good nutrition for people living with HIV, as well as the role of nutrition in HIV care, treatment and impact mitigation. It also details the nutrient requirements of people taking ARVs in addition to those who are not. Given that HIV interacts with other infectious diseases, nutritional needs in treating other illnesses (e.g. tuberculosis) are also provided.

The second theme, Nutrition and the Household, is designed to enhance the learner's understanding of the nutrition impacts of HIV on the household. Food and nutrition security are essential for all households, with particular needs for HIV-affected households. On the other hand, food and nutrition insecurity (as well as livelihood insecurity) could lead members of households to engage in behaviours that increase vulnerability to HIV infection. The section goes on to propose recipes for resource-strained households, and that require low labour inputs (ideal for households facing the negative impacts of HIV) in order to prepare safe and nutritious food. For example, certain easily-grown crops, like orange-fleshed sweet potatoes, can be grown in many environments, including urban gardening plots. Orange-fleshed sweet potatoes are very rich in Vitamin A and can be easily cultivated and cooked with little effort. This crop is therefore ideal for HIV-affected communities and households.

The third theme in the module addresses building the capacity of communities and households to ensure good nutrition, and the role of the agriculture sector in this regard. With adequate capacity, household- and community- level responses are essential to ensuring that the nutritional needs PLHIV are met. Important in this regard is the development of agriculture and HIV policies and strategies that take into account the role of nutrition.

Finally, the module looks at the role of home and school gardens in responding to nutrition challenges within and AIDS context. The section gives examples of simple and adaptable innovations, such as setting up of home gardens and school gardens, that can contribute to household food and nutrition security and that are appropriate for resource-poor settings. Such gardens are also suitable for HIV-affected households due to the low labour input required. The success of these interventions depends largely on close collaboration with agricultural extension workers, NGOs and other organizations working in rural areas. Furthermore, inter-sectoral partnerships are essential, such as those of health, education and agriculture.

Lessons learned

1. The role of nutrition in ART is poorly understood and inadequately addressed by many AIDS policies and programmes in developing countries.
2. The agriculture sector has a comparative advantage in supporting adequate nutrition at community and household levels through its ability to provide guidance and technical support on nutrition-rich crops and labour-saving technologies and cultivation methods appropriate for households affected by HIV.
3. The nutritional value of crops for home consumption must be balanced with the commercial value of crops.

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4. Including nutrition in AIDS responses requires an inter-sectoral approach, and thus partnerships should be fostered between the agriculture and other sectors, particularly between the health and education sectors. A proactive policy dialogue and joint programming is needed to build effective inter-sectoral partnerships on nutrition and HIV.

ACRONYMS AND ABBREVIATIONS

AIDS	Acquired immunodeficiency syndrome
AMPATH	Academic model for the prevention and treatment of HIV
ART	Antiretroviral therapy
ARV	Antiretroviral [medicines]
FAO	Food and Agriculture Organization of the United Nations
HAART	Highly active anti-retroviral therapy
HIV	Human immunodeficiency virus
JFFLS	Junior farmer field and life schools
NGO	Non-governmental organization
OVC	Orphans and other vulnerable children
PLHIV	People living with HIV
TB	Tuberculosis
WFP	World Food Programme

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ANNEX 1 – WHO disease classification³⁴

<i>Stage</i>	<i>Symptomatic or Asymptomatic</i>	<i>Characteristics</i>
Stage 1	Asymptomatic	• Persistent generalized swelling of the lymph nodes
Stage 2	Symptomatic	• Weight loss < 10 percent of body weight • Minor mucocutaneous manifestations such as seborrhoeic dermatitis, prurigo, fungal nail infections, recurrent oral ulcerations, angular cheilitis. • Herpes zoster within last five years • Recurrent upper respiratory tract infections such as bacterial sinusitis.
Stage 3	Symptomatic	• Bedridden for < 50 percent of the day during the last month AND • Weight loss > 10 percent of body weight • Unexplained chronic diarrhea > 1 month • Unexplained prolonged fever (intermittent or constant > 1 month. • Oral candidiasis (thrush) • Oral hairy leukoplakia • Pulmonary tuberculosis • Severe bacterial infections such as pneumonia or pyomyositis
Stage 4	Symptomatic	• Bedridden for > 50 percent of the day during the last month AND • HIV Wasting Syndrome • Candidiasis of the oesophagus, trachea, bronchi or lungs • Cryptococcus, extrapulmonary • Cryptosporidiosis with diarrhoea for > 1 month • Cytomegalovirus disease of an organ other than the liver, spleen or lymph nodes • Herpes simplex virus infection, mucocutaneous for > 1 month or visceral for any duration • HIV dementia (encephalopathy) • Kaposi's sarcoma • Lymphoma • Extrapulmonary tuberculosis • Atypical mycobacteriosis, disseminated or pulmonary • Any disseminated endemic mycosis • Pneumocystis carinii pneumonia • Progressive multifocal leukoencephalopathy • Salmonella septicaemia (non-typhoidal) • Toxoplasmosis of the brain

³⁴ Extracted from: WHO. 2006. WHO case definitions of HIV for surveillance and revised clinical staging and immunological classification of HIV-related disease in adults and children. Geneva, Switzerland.
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ANNEX 2 – Orange-fleshed sweet potatoes in nutrition and household food security³⁵

Since 1994, Mozambique has made considerable progress in reducing its dependence on imported basic foodstuffs, raising agricultural production while macro-economic conditions have improved impressively. However, the majority of the rural populace continues to be poor, depending principally on semi-subsistence agriculture to survive. The Nutrition Division of the Ministry of Health has played a strong role in promoting the integration of food security and nutritional concerns into national agendas. In July 1999, the government approved its Strategy for Combating Micronutrient Deficiencies, emphasizing both short- and longer-term approaches for reducing iodine, iron and vitamin A deficiencies. The orange-fleshed sweet potato, which is extremely rich in Vitamin A and is easy to grow in Mozambique, is part of this strategy. Mozambican women control the production and sale of sweet potatoes and in some areas, it serves a source of timely income which women use to pay for salt, sugar, medicines, and other basic household needs. For these reasons, orange-fleshed sweet potatoes can be an important tool in strengthening food security and nutrition in HIV and AIDS-affected households.

While sweet potatoes grown in Mozambique are playing an important role in assuring adequate caloric intake, most of the varieties currently growing in the country are white-fleshed. White-fleshed varieties lack beta carotene, the plant precursor of Vitamin A, an essential component of all human diets. Orange-fleshed varieties, on the other hand, are outstanding sources of beta -carotene. Regular intakes (100 grams per day or half-cup) of orange-fleshed sweet potato roots provide the recommended daily amount of vitamin A for children less than five years of age (400 µg Retinol Equivalents [RE]). Since two harvests per year of these early-maturing varieties is feasible in many areas of Mozambique, particularly in the central and northern provinces, widespread adoption will help reduce seasonal fluctuations in calorie availability particularly in isolated communities with limited market access. Market survey results indicate that orange fleshed sweet potato roots would be the cheapest dietary source of vitamin A in most parts of Mozambique.

The availability of orange-fleshed sweet potato within the household provides women with a productive, low cost source of pro-vitamin A as a base for preparing weaning foods of higher nutritional value. Improving vitamin A intake among older children and adults is much simpler, as most of the tested varieties are acceptable to consumers in terms of taste and appearance.

The common practice for root preparation is simply to boil or steam the roots. However, the vitamin A content of products such as bread, chapatis, and fried doughnuts was vastly enhanced through the replacement of just of the wheat flour ingredient in these products produced in Uganda and Kenya.

Providing women with access to improved sweet potato planting material reduces the amount of land and labour needed to produce sufficient household calories and consequently, helps reduce the labour burden of women. Labour-saving strategies are important in supporting food security in HIV and AIDS-affected households.

³⁵ Low, J. Uaiene, R., Andrade, M.I. and Howard, J. 2000. Orange-flesh sweet potato: promising partnerships for assuring the integration of nutritional concerns into agricultural research and extension. Results from the Department of Policy Analysis, MARD-Directorate of Economics, No. 20E.
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Targeting any sweet potato processed product development at women enhances their ability to improve diet quality within the home and obtain additional value-added income from selling vitamin A-enriched food products to consumers outside the home. Sweet potato sales are an important source of timely income for rural women. As large urban markets develop for the product, men are also likely to become more involved in larger-scale sweet potato production, as is the case in Western Kenya. Sweet potato is playing an ever increasing role as a commercial crop aimed at feeding the urban poor in countries such as Malawi, Kenya, and Uganda.

Implications for agricultural and nutrition policy in Mozambique: The careful integration of nutritional concerns into agricultural research and extension systems can significantly contribute to the reduction of child malnutrition and mortality and improve food security for all household members. This necessarily implies the establishment of strong collaborative arrangements between nutritionists and agronomists, researchers and extension agents, as well as finding secure funding over the medium term. As sweet potato is a vegetatively propagated crop, the private sector never will have great interest in developing and marketing improved sweet potato planting material. The public sector must lead efforts such as these on crops like sweet potato which typically benefit the poorest in society (especially women and children) by helping to assure their nutritional well-being. Moreover, the public sector needs to support the development of agro processing activities that utilize crops produced by the family sector to enhance rural incomes and reduce the labour burden associated with traditional agro-processing methods.

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ANNEX 3 – Recipes³⁶

Recipe	Ingredients	Method
Ugali (Stiff Porridge) 	• Maize Flower ½ kg • Water 850 ml for Ugali	1. Boil 850ml of water. 2. After boiling, then start adding maize flour while mingling fast. 3. Turn the flower and mix constantly until soft dough appears after 10 min. 4. Put the dough in the hot pot and serve immediately.
Sweet Potatoes 	• 6 Sweet potatoes -- washed • Cold water	1. Keep the potatoes whole or cut into 1-inch chunks. 2. Cover with water and boil 30-35 minutes until tender. 3. Carefully remove from water cut in half lengthwise or slip skin off using a knife.
Cassava 	• 1 sweet cassava tuber • Cold water • Salt	1. Peel cassava, wash and cut into cubes. 2. Place in a deep pot. Place enough water to cover. 3. Bring water to boil on the stove top. Place pieces in the water and boil until it is soft. 4. Test by sticking a fork through one of the pieces. It is ready if the fork passes through easily. Drain off water
Bean Stew 	• ¼ kg Dried beans • Coconut 1 medium size • Onions 2 • Tomatoes 2 • Salt 1 teaspoon level	1. Boil beans for 30 min or until they are tender; 2. Peel and chop tomatoes and onions. 3. Grate coconut. Make juice out of it by adding 1 cup of warm water to the grated coconut, squeeze well and sieve to obtain the first coconut juice, add again one cup of warm water to obtain the second coconut juice as you did when you do the first. 4. Fry onions, add tomatoes and salt and fry them for two minutes. Add boiled beans, mix them well. 5. Add the second coconut juice into the mixture; let it boil until tender for 5-10 min. 6. Then add the first coconut juice

³⁶ Taken from: Government of the Republic of Zambia. 2007. Improved complementary foods recipe booklet – family foods for breastfed children in Zambia. Rome, FAO. (<ftp://ftp.fao.org/docrep/fao/010/ai208e/ai208e.pdf>); Caribbean Food and Nutrition Institute. 2006. Common Caribbean foods and your health. *Cajanus*, 39(1): 2-57. (<http://www.paho.org/English/CFNI/cfni-caj39No106-art.pdf>).

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		and reduce heat, leave to boil for 5 minute then its ready.
Cow Pea Stew 	• 1 cup cow peas • Water • 1 onion, ground • Vegetable oil	1. Wash and boil cow peas till soft. 2. Fry onions, add tomatoes, and add salt. 3. Add boiled cowpeas. Add water to make stew.
Sautéed green vegetables	• Vegetable oil • 1 medium onion • 1 pinch of salt	1. Wash vegetables 2. Cut green vegetables and onions 3. Fry onion into golden brown, add salt and vegetable. 4. Cover it to sauté for not more than eight minutes.
Steamed Spinach 	• Spinach leaves • Water • Cooking materials • Pot, sieve or loose-waved threshing basket, wooden spoon, source of heat	1. Wash the spinach leaves, and tear them. 2. Place them in the sieve or loose-weaved threshing basket. 3. Place the sieve/basket over the rapidly boiling water and cover so that the steam cooks the leaves. <i>**Make sure sieve or basket do not touch the water. The spinach should be cooked in about five minutes.</i>

Cooking tips for vegetables

In order to prevent the loss of water soluble vitamins:

- Cook vegetables for less than 8 minutes
- Tear leaves into pieces rather than cutting them with a knife
- Do not use bicarbonate soda
- Use a small amount of water to steam vegetables rather than boiling them
- Cover the pan after adding the vegetables
- The less time you cook, the more nutrients you will preserve
- Eat vegetable immediately after preparation
- Prepare vegetables as the last meal

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ANNEX 4 – Keyhole gardens³⁷

NUTRITION and HIV/AIDS - Keyhole gardens in Lesotho -

PROJECT TITLE

"Protecting and Improving Food and Nutrition Security of Orphans and HIV/AIDS-affected Children (GCP/RAF/388/GER)"

INTERVENTION DOCUMENTED

Keyhole gardens

CONTEXT

The district of Mafeteng was selected for a pilot project carried out between November 2004 and May 2008 to support food and nutrition security and livelihoods of vulnerable HIV-affected communities, in particular orphans and vulnerable children (OVC). This initiative was supported under the umbrella of a wider project for southern Africa, and is in line with the National Policy for Food Security. The district is affected by recurrent droughts and high rates of HIV. According to the district situation analysis conducted in 2004, Mafeteng had the country's highest rate of orphans. A baseline study commissioned by the project highlighted high stunting rates and moderate underweight in children under the age of five, particularly in resource-poor households that host OVC. The main problems identified included poor dietary diversity, lack of awareness of nutritional needs and inadequate food safety. In addition, households that look after OVC were less likely to have developed vegetable gardens.

TARGET POPULATION

OVC; rural food-insecure, HIV affected communities; district and local institutions

STAKEHOLDERS

The project focused on capacity building as well as intersectoral and interagency collaboration. The National Project Steering Committee, responsible for policy guidance and support, was co-chaired by the Ministry of Agriculture and Food Security and the Ministry of Health and Social Welfare and included, among other members, the Ministry of Education and the National AIDS Commission. A Technical Working Group composed of FAO, WFP and UNICEF provided technical assistance to the Project Management Team. The District Child Protection Team, composed of professional and technical staff from relevant government departments and development partners oversaw, coordinated and monitored activities at district level. Community groups were involved from the planning process, through participatory approaches. This intervention on keyhole gardens and capacity building was implemented by the NGO, Send a Cow Lesotho.

THE INTERVENTION

Within the framework of the Mafeteng pilot experience, Send a Cow Lesotho implemented a variety of activities aimed at increasing homestead food production through bio-intensive agriculture, for more healthy diets. **Keyhole gardens** were the most effective intervention in this regard.

A keyhole garden (so-called because of its shape) is a round raised garden, supported with stones. Underneath, the first layer of soil has been dug out, levelled and covered with multiple layers of locally-made compost (manure, organic waste, scrap metal, wood ash, plant waste, yard sweepings, etc). A central basket made with sticks and filled with grass and leaves serves for irrigation purposes: water is poured in it, allowing for its dispersal through the whole enclosed garden. A small pathway leading to the central basket allows a person to easily work the garden without bending and the soil surface is sloped to allow runoff. Keyhole gardens are built in places where it is difficult to build normal gardens (rocky areas, shallow arid/or compacted soils, etc), near the entrance of dwellings to facilitate their watering with household waste water.

Keyhole gardens are made with low-cost locally available materials. Compared to regular vegetable gardens, keyhole gardens require less labour (ideal for elderly, children or sick persons), less water and no costly fertilizers or pesticides. A keyhole garden also has important comparative advantages: its structure ensures soil fertility for 5 to 7 years; it can produce food all year round even under harsh temperatures; it can support the production of at least 5 varieties of vegetables at a time - thus supporting dietary diversity; and it is so prolific that its produce is more than enough to feed a family of 8 persons.

Crop rotation and growing of insect-repellent plants are important to balance nutrient demands, fight insects and plant diseases, and deter weeds. The garden is divided into four parts allocated for leafy plants (except spinach), root crops and spinach, peas and beans (or other legumes) and the fourth section stays fallow, covered by a thick layer of manure and mulch. Crops should rotate in turn approximately every two months.

Household gardening interventions have been complemented with small livestock rearing, hygiene (tip-taps) and food processing (fuel saving stoves) interventions, to increase their positive impact on food and nutrition security of the recipient households and communities.



Keyhole gardens



Keyhole gardens' structure with the central basket for irrigation

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³⁷ FAO. 2009. Nutrition and HIV/AIDS – keyhole gardens in Lesotho. Rome.
(http://km.fao.org/AgriHealth/images/FSNL_Fact_sheet_Keyhole_gardens.pdf)

Building Capacity for the Agriculture Sector's Response to AIDS

Module 4: The Role of Nutrition in the AIDS Response

CAPACITY BUILDING

At community level:

Community groups (including teachers, priests, peer group farmers and others) and community management committees were trained on group dynamics, conflict resolution, meeting management, record-keeping and social skills, to enable communities to collaboratively undertake development activities. Community trainers received training on group dynamics and on bio-intensive, environment-friendly horticulture techniques such as:

- building and maintaining keyhole gardens;
- making liquid manure and natural pesticides from plant origin;
- saving waste water ("grey water") from household use for irrigation;
- protecting plants from excessive temperatures and hail stones (use of mulch and hail-nets);
- growing medicinal and insect-repellent plants.

Communities also benefited from nutrition education (sessions on nutrition for children, nutrition and HIV, etc) and from training on marketing of surplus production to increase household income.

At district and national level:

Relevant government and NGO staff benefited from capacity-building interventions that raised their awareness of nutrition issues and on the linkages between nutrition and HIV. The knowledge acquired enhanced their ability to plan and implement effective responses.

MATERIAL PRODUCED

The compiled *Training Modules for trainers* will be refined for distribution. They include relevant "how-to" training materials on organic gardening, group dynamics, livestock husbandry, dam-building, fuel saving stoves, tip-taps and marketing.

CHALLENGES AND...

- initial construction of keyhole gardens is labour-intensive;
- social and human factors are unpredictable and can determine the success or failure of an intervention;
- lack of communication and coordination with other projects in the same area of intervention can lead to tension;
- solutions must be explored to allow peer farmers to attend training sessions with the rest of the community and support the intervention without neglecting their own crops.

...OPPORTUNITIES

- productivity of keyhole gardens is high;
- maintenance of keyhole gardens is easy, low-cost requires few inputs and minimal labour;
- materials for keyhole gardens can be replaced by similar products obtainable locally;
- the intervention strengthens and creates social networks and capacities which contribute to the community's ability to deal with other development/social issues.

IMPACT ASSESSMENT

Qualitative impact assessments have highlighted that the promotion of vegetable gardens – in particular keyhole gardens - to improve access to a variety of food, even during the winter months, proved particularly successful. Participating households noted the increase in the availability of food, the wider diversity of their diet and the surplus in vegetables which they were able to sell to generate income. Implementing Partners noted that neighbouring villages outside the project intervention area were reproducing keyhole gardens on their own initiative, clearly indicating the success of the intervention and its potential sustainability.



Home-made tip-tap for hand washing



Fuel saving stoves



Beneficiaries cooking and consuming the food they have produced

UPSCALING/REPLICABILITY OF THE INTERVENTION

The experience described here can be successfully scaled-up/replicated under the following conditions:

- the intervention is carried out within an integrated policy and programme development framework at district, national (and sometimes regional) level rather than in isolation, to ensure that all stakeholders are involved and gain ownership, and that it is sustainable and coherent with other interventions;
- through participatory approaches, beneficiaries are involved in all stages of project activities: planning, implementation, monitoring and evaluation;
- the building of keyhole gardens is preceded by community group formation and capacity-building (basic management, conflict resolution, etc) to ensure effective participation, ownership and sustainability;
- the construction of keyhole gardens is implemented by the whole community to alleviate the burden on the elderly and the chronically ill;
- the development of keyhole gardens is accompanied by relevant training, in particular nutrition education;
- the selection of the most appropriate local varieties for cultivation in keyhole gardens is based on their nutrient content and potential for inclusion in diets;
- systematic retrieval of knowledge and experience of local populations is applied: nobody knows the constraints and opportunities of their environment better.

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ANNEX 5 – Glossary of key nutrition terms³⁸

Anti-retrovirals or (ARVs)	Drugs used for the HIV prophylaxis or treatments that aim to slow or stop the HIV virus from multiplying in the body. However, they are not a cure for HIV.
CD4+ count	A CD4 count is an indicator of the resilience of the immune system. It is particularly important in the case of HIV and AIDS, as the virus destroys the very immune system that is supposed to fight it. So, a higher CD4 count reflects a strong immune system and hence its ability to fight the virus. A person infected with HIV is given ARVs only when his or her CD4 count drops below 200.
DRI	Daily Recommended Intake (DRI) refers to the lowest continuing intake level of a nutrient that, for a specified indicator of adequacy, will maintain a defined level of nutriture in an individual. The term DRI is a collective term encompassing Estimated Average Requirement (EAR), the Recommended Dietary Allowance (RDA), the Adequate Intake (AI), and the Tolerable Upper Intake Level (UL).
Diet	The customary mix or pattern of the foods and drink taken by a person from day to day. The word means more than just a special diet or a weight-loss diet.
Digestion	The process of breaking down foods into forms our body can use. It begins when you put food in your mouth until when it gets into the stomach to the end of the intestine.
Dyspnea	Difficulty in breathing, often associated with lung or heart disease and resulting in shortness of breath. Also called <i>air hunger</i> .
Energy	Can mean the way a person feels, such as when he or she says, “I am full of energy” or “I have no energy.” The word energy is also used to describe the fuel for the body. All foods can provide energy (fuel) though some foods provide more energy than others.
Folate	(Vitamin B9, folic acid): One of the B vitamins that is a key factor in the making of nucleic acid (DNA and RNA).
Food-borne illness	Illnesses caused by eating contaminated food containing harmful pathogens or germs.
Good nutrition	A broad term often used by nutritionists to refer to diets that contain all essential nutrients in their correct proportions.
HAART	Highly active antiretroviral treatment is used in the treatment of infection by retroviruses, primarily HIV. When several antiretroviral drugs, typically three or four, are taken in combination, the approach is known as highly active antiretroviral therapy, or HAART.
Hepatotoxicity	Liver damage caused by chemicals.
HIV	Human immunodeficiency virus is one of a family of viruses known as retroviruses. HIV infects and destroys special white blood cells called CD4+ lymphocytes. These cells are an important part of the body's immune system, which is the body's defence against infection. HIV-infected means the person has been tested and the results show that the Human immunodeficiency virus is present in his or her body.
Ideal body weight	A term describing the weight that people are expected to weigh based on age, sex and height. A malnourished person would weigh less than his or her ideal body weight.
International units	Refers to an internationally accepted amount of a substance. This type of measure is

³⁸ WHO. 2009. Nutritional care and support for people living with HIV/AIDS: A training course. Geneva, Switzerland, WHO. (http://www.who.int/nutrition/publications/hivaids/PLWHIVcourse_Facilitators_Guide.pdf); Caribbean Food and Nutrition Institute. 2004. Healthy eating for better living: A manual on nutrition and HIV/AIDS for healthcare workers in the Caribbean. Cajanus, 38(1). (<http://www.paho.org/English/CFNI/cfni-caj38No105.pdf>)

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	used for the fat-soluble vitamins (such as vitamins A, D and E) and certain hormones, enzymes, and biologicals (such as vaccines).
Lipodystrophies	A heterogeneous group of disorders of the adipose tissue that are characterized by selective redistribution of body fat.
Malabsorption	Refers to failure of the gut to absorb one or more nutrients from the food eaten into the body. May occur if: • the gut wall is damaged • the food moves too quickly through the gut (as in diarrhoea) or • the body processes are not working adequately, for example if the digestion organs do not produce enough fluids to breakdown foods.
Malnutrition	Condition caused when the body gets too few or too many nutrients causing the body not to function properly. However of a person receiving too little food is more common referred to under nutrition.
Nutrients	Nourishing substances or components of food released during digestion and absorbed to be used to promote body functions. Nutrients may be divided into: • Macronutrients (protein, fats, carbohydrates) • Micronutrients (vitamins and minerals)
Nutrition supplements	Refers to any food or nutritional product that is provided to supplement or add to the daily diet.
Nutritional status	The extent to which the individual needs for nutrients are being met. Weight, height and other measures of growth are often used to indicate nutritional status. Clinical indicators, such as levels of nutrients in the blood, urine, bone as well as other areas, are more difficult to measure.
Paresthesia	A skin sensation, such as burning, prickling, itching, or tingling, with no apparent physical cause.
Pyridoxine	Pyridoxine (vitamin B6 group) functions as a coenzyme, a substance that enhances the action of an enzyme and thereby helps catalyze and speed a biochemical reaction.
Opportunistic infections	Refers to an infection that takes advantage of a weakened or absent immune response from immune-compromised individuals. Several microbes either do not cause disease or cause mild illnesses in healthy people, but can cause infections in people whose immune systems are weakened or absent due to disease or disorders. For example, HIV and AIDS patients (who are immune compromised) are prone to several opportunistic infections that are relatively harmless to healthy individuals.
Stomatitis	Inflammation of the mucous lining of any of the structures in the mouth, which may involve the cheeks, gums, tongue, lips, and roof or floor of the mouth.
Thrush	Also known as Candida, thrush is a fungal infection that can occur in the mouth or other moist areas of the body. White fuzzy patches may be seen on the tongue and insides of the cheeks. Thrush can result in a very sore mouth and make eating difficult. Certain treatments can reduce thrush infection.
Symptomatic	Refers to observable change in the body that indicates the presence of disease. Asymptomatic is the opposite: it means the symptoms of a condition are not present, even though the person has the disease.
Triglycerides	The major form of fat. A triglyceride consists of three molecules of fatty acid combined with a molecule of the alcohol glycerol. Triglycerides serve as the backbone of many types of lipids (fats). Triglycerides come from the food we eat as well as from being produced by the body.