

Nutrition in Jordan

Update and plan of Action

A Collaborative Project with the Ministry of Health and WHO



Nutrition in Jordan

Update and plan of Action

(1010)

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PREFACE

Food and nutrition policies are needed to improve diet, reduce non-communicable diseases, and ensure food safety. Thus, developing inter-sectoral food and nutrition policies to reduce the burden of food-related ill health is crucial. On the basis of current scientific evidence, national strategies can be formed that reduce levels of non-communicable diseases, protect the health of adults and children and develop the systems needed to deal with food and nutrition issues.

In 1992, the International Conference on Nutrition (ICN) was a historic eye opener to governments around the world on the issue of Food and Nutrition. Over 150 nations met to focus on food and nutrition issues. The ICN observed, while there has been an increase of awareness and efforts on human development, little effort has been exerted to establish nutrition security, and in promoting nutrition in underdeveloped and developing countries. The ICN stated that an important pre-condition for the development of societies is nutritional well-being. Moreover, progress in human development could never be achieved without including this issue as its key objective.

Thirteen years after the ICN, Jordan has taken important steps in the area of food and nutrition, particularly in relation to promoting food quality and safety, and in addressing the problems posed by micronutrient deficiencies. However, following a review of the food and nutrition programmes conducted in 2002 by the WHO Representative Office and the Ministries of Health and Agriculture, consensus was reached that an immediate situation analysis was needed and a comprehensive food and nutrition policy and action plan should be developed. This was the basis for including a project on food and nutrition policy in the collaborative programme between WHO and the Government of Jordan.

One of the first activities implemented was to hold a seminar for a group of national experts to examine and discuss the current status of national food and nutrition policies and programmes, as well as, the health status of Jordanians. This national seminar held, in May 2002, was organized by the World Health Organization in collaboration with the Ministries of Health and Agriculture. This activity was followed by extensive work to develop a situation analysis paper, which was subsequently subjected to discussion by a wide circle of national experts representing governmental and nongovernmental sectors in Jordan during the second national seminar held in January 2003. During this latter seminar, major issues and challenges in the area of nutrition were identified. Six working groups were formed with memberships representing the various ministries concerned, as well as, national experts in food and nutrition. Two more seminars were subsequently organized to discuss priorities and to identify policy objectives and strategic directions. These seminars were conducted in July 2003 and June 2005.

This report aims to document the outcome and conclusions of the project and presents an outline of the current nutrition situation in Jordan and the strategic directions of the national food and nutrition policy. It is divided into two parts. The first part outlines the current food and nutrition situation in Jordan in five main chapters: Chapter I is the country profile, Chapter II presents food and nutrition patterns, Chapter III outlines policies of food security, Chapter IV discusses malnutrition, breastfeeding and micronutrients deficiencies, and Chapter V discusses food safety.

The second part is divided into two main chapters: Chapter VI defines what food and nutrition policy is, and Chapter VII presents the proposed policy objectives and strategic directions.

We hope that the report will be the basis for the development of a multi-sectoral implementation plan.

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LIST OF ABBREVIATIONS AND ACRONYMS

AIDS	Autoimmune Deficiency Syndrome
ARI	Acute Respiratory Infection
ASEZA	Aqaba Special Economic Zone Area
ASYCUDA	Automated System for Custom Data
BCC	Behaviour Change Communication
BF	Breast Feeding
BFHI	Baby Friendly Hospital Initiative
BIPs	Border Inspection Posts
BMI	Body Mass Index
BSE	Bovine Spongiform Encephalopathy
CCA	Common Country Assessment
CDC	Centre for Disease Control
DES	Dietary Energy Supply
DHS	Demographic and Health Survey
DoS	Department of Statistics
DVFA	Danish Veterinary and Food Administration
EU	European Union
FAO	Food and Agriculture Organization
FBD	Food borne Disease
FDA	Food and Drug Administration
GDP	Gross Domestic Product
GNP	Gross National Product
GSHS	Global School-based Student Health Survey
HACCP	Hazard Analysis Critical Control Point
HDI	Human Development Index
HIES	Household Income and Expenditure Survey
HIV	Human Immunodeficiency Virus
HPI	Human Poverty Index

HPLC	High Performance Liquid Chromatography
ICN	International Conference on Nutrition
IDA	Iron Deficiency Anaemia
IDD	Iodine Deficiency Disorder
IDDNC	Iodine Deficiency Disorder-National Committee
IGT	Impaired Glucose Tolerance
ILO	International Labour Organization
IEC	Information Education and Communication
IMR	Infant Mortality Rate
IR	Incidence Rate
JAFS	Jordan Annual Fertility Survey
JISM	Jordan Institute for Standards and Metrology
JCR	Jordan Cancer Registry
JPFHS	Jordan Population and Family Health Survey
JFDA	Jordan Food and Drug Administration
JTI	Jordan Traffic Institute
KABP	Knowledge Attitude Behaviour and Practice
LDC	Less Developed Countries
MCH	Mother and Child Health Centres
MND	Micronutrient Deficiency
MoA	Ministry of Agriculture
MoE	Ministry of Education
M&E	Monitoring and Evaluation
MoH	Ministry of Health
MoS	Ministry of Supply
MoSD	Ministry of Social Development
Mt	Metric Tons
NCC	National Codex Committee
NCHS	National Centre for Health Statistics

NCD	Non Communicable Diseases
NCIDD	National Committee on Iodine Deficiency Disorders
NGO	Non Governmental Organization
NPITS	National Programme for the Iodization of Table Salt
NSCP	National Society for Consumer Protection
NSI	National Salt Iodization
PEM	Protein Energy Malnutrition
RSS	Royal Scientific Society
SRC	Serum Retinol Concentration
STC	Serum Tocopherol Concentration
TGR	Thyroid Growth Rate
UJ	University of Jordan
UNICEF	United Nations Children's Fund
USFDA	United States Food and Drug Administration
VA	Vitamin A
VAD	Vitamin A Deficiency
VCT	Voluntary Counselling and Testing
VPD	Vaccine Preventable Diseases
WHO	World Health Organization
WTO	World Trade Organization

PART I

FOOD AND NUTRITION IN JORDAN: AN OUTLINE OF THE CURRENT SITUATION

LIST OF CHAPTERS

Chapter I
Country Profile

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CHAPTER I: COUNTRY PROFILE

Introduction

The purpose of this chapter is to provide an overview of Jordan, to present available demographic, socioeconomic and health indicators, and to discuss the current health status of Jordanians.

Overview

Jordan is located between obliquely 29° - 30° North, and longitudinally 34° - 39° East with a surface area of about 89,318 km². The climate is hot and dry in summer, temperate and rainy in winter. The highest temperature reaches 38° ± 2° in summer and the lowest reaches 0° ± 2° in winter.¹

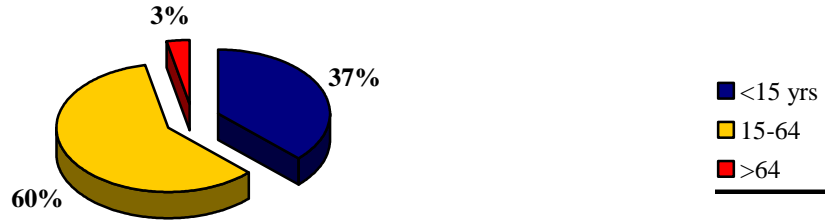
Jordan is divided into twelve governorates, and three natural and climatic areas: Jordan valley, mountain heights plateau, and the eastern desert (Badia region) about 70,000 km² of the total area. The cultivated area amounts to about 3.87 thousand donums, of which 83% is rain fed and 17% is irrigated. The cultivated surface area of fruit trees is 870 km² represents about 1% of the total surface area. The cultivated surface area of vegetables ranges between 453 – 458 km² (0.34% - 0.4% of the total surface area of the country).¹ (*Annex 1: Map of Jordan*).

The challenges facing agriculture in Jordan include limited land, water, and financing resources. The water supply is estimated at 700 – 1,100 million cubic meters per year. Jordan ranks as one of the world's ten most water stressed countries.^{2,3} The Jordan Valley and the highlands are the main production areas.⁴

Demographic, Socio-economic and Health Indicators

The population of Jordan was reported to be 5,850,000. According to estimates presented by the Department of Statistics (DoS), children below the age of 15 constitute 37.3% of the total population, while individuals between 15-64 years of age constitute 59.4% of the total population. The proportion of people over the age of 65 is 3.3% (*Figure 1.0*). Around 38.7% of the population lives in Amman Governorate.¹

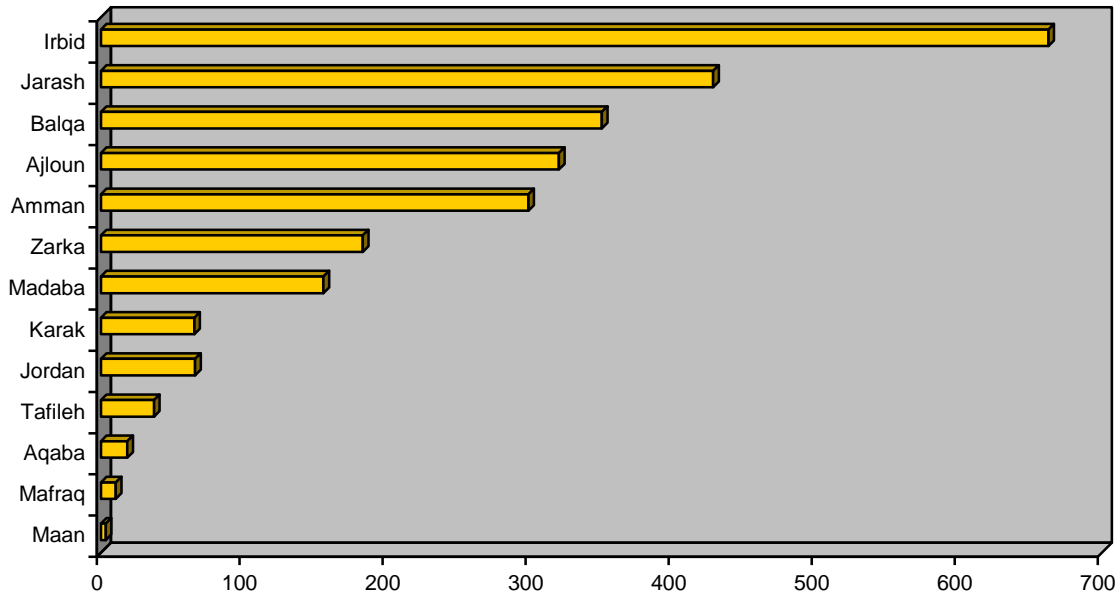
Figure 1.0: *Population age structure (%)*.



Source: *Department of Statistics, 2008.*

In Jordan, the population density ranges from 662.4 persons per km² in Irbid governorate in the north, to 3.4 persons per km² in Ma'an governorate in the south (*Figure 1.1*).

Figure 1.1: *Population Density per Governorate.*



Source: *Department of Statistics, 2008.*

Urban population forms about 82.6%. The rapid population growth had several implications and challenges for the country, namely in terms of food and water supply, housing and employment opportunities, increasing needs of educational system and the urban infrastructure. However, fertility declines in Jordan have contributed to slowing the population growth rate to 3.2% in the second half of the 1990's, and further to 2.6% in 2002 and 2.2% in 2008. In 2002, the average life expectancy of the Jordanian population was reported to be 71.5 years and 73.0 in 2008. In 2008 the adult literacy rate was 92.3% and the infant mortality rate (IMR) was 20.0 per 1,000 live births.^{5,6}

The per capita GDP in Jordanian Dinars (JD) is 2,573.9 in 2008 .⁷ The corresponding figure reported by DoS for 2002 was JD 1,248. According to the Human Development Report 2004, which used the 2002 figure for GDP per capita, the real GDP per capita rose from \$3,450 in 1997 to \$4,130 in 2002 representing 20% change over a period of five years.⁷ In 2008 the GDP growth rate in current Prices 24.9%

The per capita food per year in 2008 was 588 kg, the per capita energy per day in calories was 3.087, the per capita protein and fat per day in grams was 83.7, and 97.2 respectively. (DoS 2008)

There are several poverty estimates in Jordan. These estimates depend on the method of measurement and the general poverty line defined by the UN Common Country Assessment (CCA) Report as “the total cost of the basic consumption needs, food and non-food.”⁸ Various studies mentioned in the Jordan Human Development Report 2001 indicated that 21-31% of Jordanian households live in poverty, and 4% lived in severe poverty in 1999.* According to the Ministry of Social Development (MoSD), which adopts 313.5 JD per person per year as the poverty line **, 11.7% of the population were reported to be below the poverty line in 1997.⁶ Poverty is characterized by rural and urban differences, as well as, discrepancies within urban areas. Income poverty is generally higher in rural areas. A study published by the Government of Jordan and the World Bank entitled “Poverty Assessment in Jordan, 2004” indicated that the poverty prevalence had dropped down by one third during the last five years; from 21.3% in 1997 to 14.2% in 2002, and it had dropped down to 13% in 2006 in which MoSD adopts 556 JD per person per year as poverty line , while in 2008 this percentage raised to be 13.3% in which 680JD per persons per year was adopted to be as poverty line.⁹

In terms of poverty and gender, there seems to be no evidence to indicate that poverty affects females more adversely than males. However, female-headed households and households of poorly educated heads are particularly prone to low income and poverty.⁶

According to the United Nations human poverty index (HPI), Jordan has a rate of 9%. The HPI attempts to capture basic human development index (HDI), which includes measurements of a long and healthy life, knowledge, and decent standard of living.⁶ The 2002 CCA report of the Government of Jordan/United Nations System suggested that Jordan managed to convert its economic resources into human development very effectively. Jordan scored in life expectancy and education indices higher than in the gross domestic product index (GDPI). A similar favourable trend was also observed in relation to health indicators.⁸ Other selected demographic, health, economic and social indicators are shown in *Annex II: Tables 1 and 2*.

Health Status

Mortality trends

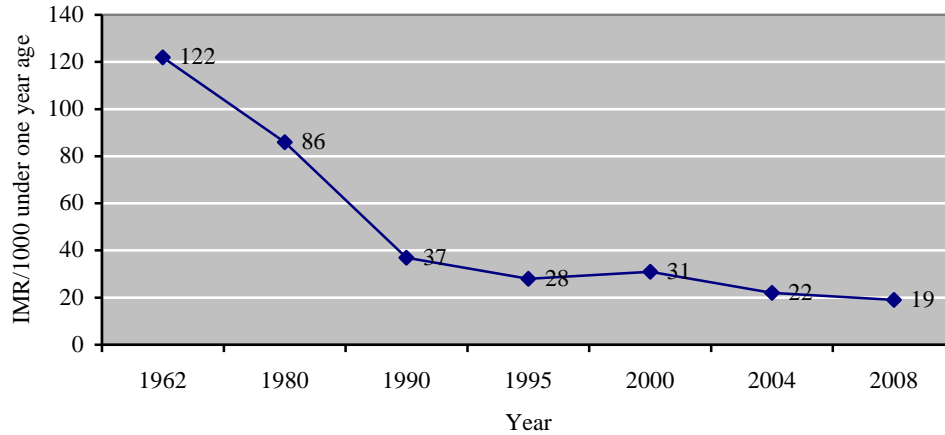
Major achievements have been made in the health field during the last few decades. The infant mortality rate (IMR) has fallen from 122 in 1960 to 22 deaths per 1000 live births in 2004 and was 19.0 deaths per 1000 live births in 2008.

* Severe poverty line: the minimum income needed to meet basic food needs for household members.

** World Bank's benchmark of JD 313.5 (annual per capita) as the poverty threshold.

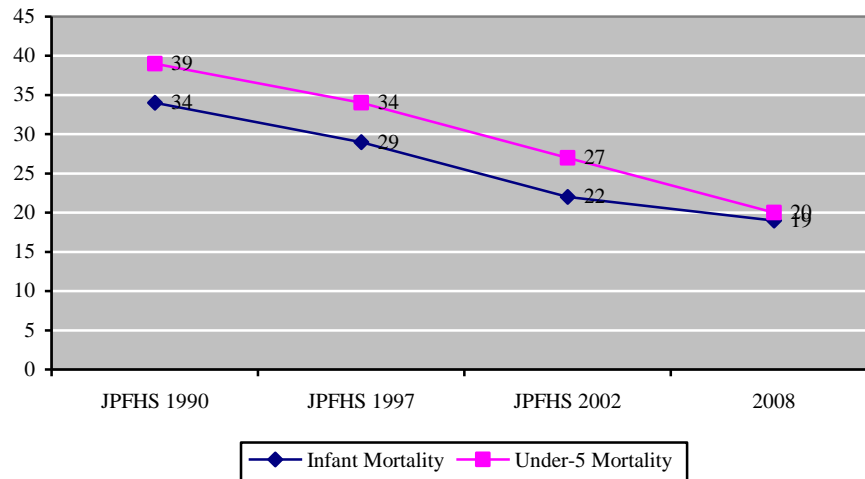
(Figures 1.2 and 1.3).¹⁰

Figure 1.2: *Decline in infant mortality rate in Jordan.*



Source: MoH 2004.

Figure 1.3: *Trends in mortality levels for both infants and under-five.*



Source: JPHS 1990, 1997, 2002, and DoS 2008

Neonatal mortality (16 per 1,000 live births) accounts for 70% of the overall infant mortality. Based on a prospective study, the causes of neonatal death include respiratory distress syndrome (40%), sepsis (14%), and asphyxia (12%).¹¹ According to the 2002 Jordan Population and Family Health Survey (JPFHS), the under-5 mortality is 27 per 1,000 live births.¹⁰ However, based on the Jordan Annual Fertility Survey (JAFS) estimate, the under-5 mortality was 40 per 1,000 live births and 20.0 per 1,000 live births in 2008 (DoS). Infant and under five mortality vary across regions. Infant mortality is slightly higher in the north (29 deaths per 1,000) than in the south (27 per 1,000) and central regions (22 per 1,000). There are gender and rural/urban variations in infant and child mortality. Children in urban areas have lower mortality than their counterparts in rural areas (27 and

36 deaths per 1,000 live births respectively). A similar pattern is found for neonatal mortality as well as post neonatal mortality.¹⁰ Based on JPFHS 2002, infant mortality is slightly higher among males than among females.

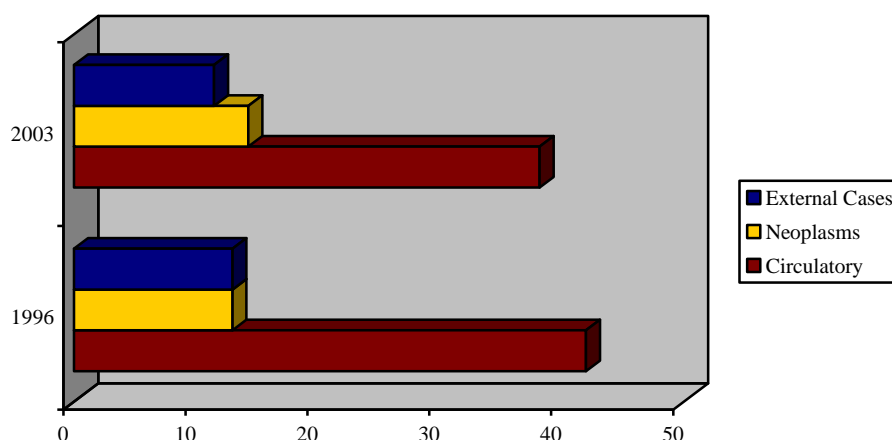
Generally, the impressive decline in IMR and child mortality which occurred over the last few decades is the result of focused maternal and child health activities, increased vaccination coverage rates, improvements in education, birth spacing, sanitation and access to clean water. Other factors contributing to the reduction in mortality rates include the increased use of oral rehydration therapy and better child nutrition.

Maternal mortality also decreased to approximately 40 per 100,000 live births in 1997.¹² There have been no recent studies done since then. According to the 1997 JPFHS, the leading causes of death were hypertensive disorders in pregnancy (19.6%), bleeding excluding abortion (15.7%), pulmonary embolism (13.7%) and sepsis (9.8%). During the same period, the use of antenatal care has expanded to cover 99% of pregnant women. Similarly, most births (98.3%) were attended by trained health personnel.¹⁰ (*See Annex II: Table 2*).

All deaths should be registered according to law in Jordan. However, registration is not universal and death certification by cause is not completely accurate. The estimated crude death rate is 7 per 1000 population.¹¹ Cardiovascular diseases, according to death certificates, accounted for an average of 42% of all deaths in 1996. Cancer is the second cause of death, reportedly responsible for 13% of total deaths while accidents came as the third cause responsible for 10.5% of total deaths.¹³ The Directorate of Disease Control in the Ministry of Health (MoH) has analysed a sample of 62,298 death certificates.¹⁴ Forty-five percent of all deaths occurred in the age group 65 years and over and about 25% in the age group 50-64 years. Deaths during the first year and 1-4 years constituted 6.8% and 3.9% respectively. Cardiovascular diseases were confirmed as the leading causes of death. Diabetes was found to be the cause of death in more than 5%.¹⁴ This obviously does not accurately reflect the diabetes burden in Jordan given that cardiovascular disease is the direct cause of death for most people with diabetes.

In 2001, MoH initiated a project to improve mortality statistics in collaboration with WHO and other partners. An updated registration system was established in 2003 at the information directorate of MoH. Analysis of death certificates for a period of 6 months in 2003 confirmed that the three leading causes of death were: circulatory system 38.2%, neoplasm's 14.3% and external causes 11.5%.¹⁵ As indicated above, external causes were responsible for almost 12% of all deaths. (*See Annex II: Tables 3 and 4*). As seen from *Figure 1.4* there is no significant difference in leading causes of death in Jordan between the findings of the 1996 survey and the newly established mortality register.

Figure 1.4: *Leading causes of death in Jordan 1996 -2003.*



Source: *1996 Mortality Survey and 2003 Register.*

Morbidity data

Morbidity data are concerned with the pattern and occurrence of disease. Most of the available data relate to notifiable communicable diseases. Although there is a general declining trend, certain infections may report an increase which is most probably due to improved reporting rather than an actual rise in the number of infections.

Communicable diseases

Although disease profile in Jordan is changing, infectious diseases remain on the list of major causes of morbidity. According to reports of the Disease Control Directorate in the Ministry of Health (MoH), diarrhoeal diseases, Acute Respiratory Infections (ARI), and hepatitis are still leading conditions reported from health facilities in Jordan. The list of reported communicable diseases includes forty diseases, of which one fourth are no longer reported in Jordan (e.g. cholera, typhus, yellow fever and plague).¹⁶ The other part of the list includes vaccine preventable diseases (VPDs) that are declining in terms of the number of reported cases and some infections which are oscillating in occurrence (e.g. bloody diarrhoea, meningitis and zoonotic diseases). The variations in the number of reported cases may be due to either improvement in the surveillance system, or involvement of private sector in reporting of these diseases.

The trend of VPDs has shown a remarkable decline in the last 20 years.¹⁶ The last polio epidemic occurred in Jordan in 1991/1992 during which 35 cases and 5 deaths were reported. This epidemic was followed in 1994 by zero cases for the last 10 years. Similarly, diphtheria has not been detected for the last 10 years. A very small number of pertussis and tetanus cases have been reported during the same period. Reasons for the remarkable decline in the number of VPDs include the high immunization rates among children, which are 97% for polio and DPT as well as improved surveillance.¹⁶

ARI are still one of the leading causes of morbidity among children under five. Reduction of ARI and prevention of complications require further improvement in health service delivery as well as more effective education of mothers on how to implement home care to affected children.¹⁶

The incidence of pulmonary tuberculosis is in continuous decline. With good surveillance and follow up of all cases and contacts, the incidence dropped from 7.3/100,000 in 1993 to 2.8/100,000 in 2004.¹⁷

Jordan has achieved the goal of malaria control since 1971. All malaria cases currently detected in Jordan are imported. An effective system of surveillance and monitoring is implemented, including screening of Jordanians and expatriates coming from infected countries, and vector control in certain areas.¹⁶

Jordan is considered among low prevalence countries for HIV/AIDS. The estimated prevalence is less than 0.02%.¹⁸ As of August 2005, the total cumulative number of all HIV/AIDS reported cases in Jordan was 405; of which less than one third were among Jordanians. Almost half of the Jordanian cases affect the age groups 35 years and over. More than three quarters of cases are in the age group of 25 years and over. About 80% of the cases affecting Jordanians are among men. More than 56.7% of all detected cases were due to sexual contacts and 19.1% as a result of blood transfusion.¹⁹ Among Jordanians, sexual contact is the reported mode of transmission in 46% of cases while blood and blood products are responsible for 36% of cases. The mode of transmission is unknown in 12% of cases.

Available data however relies heavily on passive case reporting which may overlook the true situation among vulnerable groups. There is consensus that existence of high risk groups and unprotected sexual contacts, as well as other vulnerability factors like behaviour change among young people and frequent travel, all increase the risk for spread of the epidemic.

Jordan's national response to HIV/AIDS is characterized by strong and significant political commitment. There is evidence of increased government and non-government inter-sectoral collaboration particularly in relation to the implementation of programmes. The National HIV/AIDS Strategy (NSP) 2005 – 2009 is currently being developed, outlining the main goal, objectives and strategies for a multi-sector response.

Current focus on the national response is on scaling up prevention on HIV/AIDS through the media, in the educational system and in other settings, in particular among young people, with increasing efforts being made to reach those most vulnerable to HIV/AIDS with adapted messages and approaches. Reaching vulnerable groups with information and services remains a daunting challenge. Some innovative activities, such as formative research among workers in tourism and sex workers, as well as outreach activities have recently been initiated. Centres for voluntary counselling and testing (VCT) have been established, and treatment and counselling is provided to people living with HIV. Currently, there are 35 people under treatment. Home-based care has been introduced, including counselling, but it requires strengthening and further support.

According to MoH Statistics for 2003, the incidence for notifiable food borne diseases (FBD) has been declining in recent years; for bloody diarrhoea it was 4.8 per 100,000, compared to 12.7 for the period 1998-2002; for typhoid and paratyphoid fever the incidence was 0.6 compared to 1.4 for the period 1998-2002; hepatitis A: 10.2 compared to 16.9 for the period 1998-2002; brucellosis: 14.5 compared to 4.1 for the Average I.R for the period 1998-2002.

A nationwide cross-sectional population survey was conducted using multistage cluster sampling design and face-to-face interviews during September 2003 and May 2004. The study showed that 8% of the Jordanian population had diarrhoea and 2% had fever in September 2003, and 6% had diarrhoea while 1% had fever in May 2004. About one in five persons with diarrhoea and one in two with fever sought medical care in September 2003. Two out of five persons with diarrhoea and four in five with fever sought medical advice in May 2004. The laboratory survey identified 1191 stool specimens tested; 10 (0.8%) yielded Shigella and four (0.3%) yielded Salmonella. Of 2951 blood specimens tested, 40 (1.4%) had a Brucella titre >160. None of the 2042 blood specimens tested yielded S. Typhi.

Chronic non-communicable diseases

Jordan, like other middle income countries, is witnessing an epidemiological transition, which is characterized by an increase of non-communicable diseases, particularly cardiovascular diseases, cancer, diabetes and chronic respiratory conditions.

The major cardiovascular diseases are hypertension, coronary heart disease and stroke. These health problems are now becoming the leading causes of mortality in Jordan with cardiovascular diseases and cancer alone responsible for more than half of all deaths.

Based on the Jordan morbidity survey of 1996, MoH reported a national prevalence rate of hypertension of 32% among those aged 25 years and above. According to the same survey of 1996, about 40% of those aged 40 years and above were hypertensive.^{11,14} Regarding the prevalence of risk factors of non communicable disease survey conducted in 2007 about 25.6% of those aged 18 years and above were hypertensive .

The Utilization of Health Services and Delivery Study showed that over 85% of people with hypertension were either overweight or obese. The same study revealed that 89% of the overall sample had uncontrolled hypertension. Furthermore, the study showed that only about 25% of the sample population were aware of the disease.²⁰ Using different diagnostic criteria with higher cut-off points (160/95), another study revealed a prevalence rate of 16.3% on a small sample of a Bedouin community of the same age groups.²¹ Using the same criteria, another community-based study conducted on three communities in different parts of Jordan showed similar prevalence with about one half of subjects with hypertension unaware of their hypertensive status before the survey.²² In a national survey on non-communicable disease risk factors conducted by MoH, in collaboration with WHO in 2004, hypertension was more prevalent among males (32%) than females (23%) in the age groups 55 years and over. Nearly half of the sample had a high blood pressure.²³ According to the the prevalence of risk factors of non communicable disease survey conducted in 2007 by MoH about 30.9% males and 21.5% females of those aged 18 years and above were hypertensive .

In conclusion, there is a clear indication that Jordan has at least the same high prevalence seen in other countries of the region; the differences in diagnostic cut-off points in the various studies can explain the discrepancy in prevalence figures. About one quarter of the adult population seem to suffer from high blood pressure.

As mentioned above, available data also indicate that only a small proportion (11%) of subjects with hypertension using MoH facilities were well managed and able to bring their blood pressure to therapeutically acceptable levels. The control of hypertension was best in the central region (13.8%)

and worst in the north (7.4%). Control was better in comprehensive health centres than primary health care centres.¹⁴

The Jordan Cancer Registry (JCR) is a population-based registry established in 1996 under the umbrella of MoH to provide data on cancer, define the size of the cancer problem and pattern of cancer occurrence. In 2002, JCR registered 4,187 cancer cases, of these 3,430 (82%) were among Jordanians and 757 (18%) were among non-Jordanians. The crude incidence rate of all cancers among Jordanians in 2002 was 64.4 per 100,000 (63.1 for males and 65.7 for females). The male to female ratio was 1.06:1. In 2002, 11.3% of all cancers occurred before the age of 20 and 40.3% occurred after the age of 60. The overall median age at diagnosis was 58 years with considerable variation depending on the type of cancer. The leading types of cancers among Jordanian males and females in 2002 were as follows: breast 513 cases (15% of total cases); colorectal 381 (11.1%); leukaemia including multiple myeloma 292 (7.5%); lymphoma 221 (6.7%); lung 214 (6.2%); brain and central nervous system 131 (3.8%); kidney and urinary bladder 80 (2.3%); stomach 153 (4.5%); prostate 143 (4.2%) and thyroid 136 (4%). Breast was the most frequent cancer site among females with 501 registered cases (30.1% of all cancer cases) while lung cancer was the leading type of cancer in males with 168 cases (9.5% of all cancers).²⁴ There are no accurate data on staging of cancer but hospital-based information on breast cancer suggests that the majority of cases are diagnosed in late stages.

In addition to cardiovascular diseases and cancer, other chronic diseases like diabetes represent major health problems. According to epidemiological surveys conducted over the last few years on samples of Jordanian population using fasting and two-hour blood glucose levels, diabetes affected more than 10% of adults.²⁵ A cross sectional study conducted in four Jordanian communities showed a prevalence of diabetes of 13.4% in population samples aged 25 years and over. Impaired glucose tolerance (IGT) was found in an additional 9.8% of the population bringing the total prevalence of glucose tolerance abnormalities to over 23%. In the 1996 National Morbidity Study, fasting blood glucose was used as a diagnostic tool. About 7% of the study population had levels above what was considered then as the cut-off levels, and an additional 10% were classified as suspected diabetes. In the 2004 national survey conducted by MoH, the prevalence of diabetes was 12%. According to the prevalence of risk factors of non communicable disease survey conducted in 2007 by MoH about 16% of those aged 18 years and above were diabetic . . Generally available evidence confirms the high prevalence of diabetes. At least 10% of the adult population have diabetes using criteria consistent with WHO recommendations.

Osteoporosis (a condition characterized by a decrease in bone mass and density, causing bones to become fragile) is yet another significant problem in Jordan. In a recent study conducted on 821 Jordanian postmenopausal women aged 50-89 years, the prevalence of osteoporosis was reported to be 33% in the spine (L1-L4) and 8% in the femur neck; overall the prevalence was 23% when all the different skeletal sites were combined.²⁶

Determinants and levels of risk factors for chronic non-communicable diseases are rising. Smoking is a major problem, with more than 49.6 % of adult men and 5.7% of women smoke regularly according to the prevalence of risk factors of non communicable disease survey conducted in 2007 by MoH .

What was more alarming is the outcome of two surveys conducted on school children in Jordan. The WHO/UNICEF survey conducted in 1999, in collaboration with MoH and Jordan Smoking

Control Association, now showed a prevalence of smoking of about 20% among school children, 13-15 years of age.²⁷ Another follow-up survey conducted, as part of the Jordan Global School-based Student Health Survey (GSHS), in 2004, showed that the percentage of school children aged 13-15 who smoke cigarettes was 13% and those who used other forms of tobacco constituted an additional 13% ,the prevalence of risk factors of non communicable disease survey in 2007 conducted by MoH revealed that 9.3% of school children who smoke cigarettes at aged 10-14 years, and 47.9% of them smoke cigarettes at age 15-18 years . . According to the 2004 behavioural risks survey, about 60% of smokers started to smoke before 18 years of age.²³ More than three quarters of students reported people smoking in their presence in the past.²⁸

Obesity seems to be emerging as a major problem. According to a study conducted in semi-urban communities in Jordan, obesity (defined as body mass index (BMI) ≥ 30) was found to affect about 60% of females and 33% of males aged 25 years and over.²⁹ More data on obesity were obtained from the 1996 Jordan Morbidity Survey which revealed a very high prevalence of overweight (BMI of 25 to 29.9) and obesity (BMI of 30 and over) of 68% in a sample of 2,435 subjects aged 25 years and over. Less than one third of the sample was considered of normal weight. More females were overweight compared to males (47.5% compared to 42.2%). The most recent figures on overweight and obesity have recently been reported by the 2004 MoH survey (unpublished data) on non-communicable risk factors among a sample of 3,334 individuals aged 18 years and over. The survey confirmed very high rates of overweight and obesity of more than 70% (65% of males and 72% of females). As indicated above, the high rates of overweight and obesity were associated with high prevalence of hypertension and diabetes. Obesity is also a problem among children and adolescents.

A different pattern is seen among children and adolescents. While obesity is common, under-nutrition remains a problem. Based on a recent study conducted among a sample of 3,849 Jordanian adolescents (10-17 years) in the greater Amman area, about 13% were overweight and an additional 8% were obese, using the BMI percentiles for gender and age. However, the same study revealed that underweight affects about 30% of the sample studied.³⁰

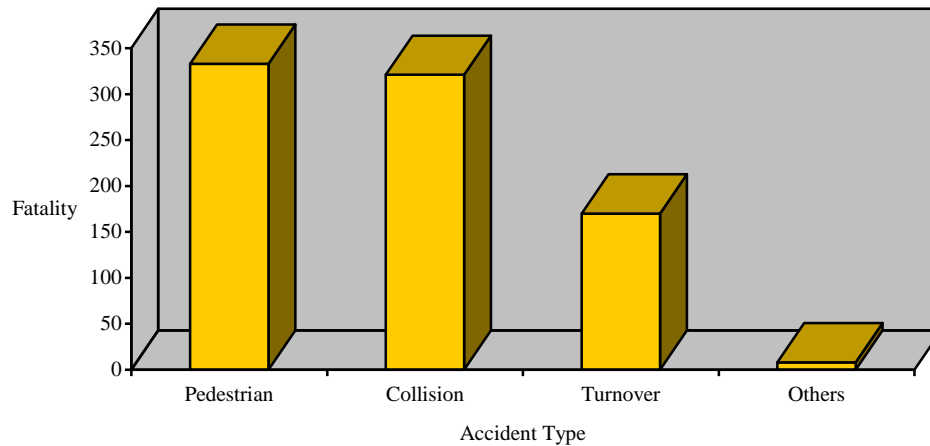
Data on hyperlipidemia are scarce. However, a community-based survey conducted on a population sample aged 25 years and over revealed high prevalence rates of hypercholesterolemia and hypertriglyceridemia of 23% and 23.8% respectively. The mean cholesterol level was reported to be 5.23 mmol/L and 5.44 mmol/L for men and women respectively. The mean triglyceride level, however, was 2.11 mmol/L for men and 1.82 mmol/L for women. Women, obese subjects, people with diabetes and hypertension were found to have a higher prevalence of hypercholesterolemia.³¹ The 2004 study on behavioural and biochemical risk factors and chronic disease suggested similar trends. The prevalence of risk factors of non communicable disease survey conducted in 2007 by MoH revealed high prevalence rates of hypercholesterolemia and hypertriglyceridemia of 36% and 48.8% respectively.

Physical activity constitutes another important chronic disease risk factor in Jordan. Levels of physical inactivity are high in Jordan. Behavioural risk factor data (unpublished) from a sample of working adults showed that a little over half of men and women were inactive.³² The 2004 Jordan GSHS surveyed 2,457 school students aged 13-15 years on physical activity. Results showed that 16% of students were physically active all 7 days of the week for a total of 60 minutes per day, and

41.3% spent 3 or more hours per day doing sedentary activities (watching TV, reading, playing computer games, etc...).²⁸

Accidents and injuries emerge as an increasingly significant problem. According to the Jordan Traffic Institute (JTI), the total number of traffic accidents reported in 2004 was 70,266 resulting in 16,727 injuries and 818 deaths. More than 80% of these accidents required ambulance services. The highest ratio of injuries were in age groups ranging between 15 and 30, constituting about 38% of the total number of injured people; the highest mortality rate was in age groups 50 years and over and age group 0-11 (22.2% and 21.4% respectively). Occupational accidents amounted to 112,859 causing an estimate of 97,522 work days lost for the year 2004. On the causes of fatal road traffic accidents in 2003, the highest number of death occurred among pedestrians (333 deaths) followed by collision (321 deaths)³³ as seen in *Figure 1.5*.

Figure 1.5: *Distribution of road traffic fatalities in Jordan 2003*



Source: *Jordan Traffic Institute*

In conclusion, demographic, socioeconomic and health indicators provide evidence to a major shift in morbidity and mortality trends in Jordan. Diet-related non-communicable diseases are increasing to an alarming magnitude, at the same time, certain communicable diseases, including food borne diseases, remain significant. Therefore, the national food and nutrition policy should place adequate emphasis on the prevention and control of diet-related non-communicable diseases and, at the same time, address the commonly encountered communicable diseases. The policy should aim at translating scientific evidence into meaningful messages for Jordanians to apply. Nutrition during pregnancy and early childhood can influence the development of chronic diseases in later life. Promoting healthy lifestyle throughout the entire life span (from prenatal care to old age) is crucial to the control and prevention of the leading causes of disease in Jordan.

CHAPTER II: FOOD AND NUTRITION PATTERNS (WHO)

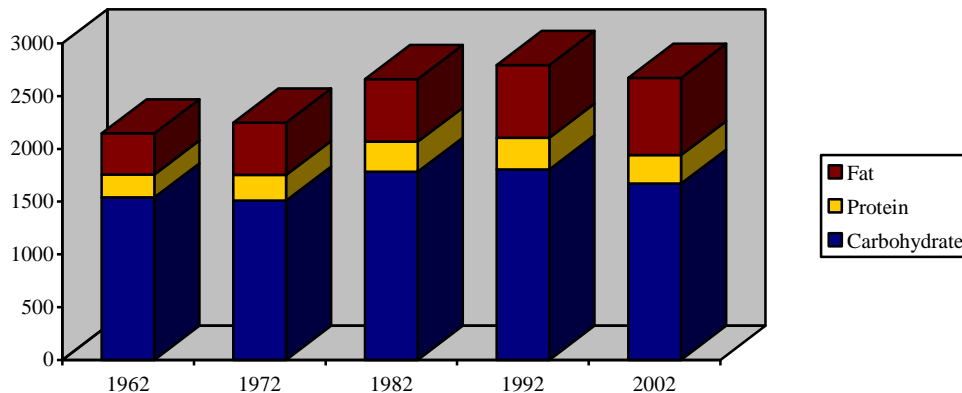
Introduction

The purpose of this chapter is to review food and nutrition trends, availability, energy and macronutrient supplies, major food imports and exports, and food expenditure in Jordan.

Trends in Energy and Macronutrient Supplies

Based on FAO statistics, the average daily per capita energy supply has increased by 25% during the period from 1962 to 2002. During this time frame, the carbohydrate share of the dietary energy supply (DES) decreased from 72% in 1962 to 62% in 2002. This decrease was, in turn, accompanied by an increase in the energy supply from fat (from 18% in 1962 to 27% in 2002).³⁴ and Additionally, the protein share in energy supply has been fluctuating around 10% of DES from 1962 to 2002, which is equivalent to the minimum daily protein supply covering 100% of the Dietary Reference Intakes for adults (formerly known as Recommended Dietary Allowances). *Figure 2.0* below shows the percentage energy supply from carbohydrates, protein and fat.³⁴

Figure 2.0: *Share of Proteins, Fats and Carbohydrates in DES 1962 - 2002*



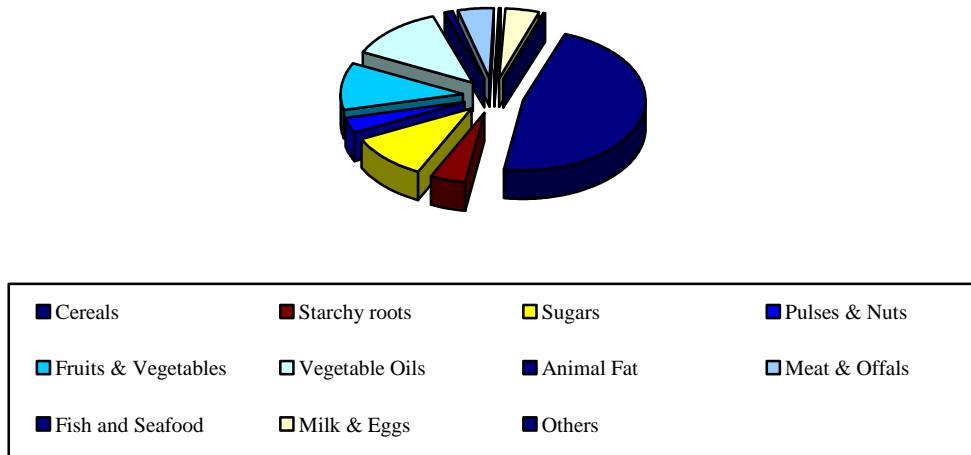
Source: *FAO Food Balance Sheets.*

The relatively high carbohydrate share in DES is characteristic of developing countries. However, the increasing fat share and decreasing carbohydrate share of DES, together with the increased proportion of urban population, reflect an increasing trend towards urbanization in the country, which in turn, may contribute to the increasing magnitude of non-communicable diseases.

According to *Figure 2.0*, there appeared to be an increasing trend in DES from 1962 to 1992. The trend seemed to level off and decreased in the following decade. However, throughout this time frame, there has been no significant change in the share of cereals in DES. Cereals comprised 1,505 kcal/capita/day, which is equivalent to 53% of the total energy intake. Other contributors to DES were vegetable oils, sugars, meat and offals, and milk and eggs contributing 14%, 12%, 5% and 5%

of the total DES, respectively. This, in turn, reflected the importance of sugar and animal products in the Jordanian diet. Sugar represented 12% of energy and 21% of carbohydrates. Animal products contributed at least 11%, while protein and fat supplies contributed 29% and 26% of DES, respectively.^{34,35,36} *Figure 2.1* shows the percentage DES from major food groups for the period 1998-2000.

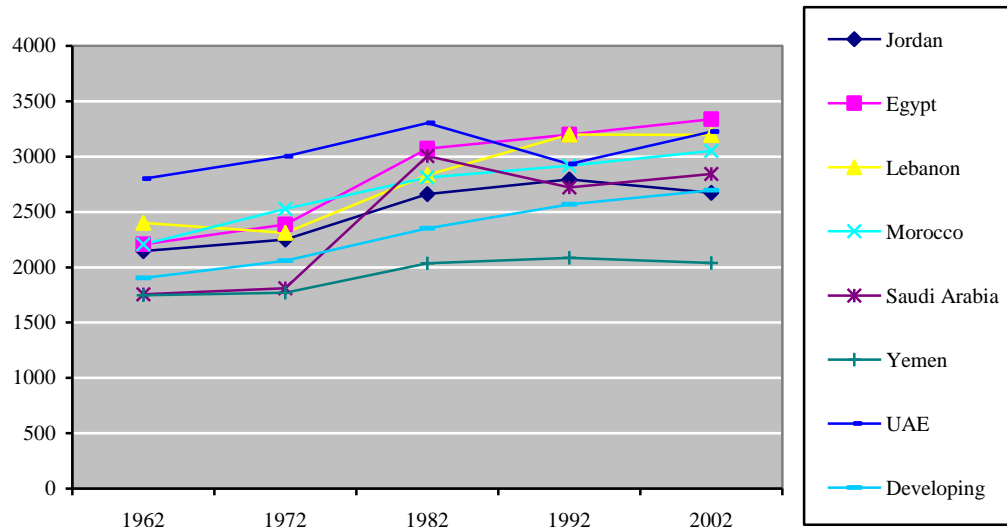
Figure 2.1: Major Food Groups (% of DES)
1998-2000



Source: *FAO Statistics, 2002.*

Review of trends in per capita supply of calories, protein and fat in Arab countries over the last four decades revealed patterns similar to those of Jordan. Based on the FAO Food Balance Sheets, the per capita supply of calories has increased in all countries. *Figure 2.2* shows the trends in Jordan, Egypt, Lebanon, Morocco, Saudi Arabia, Yemen, United Arab Emirates (UAE) and developing countries. In all of these countries, the baseline per capita supply of calories (1962) was higher than the average for developing countries except for Saudi Arabia and Yemen. After 1972, all countries except Yemen had a rising trend in the per capita supply of calories higher than the average for developing countries.³⁴

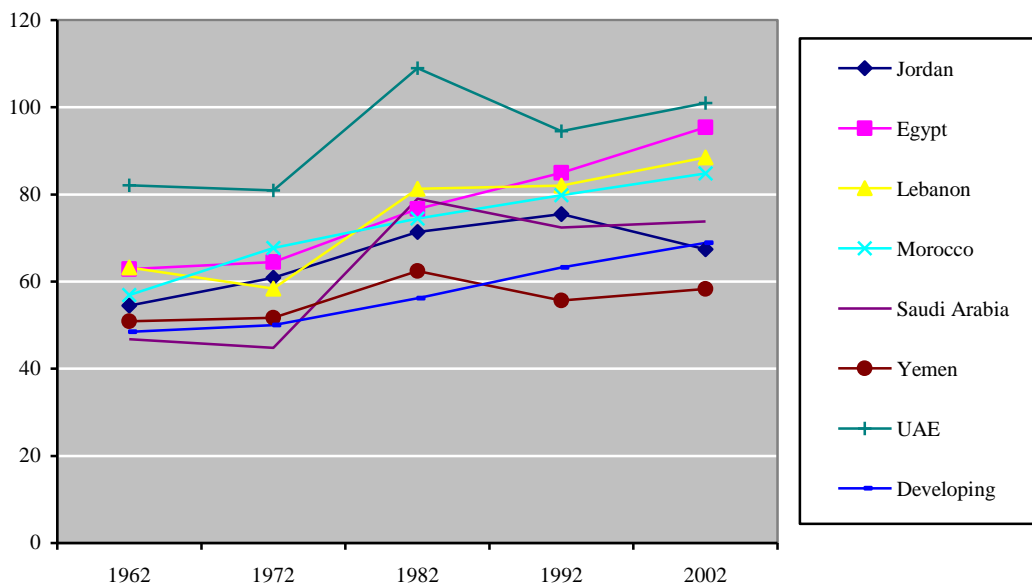
Figure 2.2: Trends in Per Capita Supply of Calories
1962-2002



Source: *FAO Food Balance Sheets.*

Figure 2.3 shows the trends in per capita supply of proteins (in grams) which again demonstrate similar features.

Figure 2.3: *Trends in Per Capita Supply of Proteins (g) 1962-2002*

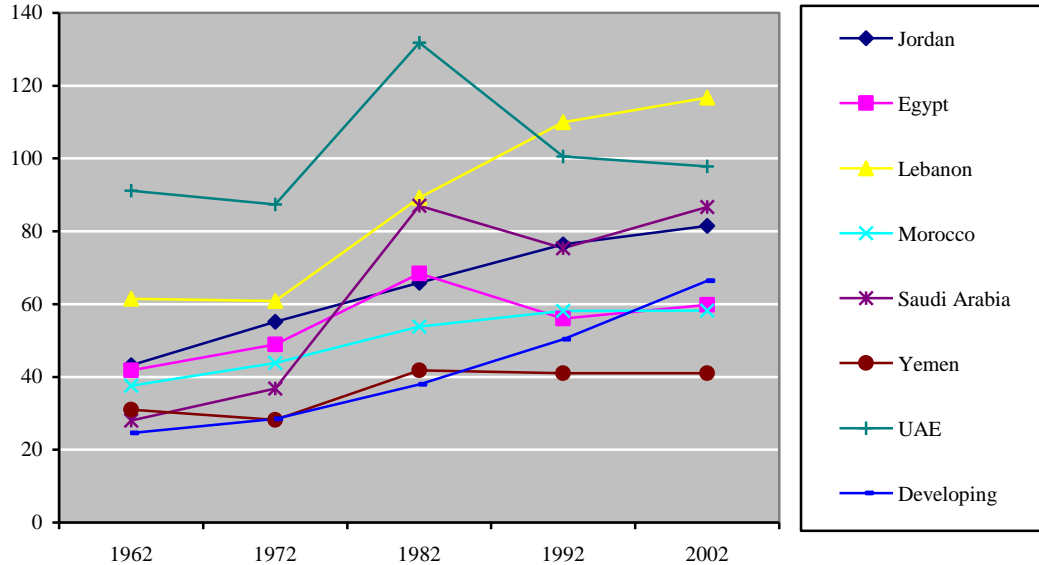


Source: *FAO Food Balance Sheets.*

Figure 2.4 shows the trends in per capita supply of fats which suggests that the increase in per capita supply of fats was common to all countries with Jordan occupying a middle position. The

overall increase in all countries has been fluctuating throughout the last four decades except for Jordan where the increase has been consistent.

Figure 2.4: *Trends in Per Capita Supply of Fats (g) 1962-2002*



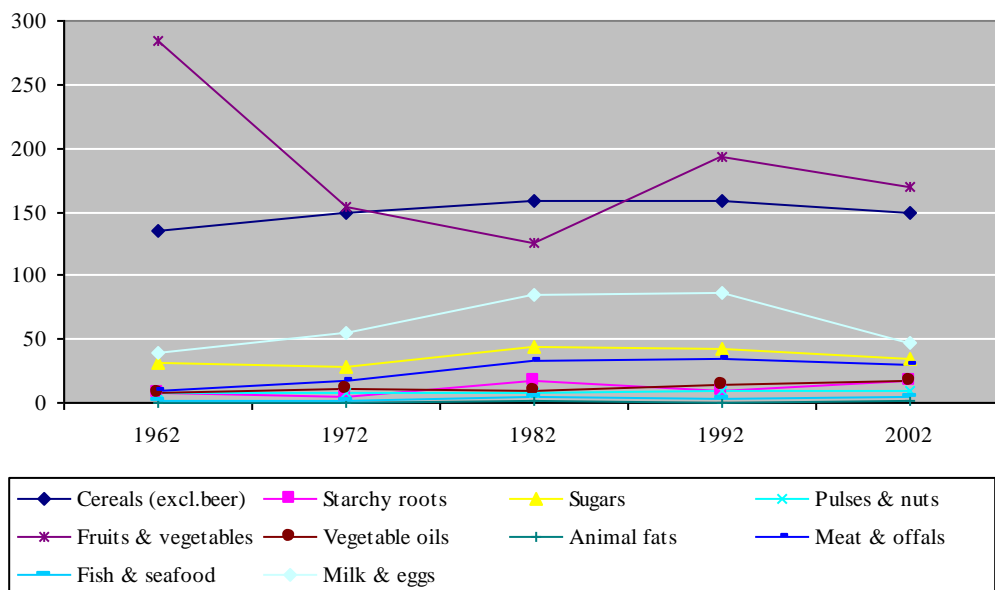
Source: *FAO Food Balance Sheets.*

Trends in Food Availability

The availability of food in Jordan depends on the amounts of food produced and imported, as well as, the amounts used for seeds, and amounts lost due to post harvest losses as provided by the FAO food balance sheets.³⁴ For instance, the main cereal used in Jordan is wheat of which only 4% is locally produced, so the availability of cereals is rather dependent on the amount imported. The second most important cereal in Jordan is rice, which is entirely imported.³⁴

Figure 2.5 shows the trends of food supply during the periods from 1962 to 2002. According to the figure, there was an increase in the supply of cereals (mainly wheat) from 135 to 149 kg/capita/year. Similarly, there was an increase in the supply of milk and eggs (from 39 to 47 kg/capita/year), in the supply of sugars (from 31 to 35 kg/capita/year), and in the supply of meat and offals (from 9 to 30 kg/capita/year). The increase in food supply was thought to be due to increased imports, coupled with liberalization of economy, and affluence of people, particularly during the period from 1972 to 1992. On the other hand, data suggest a net reduction in the availability of fruits and vegetables from 285 to 170 kg/capita/year.³⁴

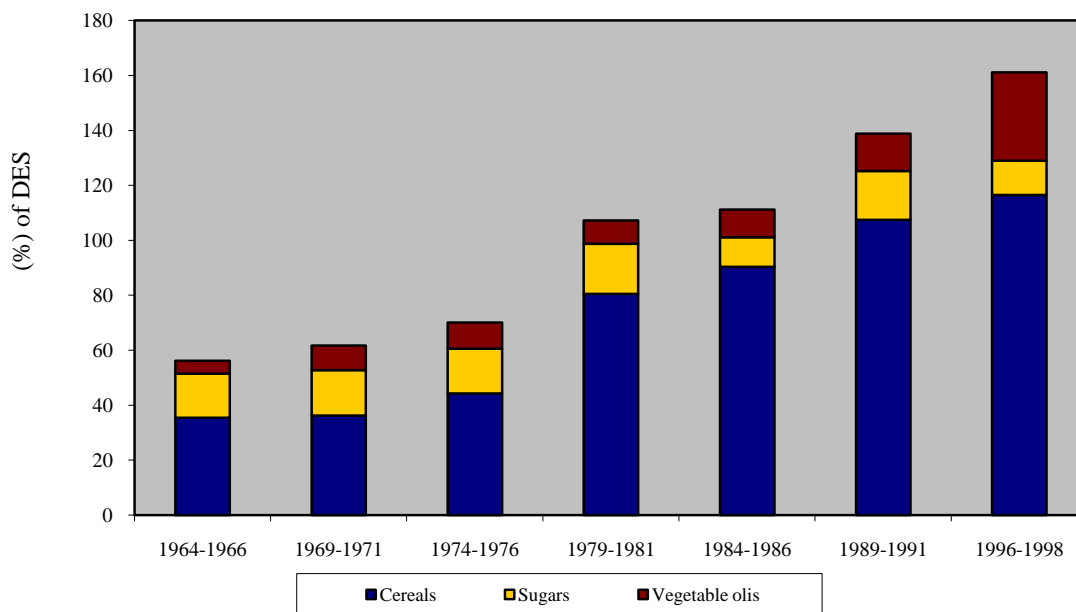
Figure 2.5: *Supplies of Major Food Groups (kg/capita/year) 1962-2002.*



Source: *FAO Food Balance Sheets.*

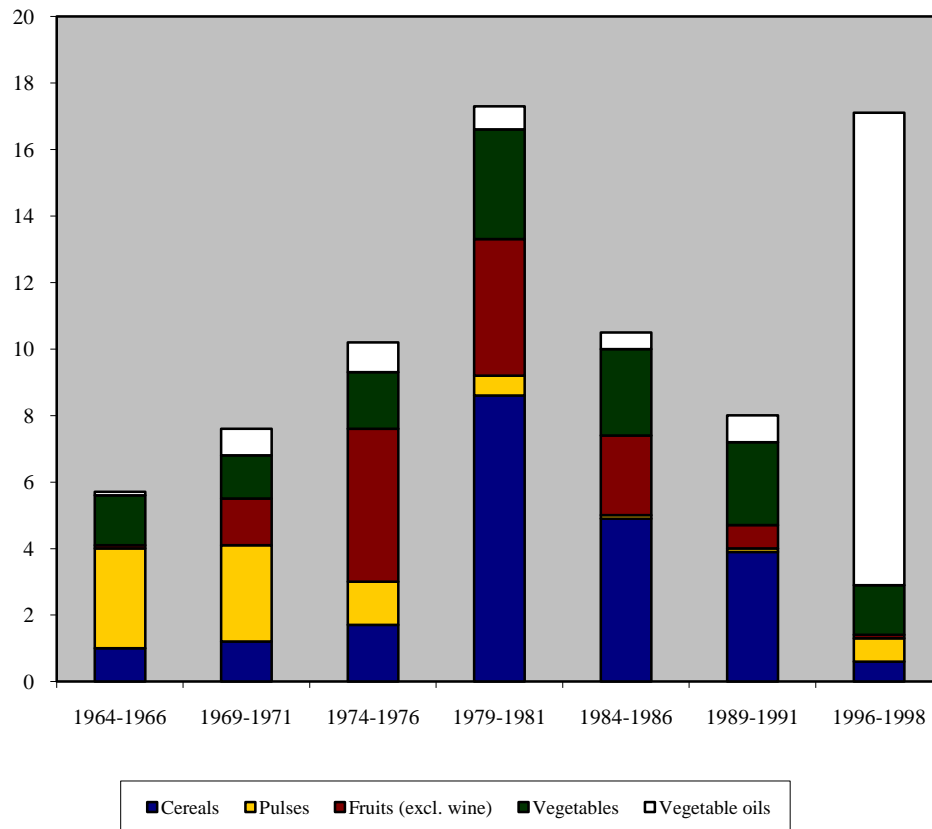
Most of the food consumed in Jordan is imported. There has been an increase in food exports between the years 1964-1966 and 1979-1981, mainly in vegetables, vegetable oils (including olive oil) and fruits (see *Figures 2.6 and 2.7*).³⁷

Figure 2.6: *Major Food Imports (% of DES).*



Source: *FAO Statistics, 2002.*

Figure 2.7: *Major Food Exports (% of DES)*



Source: *FAO Statistics, 2002.*

The National Strategy for Agricultural Development (NSAD), for the period 2002-2010, aimed at increasing olive oil production by 50% in 2010 through continuous quality improvement and cost reduction.³⁸ This is planned for by implementing strategies to encourage appropriate agricultural practices, improving olive oil processing and marketing, and limiting cultivation of olives to suitable agro-ecological environments. The increased production of olive oil is expected to increase exports and monetary value.

Food Consumption in Jordan

Food Expenditure

Data on household food expenditure and nutrient intake were derived from 1992, 1997, and 2002 Household Expenditures and Income surveys, conducted every five years by the Department of Statistics in Jordan. The household expenditure on foods and beverages slightly increased from 40% including tobacco and alcohols (37% without tobacco and alcohol) in 1992 to 44% including tobacco and alcohols (41% without tobacco and alcohol) in 1997.^{35,37}

In 2002, the average household expenditure on food for the entire country was 40%, but the value ranged from 28% (for the household member expenditure group receiving JD 2,000 and more per

year) to 44% (for the expenditure group receiving JD 300 to 400 per year).³⁷ Of the total food expenditure, household expenditure on cereals increased from 3% in 1992 to 6% in 1997, and 5% in 2002. Expenditures on dairy products slightly decreased from 4.6% in 1992 to 4% in 1997, but went up again to 4.5% in 2002.³⁷ In addition, the average household expenditure on meats and poultry was 9%, and the average expenditure on fruits and vegetables was 6% in 2002. It should be noted, however, that the lower the income levels of a household, the higher the proportion of its total expenditure on food, particularly cereals.

Consumption of Major Foods

Cereals, mainly wheat and rice, constituted the highest amount of food consumed, 210 kg/capita/year in 1997 and 218 kg/capita/year in 2002.³⁷ See *Annex II: Table 5*. Between 1992 and 1997, the intake of rice and bread has decreased by 1% probably due to the phasing out of bread price subsidies in 1996, and rice, sugar and powdered milk price subsidies in 1997. However, the increase in cereal intake in the 2002 Household Expenditure Survey was probably due to their relatively cheap price compared to other food ingredients.

Fruits and vegetables constituted the next largest volume of food consumed with 188 kg/capita/year consumed in 1992, 188.6 in 1997, and 213.2 kg in 2002. The consumption of at least two to three servings of vegetables and fruits per day was common. The type of fruits and vegetables consumed varied with availability and price. For example, tomato, potato and cucumber were the most available and consumed vegetables in 1992, 1997 and 2002. In 2002, the per capita consumption of these vegetables was 40 kg for tomato, 27 kg for potato and 17 kg for cucumber. The highest consumed fruits in 2002 were citrus fruits, melons and apples estimated at 20 kg, 14 kg, and 10 kg/capita/year, respectively.^{35,36,37}

In addition, poultry consumption has increased from 30 kg/capita/year in 1992 to 40 kg/capita/year in 2002. Poultry intake was reported higher than that of meat and fish partly due to cost.³⁷

The consumption of milk and its products was maintained at 30 kg between 1992 and 1997, but increased to 36kg in 2002. The contribution of fresh milk from the total consumed milk products was 16%, while yogurt constituted 52% of consumption.^{35,36,37}

In 1997, cereals represented the main source of energy in the Jordanian diet, providing 48% of total energy intake.³⁴ (See *Annex II: Tables 6 and 7*). Pulses, milk products, meat, and fruit and vegetables provided less than 2%, 4.6%, 6% and 7% of total energy, respectively. The intake of sugars was relatively high contributing to 14% of total energy. *Table 7* also showed that the percentage of energy provided by protein was 13% in 1992 compared to 13.2% in 1997 with 35% originating from animal food sources (FAO statistics reported 29% of protein intake from animal food sources). The remaining protein source was from plant-based foods.

The percentage of energy provided by fat seems low (relative to the rising prevalence of cardiovascular disease) at 22% in 2002 compared with 24% in 1997 and 25% in 1992 (*Annex II: Table 7*). The intake of fat and oils occurred more in urban than rural areas. Fats and oils are generally used in the Jordanian diets for cooking and seasoning purposes. Although, these figures vary from the FAO statistics data mentioned previously, they seem to reflect the real situation as

they are based on actual food consumption in a sample of families representing the whole population. Nevertheless, in view of the increasing magnitude of non-communicable diseases, the reported percentage of energy derived from fat requires further studies.

In summary, Jordan has witnessed an increasing trend, in the last four decades, towards the average daily per capita energy and macronutrient supply. Review of trends in per capita supply of calories, protein and fat in Arab countries over the last four decades revealed patterns similar to those of Jordan. Food availability in Jordan has been characterized, over the last three decades, by a considerable increase in cereals (primarily wheat) through imports, and a relative increase in milk, eggs, meat products, sugars, and vegetable oils. Removal of food subsidies, implementation of price liberalization policies, and the economic and social changes may have affected food expenditure and the purchasing power of the lower social segment of the population.

CHAPTER III: FOOD SECURITY

Introduction

The purpose of this chapter is to review the status of food security in Jordan, discuss issues pertaining to food supply, agriculture production, and food demand. The chapter is also intended to outline the current situation analysis, the special programme for food security in Jordan and future directions.

Definition

The Food and Agriculture Organization (FAO) defines the objective of food security as “assuring to all human beings the physical and economic access to the basic foods they need.”³⁹ This objective focuses on three different areas: availability, stability and access. Similarly, the committee on World Food Security defines food security as “the physical and economic access to adequate food for all household members, without undue risk of losing such access.” The International Fund for Agriculture Development (IFAD) describes household food security as “the capacity of households to procure a stable and sustainable basket of adequate food.”⁴⁰ At the national level, food security is best described as “a satisfactory balance between food demand and food supply at reasonable prices.” The definition indicates a situation where there has been no major upheaval in food markets in the recent past, where adequate food is available, and where most of the population has access to that food. An alternative definition to this is that “a country is food secure when all the individuals in the country are food secure.” Similarly, at the individual level, the definition of food security is “an individual is food secure if his or her food consumption is always greater than need, as defined by physiological requirements.”

Risks to food security in Jordan

The World Food Programme (WFP) identified key risks to food security in Jordan⁴¹ as follows:

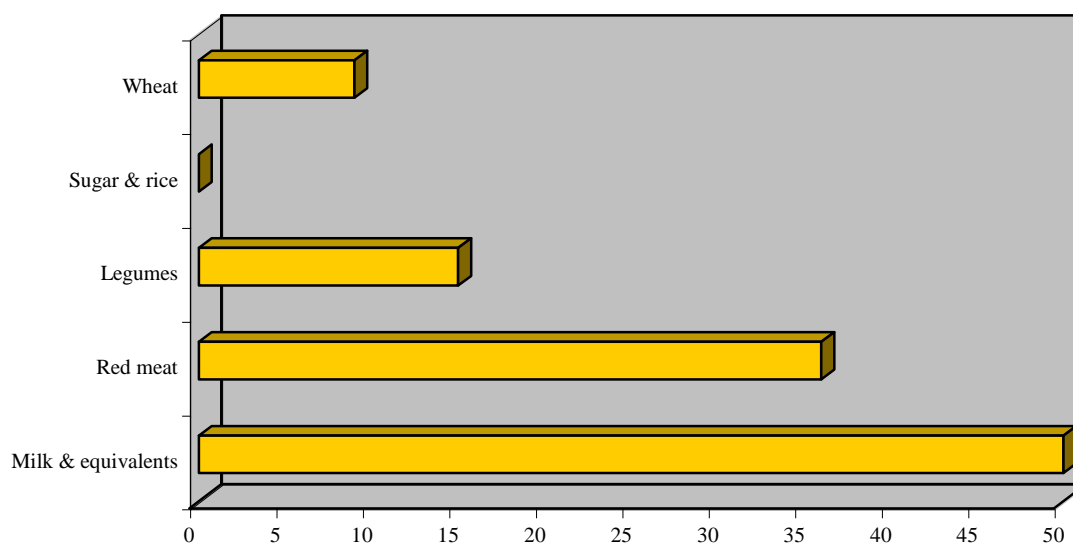
- Lack of job opportunities and low income.
- Decline in economic indicators.
- Agricultural land degradation.
- Self insufficiency in food products, especially cereals.
- Water scarcity, with Jordan ranking among the ten most water-deficit countries.

Food Supply

Food security in Jordan is dependent on the domestic food demand of foreign food market supply for food items of strategic value, such as, wheat, sugar, and rice. The average self-sufficiency degree for these items in the second half of the nineties is shown in *Figure 3.0*. Jordan exports fruit

and vegetables and is self-sufficient in poultry and eggs, though most inputs of poultry industry are imported.

Figure 3.0: *Self-Sufficiency during 1990-1999 (%)*



Source: *Foreign Trade Year Book (1990-1999).*

Although improvement of this situation is not expected in the near future, it is possible to improve self-sufficiency of particular food items, such as, animal products, legumes, and cereals through rational use of scarcely available agricultural resources, and implementation of a reasonable food and macro-economic policy. However, wheat production is not expected to improve the self-sufficiency of wheat because it is not competitive.

Agriculture Production

During the last two decades, industrial and other sectors have expanded but the contribution from agriculture as a percentage of GDP has decreased from 8% in 1990 to 4% in 1998. This decline may have been caused by the removal of subsidies on some agricultural products that took effect in 1994 and the drought that affected Jordan in subsequent years. Agricultural employment represents only 6% of the active labour force, and a substantial number of workers are non-Jordanians.

According to MoA, the agricultural cultivated area in 2004 was 271,000 hectares. This increase is thought to be primarily due to implementation of strategies aimed at increasing irrigation by harnessing water resources - the country's most pressing need. Irrigated areas have also increased from 71,000 ha in 1993 to 75,000 in 1999.⁴²

As a result of implementing several agriculture development policies, Jordan has improved its position regarding food security in the last two decades. During the period from 1980 to 1996, the per capita production has increased by 13%, and the percentage of food imports has decreased from 26% (in 1974-1976) to 20% (in 1996-1998). However, food imports remain necessary to meet the needs of the escalating population growth rate. For instance, Jordan has received 111,000 Mt of food aid of cereals during the period 1996-1998.⁴

At the household level, food security is determined by income and food prices. Low-income households have greater food supply insecurity. The lower the income level of the household, the higher is the proportion of its total expenditure on food. In Jordan, households with an annual income below JD 1,200 pay larger share of their income per calorie when compared to households with an annual income of JD 6,000 or more. Furthermore, the poor households have lower quantity and quality of food, calorie and nutrient intake. Cereals are the main and cheapest source of energy for households with an annual household income of less than JD 1,200 contributing to about 70% of total calorie intake.⁴³

The role of the agricultural sector has decreased in the last two decades as evidenced by the marked decrease in the contribution of this sector to GDP and employment. This decrease favoured growth of industrial, service and other sectors. Food imports are still necessary to meet the needs of the high population growth rate, particularly with respect to cereals, oils and fats.

Food Demand

In Jordan, the increasing food demand is mainly seen as the result of a continuously growing population and the changing food consumption patterns of Jordanians. In addition, high income elasticity of food demand, improved income levels of consumers, moderate food prices and policies of food price control also contribute to increased food demand.

During 1988-1989, Jordan faced tightened economic conditions due to loss of some markets, unemployment, poverty, increased food demand and high debts. In an effort to overcome these problems, Jordan implemented the "Economic Adjustment and Restructuring Programmes." These programmes required the privatization of economy, lifting subsidies for both consumers and producers, and elimination of food pricing systems.

In 1998, a study was conducted to evaluate the impact of the Economic Adjustment and Restructuring Programmes on the food consumption patterns of the poor in Amman.⁴³ The study showed that per capita food consumption patterns of the poor was comprised of 455g cereals, 48g legumes, 72g sugars, 47g fats and oils, 31g dairy products, 203g vegetables, 23g table eggs and 38g red and white meat. These food items contributed 63.3g proteins, 58.2g fats and oils, 242g carbohydrates and 2,475 kcal. Compared with the food consumption patterns of the poor in 1987, the figures of this study indicated decreased food consumption, especially of proteins, fats, and energy by around 10%, 18% and 6%, respectively.⁴³ The consumption of carbohydrates remained constant.

The implementation of the “Economic Adjustment and Restructuring Programmes” and privatization that resulted in lifting food subsidies, affected the quantity and structure of food demand of certain social groups, particularly the poor, and resulted in different consumption patterns. In 1998, it appeared that the poor consumed less food and consequently less nutrients and energy. They may have consumed more food of low cost and less food of higher cost. Effective interventions as part of the Poverty Alleviation Programme are required to address this issue.

Current Situation analysis

Based on the situation analysis, the following represents what are thought to be major points of emphasis:

- Agriculture is considered a basic pillar of economic and social development. Jordan needs to develop agriculture as the economic base for integrated rural development, through encouraging investment in the agricultural sector, creating job opportunities for rural people, providing raw material for agro-industries, and strengthening integrated economic links with other sectors of the economy. Jordan can benefit from agriculture to increase exports, to improve the level of self-reliance in food commodities, and to reduce the deficit in agriculture trade balance. Agricultural development is also needed to help control migration from rural areas, conserve natural resources, protect the natural environment, and ensure sustainable development.
- Agriculture is the core of the development of Jordan’s rural area. It is the main source of income for its inhabitants. It creates job opportunities and income generating activities in agriculture and related agribusiness activities.
- Agriculture resources are very scarce especially in regard to water and agricultural lands. The area of agricultural land will decrease (due to irrational expansion of city and village boundaries to agricultural land, and the absence of a law that defines land uses).
- Jordan has been classified as “a net food importing developing country” by the WTO Committee on Agriculture.
- Food shortages still occur. This is the result of the limited use of appropriate agricultural technology, over-dependence on rain-fed agriculture, lack of markets and market information, and inefficient marketing plan.
- Jordan exports fruit and vegetables and is self-sufficient in poultry and eggs.
- Marketing infrastructure suffers from clear weaknesses, especially in fruit and vegetable sectors. Infrastructure for post-harvest operations also suffers from shortages in the areas of pre-cooling, grading, packaging, refrigerated transport, storage, and processing of products. There are no wholesale markets for livestock with appropriate administrative and service structures, including the biggest and most important livestock market in Amman. As for slaughterhouses, there is a central slaughterhouse run by the Amman Municipality, which is already operating at

twice its capacity. Several old slaughterhouses (with limited capacity and poor hygienic conditions) are still operating in various governorates and districts.

- There is wide marketing margins expressed by large differences between producer and consumer prices. Producer incomes have decreased and consumer prices have increased in favour of middlemen. The small size of the local food market is affected by marketing of regional produce. The local produce appears to have poor quality in terms of specifications, grading, and packaging.
- About twenty pockets are reported to be under the absolute poverty line according to a study funded by the World Bank and conducted by Ministry of Planning (MoP) and Ministry of Social Welfare (MoSW).
- Contributing factors to chronic under-nutrition and food insecurity include poverty, low productivity in agriculture, and high seasonal and year-to-year variability in food supplies due to unreliable rainfall, insufficient water for crop and livestock production, lack of off-farm employment opportunities, which contribute to low and uncertain incomes in urban and rural areas.

Special Programme for Food Security in Jordan

The Special Programme for Food Security in Jordan was established in collaboration with FAO and with the objective of improving food security for poor rural households, mainly through improvement of agricultural productivity and production, increasing employment opportunities and promoting income generating activities. Programme objectives also include stabilizing farming income, enhancing the role of women as partners in rural development, maximizing the degree of self-reliance of rural women, and increasing net incomes through activating the role of rural families.

The programme will achieve these objectives through disseminating advanced agricultural technologies, assisting farmers in adopting them through farm-led demonstrations, and setting up pilot farms of small production sizes. Pilot farms will serve as an entry point to identify the problems that hamper the adoption of new production systems and technologies, to develop solutions to overcome them, and to create a socially and economically enabling environment that fosters the wide-scale adoption of these production methods. The programme will be implemented by working jointly with farmers to identify the economically feasible and sustainable systems that suit the capacities of farmers, their technical and financial resources and social conditions.

The programme consists of twenty-one projects proposed to be implemented during the period from 2004 to 2010 in the highland regions of Jordan, at a total cost of JD 37 million with the following core components:

- Soil and water management at farm level.
- Development of field crops production.

- Diversification of production systems by introducing Horticultural C.
- Development of small livestock projects at household level.
- Income generating activities for employment and poverty alleviation.

The Future of the Agricultural Sector

- The area of agricultural land will decrease (due to irrational expansion of city and village boundaries to agricultural land, and the absence of a law that defines land uses). This will impact agricultural production negatively and will transform a growing number of agricultural producers to job seekers in urban centres, thereby creating social and environmental problems in urban areas.
- Maintaining the current rates of groundwater extraction, which exceeds double the safe yield, will result in an accelerated drop in water table levels of groundwater basins, increased cost of pumping, and increased water salinity (to the point that it may not be suitable for domestic use or unrestricted agricultural use). Continuing extraction at this level will ultimately cause groundwater depletion, loss of investments made in irrigated agriculture in highlands, and of other related agribusinesses.
- Increasing the quantities of fresh water pumped from King Abdullah Canal for municipal and industrial use outside the Jordan Valley area, and replacing it with treated wastewater of high salinity will lead to increased soil salinity, deterioration of soil productivity and quality of produce, and a decreasing consumer confidence in Jordanian products.
- The increased ratio of treated wastewater to irrigation water will restrict its use in agriculture thereby resulting in loss of important agricultural area in the Jordan Valley.
- The economic reform policies and the Agricultural Structural Adjustment Programme, which advocated abolishing subsidies on production inputs, trade liberalization, and opening the Jordanian market to agricultural imports (without taking advantage of measures provided by international agreements to encourage agricultural production in developing countries) will force increasing numbers of small farmers and livestock breeders to leave the sector and migrate to urban areas in search of work opportunities, thereby increasing the problems of unemployment and poverty at the national level.
- The continued dependency of the present inadequate marketing system, the poor interaction and organizational relations between producers and consumers, will lead to continued complaints of producers with regards to the big difference between prices they receive and consumer prices, and blaming the government for not organizing and developing the marketing system. Agricultural producers will continue to complain about market congestion and material losses, and will pressure the government to provide them with support and subsidies through interventions that are either not allowed by international and regional agreements, or the government cannot provide them permanently.

- The continued failure of the concerned government institutions to enforce the legal authority over government-owned natural rangeland, and to apply the legislations and instructions related to the protection and development of such lands, or the introduction of new legislations for communal rather than individual benefit, will result in: degradation of rangeland and its productivity, increased desertification, and deterioration of socioeconomic standards of its inhabitants, who mainly depend on sheep and goat herding for their living.
- The limited attention given by the government to develop and build institutional capacity of the public sector will result in its failure to develop programmes and projects, in critical areas such as in irrigation, research, agricultural extension, and marketing of agricultural produce. The lack of attention will also result in failure of government organizations to promote mutual relationships with the agribusiness sectors supporting agricultural development and in the creation of a suitable environment.
- Production of field crops will decrease in light of the decline, in agricultural resources, of arable lands and irrigation water. It will not be possible to maintain the current production levels of these crops as long as the current policies concerning land use remain.
- Production of sheep and goat meat will decline due to the continued deterioration of the rangeland and the removal of feed subsidies. Local production of milk, poultry, and meat will face severe competition from imports, which will be increasing in quantity, due to trade liberalization. This development may not only affect local production but may lead to termination of some projects.

In summary, under the combined pressure of macroeconomic, social and political factors, the food sector in Jordan moved from a food subsidy, price and import control policy during the 1970s and 1980s to a gradual but progressive liberalization and removal of food subsidy in the early 1990s. Despite some improvement in food production, food imports of essential food commodities such as cereals, animal foods and dairy products remain critical and affect the process of socioeconomic development. Therefore, a sustainable food security strategy is important to ensure adequate food of good quality while helping to stimulate rural economies and to promote the social and environmental aspects of sustainable agricultural development.

Introduction

The purpose of this chapter is to provide an overview of the state of nutrition in Jordan and national nutrition programmes. It presents a situational analysis on malnutrition, micronutrient and other deficiencies in addition to breastfeeding and complementary feeding practices.

Malnutrition: A Situational Analysis

Data on Infants and Children

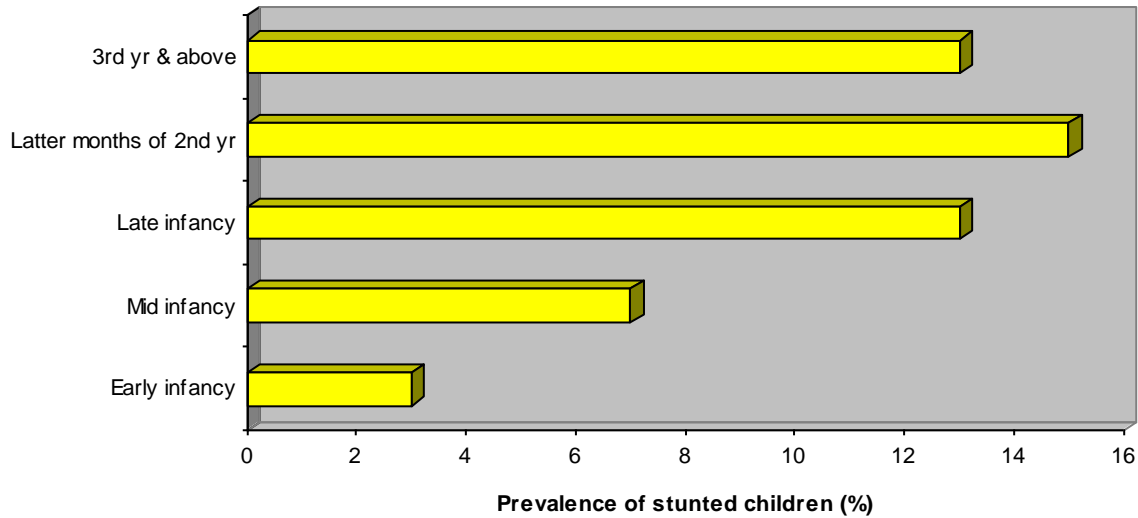
During the 1960s, severe protein energy malnutrition (PEM),⁴⁴ whether presented as Kwashiorkor or Marasmus, was not an uncommon observation in paediatric wards of Jordan's government hospitals. According to local research in the following years, the problem has now become much less significant. Until late 1980s, clinical manifestations of moderate to mild PEM were invisible although the problem continued to exist silently at the community level.⁴⁵

In 1990, the Jordan Population and Family Health Survey (JPFHS) included an assessment of the nutritional status for children (under 6 years of age) to measure Weight-for-Height (wasting), which indicates acute nutritional problem, and the Height-for-Age (stunting), which reflects chronic under-nutrition and short stature for age, and the Weight-for-Age (underweight), which is a composite of both long and short term effects.⁴⁵ A national representative sample of 6,100 children was measured and assessed using National Centre for Health Statistics (NCHS) reference charts. Thorough analysis of the nutritional data confirmed a previously reported finding that nutrition-related growth of Jordanian children started to falter only during and after late infancy.⁴⁶ Further data analysis showed that stunting, and not wasting, is the prevalent mode of malnutrition among preschool children. The prevalence of stunting was 16% in both sexes. Only 3.5% of males and about 2.5% of females were wasted. Prevalence of stunting was 25% - the highest - among toddlers 18-24 months with no reported sex related differences. When comparing governorates in three main geographical regions in Jordan (central part, north and south), the study reported a stunting prevalence of 14%, 19% and 20% respectively indicating that children are doing better in central governorates. Receiving good quality health care during pregnancy and at delivery was found to be associated with future child's growth and nutritional status. Other contributing factors to a child's nutritional status were: birth weight, place of delivery, mother's education level and infant's age at introduction of solid foods and milk-formula-feeds. The areas shown to be most appropriate for effective intervention were: mother's education, and patterns of infant feeding.⁴⁷

In 1990, another cross-sectional survey on nutrition was conducted to assess the nutritional status during pre-pubertal life stage in north Jordan. The survey aimed at studying the dietary patterns and growth of apparently healthy children from relatively privileged localities. Subjects were selected from the 0-9 year age cohort with a total sample of 6,000 children, including 1,073 from the age group 6-24 months.⁴⁸ As seen in *Figure 4.0*, the reported prevalence of stunting in north Jordan was 3% in early infancy, 7% in mid-infancy, 13% in late infancy, 15% in the latter months of the second year, and 13% during the third year of age and above. The reported prevalence of wasting was

about 3% at early infancy, 5% at mid-infancy, and 14% during early months of second year. The prevalence gradually decreased with age until it disappeared around the age of school-entry.⁴⁸

Figure 4.0: *Prevalence of Stunted Children in North Jordan (%)*.



Source: *JUST Study, 1993.*

The magnitude of stunting, underweight, and wasting was also investigated in a survey conducted by the MoH in 1991 on 8,113 children (0-59 months) in 8 governorates. The prevalence of stunting, underweight, and wasting among children were 16%, 9%, and 2%, respectively. The differences between governorates showed that nutritional status of children was worst in Mafrq governorate followed by Tafileh and Ma'an (stunting percentage in Mafrq was 33% for males and 24% for females).

On the other hand, the 1997 JPFHS reported that the national prevalence rates of stunting, wasting, and underweight among children aged 0-59 months in all governorates under study averaged 7.8%, 1.9%, and 5.1%, respectively. The nutritional status, as represented by the above indicators, was better in children in their first six months, but it worsened with age. There was little difference in stunting between boys and girls in the total sample. However, the prevalence figures generated by this survey are inconsistent with other studies and may require further in-depth analysis.⁴⁹

The data collected in the 1990s surveys reported similar findings: higher proportions of malnourished children in rural areas compared with urban areas, and no significant gender related differences. (See Annex II: Table 8). However, as mentioned above, discrepancies exist between these findings and the results of the JPFHS (1997). Confirmatory investigations are required.

The latest Jordan Population Family Health Survey (DHS 2002) revealed somewhat similar findings. Nine percent of children were found to be moderately stunted and 2% severely stunted. The level of stunting increased rapidly with age, from 3% among children less than six months of age to 13% among children age 12 to 23 months.

There was little difference in the stunting level by sex. Two percent of children under five years of age were wasted (weight for height) and less than 1% were severely wasted. Four percent of children were underweight (low weight for age) and less than 1% were severely underweight. Variations in wasting were seen more likely in the south. Rural children were more likely to be wasted than urban ones. Higher levels of wasting were observed in children born to young mothers (15-19 years). Hence, mothers' education could have a positive impact on lowering wasting. Variations were also seen with respect to birth order and birth interval.⁵⁰

In the late 1990s, other studies were conducted to examine the growth pattern associated with infant feeding practices. The studies reported that >95% of Jordanian mothers breastfed their infants in the first three months, 85% breastfed their infants until six months of age, and 69% breastfed their infants for seven to nine months. Recent data from the Department of Health Statistics (2002) showed improvement in breastfeeding rates: 90% of children less than six months of age, and 76% of children from six to nine months of age were breastfed.⁵ The improvements in nutritional status were likely to be associated with: promotion of maternal and child health activities (the number of MCH centres increased by 214% from 1990 to 2000), increased vaccination coverage rates, and improvement in education, birth spacing and sanitation. These results showed a dramatic change in the patterns of exclusive breastfeeding. The rate of exclusive breastfeeding of infants 0 - <6 months changed from 11.9% in 1997 to 26.7% in 2002. This has contributed to the fall of infant and under-5 mortality rates in recent years to 22 deaths per 1,000 live births in 2002.⁵⁰

Data on Other Age Groups

Studies on adolescents are presented in *Annex II: Tables 9 and 10*. Table 9 presents data from Zarqa governorate in 1999 and North Badia/Mafraq governorate in 2000. The mean body height varied among the same age group (females 11-11.9 years) from 149.4 cm for Zarqa and 134.7 cm for Mafraq/Badia. Calculated body mass indices (BMI) were also different with 18.8 in Zarqa and 16.5 in Mafraq. There was an increase in BMI with age reported in both Badia and Zarqa.⁵¹ However, there were limitations to these two studies given that the samples were not representative of the general population, and the two areas were different.

Anthropometric measurements

Another study was conducted in 2000 to compare similar sample populations in Amman and Mafraq/Badia governorates. See *Annex II: Table 10*. The study revealed that a larger number of women living in Badia stayed at home and were jobless compared to those living in Amman, therefore, higher percentages of overweight and obesity were reported in Badia women when compared with those living in Amman (33.9 vs. 21.8%).⁵²

Micronutrient Deficiencies (MNDs)

The first reported laboratory based evidence on micronutrient deficiencies in Jordan dates back to early 1960s when vitamin A deficiency (VAD) was first discovered. In one report, the incidence was estimated to reach more than 300 xerophthalmic children per year with a mean serum retinol concentration (SRC) of 55µg/L. In another, (using the SRC below 200 µg/L as the cut-off point), the prevalence of VAD among the under five year old children mounted to about 37%.⁵³

Following these reports, and over the decades of the seventies and eighties, the concern for vitamin A as a public health problem faded away, and studies were focusing on Iron Deficiency Anaemia (IDA), anthropometric measures, and breast feeding practices. In most of the surveys, and based only on the values of derived haematological indices, iron deficiency anaemia (IDA) was always assumed to prevail.

Recent Reports

In 1993, Jordan University for Science and Technology (JUST) conducted a survey to assess the nutritional status of children in the north of Jordan. It revealed a 40% prevalence of anaemia in children less than two years of age. Dietary assessment in this survey suggested inadequate zinc and iron intakes during late infancy. The complementary intervention study integrated in the survey confirmed these findings along with additional suggestions on the possibility of multiple deficiencies, including iodine deficiency disorder (IDD) and vitamin A deficiency (VAD). The conclusion led to mounting interest in studying micronutrients, particularly: vitamin A, iodine, and iron.

Vitamin A Deficiency (VAD)

Improving vitamin A status of young children leads to significant reductions in mortality rates. VAD is linked to the nature of foods available and feeding practices, rather than to geochemical or other conditions affecting populations at different geographic areas.

The first attempt to prepare for conducting a national survey on vitamin A status took place in 1997 through a pilot project supported by WHO. A convenient sample was selected in three semi-rural areas. The pilot study aimed at assessing vitamin A status by measuring SRC using the HPLC technique (for the first time) along with assessment of VA-rich food consumption.⁵⁴ Anthropometric, breastfeeding, dietary and health data were used as indirect indicators. Mean and median SRC were 339 and 328 $\mu\text{g/L}$ ($\text{SD}\pm 89$), respectively. Total availability of various VA-rich foods, at a rate of ≥ 3 days/week (D/W) for children and households was equivalent to 99%. 98% of subjects consumed a variety of VA-rich food (≥ 3 D/W) and 78% were reported to be breastfed for a period of six months. Prevalence of stunting was 15%. Number of subjects with sub-clinical VAD (SRC < 200 $\mu\text{g/L}$) was 4%, whereas those at risk of VAD (SRC > 200 but < 300 $\mu\text{g/L}$) were 31%.

Results of this pilot survey recognized trends of low SRC despite abundance of VA-rich food of plant origin. VA-rich foods of plant origin failed in outweighing the impact of foods of animal origin as determinants for these results. However, there are limitations to the study. While VA-rich foods from animal origin can be considered as determinant, over-reporting of vegetable intake could be another determinant, especially if no validated tool to assess vegetable intake was utilized (i.e. food frequency questionnaire). A third determinant is the skill of the interviewer (use of open-ended questions or asking questions in different ways) and the number of interviewers (the higher the number, the greater the bias). The success of operating the HPLC methodology in this pilot trial and the observation of unexpected trend of low SRC despite the apparently high consumption of vegetables warranted further investigations. A well designed national level survey was recommended.

School Surveys in underprivileged Areas

The first response to the recommendations of the 1997 pilot survey came from the Ministry of Education (MoE). In 1999, an interventional study with dietary supplements was conducted. A total of 1,023 school children aged 5.5 to 9.9 years were randomly selected from seven semi-rural districts labelled by the government as disadvantaged areas. The study was conducted over a period of nine months. Subjects were provided with a daily mid-morning snack that consisted of iron fortified biscuits, fresh milk and a fruit. Only one 200,000 IU vitamin A capsule supplement was additionally given at the middle of the survey period. The study showed a baseline prevalence of 19.9% for stunting, 18.8% for anaemia, and 21.8% for sub-clinical VAD. Mean and median serum retinol concentrations were 248 (SD±66) and 242 µg/L, respectively. Moreover, 60% of subjects had serum retinol in the range 200-300 µg/L. Supplementation had a significantly positive impact on serum retinol levels ($p<0.01$) and on anaemia ($p<0.05$) indicators. The study concluded that VAD among school children might be a common health problem, and projected that VAD could also be affecting preschool children as well.⁵⁵

Before the end of year 2001, a new six month dual purpose intervention survey was launched in eight disadvantaged semi-rural districts. A total of 636 school children aged 5.5 to 9.9 years were randomly selected from villages generally recognized as the poorest. A daily snack and a single dose of the 200,000 IU vitamin A capsule were provided to study subjects for a period of six months. Within this second school survey, a control group was selected from one of the districts serum tocopherol concentrations (STC) were also investigated among other study parameters. The study involved three groups:

- Group 1 (Test Group): Received snack, VA capsule and nutrition education activity.
- Group 2 (Control Group): Received only VA capsule and nutrition education activity.
- Group 3 (Reference Group): Received only nutrition education with no VA capsule.

Results of the study in eight districts showed that baseline prevalence for stunting, anaemia and non-ocular VAD was 15%, 20% and 33%, respectively. The results of the control group demonstrated no statistically significant difference in serum retinol concentration (SRC) between the test group and the control group. But, when compared to the baseline, only vitamin A status of the test group showed improvement. The study showed that vitamin A supplementation could not alone boost up the SRC, but also fat and VA-rich foods from animal sources influenced mean values of SRC and STC ($p<0.05$).⁵⁶

Results of the 2002 dual study on poorer young school children in underprivileged areas supported the results of the previous survey. The findings on anaemia and vitamin A deficiency suggest that these conditions were significant public health problems among school children in poor areas. Both studies showed that Vitamin A supplementation had a significant positive impact on SRC levels, anaemia indicators, and STC. Furthermore, the positive impact of supplementation was found to be modulated by dietary fat levels and vitamin A supply from animal sources. Again, VA-rich foods of plant origin seemed to fail compensating the impact of animal-based foods as determinants of serum vitamin A levels. Therefore, it was hypothesized that the explanation may reside in the trace metal-dependant metabolic pathways of beta-carotene conversions.

The National School Survey of 2003

The study sample of school students included three age cohorts: 10, 13, and 17 years old. The analysis of data regarding vitamin A status involved heterogeneous age groups. It was customarily accepted to apply certain international criteria other than the 200 µg/L as cut-off point. According to one criterion, vitamin A deficiency problem may be diagnosed when the proportion of study subjects with serum vitamin A concentration falling below 300 µg/L exceeded 30%. However, when the prevalence reached 50% or above, the condition was then described as a “public health problem”- an expression that urged immediate intervention by the government.^{57,58}

The fore-mentioned findings of surveys in poor areas were taken into consideration when the study of a national representative sample of Jordanian school children population was launched. This national survey came as a baseline, prior to the implementation of the Royal Philanthropic Gratuity of King Abdulla II, who called for a universal multivitamin/mineral tablet supplementation for all Jordanian school children in December 2002. The survey results were varied among governorates. The mean and median serum vitamin A concentration values for the population under study were 306 µg/L and 314 µg/L respectively (SD± 79). Results indicated a prevalence rate of vitamin A deficiency of 47% in all governorates. Analysis by age groups showed that the prevalence of vitamin A deficiency was inversely related to age. The younger age students (10 years old) were mostly affected when compared to older age students (13 and 17 years); prevalence rates were 60%, 46%, and 32%, respectively. Thus, the 10 year-age was identified as the age group at highest risk of vitamin A deficiency. In addition, within this cohort, no inter-sex differences were observed. The results were considered applicable to all students in their childhood years, irrespective of region or governorate.

In a 2004 evaluation of the supplementation programme, results revealed that the students' compliance with the regular use of the multi-vitamin supplement was only 46%.⁵⁷ (*Annex II: Table 12*).

VAD in the under 5 year-Age Group

In 2001, a nutrition survey was conducted in north Badia, which revealed prevalence of nutritional disorders affecting the Bedouin children under 5 years of age at the rates of: 22% for non-ocular VAD, 19 % for anaemia, and 20% for stunting.

In 2003, the first national baseline survey was conducted before launching the wheat flour fortification programme. The survey included women of child bearing age along with under five year children .The study reported VAD prevalence of 15% among pre-school children, which was linked to the nature of foods available and feeding practices, rather than to geochemical or other conditions affecting populations of geographic areas. Another study also reported that 38% of children consumed fruits and vegetables rich in vitamin A. Consumption of foods rich in vitamin A was increased with age. Children who were not breastfed consumed more foods rich in vitamin A than breastfed children. Consumption was reported the highest in urban areas and in the central region of Jordan. Mother's education and mother's age were strongly associated with increased intake of foods rich in vitamin A among children.⁵⁸

According to this survey, the VAD prevalence exceeded the cut-off point of 15% prevalence, which is a new limit proposed lately for assessing sub-clinical VAD in communities. Therefore, VAD is indeed considered a public health problem in Jordan that warrants the need for immediate intervention.

A pilot study was conducted in three regions to identify vitamin A deficiency among children six to sixty months of age. Results showed that the problem of vitamin A deficiency in this age group ranged between mild to moderate. Another study on vitamin A was conducted in 2000 for school children in high-risk areas. A programme for vitamin A supplementation was launched covering 10,000 school children in seven areas. Monitoring of supplement distribution at schools took place, but educational materials on vitamin A were not yet developed. In 2004, a three year supplementation project (2004-2007) was established to include vitamin A supplementation for students in first to fourth grades in under privileged areas. Students were given two tablets (200,000 IU) each year.

Jordan has requested and received assistance from GAIN to undertake a follow-up survey to measure the impact of the wheat flour fortification program by comparing levels of anemia, iron deficiency anemia, and vitamin A status of the population with that measured in 2002 , in March of 2010 the MoH and collaborating partners conducted a national survey in Jordan to document the status of iron and vitamin A for women of childbearing age (15-49 years) and preschool children of (12-59 months). That survey will serve as a baseline for evaluating the impact of wheat flour fortification program , the finalizing and writing report will be in the first of 2011.

In summary, vitamin A deficiency constituted a public health problem according to the indicators from local studies. This, in turn, triggered MoH to issue recommendations to supplement children less than 1 years with vitamin A 100,000 IU tablet given to the child along with the measles vaccine

Iodine Deficiency Disorders (IDD)

Iodine deficiency, commonly manifested as thyroid enlargement, can cause impaired neurological functioning, increased rates of stillbirths, prenatal and maternal mortality, and infertility.⁶⁰ IDD include mental retardation, hypothyroidism, goitre, cretinism, and varying degrees of other growth and developmental abnormalities. These result from inadequate thyroid hormone production due to lack of iodine. The most damaging effect of iodine deficiency is on the developing brain. Thyroid hormone is particularly important for myelination of the central nervous system, which is most active in the prenatal period and during foetal and early postnatal development. Numerous population studies have correlated an iodine-deficient diet with increased incidence of mental retardation.⁵⁹

In 1993, the national committee on iodine deficiency disorders (NCIDD) was formed by the MoH. A national representative sample of 2,457 young children (cohort 8-10 years) was selected from all governorates. (*Annex II: Table 13*). The study concluded that IDD was 37.7% for all grades as indicated by goitre palpation and urinary iodine excretion, Prevalence was highest in Tafileh (76 %) followed by Irbid (55 %) and Balqa (44%). The lowest prevalence was reported in Mafraq (11%) and in Zarqa (18%). Prevalence was higher among rural than urban children (45% vs. 34 %), and was slightly higher in females than in males (39% vs. 36%). The study provided clear evidence that moderate or lower degrees of IDD existed in Jordan. In 1995, a universal salt iodization programme was established.⁶⁰

In 2000, the NCIDD conducted another impact evaluation study on the salt iodization programme, five years after its implementation. A national representative sample of young school children was selected (age cohort 8-10 years). The results of this follow up study showed that there was an improvement in total goitre prevalence (38% in 1993 to 33.5% in 2000). The study also showed an alleviation of severity of goitre; grade two decreased from 22% in 1993 to 8.5% in 2000. Urine iodine concentration was also increased (4 µg/100ml in 1993 to 15 µg/100ml in 2000). The number of households consuming iodized salt was 88%. Thus, and according to the differences in the median urinary iodine excretion, the national programme for iodine table salt supplementation (NPITS) proved to be effective.⁶¹

Another assessment study was also conducted in 2000 to monitor the progress of the iodization programme in Tafileh governorate, which had the highest goitre prevalence in 1993. The study revealed a reduction in the prevalence from 76.1% in 1993 to 42.5% in 2000.⁶² See *Annex II: Table 13*.

IDD Programme Efficacy

In 1996, a monitoring and evaluation system was formed to control the quality of iodized salt at both the production and distribution levels. The main objective was to ensure that all salts produced and distributed were iodized, and that the iodine content of these salts remained within the optimal range. Monthly salt samples were collected from all governorates by food inspectors, and a check kit - test was performed. Samples were transferred to the central MoH laboratories and were submitted to quantitative testing by the titration method.

In order to monitor the effectiveness of the iodization programme, the WHO standards of 1994 were adopted. The standards considered the median concentration value of the urinary iodine excretion as a main indicator of iodine deficiency. If urinary iodine excretion level was well above the lower level of 10 µg /dl, then iodine intake was considered adequate. In 2000, survey results revealed a median value of 15.4µg/100ml for the urinary iodine excretion. The value has increased considerably when compared to 4 µg/100 ml in 1993, thereby indicating effective programme implementation. *Annex II: Table 14*.⁶⁰

In 2004, the MoH-Nutrition Department conducted another programme-impact evaluation study on 831 school children aged 8-10 years who were selected from three governorates; Aqaba, Jerash and Tafileh. The results of this limited study showed further status improvement. The percentage of households consuming effectively iodized salt was 98%. The median concentration value of the urinary iodine excretion was 25.9 µg/100ml compared to 15.4µg/100ml in 2000, and 4 µg/100 ml in 1993. *Annex II: Table 14*.

The 2004 MoH Annual Report clarified the current programme profile. The results obtained so far showed that the percentage of iodized salt in the country averaged 74% in 2004 versus 40% in 2001 (the year when data collection was started). The percentage of households consuming iodized salt in 2004 mounted to 99.8% compared with 97.5% in 2001.

An assessment of IDD among school children was done in 1993. National salt iodization project in Jordan was launched in 1995. Legislation was amended to support this project. A mass media programme to increase awareness of iodized salt consumption was done.

National monitoring survey was conducted in October 2010, the study aims to assess the effects of iodization program on Jordanian population and it was conducted on (4600) school children aged 8-10 years who was selected randomly from the primary of public, private, and UNRWA school children in 3rd, 4th and 5th grades , The indicators that was used for this study consist of measurement of the iodine concentration in urine, clinical examination for goiter and proportion of households consuming iodized Salt, the result will be disseminated in the first of 2011.

Anaemia and Iron Deficiency Anaemia (IDA)

Anaemia in general, and iron deficiency anaemia (IDA) in specific, constitute a major problem worldwide. The most susceptible groups are preschool children, women of childbearing age, and adolescent girls. Anaemia in infants is associated with physical and intellectual growth retardation, and reduced immunity.⁶⁰ Paediatric and antenatal clinics tend to distribute iron and folic acid supplements to prevent anaemia and IDA.

The Jordan National Survey on IDA, conducted in 2002 by MoH, WHO, UNICEF and CDC used the WHO standards. The sample included 1,411 females aged 15-49 years, and 1,253 children aged 12-59 months in all governorates. The survey showed that anaemia affected 32% of Jordanian woman in reproductive age, with a prevalence of iron deficiency of 41% and that of iron deficiency anaemia of 22%. The highest prevalence of anaemia was in Aqaba with 58.4% followed by Irbid with 44.7%. As for Jordanian children under five years, the respective prevalence rates were 20% for anaemia, 26% for iron deficiency, 10% for iron deficiency anaemia and 15% for vitamin A deficiency. Results are shown in *Annex II: Tables 15 and 16*.⁶³

A study on the incidence of iron deficiency anaemia in infants was conducted in 1999. The study examined the relationship between anaemia during pregnancy and iron deficiency in 232 infants. The iron status of infants born to 107 anaemic mothers and 125 non-anaemic mothers was reviewed at 3, 6, 9 and 12 months. Indicators to define iron deficiency were: haemoglobin <11g/dl, and either plasma ferritin (<12 mg/dl), or zinc protoporphyrin (ZPP) (>35mg/dl) of whole blood. The results indicated that anaemia was significantly higher in infants born to anaemic mothers (81%) compared with controls (65%). At 12 months of age, 72% were anaemic, while 57% were identified as iron deficient.⁶⁴

Results from the 2003 national survey on school children were different for the different age groups studied (10, 13 and 17 year-age group). They highlighted the conditions of anaemia and iron inadequacy in addition to the VAD findings in the various setups. The statuses of vitamin A and anaemia have been found to be significantly correlated in all categories. Anaemia (measured by mean haemoglobin concentration) was found to be at an acceptable level when compared to the reported results by any of the previous surveys. According to this national study, prevalence rates of anaemia in the south, north, and middle regions of the kingdom were 13%, 12%, and 5%, respectively. Anaemia prevalence rates in the surveyed three age cohorts (10, 13, and 17 year-age groups) of students were 12%, 8%, and 8%, respectively, indicating that anaemia victimized children (less than 10 year-age group) more than adolescents (13 to 17 years). Accordingly, the

prevalence of anaemia in students was 9% in the national sample, which showed that anaemia, in the Jordanian preparatory and secondary schools, was a mild problem. Many social factors may have contributed to the apparent declination of anaemia prevalence in Jordan, especially following the implementation of the MoH-enforced iron fortification of wheat flour that has been going on since May 2002.

As for iron deficiency, one comparison between anaemic and non-anaemic categories of school students was performed documenting a prevalence of iron deficiency of about 40% and 9% respectively. This underlined iron deficiency as the major cause of anaemia in the study population. The group suffering the most was the 17 year-age cohort with 22% prevalence. Females from this group showed prevalence rates of 13% for anaemia and 31% for iron deficiency. It is normal in this particular case to suggest that a girl's periodic menstruation in late adolescence may have stood as the primary reason for such finding because menstruation is not expected to have started at 13 years. The haematological indicators were relatively better levels. *Annex II: Table 17.*

Micronutrient Intervention Programme

A national task force was formulated in 2002 to develop a programme for flour fortification in collaboration with WHO and UNICEF. The Cabinet subsequently approved the programme. WHO and UNICEF funded the purchase of premix and ten feeders. The project was launched at the national level in April 2002. The Ministry of Health provided seed money to purchase the premix for the second year of the project from the government's annual budget. Orientation meetings were conducted to millers about IDA. In 2002, a monitoring and evaluation system was formed to control the process of iron flour fortification.

Further to the above, the National Nutrition Taskforce adopted the initiative to add vitamins A, B1, B2, B3, B6, B12 and zinc to flour in addition to the already added iron and folic acid. This initiative was implemented in year 2006. The vitamins also was added to biscuits provided in the school lunch meals and will be served to all students in kindergarten to grade six. The initiative will cover 550,000 school children

Other Suspected Deficiencies

Vitamin D Deficiency

Vitamin D is predominantly derived from exposure of skin to solar ultraviolet radiation. Natural dietary sources of vitamin D are limited, unless fortification or supplementation practices are adopted.⁶⁰ Jordan is a sunny Middle Eastern country where no vitamin D fortification of milk is undertaken.

Studies on vitamin D deficiency in Jordan are scarce. A small study was conducted to evaluate vitamin D and parathyroid hormone levels among healthy young Jordanian women of child-bearing age. Results suggested a prevalence of hypo-vitaminosis D of 62%. Studies to verify these findings are not available.

In 2000, another study was conducted to investigate the prevalence of vitamin D deficiency in 38 children aged 3 to 24 months who were at high risk of developing nutritional rickets. Out of the 38

children selected, 26% were premature babies, 65% were found to have other nutritional problems (such as anaemia), and 71% were breastfed till the age of one year without any reported intake of dietary supplements. Clinical manifestations included: bowing of the legs, wide anterior fontanel, developmental delay and convulsions. All subjects were treated with Vitamin D2, either orally or intramuscularly, and showed marked radiological improvement after six weeks on average. Children at high risk of developing nutritional rickets were premature babies, babies with prolonged breastfeeding without any dietary supplements, and children with nutritional problems such as anaemia.⁶⁵

Additionally, Masri et al. reported, in a recent study on osteoporosis, that 87% of the study subjects (821 women aged 15-89) had a low level of serum 25-hydroxy vitamin D (the cut-off points for evaluating vitamin D status were Deficient =<10ng/ml, Insufficient = 10-20ng/ml, Optimal =20-60ng/ml).²⁶

In conclusion, data available on vitamin D are scarce and are based on small samples that are not representative of the Jordanian population. Hence, it is difficult to draw firm conclusions on the status of vitamin D deficiency in Jordan.

The national survey conducted by MoH in 2010 aims to describe the prevalence of vitamin D deficiency in women of childbearing age (15-49 years) and preschool children of (12-59 months), therefore, Jordan has expanded fortification to include 9 micronutrients one of these is vit D

Vitamin B12 Deficiency

Results of testing for serum B12 in clinical laboratories have shown a trend of low serum values in large numbers of the population of Jordan. However, cobalamin deficiency cannot be diagnosed by measuring serum vitamin B12 alone. It requires serum methyl malonic acid testing (MMA), folate and total homocysteine. The national survey in 2010 aims to describe the prevalence of vitamin B12 deficiency in women of childbearing age (15-49 years), vitamin B12 is one of the 9 vitamins which is added for premix .

Breast Feeding and Complementary Feeding Practices

Early childhood feeding practices and patterns are important determinants of the nutritional status of children. Breastfeeding greatly benefits both the mother and the child, but the benefits are influenced by both the duration and intensity of breastfeeding, and by the age at which the child receives supplementary foods and other liquids.⁶⁰ Breastfeeding ensures that an infant receives full nutritional requirements. It also helps to protect against infections and communicable diseases. It has a positive impact on the mother's health by reducing the risk of breast and ovarian cancer and in allowing the mother's body to recover fully from childbirth. In addition, exclusive breastfeeding provides a contraceptive method known as the lactation amenorrhea method (LAM). Amenorrheic mothers who breast feed exclusively during the first six months of life are 98% or more protected from pregnancy. Children who are exclusively breast fed receive only breast milk.

Jordan pursued a set of policies to encourage breastfeeding. In 1997, a national strategy on breastfeeding was included in the MOH national plan for nutrition. The MoH recommended that

infants should only receive breast milk until the age of six months, and should continue breastfeeding with complementary food until they reach two years of age and beyond. National policies were developed to ban all forms of marketing of breast milk substitutes, especially in the public sector. In 2001, MOH proposed a draft regulation on marketing of breast milk substitutes and submitted it to the legislative bureau for approval. In 2008 the Jordanian code for promotion and protection of BF was written by a committee and it was signed by the minister of health.

According to the results of the Jordan Population and Family Health Survey (JPFHS) in 2002, 26.7% of children less than six months were exclusively breastfed, but this rate decreased to 22% in 2007

Early initiation of breastfeeding is beneficial for infants as milk contains colostrums in the first three days after delivery. Colostrum is an important factor for nutrition and immunity in early infancy.⁶⁰ The 1997 JPFHS data showed that only about one-third of children in Jordan were breastfed within an hour of birth, and 75% were breastfed in the first 24 hours after delivery. This has improved in recent years as documented by the DHS 2002 study, in which 40% of children were breastfed within the first hour of birth, and 80% were breastfed during the first 24 hours of delivery, the rate of early initiation of BF in the first hour after birth has been almost the same in the year 2007 around 39%. The introduction of supplementary foods began early in Jordan, 12.4% of children two to three months of age were given complementary food, and 69.5% of children six to seven months of age were fed solid or mushy food.³⁷

The baby friendly hospital initiative (BFHI) slowly gained momentum in Jordan. seven hospitals are currently certified as baby friendly hospitals. . The Mother and Child Health Directorate of MoH launched both initiatives of the “Baby Friendly Mother and Child Centre” and the “Mother to Mother Support Group.” The centres require further assessment. In 2004, MoH established a breastfeeding unit in the Mother and Child Health Directorate to promote breastfeeding.

The government passed a law in 1995 to extend maternity leave from 8 to 12 weeks. In the International Labour Organization (ILO) meeting, conducted in Geneva in June 2000, Jordan endorsed the convention on maternity protection to give mothers the right to have a maternity leave for not less than fourteen weeks, and to have nursing breaks when returning to work. However, this endorsement was not translated into action yet.

In conclusion, Majority of mothers gave some breast milk to their children less than six months of age. Early initiation of breastfeeding (within one hour after delivery) was delayed in 60% of cases, exclusive breastfeeding was practiced by very few mothers, and introduction of supplementary foods began early in Jordan. Promotion of exclusive breastfeeding for six months and appropriate complementary feeding contribute to optimal physical growth and mental development and need to be encouraged.

CHAPTER V: FOOD SAFETY IN JORDAN: A SITUATION ANALYSIS

Introduction

The purpose of this chapter is to review the current situation of food safety in Jordan and to outline the current national food safety strategy.

Background Information

Responsibility for food control in Jordan was fragmented amongst government ministries with numerous local, national, and regional services involved. However, successful food safety strategy requires the integration and co-ordination of food controls. As a result of this understanding, Jordan Food and Drug Administration (JFDA) was established under the JFDA Act no. 31/ 2003, which came into effect on 16 April 2003. JFDA is responsible for the integration and coordination of food controls, and for the development of a modern and effective food control system that is scientifically based with focus on human health.

Food Control System

Overview

Under the JFDA act no. 31/ 2003; the administration has the overall responsibility to ensure that food legislation is enforced. This responsibility is carried out through various official agencies, such as, the Ministry of Health (MoH), Ministry of Agriculture (MoA), Jordan Institution for Standards and Metrology (JISM) and several municipalities. The official agencies involved are accountable to JFDA for food safety enforcement activities, programmes and standards of work.

Control of imported food in Jordan is carried out at the Border Inspection Posts (BIPs) under direct control from JFDA, while inland food inspection is carried out according to JFDA standards and procedures by twenty-one health directorates distributed all over the country. Large municipalities, especially Greater Amman Municipality and the Aqaba Special Economic Zone Authority (ASEZA) also exercise food inspection activities within their jurisdiction.

JFDA is essentially responsible for the enforcement of food law applied after the level of primary production rather than the law governing other influences on food safety such as animal health, animal feed or veterinary drugs.

Slaughterhouses are licensed and supervised by MoA in coordination with Ministry of Municipalities. MoA regularly monitors local poultry and meat processing for compliance with hygiene and veterinary control requirements.

In July 2003, JFDA entered into its first Memorandum of Understanding with MoH, which details duties and responsibilities of MoH and JFDA in the area of food control. Two memorandums of understanding were signed with ASEZA in 2006 and with Greater Amman Municipality in 2008. Other memorandums of understanding with other agencies are to follow in the few coming months. The memorandums of understandings outline an agreed level and standard of food safety activity that agencies perform. In January 2007 JFDA took over from the MoH the responsibility of food

control in Amman Governorate where 50% of food businesses are located. Overtime, JFDA will assume responsibility for the functions currently residing with other official agencies. However, and until this is reached, it is essential that activities of these agencies are coordinated so that any gaps or overlaps are eliminated.

An EU funded twinning project between JFDA and the Danish Veterinary and Food Administration (DVFA) was initiated in May 2005 and was concluded in November 2007. Through this 30 month twinning project the DVFA cooperated with JFDA to reorganize and upgrade the food inspection system in Jordan including food laboratories.

The Twinning Project achieved the following main outputs:

- Reorganization of the Food Control Directorate in (JFDA).
- Drafting of a new Jordanian Food Law.
- Food Inspection Manual including control values and standardized inspection procedures was drafted and distributed to all food inspectors in Jordan.
- Preparation of JFDA food laboratory in Shafa-Badran for international accreditation.
- Laboratory testing manuals for JFDA food laboratories and training on new methods delivered and implementation in process.
- New and modern laboratory and sampling equipment were delivered.

Other outputs of the Twinning Project are to be implemented in due time.

JFDA has embarked on a twinning project with the Danish Veterinary and Food Administration (DVFA), and the Twinning Grant Agreement was signed in March 5, 2005. Through this 24-month duration twinning project, the DVFA will cooperate with JFDA to reorganize and upgrade the food inspection system in Jordan including food laboratories.

Imported Food Control

Monitoring of imported food for compliance with food regulations is based on a risk based system. The system places emphasis on products considered as high risk food products in terms of human health. Food products have been classified to three categories (high, medium, and low risk) based on the potential health risk associated with each category. Based on this classification, levels of inspection and sampling operations for laboratory analysis were identified.

The current (RBS) for inspection of imported food relies heavily on the categorization of food according to its composition and food characteristics like PH, Water activity, etc. Ready to eat food is categorized differently to raw food, and food processing is also taken into account.

JFDA is currently reviewing the current RBS; country of origin, history of the product and other new parameters will be adopted in the modified RBS. The percentage of sampling for laboratory analysis will be decreased and the quality of physical check and documentary check will be improved through better training and supervision.

The risk-based system allows for the allocation of resources to the most important areas of consumer protection. It enhances the effectiveness of the control measures by having a predetermined plan of what entries will be sampled, while not spending scarce resources on those entries which have little to no impact on the health of the consumer.

The control is exercised through the computerized selectivity module of the Automated System for Custom Data (ASYCUDA). Food entries entered into the ASYCUDA system will be identified by their Harmonized System HS code for specific handling by food control officials in the clearance procedures based on the category in which the food is identified.

In 2007 (1) % of imported food consignments were rejected due to non-conformity with Jordanian food technical regulations. An annual average of (30) thousand imported food consignments are handled by JFDA staff in Customs Centers.

Control of Local Food Businesses

In 2006 JFDA categorized all food businesses in Jordan according to risk. Food businesses are risk-categorized to allow for proportional inspection frequency; High Risk Businesses are to be inspected more frequently while Low Risk Businesses will receive less inspection visits as long as they comply with the relevant food legislation.

The risk categorization was based on several criteria, e.g: type of food handled, size of production, history of compliance with relevant regulations, implementation of quality control systems like “Good Manufacturing Practices”, “Good Hygienic Practices’ and HACCP.

In 2007 11% of inspection visits ended with warning to food businesses due to non compliance with relevant regulations and 1% of the inspected businesses were brought to court. One out of every 250 inspected businesses was closed due to critical violations.

During the period from September 2006 to August 2007 three outbreaks of Salmonellosis occurred in Zarka, Madaba, and Balqa Governorates; two thousand consumers of Shawerma were affected in the three Governorates. JFDA reacted promptly and tightened control measures on Shawerma restaurants; new regulation on hygienic requirements for the production of Shawerma was issued and came into force by October 2006. The new regulation requires that every Shawerma restaurant must have a “Quality Own Check Programme” and a “food-safety supervisor” to be responsible for the proper implementation of the “own check programme”. So far JFDA conducted eight (3) day workshops to train the food-safety supervisors on the safe handling of food and on implementation of a HACCP- based own-check programme tailored to Shawerma restaurants. JFDA drafted a Guide on safe handling of food and the basics of food-safety for food handlers; the Guide was distributed to all food-safety supervisors in Shawerma restaurants.

Main challenges

Of the main challenges facing the food control system in Jordan are the following:

- Gaps and overlaps across the food chain.
- Limited use of risk assessment to provide a scientific basis for management decisions.
- Lack of multidisciplinary inspection teams.
- Lack of adequate laboratory services.
- Lack of accredited food laboratory services

Food Control Legislation

The basic legislation that regulates food control in Jordan is the Food Law no.79/2001. According to the food law, JFDA is the official agency entrusted to regulate and supervise food control activities in Jordan.

Article 4 of the food control law states: “With due regard to the valid agricultural law, JFDA will be the only party responsible for food control, whether locally produced or imported, in coordination with any public party concerned if the Director General deems that necessary.”

Other legislations related to food safety include “Agriculture Law” which identifies the role of MoA in areas of animal health, plant health, and use of pesticides, feed, fertilizers and growth promoters. A number of enabling food regulations are available, among the most important are:

- Regulations for the transport, storage and display of food products.
- Sampling plans for imported food.
- Regulations for licensing of food plants.
- Regulation for hygiene requirements in food –service establishments.

Available are more than 400 food and food related standards and technical regulations issued by JISM in cooperation with JFDA and other official concerned agencies. Most of these standards are Codex-based.

JFDA has completed the final drafting of a new Food Law that will replace the current Food Control Law; the new food law incorporates the more up-to-date concepts of food control, stresses the position of JFDA as the National Competent Authority for food control in Jordan and highlights the responsibility of food operators for food safety. The new food law ensures the harmonization of food control regulations and measures in Jordan with the Codex Alimentarius Commission standards and guidelines and with the Sanitary and Phytosanitary Agreement (SPS) of the World Trade Organization (WTO).

Laboratory Support Services

JFDA has 3 food laboratories in Amman (Shafa-Badran Food Lab), Amman Customs Centre and in Irbid within the Jordan University of Science and Technology (JUST) Campus. Shafa-Badran Food Lab is the main laboratory for food control in Jordan where an annual average of (40) thousand food samples are analyzed. In this lab food samples are tested for microbiological pathogens (Salmonella, Shigella, Listeria monocytogenes, Campylobacter, etc.) and for chemical contaminants and food additives (Aflatoxins, preservatives, food colours, etc.). Shafa-Badran Food Lab with the support of the EU is preparing now for national and international accreditation.

The Municipality of Amman has also a well-equipped food laboratory for the support of food control activities within the Greater Amman area.

With the support of the EU and JFDA (ASEZA) established a modern food lab in Aqaba (Ben Hayyan Lab) where food samples from food consignments imported through the Port of Aqaba are analyzed according to JFDA standards.

Food laboratory of the faculty of Agriculture in the University of Jordan is frequently used by JFDA as a reference laboratory for microbiological analysis. For sophisticated food chemical analysis, laboratories of the Royal Scientific Society (RSC) are considered the most competent.

During the melamine-contamination incident in China, the RSS food lab was used by JFDA to test imported milk and milk products for melamine

Although the food control law no. 79/2001 is the main legislation governing food control activities in Jordan, there are other laws and regulations that address specific aspects of food control:

- Crafts and industries law no. 16/1953.
- Agriculture law no. 44/2002.
- Standards and metrology law no. 22/2000.
- Veterinary profession practice law no. 10/1988.
- Slaughterhouses by-law no. 1/1985.
- Codex Alimentarius Commission guidelines and codes of practice.

Classification of Food Industry by Sector

Food Sector	Number of Businesses
Preparations of cereals, flour, starch, milk and pastry products	197
Sugars and sugar confectionery	126
Preparations of vegetables, fruits, and nuts	72
Cocoa and cocoa preparations	59
Beverages, spirits and vinegar	27
Preparations of meat	19
Miscellaneous edible preparations	134
Total	634

Source: Amman Chamber of Industry

Food-borne Disease Surveillance

The surveillance of food borne infections and intoxications in Jordan is based on two systems by which relevant data are collected:

1. The notification system.
2. The outbreak reporting system.

Health directorates receive notifications on individual cases and outbreaks from physicians working in MOH health centres and hospitals, and sometimes from the general public. The Disease Control Directorate (DCD) in MOH collects weekly and monthly data reported to the 12 Directorates of Health in the country. The data are compiled weekly, monthly and on an annual basis and are disseminated to health directorates all over the country.

1. Notification system

Forty-two communicable diseases, including cholera, bloody diarrhoea, food poisoning, hepatitis A, brucellosis, typhoid and paratyphoid fever are notifiable in Jordan. The attending physician must notify the district medical officer of any patient suffering from these diseases. The notification may be based on clinical diagnosis only or on clinical diagnosis supported by laboratory confirmation.

According to the MoH Statistics for 2007, the incidence for Typhoid and Paratyphoid fever and Hepatitis A has been declining in recent years, while incidence for bloody Diarrhoea and Brucellosis has been rising; for Typhoid and Paratyphoid fever the incidence was (0.28) per 100,000, compared to (1.2) for the period 2002-2006, and for Hepatitis A it was (6.8) compared to (7.9) for the same period. The incidence for Brucellosis was (3.9) per 100,000, compared to (3.2) for the period 2002-2006, and for bloody Diarrhoea it was (33.2) compared to (6.1) for the same period.

According to MoH Statistics for 2003, the incidence for notifiable food borne diseases has been declining in recent years; for bloody diarrhoea it was 4.8 per 100,000, compared to 12.7 for the period 1998-2002; for typhoid and paratyphoid fever the incidence was 0.6 compared to 1.4 for the period 1998-2002; hepatitis A: 10.2 compared to 16.9 for the period 1998-2002; brucellosis: 14.5 compared to 4.1 for the Average I.R for the period 1998-2002.

2. The outbreak reporting system

District medical officers report outbreaks occurring in their districts even if no laboratory results proved to be positive. Reported details include the place of the outbreak, the number of people infected, symptoms, suspected foods and description of food handling.

Epidemiological investigation of the outbreak also includes examination of faeces, vomitus, throat or skin of persons involved in the preparation and serving of the food, as well as bacteriological examination of the incriminated food or water.

The district medical officer usually carries out the investigation in order to find out the vehicle, the source of infection, and possible contributing factors to recommend adequate control measures and future preventive strategies. Outbreaks in institutions and community at large rather than family outbreaks are targeted.

Limitations of the Surveillance System in Jordan

- Underreporting from the private medical sector.
- Limited laboratory diagnostic capabilities that do not fully allow for definite identification of the whole range of microbial causative agents.
- Questionable quality of food poisoning outbreaks investigations.
- Only few food borne diseases are included in the list of notifiable diseases.

Jordan Burden of Food Borne Diseases Sentinel Study

Only limited information is available on the burden of illness resulting from food borne pathogens in the Eastern Mediterranean Region. As part of a strategy to reduce food borne diseases globally, WHO in collaboration with MoH, selected Jordan to be the first sentinel site in this global effort to study the burden of illness due to Salmonella (including S. Typhi), Shigella, and Brucella.

A nationwide cross-sectional population survey was conducted using multistage cluster sampling design and face-to-face interviews during September 2003 and May 2004. The study showed that

8% of the Jordanian population had diarrhoea and 2% had fever in September 2003, and 6% had diarrhoea while 1% had fever in May 2004. About one in five persons with diarrhoea and one in two with fever sought medical care in September 2003. Two out of five persons with diarrhoea and four in five with fever sought medical advice in May 2004. The laboratory survey identified 1,191 stool specimens tested; 10 (0.8%) yielded Shigella and four (0.3%) yielded Salmonella. Of 2,951 blood specimens tested, 40 (1.4%) had a Brucella titre >160. None of the 2,042 blood specimens tested yielded S. Typhi.

In contrast, MOH laboratories reported three Shigella and thirteen Salmonella cases during the study period. Burden of illness calculations estimated that 16,260 cases of Shigella (306 per 100,000 population), 6,612 Salmonella (124 per 100,000), and 6,912 Brucella (130 per 100,000) are registered each year in Jordan. This study provides evidence for the first time in Jordan of a large burden of food borne pathogens and highlights the magnitude of under-reporting and under diagnosis of food borne pathogens at all stages in the surveillance system. Improving the laboratory capacity and the laboratory reporting system, identifying risk factors and sources of transmission, and ultimately linking information on the genotypic characterization of the isolated pathogens with ill subjects and food items should be priority to plan rational control strategies in Jordan.

Food Control in Jordan and Codex

Jordan has a national codex contact point, which is located at JISM. The national codex committee (NCC) was established many years ago, but the committee became more active during the last two years, after moving the codex coordinating committee for the Near East from Cairo to Amman.

Consumer Participation in Food Safety

The National Society for Consumer Protection (NSCP) was established in 1989. The society represents consumers in NCC, JISM Board, and Higher Committee of food control, Technical committee and BSE committee. NSCP is very active in consumer education in general, and in food safety issues in particular through mass media (Television, radio, daily and weekly newspapers). NSCP publishes a monthly newsletter and quarterly magazine. It has a website to inform and educate the consumer.

Knowledge, attitude and practice of food handling among housewives

In August 2003, JFDA conducted a KAP survey on food handling among 500 housewives in the city of Amman. The study was funded by WHO and aimed at exploring the food handling knowledge, attitudes and practices of housewives. Study results were used as basis for consumer awareness campaigns in the area of food safety.

The study sample consisted of forty-two clusters (residential blocks). Twelve households were drawn from each of the forty-two blocks by systematic sampling. 501 housewives from all socioeconomic classes participated in the survey. A pre-tested questionnaire was used to survey the housewives by direct interview and observation. The age of 71% of the study subjects ranged between 26 and 55 years of age, and the mean number of school years for the housewives was nine years.

Although education had a favourable effect on food handling knowledge and practice, the survey results indicated that this effect was neither decisive nor consistent throughout the different handling practices.

The study revealed important gaps and misconceptions in the knowledge and practices of food handling among housewives, especially in the following areas:

- Cross contamination.
- Thawing of frozen food.
- Reheating of cooked food.
- Leaving cooked and ready to eat food outside the refrigerator for more than 2 hours.

The temperature of refrigerators in the study households was measured by the use of calibrated digital thermometers. Only 25% of refrigerators were maintained at a temperature from one to seven degrees Celsius, while 50% of them exceeded ten degrees Celsius. This constitutes a food safety threat in which highly perishable foods may not be kept at a temperature to prevent growth of food-borne pathogens.

Additionally, the 2004 Jordan Global School-based Student Health Survey (GSHS) of students aged 13-15 years used a sample of 2,457. The survey revealed that 7.5% of students never or rarely washed their hands before eating during the past 30 days of the survey, and 5.6% never or rarely washed their hands after using the toilet or latrine during the past 30 days.

In summary, there is a decreasing incidence of food-borne diseases in Jordan. The government recognized the true extent of health and economic consequences of food-borne diseases (including diarrhoeal diseases), hence, Jordan Food and Drug Administration was established and declared as the authority responsible for food safety control and improvement. Limited data are available to assess the burden of illness resulting from food-borne pathogens. Health education for the general public, and especially housewives, on safe food handling practices is needed.

PART II

FOOD AND NUTRITION POLICY IN JORDAN

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What is Food and Nutrition Policy

Chapter VII
Proposed Policy Objectives and Strategic Directions

CHAPTER VI: WHAT IS FOOD AND NUTRITION POLICY?

Nutrition is a pre-condition to sustainable development. It is also an important determinant of health in any population. The right of individuals to adequate nutrition is crucial.

ICN declares that, as part of national plans of action, governments should generally develop measurable goals and objectives and pledge to reduce starvation and nutritional deficiencies. It is also imperative that basic issues related to health and nutrition should be addressed as part of these plans. These issues include:

- Iodine and vitamin A deficiencies.
- Starvation and widespread chronic hunger.
- Under-nutrition, especially among children, women and the elderly.
- Other important micronutrient deficiencies including iron.
- Diet-related communicable and non-communicable diseases.
- Impediments to optimal breastfeeding.
- Inadequate sanitation and poor hygiene, including unsafe drinking water.

Pre-requisites to an effective national policy

The nutritional situation varies from one country to another and priorities will vary as well. *Accurate situation analysis* and definition of priorities should therefore be the first step in developing effective action plans.

Political will, well-conceived policies and concerted actions at national and international levels can have a dramatic impact on the global nutrition situation. The situation in each country and region needs to be assessed in order to set priorities for formulating specific national and regional plans of action. These plans should identify short and long term objectives, specify quantifiable goals (where feasible) to be achieved within specific time frames, and define the roles of government, ministries and other stakeholders. This should include estimates of resources that may be acquired. In addition, the plan should take into consideration the world declaration on nutrition at all stages.

According to the 1992 world declaration on nutrition, the overall objectives of an action plan on food and nutrition include:

- Ensuring continued access by all people to sufficient supplies of safe food for a nutritionally adequate diet. Supplies may include a variety of safe foods at affordable prices and safe drinking water. Access by all refers especially to the poor and vulnerable groups.
- Achieving and maintaining health and nutritional well-being of all people. Nutritional status depends on the availability of sufficient knowledge about appropriate diets, and taking into account local food habits to prevent problems of under nutrition and diet-related non-communicable diseases.

- Achieving environmentally sound and socially sustainable development to contribute to improved nutrition and health. Equally important is the implementation of national development policies that achieve and maintain a balanced relationship between rural and urban areas.

It is vital to obtain *firm commitment from all relevant government sectors* to promote nutritional well-being and to incorporate nutrition objectives into their plans, programmes and projects.

Equally important is *coordination and harmonization among various sectors* with regard to nutritional issues.

Development strategies to reduce poverty and ensure better nutrition for all, should be oriented towards achieving economic growth with equity, ensuring justice, protecting and promoting the well-being of all, particularly of the vulnerable groups (mostly female children and adolescents).

Local community involvement including households is a prerequisite for improving food production and sustainability of food programmes. The importance of this sector in the processing and distribution of food should be recognized. To improve self-reliance and positive outcomes, special efforts must be made to ensure the genuine participation of the poor and marginalized.

Women are inherently entitled to adequate nutrition in their own rights as individuals. However, their role as the main food and nutrition providers in households should also be considered in developing a national food and nutrition plan. The plan should provide support for their effort to constantly balance their reproductive, nurturing, educational and economic roles, which are important to the health and nutritional well-being of the household.

Nutritional well-being is a prerequisite for the achievement of full social, mental and physical potential in a population. As such, it is necessary to *strengthen the teaching of nutrition* in universities, medical and agricultural faculties, schools of health sciences and other concerned educational institutions.

Population and health policies should have special priority while establishing a food and nutrition strategy. Policies should allow parents to freely and knowingly determine the number of children and spacing of their births. Health policies require action of many social and economic sectors. Inequities of the health status that exist among populations and communities are unacceptable and require urgent political, social and economic attention. It is the government's responsibility to protect and promote the health of their people and to formulate national policies, programmes and services in accordance with strategy for health for all. Special attention should focus, during the development of the national plan, on poor and disadvantaged populations.

As indicated above, improved nutrition requires the coordinated efforts of relevant government ministries, agencies and offices with mandate in agriculture, livestock, food, health, water supply, public works, supplies, planning, finance, industry, education, information, social welfare and trade. Many inter-sectoral issues must be addressed in a plan of action with close cooperation and coordination. This includes the establishment of infrastructure of bodies to address nutritional problems with attention to training and management skills, to support research, and to strengthen educational systems and social communication mechanisms. Nutrition training may include a wide

range of areas/sectors of agriculture, health, economics and education, in addition to establishing a better monitoring and surveillance system.

In summary, a food and nutrition policy is a policy with a preventative and clinical health perspectives based on human rights. The basic idea is that all members of the society should be granted enough food to grow and develop without disorders due to malnutrition (under or over nutrition). The food and nutrition policy should adopt an integrated approach with collaboration among all relevant government ministries, non-governmental organizations (NGOs) and UN agencies.

Who Formulates the Policy?

The food and nutrition policy should be formulated with leadership by the Ministry of Health and Agriculture, and involvement of other related sectors. It should be approved by the Cabinet.

The food and nutrition policy must have a strong backing at the highest political level. It should be implemented by a responsible council and have a permanent office staffed by professionals with adequate resources to effectively implement the policy and its programmes.

Aims of the Policy

As indicated earlier, the main aims of the policy are:

- Reduce the prevalence and burden of diet-related diseases.
- Ensure that the food products are safe in terms of health.
- Strengthen the influence of the consumer on the food and nutrition policy.
- Promote safe production, distribution and marketing of food products, and to safe behavioural and consumption patterns related to health, environment and resources.

Based on the above mentioned aims, the Food and Nutrition Policy should therefore address:

- Control of nutritional disorders including micronutrient deficiencies.
- Maternal and child health and breastfeeding patterns.
- Control of communicable diseases.
- Control of non-communicable diseases.
- Balance of food intake and physical exercises.
- Legislation on food security and safety.

Steps followed for the development of the draft Food and national policy document

First national seminar

On 19 May 2002, in collaboration with the MoH and MoA, the WHO organized a national seminar during the initial phase of the development of the Food and Nutrition Policy. Participants included the main stakeholders at the national level and relevant international and UN agencies. Participants included representatives from Ministries of Health, Agriculture and Higher Education, as well as, National Council for Family Affairs, WHO and other UN agencies, interested NGOs and parties from the private sector and media. The objectives of the seminar were:

- To review available data on nutritional patterns in Jordan.
- To discuss action taken and activities implemented since the ICN in 1992.
- To identify existing gaps in essential data on food and nutrition surveillance.
- To discuss challenges related to food and nutrition.

The main findings of the seminar and the impressions of the consultants were as follows:

- No comprehensive analysis of the nutritional situation in Jordan was available.
- There are many highly motivated and experienced people within the ministries, universities, NGOs and UN agencies.

A document named “National Plan of Action in Jordan” was written in 1996, but not endorsed and implemented. Possible reasons for the lack of follow up and implementation could include inadequate inter-and intra-sectoral collaboration, low priority given to the importance of the topic, and possibly lack of political leadership. However, the following proposed initiatives mentioned on the 1996 plan have been successfully implemented:

- The food control system has become more efficient and a new law on food control has been approved.
- Many new MCH centres have been established.
- Salt has been iodized.
- Baking flour has been fortified with iron and folic acid.
- Much of the basic data required for an integrated food and nutrition policy are probably available. However, the data, some of which were quite old and un-standardized, have to be put together, secured and interpreted in a more concerted way and the results discussed thoroughly. There are some conflicting data on obesity and vitamin A deficiency.
- Jordan has neither food-based guidelines nor recommendations regarding intake of nutrients.

- Nutrition education in medical and nursing schools appears to be adequate.
- There is serious stunting in children under the age of five.
- There are still problems with intake of iodine based on the prevalence of goitre and anaemia.
- There are still signs of sub-clinical vitamin A deficiency in some areas.
- The body weight of Jordanians is increasing and the prevalence of diabetes is increasing.
- Mortality statistics reveal that cardiovascular diseases and cancer, the two leading causes of death, are increasing. These diseases will present a huge health and economic problem in the future if prevention against these diseases is not taken seriously.
- Physical activity patterns among Jordanians are inadequate. Municipal-town planning does not encourage physical activity.
- Smoking is frequent, especially among men, and there are extensive advertisements for cigarettes.
- The atmosphere and interests shown in the informal seminar on May 19th are encouraging for the future work in the field of food and nutrition.

Based on the situation analysis exercise and the proceedings of the seminars, the following was recommended for immediate action:

- Formulating a high technical task force for the development of the policy and action plan. Members should have a deep knowledge in the field of food and nutrition policy (health, agriculture, education, food safety and security, epidemiology, planning, trade). The “technical committee: should form thematic groups for discussing areas.
- Securing and compiling intra and inter-sectorally pertinent data from previous databases and set up guidelines and recommendations for collecting new data. This has to be done to monitor and evaluate the actions and projects to be started. Persons working with this could be the thematic group on “statistics and data”, see above.
- Developing an in-depth analysis of the nutritional situation for discussion and identification of priorities in October 2002.

Based on the above recommendations, a task force to develop an in-depth situation analysis report was formed. Members of the task force including the following (in alphabetical order):

- Dr. Ahmad Barmawi
- Dr. Ala'din Alwan
- Dr. Hamed Takruri

- Dr. Ibrahim Al Khatib
- Dr. Rafiq Hamdan
- Ms. Wissam Qarqash

Second National Seminar

The first draft, developed by the Task Force, was discussed during the second seminar which was held from 22-23 January 2003. The terms of reference for the second seminar were to:

- Discuss the first draft of the situation analysis report on nutritional patterns in Jordan which was developed following the first seminar held in May 2002.
- Identify issues, challenges, and priorities in the area of food and nutrition in Jordan.
- Initiate discussion on the strategies that may be adopted in each of the major components of the national policy which include: food security (sufficiency and accessibility), food safety and consumer protection, diet-related chronic diseases and healthy dietary patterns, micronutrient deficiencies and childhood nutrition, breastfeeding and nutrition of disadvantaged and vulnerable population.

Participants were split into six working groups according to the above nutrition components. Each group had to discuss the following:

- Identify missing or inaccurate information.
- Agree on gaps in baseline data which need to be generated in a next step.
- Develop a list of major issues and challenges that require further clarification in the national nutrition policy.
- Prioritizing the items agreed upon in the working paper.

Reported Findings of the Working Groups

1. Breastfeeding group identified the following issues and missing data:

- Exclusive breastfeeding.
- Complementary feeding.
- International conference on marketing of breast milk substitutes.
- Advantages and disadvantages of breastfeeding.
- Strategies for promoting breastfeeding, counselling services and maternity leave.

2. Diet-related Diseases and Healthy Dietary Patterns group: this group emphasized the importance of education for individuals on obtaining healthy diets and they identified the following issues:

- High prevalence of cardiovascular diseases and cancer.

- Lack of physical activity and wide-spread habits of smoking in Jordanian life styles.
- Absence of standardized questionnaires for data collection on eating habits, smoking and physical activity.

3. Food Safety and Consumer Protection group highlighted four key components of food safety: consumer, industry, producer, and government. The consumer has to be aware of food prices, food preparation methods and knowledge through radio, TV and newspapers. The food industry has to implement HACCP system in food plants, carry out inspection, training of personnel and assure quality control at food sites. Producers are expected to apply quality control measures, HACCP system, monitor personnel hygiene and control any possible cross-contamination when processing food. Finally, the government plays a crucial role in imposing laws and regulations regarding food producers and industry, monitoring imported food and educating consumers on food safety and food prices through common news papers and radio.

4. Food Security group emphasized the importance of providing adequate food for people at affordable prices. Two major components of food security were identified: food supply and food demand. The food supply component addressed domestic production, food import and food distribution system. The food demand component addressed consumer protection, food budget for the poor, economic adjustment and restructuring programmes, and consumption of basic food items (bread, legumes, etc...). Priorities and challenges for providing food security were:

- Ensuring sufficient food for the population.
- Ensuring sufficient investment in agriculture and food production.
- Encouraging domestic food production.
- Improving nutrition of the poor.
- Improving food distribution system.

5. Nutrition of Disadvantaged and Vulnerable groups: this group includes preschool children, pregnant and lactating women, the poor, the homeless, people with specific therapeutic needs, the elderly and displaced population and stressed persons in emergencies. Major challenges were identified in the following areas:

- Inadequate data on nutritional and food consumption patterns.
- Lack of effective national council structure for nutrition and diet.
- Shortage of manpower.
- Inadequate concern from the food industry to nutrient fortification of food fortification and lack of availability of therapeutic diets.
- Lack of dietary guidelines for normal as well as vulnerable groups.

6. Micronutrient Deficiencies and Childhood Nutrition: this group addressed three main points to approach micronutrient deficiencies and childhood nutrition: priorities, strategies and interventions.

A) Priorities:

- Reach a single standardized clinical testing and neonatal screening for iodine deficiency.
- Agreement on an Iron supplementation strategy and conduction of an impact survey.
- Vitamin A supplementation for children and eight-week supplementation during postpartum.

- Data collection on zinc, folate and other micronutrient deficiencies that might be present but invisible.
- Conduct campaigns and establish committees to promote awareness on micronutrient deficiencies.

B) Strategies:

- Establish a programme for neonatal screening.
- Establish a national programme for iron and vitamin A supplementation.
- Form a national consultative group on micronutrient deficiencies.
- Form a group of physicians and nutrition specialists to formulate plans.

C) Interventions:

- Monitoring and evaluation of implemented programmes.
- Capacity building and training of human resources.
- Research and assessment.

Third National Seminar

Following the identification of key issues, challenges, and priorities, a working paper on policy objectives and strategies was developed and subsequently discussed by the six Working Groups during the third national seminar held in July 2003. For each policy objective a set of strategies were identified.

Implementation will further require identification of enabling environments needed for each strategy and measures like legislative, technical, advocacy, capacity building, financial, and administrative interventions or approaches. While measures and interventions will be discussed in more depth during the subsequent development of the action plan at a later phase, every effort should be made to identify them in broad terms as part of the outline of the national policy on food and nutrition.

Fourth National Seminar

In 2005, the fourth and final seminar was held to update the situation analysis part of the document and to review the strategies proposed under each policy objective.

CHAPTER VII: PROPOSED POLICY OBJECTIVES AND STRATEGIC DIRECTIONS

Policy Objective (1): Incorporating healthy nutrition objectives into the National Health Development Plan.

The overall purpose is to strengthen the nutrition component in national development plans, government policies and programmes.

Strategies to be adopted:

1) Assessing the impact of existing socio-economic development plans on nutrition status, and identifying the most crucial factors affecting food security and nutritional status.

Main Approaches/Activities:

- To form an inter-sectoral committee to review existing services and plans. Members should have the relevant experience and are authorized to make recommendations to policy makers.
- To establish food and nutrition units in the Ministry of Agriculture and other key ministries in order to take part in planning, implementation and monitoring of nutrition plans. The functions of such a unit could be integrated into existing administrative and managerial structures in these ministries.
- To review ongoing projects and programmes relevant to nutrition in different ministries including the Ministry of Education, and to ensure that healthy nutrition objectives are effectively incorporated.
- To evaluate the nutrition component of the poverty alleviation strategy and recommend relevant interventions to reinforce healthy nutrition for poor and disadvantaged populations.

2) Strengthening and standardizing data collection on nutrition for policy development and evaluation.

Main Approaches/Activities:

- To conduct dietary consumption surveys by the Department of Statistics, in collaboration with other relevant sectors, on regular basis (every 5 years).
- To coordinate data collection and research related to the implementation and evaluation of the national food and nutrition policy (a function of the inter-sectoral committee or one of its subcommittees).

3) Promoting community participation to identify problems and monitor progress of intervention programmes and strengthening partnerships.

Major Approaches/Activities:

- To encourage nutrition projects and incorporate healthy nutrition activities in the Healthy Villages programme and in similar community-based projects.

Major indicators for incorporating health nutrition objectives in the national health development:

- Access to quality health and nutrition services.
- Availability of nutrition education community-based programmes.

Policy Objective (2): Improving food security.

The overall objective of the policy is to improve the nutritional status of the people of Jordan through multi-sectoral and coordinated interventions that focus on food security and improved nutrition. This policy objective is consistent with the policies and strategic directions of the National Agricultural Development Strategy 2003-2010.

Strategies to be adopted:

1) Promoting the availability of the main food commodities from domestic resources:

Main Approaches/Activities:

- To increase food production of main food commodities at national and households levels.
- To improve agricultural productivity.
- To promote and diversifying the production of food commodities to meet the nutritional needs of households.
- To ensure that agricultural resources, water, soil and other agricultural resources are well managed.
- To encourage and support operational and applied research to improve food production, and disseminating the research results to the end users.
- To encourage income-generating activities that improve the purchasing power of families.
- To implement agricultural national strategy related projects and enabling environment.

2) Diversifying food exports according to the food security needs of the country, and monitoring and regulating the quality and quantity of food imports, as necessary.

Main Approaches/Activities:

- To encourage farmers to diversify and increase food production for export without prejudicing national food security.
- To monitor and document national food supplies and demand.
- To protect local production from unfair competition of imports, violations in the area of public and plant health and fraudulent trade practices prohibited by the WTO, through good understanding and the preparation of concerned Government agencies to implement the relevant WTO agreements.
- To strengthen advisory services to farmers in order to diversify and increase food production for export without prejudicing national food security.
- To establish a mechanism for monitoring and documenting national food supply and demand.
- To strengthen the food monitoring system including the detection and prevention of dumping of sub-standard and toxic food.

3) Addressing inequalities and improving nutrition of poor and marginalised populations.

Main Approaches/Activities:

- To promote small scale income generating projects.
- To subsidize food budgets of the vulnerable and poor households.
- To encourage investment in labour intensive projects; i.e., micro credit projects and provide incentives for investments in disadvantaged areas.
- To provide nutrition education in schools.
- To develop promotional materials, guidelines and leaflets.

Major Food Security Indicators:

- Sufficient quantities of appropriate, necessary types of food from domestic production, commercial imports, or donors are consistently available to households or are in reasonable proximity to them.
- Households have adequate incomes or other resources to purchase to obtain levels of appropriate foods needed to maintain consumption of an adequate diet and nutritional level.
- Households use foods properly as evidenced by existence of proper food processing and storage practices, adequate knowledge and application of nutrition and child care, and adequate health and sanitation services.

Policy Objective (3): Strengthening food safety and consumer protection.

Strategies to be adopted:

1) Protecting public health and consumers from unsafe and potentially hazardous food through review and enforcement of food legislation.

Main Approaches/Activities:

- To amend the current food law.
- To develop by-laws and technical regulations necessary to cover all aspects of the food control system.
- To develop an "Inspection Manual" for food inspectors, to enhance the enforcement of food legislation and to standardize performance.

2) Improving the food control system.

Main Approaches/Activities:

- To build/strengthen national capacity in administration, food inspection, and Food Information Management Systems (FIMS).
- To improve sampling methods through availability of proper sites for sample collection, sampling tools and utensils, and sampling transportation.
- To incorporate risk-based approach into food control systems on imported and locally produced food, and the use of risk assessment to provide scientific basis for management decisions.

3) Strengthening food laboratories.

Main Approaches/Activities:

- To establish quality control systems for food testing.
- To train food-laboratory technicians on modern technologies.
- To provide food laboratories with modern equipment.
- To establish Laboratory Information Management System "LIMS" in food laboratories.

4) Promoting national awareness on food safety.

Main Approaches/Activities:

- To encourage consumer society to participate in public education through mass media.
- To promote producers' awareness and involvement by education and training.
- To establish self-control systems.

5) *Strengthening FBDs surveillance.*

Main Approaches/Activities:

- To support data collection and research in the field of food safety and quality. Priority research areas include pesticide use in agriculture, the use of veterinary drugs in farm animals, and implementation of HACCP in the food industry.
- To strengthen systems for monitoring food pathogens and chemical contaminants, e.g. salmonella, brucella, aflatoxins, dioxins, and biphenyls.
- To establish links between epidemiological data on FBDs and food monitoring programmes.
- To improve the quality of FBDs and investigation of food poisoning.

6) *Implementing international norms and regulations strengthening partnerships and coordination with relevant international organizations and agencies.*

Main Approaches/Activities:

- To comply with international and bilateral agreements e.g. SPS and TBT.
- To harmonize food control regulations and procedures with that of Codex Alimentarius Commission and other internationally recognized bodies.
- To encourage joint work with relevant NGOs, consumer protection societies, charity organizations, syndicates, chamber of industry, chamber of commerce, universities and scientific institutions.

7) Encouraging food operators to implement HACCP in their facilities.

Main Approaches/Activities:

- To make the implementation of HACCP mandatory in food businesses on a gradual and selective basis, depending on risk categorization of the food sector and economic and technical feasibility.
- To train food inspectors on HACCP and HACCP audit.

Food Safety indicators:

- Change in the Incidence of foodborne diseases.
- Number of labs with quality assurance systems in place.
- Proportion of slaughter houses complying with sanitary measures.
- Proportion of food industry institutions implementing HACCP.
- Proportion of food businesses complying with health requirements.
- Number of qualified staff working in food control quarantine and border-crossing points.
- Number of food importers in compliance with good importing practices.

Policy Objective (4): Promoting infant and childhood nutrition and preventing micronutrient deficiencies.

Strategies to be adopted:

1) Reducing the prevalence of VAD among children.

Main Approaches/Activities:

- To diversify dietary consumption of vitamin A rich foods.
- To disseminate supplementation programmes of vitamin A to target groups through distribution of vitamin A supplementation to infants at the time of measles and MMR vaccination, giving one shot of vitamin A to every case of measles, and mass campaign to cover primary school children in under-privileged areas with two doses of vitamin A.
- To give postpartum women one dose of vitamin A within six weeks after delivery.
- To develop communication strategy for behaviour change through face to face communication, developing IEC materials and mass media programmes.
- To eliminate measles to include sustaining very high coverage of measles vaccine, strengthening measles surveillance, and conducting supplementary immunization activities.
- To conduct continuous monitoring and evaluation.

2) Reducing the prevalence of anaemia among the population.

Main Approaches/Activities:

- To diversify consumption of iron rich foods.

- To establish supplementation programmes to high risk groups e.g. supplements of iron, folic acid and B₁₂ to pregnant women attending health facilities; regular supplements of iron to all under five years of age, especially for those under two years of age.
- To strengthen surveillance and control programmes for diseases like schistosomiasis, malaria, and parasitic infestations.
- To establish a communication and mass media strategy for behaviour change.
- To expand the current flour fortification programmes to include all flours and adding other micronutrients like thiamine, riboflavin, and niacin, and conduct further studies on the causes of nutritional anaemia.
- To strengthen Monitoring & Evaluation through capacity building and research.

3) Eliminating IDD.

- To achieve universal salt iodization and strengthen monitoring programmes.
- To establish a communication and mass media strategy for behaviour change.

4) Reducing chronic malnutrition among the under-five years and young school children in rural and under-privileged areas.

- To promote exclusive breast feeding and complementary feeding practices.
- To strengthen the assessment of growth and development programmes for Under-5 years and young school children.
- To strengthen MCH services and promote the implementation of the IMCI programme.

Infant and Childhood Nutrition Indicators:

- Proportion of breastfed infants for 2 years.
- Proportion of infants less than 6 months who are exclusively breast-fed.
- Proportion of children under 5 with biochemical evidence of VAD.
- Proportion of children under 5 and women in the child bearing age with anaemia.
- Biochemical evidence of iodine deficiency among primary school children.
- Proportion of households consuming iodized salt.
- Prevalence of wasting among under 5.
- Prevalence of stunting among under 5.
- Proportion of obesity among primary school children.
- Frequency of eating meat/fruits/vegetable in the family.

Policy Objective (5): Improving the nutrition of the disadvantaged, socio-economically deprived and nutritionally vulnerable groups.

The overall purpose is improving the nutritional and health status of the disadvantaged, socio-economically deprived and nutritionally vulnerable groups. Interventions will include poverty alleviation, awareness and education, reviewing and updating relevant laws and legislation, capacity building and monitoring and evaluation.

Strategies to be adopted:

1) Addressing the nutritional and health needs of the elderly.

Main Approaches/Activities:

- To prepare and disseminate educational materials through mass media and elderly\care institutions.
- To improve social services to the elderly with nutritional and health problems and conduct outreach visits and counselling for the elderly.
- To include the nutritional and food security component within the national poverty alleviation strategy.

2) Promoting nutrition of Pregnant and lactating women.

Main Approaches/Activities:

- To strengthen the education and awareness of women for their nutritional needs and problems.
- To Train primary health care professionals on dietetics and nutrition.

3) Improving nutrition of infants, toddlers, and adolescents.

Main Approaches/Activities:

- To educate and raise awareness of breast feeding and weaning practices and to encourage the production of complementary food at local and household level.
- To prepare and disseminate education material on complementary foods to be produced at the household level.
- To sensitize the food industry to the needs of producing complementary foods of high nutritional value (high energy and nutrient density).

- To propose legislation that exempts the food industry from taxes on nutrients and special food for children with metabolic diseases and disorders.
 - To provide incentives to the food industry addressing the nutritional problems of children with special nutritional needs.
 - To assess the nutritional status of adolescents in Jordan and create a database on nutritional status and related health issues.
 - To conduct education health and nutrition programmes in schools and other institutions.
 - To develop and monitor good dietary practices in school canteens with active participation of students and teachers.
- 4) *Preventing malnutrition among the homeless, displaced and those with special needs.*

Main Approaches/Activities:

- To ensure the inclusion of food and nutritional needs of this group within the social support and poverty alleviation programmes.
- To strengthen the capacity of the health care facilities to provide the nutritional services for these groups.
- To conduct screening programmes to identify population groups with special needs.
- To develop a package of guidelines and education material for the nutritional needs of the target groups.

Disadvantaged and nutritionally vulnerable populations Indicators:

- Number of screened, diagnosed or detected persons.
- Changes in nutritional status.
- Changes in the prevalence of low birth weight.
- Changes in the number of trained personnel in dietetics, nutrition and health.
- Number of educational activities.
- No of targeted programmes (IEC material, Budget allocated).

Policy objective (6): Preventing Diet Related to Non-communicable Disease.

The purpose is to strengthen efforts to control major risk factors for NCDs that stem from unhealthy diets and physical inactivity by public health action, health promotion and disease prevention measures.

Strategies to be adopted:

1) Establishing a surveillance system and monitoring nutritional patterns and non-communicable disease risk factors.

Main Approaches/Activities:

- To conduct a nationally representative baseline nutritional consumption/intake survey in close coordination with DOS every 5 years, covering the quantity and quality of nutrients in diets, such as intake of saturated fat, energy, dietary fibre, cholesterol, and salt.
- To conduct a regular dietary knowledge and behaviour survey.
- To conduct regular epidemiological studies on other major risk factors (overweight/obesity, dyslipidemia, smoking and physical activity) using standardized methodologies.
- To conduct studies for presence of potentially toxic elements in foods, e.g. pesticide residues, food additives, aflatoxins, radioactivity, chemical toxins

2) Initiating community intervention programmes for risk factor reduction. Activities include:

Main Approaches/Activities:

- To develop pilot community based project on healthy lifestyles and primary prevention of NCDs.
- To train health professionals on healthy diets.
- To develop National Food-based Dietary Guidelines and recommendations for populations and individuals. Such recommendations will include: achieving energy balance and healthy weight; limiting energy intake from total fats and saturated fat and shifting to unsaturated fats; increasing consumption of fruits and vegetables, legumes, whole grains and nuts; limiting the intake of free sugars; and limiting salt consumption from all sources.

3) Strengthening early detection and screening for common NCD risk factors.

Main Approaches/Activities:

- To establish early detection programmes (and campaigns) for dyslipidemia, high blood pressure, overweight, diabetes in high risk people.
- To develop a national strategy for promotion of exercise and physical activity.

- To develop multi-sectoral committee on the promotion of sport and physical activity (Youth, Education, Municipalities, Planning etc...).
- To implement the recommendations of the national workshop on NCDs held in May 2003.

4) Promoting healthy eating patterns ensuring the availability and affordability of healthy food.

Main Approaches/Activities:

- To develop and implement a long-term plan for education of the public on healthy nutrition.
- To introduce nutrition education in school curricula starting at an early age (primary school).
- To design nutritional messages for use through the media.
- To conduct advocacy campaigns to increase awareness on the importance of healthy and low calorie/low fat food (vegetables, seasonal fruits, and low fat diet like skimmed milk, olive oil, and low calorie dairy products, whole meal bread).
- To negotiate and coordinate with the local food industry and provide incentives on the production of healthier foods.
- To discuss with government sectors concerned possibilities for tax reduction or exemption of healthy food products.
- To promote healthy nutrition in school canteens.
- To include healthy nutrition in curricula of medical and health professional education.
- To encourage role models for normal weight and healthy eating.
- To review legislation and enforce food labelling requirements to provide standardized and comprehensive information on the contents of food in order to make healthy choices.

5) Addressing commercial interests which contribute to unhealthy dietary trends.

Main Approaches/Activities:

- To enforce MoH/JFDA approval for nutritional messages broadcast by the media and before advertisements and commercials on food.
- To develop, in collaboration with consumer groups and the private sector, approaches to deal with marketing of food to children and issues like sponsorship, promotion and advertising.

- 6) *Establishing an effective infrastructure for NCD prevention by expanding the NCD Division in the Ministry of Health to enable it to accommodate surveillance, prevention and health care functions for all major NCDs and involving all relevant government and nongovernmental sectors in planning, implementing and evaluating NCD prevention programmes.*

Main Approaches/Activities:

- To strengthen the capacity of the division by appointing additional technical staff particularly in the field of epidemiology.
- To establish a national board for the prevention of NCDs which include all stakeholders and sectors

Diet Related Non-communicable Diseases monitoring and evaluation Indicators:

- An effective surveillance system for nutritional risk factors and trends.
- Proportion of trained health professionals on healthy diet with emphasis on primary care professionals.
- A pilot community-based programme established, implemented and evaluated.
- Proportion of people 40 years and over who are regularly screened for hypertension, diabetes.
- Proportion of health centres practicing blood pressure measurement for people on regular basis.
- National Strategy for the promotion of physical activity developed and implemented.
- Proportion of people practicing regular moderate physical exercise.
- Food based dietary guidelines developed and used to monitor dietary trends.
- Proportion of food items (locally manufactured and imported) which contain adequate labelling on composition and calorie/fat contents.
- An effective national multi-sectoral board for NCD prevention and healthy lifestyles.

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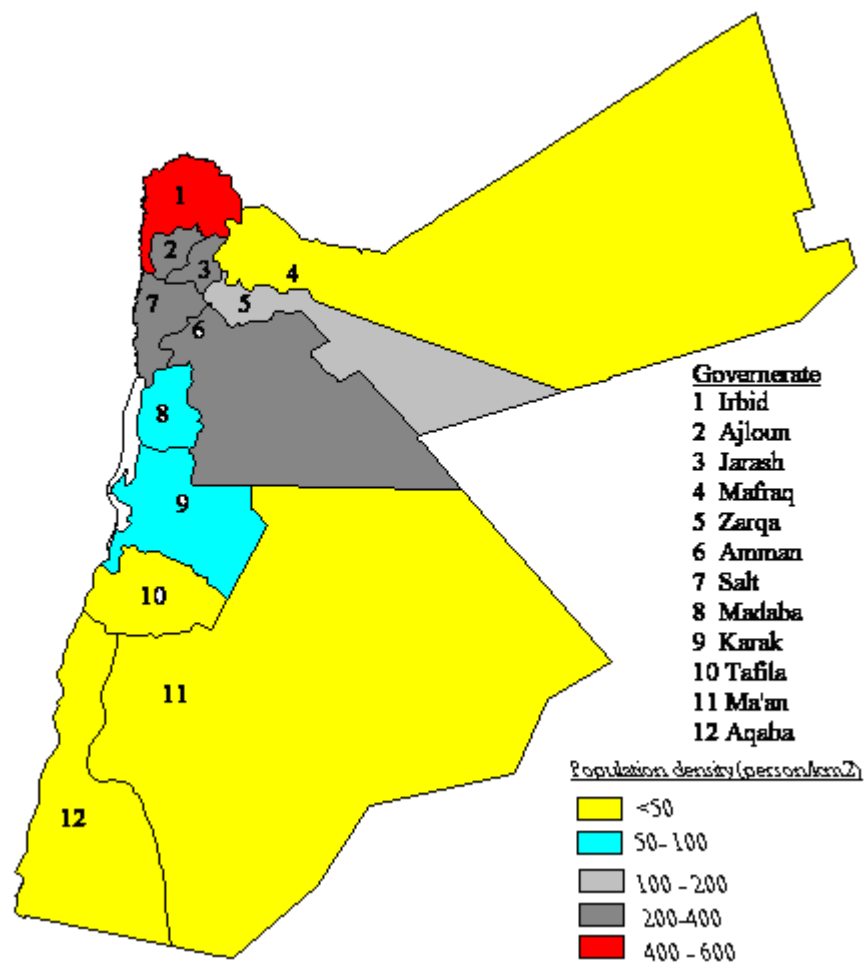
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ANNEX I: MAP OF JORDAN
A Comparative Population Density (person/km²)



ANNEX II: TABLES

Table 1: Demographic and socioeconomic indicators in 2004.

Demographic Indicators	Year	Value
Total Population (000)	2004	5,350.0
Population Growth Rate	2004	2.6%
Average Household Size	2004	5.4
Average Life Expectancy	2004	71.5
Total Fertility Rate	2004	3.7
Crude Birth rate	2004	29.0
Crude Death Rate	2004	5.0
Socio-economic Indicators	Year	Value
Adult Literacy Rate (%): both sexes	2004	90.1
Males	2004	90.9
Females	2004	85.2
Per Capita GDP (Jordanian Dinars)	2004	1,484.0

Source: Department of Statistics. Jordan in Figures 2004.

Table 2: Health status indicators in 2004.

Health Status Indicators	Year	Value
Newborns with birth weight 2,500g or more (%)	2004	93.5
Children with acceptable weight for age (%)	2004	95.6
Infant mortality rate (per 1,000 live births)	2004	22.0
Probability of dying before 5 th birthday (per 1,000 live births)	2004	27.0
Maternal mortality rate (per 10,000 live births)	2004	4.1
Life expectancy for both sexes	2004	71.5

Source: MoH 2004 (DoS 2004).

Table 3: *Leading causes of death in Jordan (2003).*

Causes of Death by ICD-10 chapters	No. of Deaths	%
Diseases of the Circulatory System	2482	38.2
Neoplasms	928	14.3
External Causes	745	11.5
Ill defined and unspecified conditions	407	6.3
Diseases of the Respiratory System	370	5.7
Conditions of Perinatal Period	338	5.2
Congenital Malformations	326	5
Disorders of the Digestive System	229	3.5
Endocrine Disorders	182	2.8
Diseases of the Genitourinary System	159	2.4
Diseases of the Nervous System	138	2.1
Infectious diseases	103	1.6
Others	95	1.4
Total	6502	100

Source: *MoH, Health Information Centre, 2005.*

Table 4: *Breakdown of cardiovascular deaths by ICD-10 blocks.*

Cause of Death	No. of Deaths	%
Ischemic Heart Disease	995	40
Cerebrovascular Disease	707	28
Hypertensive Disease	372	15
Other Forms of Heart Disease	313	13
Pulmonary Heart Disease	44	2
Disease of Arteries	35	1
Disease of Veins	7	0
Chronic Rheumatic Heart Disease	6	0
Unspecified conditions	3	0
Acute rheumatic Fever	0	0
Total	2482	100

Source: *MoH, Health Information Centre, 2005.*

Table 5: Average food intake (Kg/Capita/Year).

Major Food Groups	Average Food Intake (kg/capita/year)		
	1992	1997	2002
DoS sample size	8,000	6,048	12,792
Cereals	201.1	210	218.4
Pulses	6.9	6.9	10.0
Fruits & vegetables	188.0	188.6	213.2
Oils/ fats	22.6	22.3	22.1
Meat	44.5	44.2	55.7
Fish	4.0	3.3	2.9
Milk products	29.6	30.3	35.5
Sugars	44.5	39.4	74.2
Others	48.9	58.0	41.0

Source: DoS, Household Income and Expenditure Survey, Jordan, (1992-1997-2002).

Table 6: Average energy intake (Kcal/Capita/Day).

Daily Per Capita Calorie Intake by Group of Food Items, 1997 & 2002		
Group	Caloric Intake Per Capita Per Day	
	1997	2002
Cereals and Cereal Products	1,607	1,555
Meats and Poultry	233	260
Fish	15	17
Dairy Products and Eggs	121	143
Oils and Fats	265	390
Fruits	84	98
Vegetables	132	175
Dry and Canned Legumes	48	41
Spices and Food Add Ups	3	3
Nuts	17	27
Sugar, Confect and Honey	376	463
Tea, Coffee and Cacao	4	4
Other Food Items	6	9
Beverages	22	30
Total	2,933	3,217

Source: DoS, Household Income and Expenditure Survey, Jordan, (1992-1997-2002).

Table 7: Share in total energy intake (%).

Major Food Groups	Share in Total Energy Intake (%)	
	Years	
	1992	1997
DoS sample size	8,000	6,048
Cereals	50.5	47.6
Pulses	1.8	1.9
Fruits and vegetables	6.8	7.4
Oil/fat	10.4	10.7
Meat	6.5	5.5
Fish	0.5	0.3
Milk products	4.2	4.6
Sugars	12.9	13.5
Others	8.4	8.4

Source: DoS, Household Income and Expenditure Survey, Jordan, (1992-1997-2002).

Table 8: Nutritional status of Jordanian children: results of a nutritional survey

Year of Survey	Location	Sample size	Age (years)	Malnutrition (% of total population)						
				Underweight (Wt/Age)		Stunted (Ht/Age)		Wasted (Wt/Ht)		Overweight (Wt/Ht)
				<-3SD	<-2SD	<-3SD	<-2SD	<-3SD	<-2SD	>+2SD
1990	National	6,602	0-4.99	0.8	6.4	4.3	15.8	0.6	3.1	5.7
	Urban	4,633	0-4.99	0.6	4.9	3.2	12.7	0.6	2.7	6.0
	Rural	1,969	0-4.99	1.3	9.8	6.8	23.1	0.6	4.0	4.8

Source: Khatib I., Hijazi S., and Zoubi A. Nutritional Status of Jordanian Children. A Standardized Analysis of Anthropometric Data of Jordan's 1990-Population and Family Health Survey (JPHS). A Report of IRD/Macro-International Inc., Columbia, Maryland, USA, 1993.

Table 9: Anthropometric data on female adolescents in North Badia and Zarka governorates.

Year of Survey	Location	Sample		Anthropometric Status					
		Size	Age	Height (cm)			BMI (kg/m ²)		
				Mean	SD	Median	Mean	SD	Median
1999*	Zarka	51	11-11.9	149.4	1.1	-	18.8	0.4	-
		261	12-12.9	152.8	0.5	-	19.4	0.2	-
		207	13-13.9	156.1	0.5	-	20.2	0.2	-
		78	14-14.9	158.6	0.9	-	20.6	0.4	-
		25	15-15.9	155.1	1.4	-	20.2	0.4	-
2000**	North Badia	25	10	132.6	5.8	132.0	16.1	1.8	15.9
		32	11	134.7	9.5	131.9	16.5	2.6	16.2
		31	12	141.7	6.7	142.7	17.4	2.4	17.6
		37	13	149.0	7.6	149.9	18.2	3.4	17.4
		26	14	152.5	7.0	153.4	20.7	3.3	19.8
		15	16	155.1	6.5	155.1	21.1	2.6	20.7

Source *Asa'd L. *Some Anthropometric Measurements as an Indicator for the Nutritional Status and Menses for a Group of Girls Aged (10-15 years)*. M.Sc. Thesis, University of Jordan, Amman, 1999.

**Tukan S., Takturi H., and Ahmad M. *Growth Patterns of Adolescent Females Living in Northern Badia of Jordan*, 2002.

Table 10: Results of survey on Jordanian girls from different parts of the country.

Year of survey	Location	Sample size	Age (years)	BMI (kg/m ²)		BMI (%)	Overweight BMI (%)	Obesity BMI (%)
				Mean	SD	17.0-18.5	<25.0-29.9	<30.0
1999*	University of Jordan	276	20-25	22.4	0.2	-	-	-
2000**	Amman	234	20-25	22.9	0.2	5.6	18.4	3.4
	Jordan Badia	233	20-25	23.6	0.3	8.2	27	6.9

Source *Abu Nimeh S. *A Study of Frame Size Patterns of Students at the University of Jordan Using Certain Anthropometric Indicators*. M.Sc. Thesis, University of Jordan, 1999.

**Ahmad M., Tukan S., and Takturi H. *Anthropometric Assessment of Young Adult Women in Northern Badia of Jordan: Comparison with Women in Amman, Jordan*, 2002.

Table 11: Contribution of main food groups to Vitamin A in the Jordanian diet according to governorates.

Governorate	Vit. A Retinol equivalence per capita (mg/day)	Contribution (%)				
		Meat	Dairy	Fats and Oils	Fruits	Vegetables
Jordan	882	23	12	2	3	55
Amman	931	23	14	3	4	53
Irbid	1009	21	10	2	3	59
Zarka	930	29	9	1	3	55
Balka	520	12	16	2	3	62
Mafrak	342	16	16	4	5	53
Karak	549	29	21	4	3	37
Ma'an	939	32	13	7	2	41
Tafileh	679	29	12	6	4	45

Source: Tukan S. (1995); Based on Household Income and Expenditure Survey (1992).

Table 12: Sample distribution according to the intake of the multivitamins.

Category	Number	Percentage (%)
Doesn't take the Vitamin at all.	218	25.4
Take the Vitamin regularly	390	45.4
Doesn't take Vitamin regularly	251	29.2
Total:	859	100

Source: Department of Nutrition, Ministry of Health. Evaluation Study of School Children's Multi-vitamin Supplementation Programme. Ministry of MoH, 2004.

Table 13: Prevalence of urinary iodine concentration by governorates in 1993 and 2000 studies.

Location	Prevalence (%)		Iodine urine concentration*	
	1993	2000	1993	2000
Jordan	37.7	33.5	4.0	15.4
Amman	33.7	27.8	4.8	16.3
Irbid	54.6	49.2	2.6	12.0
Balqa'a	43.9	38.3	1.7	13.5
Zarka	18.1	17.9	6.2	17.0
Karak	22.1	48.3	6.1	18.1
Ma'an	65.6	27.1	1.4	23.0
Mafrak	10.9	36.8	4.6	11.0
Tafeeleh	76.1	42.4	1.6	16.9

Source: MoH (1993) & MoH (2000)

**Median iodine concentration in mg/100ml urine.*

Table 14: Prevalence of urinary iodine concentration by governorates in 2000 and 2004 studies.

Location	Iodine Urine Concentration*	
	2000	2004
Jerash	9.1	25.5
Tafileh	16.9	27.0
Aqaba	26.3	25.2
Total	17.4	25.9

Source: MoH (2000) and MoH (2004).

** Median iodine concentration in mg/100ml urine.*

Table 15: Prevalence of anemia, iron deficiency and iron deficiency anemia among 15-49 year-old women by governorates.

Location	Anaemia	Iron Deficiency	Iron Deficiency Anaemia
Amman	27.1	37.1	20.4
Balka	35.4	45.5	21.2
Zarqa	28.0	33.4	17.3
Madaba	24.4	35.5	13.0
Irbid	44.7	50.5	32.9
Mafraq	27.3	38.7	22.0
Jerash	44.4	47.3	29.3
Ajloun	38.5	36.5	22.9
Karak	29.2	34.6	18.8
Tafila	25.3	40.5	19.5
Ma'an	26.4	56.8	21.3
Aqaba	58.4	62.9	34.9
Total	32.2	40.6	22.5

Source: WHO, UNICEF, CDC and MoH (2002).

Table 16: Prevalence of anaemia, iron deficiency, iron deficiency anaemia and vitamin A deficiency among 12-59 month-old children by governorates.

Location	Anaemia	Iron Deficiency	Iron Deficiency Anaemia	Vitamin A Deficiency
Amman	11.7	32.1	7.7	9.2
Balka	21.9	23.5	8.6	25.3
Zarqa	18.8	21.3	9.5	12.7
Madaba	5.9	15.6	3.6	12.3
Irbid	29.9	27.3	14.0	14.6
Mafraq	27.5	28.3	13.8	21.5
Jerash	34.1	26.4	15.5	34.4
Ajloun	26.3	7.9	5.6	5.6
Karak	29.7	17.6	9.5	23.4
Tafila	12.8	16.0	6.6	8.6
Ma'an	13.8	29.1	10.9	16.1
Aqaba	26.9	29.2	18.0	32.2
Total	20.1	26.1	10.1	15.1

Source: WHO, UNICEF, CDC and MoH (2002).

Table 17: Percent distribution of students by serum haemoglobin (g/dL) intervals, by age group.

Hb Interval (µg)	Age 10 Years (n=553)		Age 13 Years (n=572)		Age 17 Years (n=463)	
	Valid %	Cumulative %	Valid %	Cumulative %	Valid %	Cumulative %
< 10 g/dl	0.7	0.7	0.3	0.3	1.7	1.7
< 11 g/dl	2.4	3.1	2.3	2.6	2.2	3.9
< 12 g/dl	8.5	11.6	5.2	7.9	4.5	8.4
≥ 12 g/dl	88.4	100.0	92.1	100.0	91.6	100.0

Prevalence of anaemia is indicated by bold values

ANNEX III: NATIONAL AGRICULTURAL DEVELOPMENT STRATEGY 2003-2010

Agricultural development strategy came in accordance with the institutional and economic restructuring recommended at the first economic meeting that was held in the Dead Sea resort in 2000. Upon the recommendation of the national economic consultant council (NECC), the government nominated eighty individuals including those from agriculture and private sectors, farmers and university professors to draft the agricultural strategy. The committee formed five sectoral subcommittees for irrigated agriculture in the highlands, irrigated agriculture in Jordan valley, rain-fed agriculture, livestock and range, and marketing. Each subcommittee prepared a draft of the strategy to develop the subsector. The strategy included the necessary projects, procedures, supporting environment and services. The subsectoral strategies were then redrafted and incorporated into the main document of the agricultural national strategy. The government, in turn, approved the agricultural national development strategy for the years 2002- 2010, which stimulated a crucial conversion in agricultural development in Jordan.

General Objectives of the Strategy

- To increase the degree of self-sufficiency in local food production in Jordan.
- To manage and utilize available agricultural production resources, particularly water, land, capital, and labour in an economically efficient way, while preserving the environment and ensuring the sustainability of agricultural production in the future.
- To improve and increase the profitability of the agricultural sector, the standard of living for farmers, and foster growth of agribusiness entrepreneurs and agricultural workers.
- To direct the production of food and other agricultural commodities to fulfil the demands and the requirements of domestic, regional and international markets, and to ensure that such production is competitive in both quality and price.
- To maximize the value-added share in the gross domestic product of the agricultural sector, particularly that of agribusiness, and its share in the GDP.
- To increase agricultural export and livestock products, and increase the contribution of the agricultural exports in the national balance of trade.
- To achieve social and economic equity between the agricultural sector and other sectors of the economy, and also within the various sub-sectors of the agricultural sector.
- To integrate agricultural production among Arab countries and promote cooperation between the countries of the region regarding the production and trade of food and agricultural

commodities, ensuring balanced benefits to all countries concerned.

- To consider agricultural development as the core for the integrated development of rural areas.

The agricultural national strategy consists of seven parts. The first part deals with the role of agriculture sector in the development from the economic, social, and environmental dimensions. The second part deals with the present situation of the agriculture sector. It includes key changes that have occurred since 1975, in addition to the problems and obstacles of the agricultural development. The third part explains the future vision of the agriculture sector. The fourth part contains the sectoral policies and their strategies for the rain-fed, irrigated agriculture in Jordan valley, irrigated agriculture in highlands, livestock and range, and marketing. Under each sector the following headlines were discussed: present situation of the sector, changes in the sector, problems and obstacles, objectives, strategies to achieve the objectives (programmes, projects, and procedures), and project matrix. The fifth presents issues pertaining to the infrastructure and services of each ministry and public institution. The sixth part states the expected economic, social, and environmental benefits for implementing the strategy. Finally, the seventh part discusses importance of monitoring and evaluation for the strategy.

Projects of the national agricultural development strategy are classified into main categories as follows:

- To improve agricultural resources, sustainability and conservation projects including water harvesting and soil conservation.
- To optimize agricultural resources' utilization, especially water.
- To increase the efficiency and effectiveness of the agricultural production systems.
- To improve the quality of agricultural products.
- To alleviate poverty, small farmers and gender oriented projects.
- To improve infrastructure projects.
- To encourage participation of farmers and private sectors in construction and rehabilitation of their organizations.
- To increase cultivated areas.
- To market facilities and infrastructure.
- To restrict agricultural research and extension.
- To restructure agricultural governing institutions, such as Ministry of Agriculture, credit cooperation, and Jordan Valley Authority.

Economic Objectives

- To provide a suitable environment for the private sector to effectively participate in agricultural development.
- To increase investment in the agricultural sector.
- To enhance integration between plant and animal production.
- To provide new job opportunities and work in the agricultural sector.
- To increase incomes of farmers and workers in supporting agricultural activities.
- To ensure economic equity between agriculture and others sectors of the economy, and within the agricultural sector itself.
- To increase productivity and decrease production costs.
- To improve the competitiveness of produce in quality and price, and in local and export markets.
- To increase agricultural production and increase its contribution to the GDP.
- To increase the degree of self-reliance in food, and improve the agricultural trade balance.
- To attain integration between the agricultural sector and the other economic sectors, especially in the area of processing of agricultural products.
- To link domestic supply with market demand.
- To develop farmer organizations and other private-sector groups working in the agricultural sector.

Social Objectives

- To limit migration from rural areas into urban areas.
- To increase women participation in agricultural development.
- To enhance the capabilities of farmers and agricultural workers, and develop their knowledge base and abilities to effectively participate in the socioeconomic development of the rural areas.
- To improve health, education, social services, and living standards for rural people.

The Agricultural Development Strategy was prepared assuming the following:

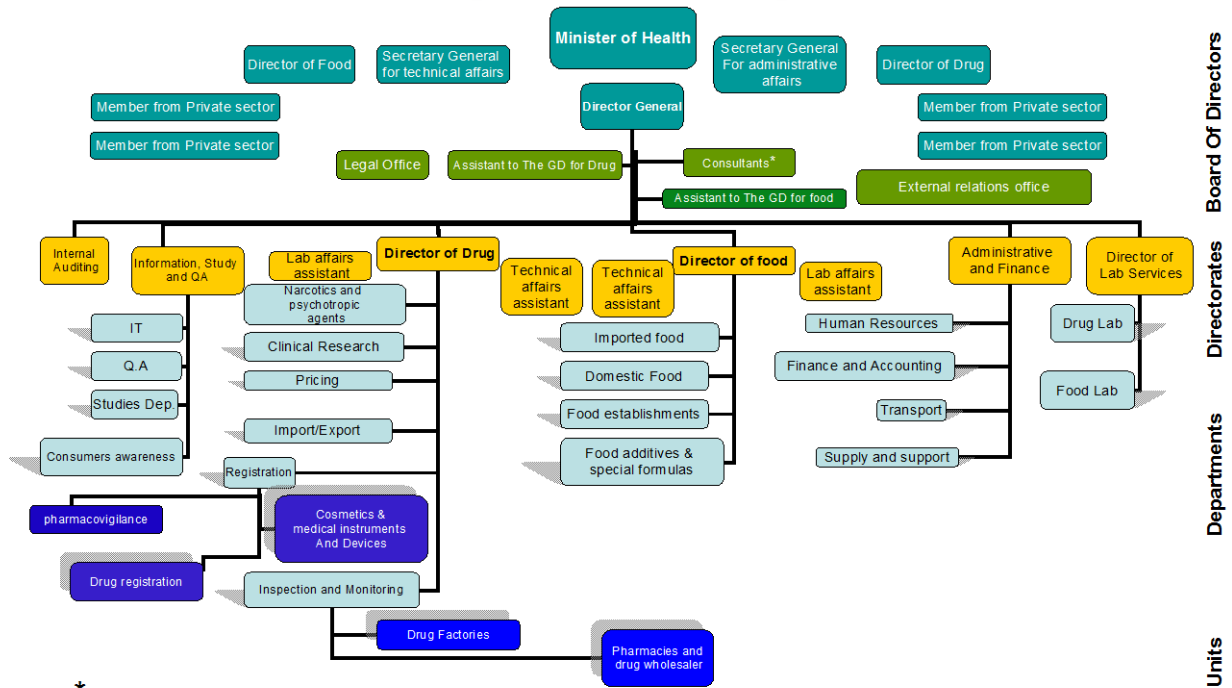
- Government's complete understanding and conviction of the key role the agricultural strategy plays in development (in its economic, social, and environmental returns), and the strong political will to deal with the strategy.
- Jordan's potential for agricultural production is not utilized at its full capacity, and the availability of unutilized potential and opportunities to achieve sustainable agricultural development.
- An average annual population growth of about 2.8 percent over the period 2001-2010, a 4% average GDP growth, and 3% for consumption of food commodities.
- Jordan will continue to face challenges in water shortage. The traditional water resources that can be utilized will continue to fall short of future requirements, despite government efforts in this respect. Since priority of water use goes to municipal and industrial uses, the expected shortage will mostly be on the account of the agricultural strategy, which will be increasingly dependent on treated wastewater and non-traditional water resources.
- Adjustment of prices of water irrigation to promote an efficient use of this scarce resource, without affecting the social and economic objectives of agricultural development in irrigated areas.
- Government movement toward approving a general policy that controls urban expansion onto prime agricultural lands, especially in the highlands with high rainfall, and where the major population centres exist.
- A decrease in the size of agricultural land ownerships in the highlands due to land fragmentation.
- An increase in the area of agricultural holdings and farm units in the Jordan Valley as a result of amendments included in the Jordan Valley Development Law, No. 30 for 2001, and expectations of establishing export-oriented agriculture in this area.
- Expanded export opportunities of some high-value agricultural products, accompanied by the emergence of strong competition and challenges for Jordanian agricultural products in local and foreign markets, due to trade liberalization.
- Government to provide suitable incentives and enabling environment for the public sector to increase its investments in agriculture, and in the provision of some services that the government will render to the public sector and farmers organizations.

-
- Government will provide all possible support to the agricultural sector within the provisions stipulated by regional and international agreements. The Jordanian government is committed to encourage and provide incentives for exports, and to protect the local market from unjust competition and fraudulent trade practices in accordance with the stipulations of the WTO.
 - Priority of government development programmes and services given to the least developed areas.
 - Government commitment to implementing the strategy in an integrated and comprehensive way, to provide needed requirements for all stages of planning, financing, monitoring and evaluation to ensure successful implementation of the strategy.

ANNEX IV: JORDAN FOOD AND DRUG ADMINISTRATION (JFDA)

The JFDA is a statutory, independent and science-based body, dedicated to protecting public health and consumer interests in the area of food safety and hygiene. It comes under the umbrella of the Minister of Health, who chairs a board of ten members. It also has a 17-member Committee referred to as the “Higher Committee of Food Control,” which is chaired by the Director General of Administration who assists and advises the board. Members of the Committee represent a broad range of interests drawn from various sectors of food regulation, food industry and trade, consumers and the academia.

Jordan Food and Drug Administration Organizational Chart



Other committees involved in food control in JFDA are:

- *Technical committee*: chaired by the Director of Food Control. The principal role of the committee is to prepare and review food safety regulations. Sectors represented in this committee include public health, veterinary medicine, food microbiology, food chemistry, among other specialties.
- *B.S.E Committee*: chaired by the Director General of JFDA. Members of the Committee represent a broad range of interests drawn from various sectors of the food regulation, consumers, and the academia.
- *Food Additives Committee*: chaired by the head of Food additives Division and includes representatives from MoH, JISM, UJ and JFDA.
- *Special foods Committee*.

Role of JFDA

The principal function of JFDA is to take the steps needed to ensure that the imported, produced, distributed or marketed food in Jordan meets the highest standards of food safety and quality available, and to ensure that food complies with legal requirements and recognized codes of good practice.

Key functions of JFDA

- Ensure the coordinated and seamless delivery of food safety services to an agreed high standard by the various official agencies involved.
- Ensure that food complies with legal requirements and recognized codes of good practice.
- Set food standards and regulations based on sound science and risk assessment.
- Provide advice to official agencies involved in food control, food industry and consumers on food safety issues.
- Manage risk in association with other official agencies involved and communicating risk to consumers, public health professionals and the food industry.

Laboratory Support Services

JFDA has three food laboratories. They are located in Amman, Aqaba and Irbid. The two laboratories in Amman and Aqaba are considered the main laboratories for food control in Jordan. The Municipality of Amman also has also a well-equipped food laboratory for the support of food control activities within the Greater Amman area.

Food laboratory of the faculty of Agriculture in the University of Jordan is frequently used by JFDA as a reference laboratory for microbiological analysis. For sophisticated food chemical analysis, laboratories of the Royal Scientific Society “RSC” are considered the most competent.

Plans for modernization and upgrading of JFDA’s Amman Food Laboratory are underway, and the new facilities are almost ready.

Evaluation and needs assessment of the food-chain laboratories of JFDA and MoA will be carried out by experts from the “Danish Veterinary and Food Administration” through the twinning project between JFDA and DVFA.

Official agencies involved in food safety control

Beside JFDA (the central regulatory agency), and in close cooperation with it, other organizations play important roles in controlling the safety and quality of domestic and imported food in Jordan.

1. Ministry of Agriculture (MoA):

The ministry has the responsibility to protect the health and life of live animals and plants, and to take measures to prevent the introduction and spread of animal and plant diseases and pest (quarantine functions).

The MoA monitors certain food categories for pesticide residues, and cooperates with JFDA in the control of imported food. Also, it regulates directly the control activities of fresh meat, fruits and vegetables.

The MoA has embarked on a twinning project with the Northern Ireland Public Enterprise (NI-CO), and the Twinning Grant Agreement was signed on May 5, 2005. Through this 22 month duration project, NI-CO will cooperate with MoA to reform the veterinary and phytosanitary inspection services in Jordan to layout the foundations towards EU 3rd country Listing.

2. Jordan Institute for Standards and Metrology (JISM):

JISM is the designated standards setting body in Jordan. It establishes standards of quality and safety for food products. Such standards are established using sound scientific principles as a basis for each standard. Internationally established standards, and particularly those established by the Codex Alimentarius Commission, are adopted whenever they meet the objectives and acceptable level of risks appropriate for Jordan. Imported food shipments subject to established Jordanian standards are examined, sampled and tested for quality parameters in JISM laboratories.

3. *Ministry of Health (MoH):*

According to the memorandum of understanding between the MoH and JFDA, the ministry, through its divisions of “food and environment” in the Directorates of Health, carries out the food control activities in the local market. Control activities are carried out according to JFDA standards and procedures. Direct, continuous and close communication is maintained between JFDA and Directorates of Health to ensure that JFDA food control policies and programmes are properly implemented.

4. *Aqaba Special Economic Zone (ASEZA):*

The ASEZA has legal authority over administrative functions within the zone. JFDA carries out directly imported food control activities in Aqaba port, in close cooperation and coordination with ASEZA. ASEZA carries out food control activities in the local market in Aqaba in coordination with the Directorate of Health of Aqaba.

Official Sectors other than JFDA Involved in Food Control Operations

Ministry of Agriculture (MoA)	
Units	Function
Veterinary department Animal production Department Plant protection department Pesticide residues and formulation analysis centre Pests & insect control section Department of Animal Wealth Laboratories (AWL) Agricultural marketing department Regional agricultural directorates Veterinary Quarantine Stations Issuing and Entry Points Department Agricultural Entry Points	Control of animal health, animal feed, fruits & vegetables, regulation of pesticide use, veterinary drugs control, hormones control and supervision of slaughterhouses and poultry processing plants. Control measures to prevent the introduction and spread of animal and plant diseases and pest (quarantine functions). Certification for export of animals and animal products.
Ministry of Municipalities (MoM)	
Units	Function
Municipalities	Licensing of food establishments and slaughterhouses control within their jurisdictions.
Jordanian Institute for Standards and Metrology (JISM)	
Units	Function
Different Sections including food quality laboratory	Issuing national food standards, quality systems certification in food processing factories, laboratory accreditation and food analysis for quality.
Amman Municipality (AM)	
Units	Function
Public health department Slaughter houses department Food laboratory Meat Laboratory	Licensing and Inspection of food establishments within Greater Amman jurisdiction. Inspection and approval of fresh meat, poultry and fish for human consumption.

