

Reclaimed Water Project
Jordan Valley Authority (JVA) - German Technical Cooperation (GTZ)



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I. Introduction

1. The RWP proposals included in this *Concepts on fresh fruit and vegetables* are:

- State Monitoring System for fresh fruit and vegetables (SMS-ffv)
- Safety Control Guidelines for fresh fruit and vegetables (SCG-ffv) and
- Steps to a Crop Quality Assurance System (CQAS),

which were developed by a Jordanian interdisciplinary working group, Mrs. Margret Will (GTZ) and Mr. Edmund William Kingcott (GTZ).

2. SMS-ffv expresses the need for 7 steps - with support of RWP - to establish and /or modify the existing monitoring system on fresh fruit and vegetables:

- STEP 1: Decision of MoH,
how to organize the crop monitoring program
- STEP 2: Training for inspectors (sampling staff)
- STEP 3: Training for lab staff
- STEP 4: Getting started in a pilot phase with sampling and analyzing
- STEP 5: Seconding an expert to JFDA
to help and train lab staff on the job
- STEP 6: Improvement of running state crop monitoring system
in MoA
- STEP 7: Data transfer among authorities / publication.

The proposal on SMS-ffv was forwarded from RWP to the Secretary General of JVA on July 5, 2004 asking for sending a copy to MoH, JFDA and MoA. These bodies were expected to approve the proposal.

Implementation agencies for SMS-ffv will be MoH, JFDA and MoA with further assistance of RWP.

As an additional activity, RWP set off a survey on bacteriological load of fresh fruit and vegetables (see related RWP-INFO) by Mai Al-Dorgham (GTZ/RWP) in cooperation with RSS.

3. In a first approach in terms of SCG-ffv, RWP initiated a review of European standards on selected fruits and vegetables (see related RWP-INFO) by Mrs. Margret Will from GTZ.

To help governmental organizations evaluating the analysis results of fresh fruit and vegetables by Jordanian regulations, a Jordanian interdisciplinary working group consisting of participants from Ministry of Health (MoH), Ministry of Agriculture (MoA), Jordan Food and Drug Administration (JFDA), National Center for Agricultural Research and Technology Transfer (NCARTT), Jordan Valley Authority (JVA), and Jordan Exporters and Producers Association for Fruit and Vegetables (JEPAFV) proposed SCG-ffv.

These SCG-ffv provide guidance to the Jordanian authorities by recommending internationally recognised science-based standards for chemical and biological parameters on fresh fruit and vegetables.

SCG-ffv was based on recommendations on setting such a guideline (see related RWP-INFO) by Mrs. Margret Will (GTZ).

The proposal on SCG-ffv was forwarded from RWP to the Secretary General of JVA on July 5, 2004 asking for sending a copy to MoH, JFDA and MoA. These bodies were expected to approve the proposal.

Implementation agencies for SCG-ffv will be MoH, JFDA and MoA.

4. In an Action Plan, CQAS expresses the need - with support of RWP - to carry out a number of activities, e.g.

- Develop a Jordanian GAP/crop assurance manual for farmers with special reference to use of marginal irrigation water quality
- Identify appropriate international GAP Crop Assurance Standard and establish dialogue with Accreditation Body
- Identify appropriate national or international Certifying Body or Bodies
- Identify Jordanian or international GAP/crop assurance consultants to assist farmers with preparation for certification
- Develop guidelines on formation and operation of Farmer Groups for certification purposes
- Identify potential 'lead' farmers who could initiate 'Farmer Group Certification'

- Arrange programme of training for Jordan Valley farmers on *GAP*/crop assurance
- Support awareness campaigns of environmental, health and exporters organisations addressing farmers on the use of diluted treated wastewater and handling agricultural produce

The proposal on *CQAS* was forwarded from RWP to the Secretary General of JVA on June 29, 2004 asking for sending a copy to JEPAFV. This body was estimated to agree on the proposals' ideas. Implementation agency for *CQAS* will be the private sector body JEPAFV.



Ministry of Water and Irrigation
Jordan Valley Authority
Reclaimed Water Project



Proposal for a State Monitoring System for fresh fruit and vegetables



Interdisciplinary Working Group
Amman, HK of Jordan
Commissioned by German Technical Cooperation (GTZ)
- May 2004 -

The proposal for this Jordanian *State Monitoring System for fresh fruit and vegetables* has been developed by an interdisciplinary working group consisting of: Ministry of Health (MoH), Ministry of Agriculture (MoA), Jordan Food and Drug Administration (JFDA), National Center for Agricultural Research and Technology Transfer (NCARTT), Jordan Valley Authority (JVA) and Jordan Exporters and Producers Association for Fruit and Vegetables (JEPAFV). German Technical Cooperation (GTZ) served as facilitator.

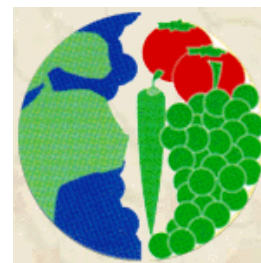


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and the Jordan Food and Drug Administration

1. Abbreviations

AFL	Amman Food Laboratory (of JFDA)
CAC	Codex Alimentarius Commission
EHD	Environmental Health Directorate (of MoH)
EU	European Union
FCD	Food Control Department (of JFDA)
GTZ	German Technical Cooperation
HD	Health Directorates (of MoH)
JEPAFV	Jordan Exporters and Producers Association for Fruit and Vegetables
JFDA	Jordan Food and Drug Administration
JVA	Jordan Valley Authority
KAC	King Abdullah Canal
KTR	King Talal Reservoir
MoA	Ministry of Agriculture
MoH	Ministry of Health
NCARTT	National Center for Agricultural Research and Technology Transfer
RSS	Royal Scientific Society
RWP	Reclaimed Water Project

And the chemical elements:

As (Arsenic), Ca (Calcium), Cd (Cadmium), Cr (Chromium), Cu (Copper), Fe (Iron), Hg (Mercury),
K (Potassium), Mg (Magnesium), Ni (Nickel), NO₃ (Nitrate), P (Phosphorus), Pb (Lead),
Se (Selenium), Zn (Zinc)

2. Introduction

2.1. General

One of the main objectives of the Reclaimed Water Project (RWP) is to ensure, that there is no negative impact of agricultural irrigation with diluted treated wastewater on groundwater, soil and crops in the Jordan Valley.

Recognizing the importance of the use of such marginal water qualities in agriculture, and due to the scarcity of water in Jordan, the Jordan Valley Authority (JVA), in cooperation with the German Technical Cooperation (GTZ), is implementing a project entitled 'Use of reclaimed water in the Jordan Valley' (RWP). The project area is located in the Middle and Karamah Directorates of the Jordan Valley that is to say between Wadi Kufrinja and the Dead Sea. In this area, farmers irrigate with diluted treated wastewater (reclaimed water). The purpose of RWP is defined as:

Farmers in the Jordanian Valley use reclaimed water for irrigation in accordance with environmental and public health regulations. [5]

Considering this project purpose, RWP is - beside other tasks - working on improving the quality of fresh fruit and vegetables being irrigated with water that is at least partially mixed with treated wastewater. RWP is focusing on human health and market acceptance of these food crops as exposed in three related project components:

- a. Safety Control Guideline for fresh fruit and vegetables: On the basis of national and international produce standards [15], [17], a proposal for a Jordanian Safety Control Guideline for fresh fruit and vegetables has been developed [6], [16]. This Jordanian guideline shall help the responsible governmental bodies evaluate the results of the planned systematic state crop sampling and analysis program.
- b. State Crop Monitoring system for fresh fruit and vegetables: The purpose of this proposed program for the Ministry of Health (MoH), the Jordan Food and Drug Administration (JFDA) and the Ministry of Agriculture (MoA) is to improve and initiate a randomized, but nevertheless systematic and comprehensive, governmental crop control. The proposal for a state monitoring system will be described and elaborated in this report.

- c. Crop quality assurance system: The main purpose in establishing the steps towards a Crop Quality Assurance System [7] is to help the Jordan Exporters and Producers Association for Fruit and Vegetables (JEPAFV), as well as individual farmers, demonstrate the quality of their produce. This will assist them in terms of selling their produce to local markets and markets abroad. In contrast to the above mentioned components a. and b., the Crop Quality Assurance System is private sector driven.

Within the vision of RWP and with respect to the above mentioned components, a working group, with members selected from different public authorities and private organizations had been established to work on a "Safety control guideline for fresh fruit and vegetables" [6] and a "State Crop Monitoring System for fresh fruit and vegetables". These measures of intervention are necessary to maintain food safety, to increase marketing opportunities and to support farmers in exporting their produce.

RWP is planning to initiate a comprehensive governmental monitoring system for fresh fruit and vegetables, which focuses on the project area in Jordan Valley (but which is also applicable for the whole Kingdom), through the following steps:

- STEP 1: Decision of MoH, how to organize the crop monitoring program
- STEP 2: Training for inspectors (sampling staff)
- STEP 3: Training for lab staff
- STEP 4: Getting started in a pilot phase with sampling and analyzing
- STEP 5: Seconding an expert to JFDA to help and train lab staff on the job
- STEP 6: Improvement of running state crop monitoring system in MoA
- STEP 7: Data transfer among authorities / publication.

After the approval of the Ministries of Agriculture and of Health and the Jordan Food and Drug Administration, RWP intends to follow up these steps and to assist in their implementation.

2.2. Necessity of state crop monitoring

In general, regarding the RWP objectives, the Jordanian government has the obligation to carry out state environmental monitoring (sampling, analyzing, evaluating of irrigation water, groundwater, soil, crops) in view of the following circumstances:

- Irrigation with diluted treated wastewater has been going on for years in Jordan Valley.

- The Jordanian government backs irrigation with this water quality, which is a necessity due to water scarcity.
- A source of possible danger exists: irrigation with diluted treated wastewater could have a negative impact on soil, groundwater and crops.
- The government is in the position of a guarantor to ensure that any probable danger does not threaten public health and is within the legal framework.

It is clear that primary responsibility for safe fresh fruit and vegetables stays with the food operators: farmers, producers, retailers. However, irrigation with diluted treated wastewater or farmers' non-compliance with Good Agricultural Practice could have a negative impact on crops and this could furthermore affect public health. A state crop monitoring system could check random samples for compliance with agreed standards. In addition, the monitoring system could serve as a first alarm where samples of certain crops are found to be breach of the standards.

It is more economic to prevent health hazards in advance rather than to pay for the health related expenses after the outbreak of a disease. Prevention is most effective when the preventive measures are part of a private sector quality assurance system. However, the government is required to make and enforce effective laws for the protection of the health of consumers.

It has to be born in mind that state food control consists of two inter-reliant approaches, process control and product control. The suggested state crop monitoring system in this report belongs to the section "product control". It can only give information on those samples which have been obtained. Moreover, the probability of detecting heterogeneously distributed contaminants is quite low. State monitoring can help to detect problems, but the affected produce may have been distributed or exported before the results of analysis are available.

To summarize: Randomized and risk-based food safety control cannot test all lots entering the wholesale and retail level or all shipments. It also cannot analyze all potential biological and chemical parameters. Additionally, the sporadic nature of most contamination makes it unlikely that testing will identify food hazards with absolute reliability.

However, state safety monitoring is a necessary accompanying measure to private sector driven Good Agricultural and Hygiene Practices along the fresh produce chain. Food safety thus needs joint effort and shared responsibility between the public and private sectors.

3. Working Group

To develop a comprehensive state crop monitoring system, RWP established a interdisciplinary working group. 5 meetings were held in the different offices of the involved bodies:

- 1st meeting on 20.01.2004 in GTZ-office, Shmeissani/Amman
- 2nd meeting on 12.02.2004 in MoH-office, Shmeissani/Amman
- 3rd meeting on 11.03.2004 in MoA-office, Barakah/Amman
- 4th meeting on 27.04.2004 in MoA-office, Shmeissani/Amman
- 5th meeting on 15.06.2004 in NCARTT-office, Baqa'a.

The working group consisted of and received input from JVA, MoA, MoH, JFDA, NCARTT and JEPAFV by:

Dr. Khaleel Al-Absi (JVA), Fuad Hanna Suliman (JVA), Mahmoud Al-Khtoom (MoA), Marwan Hadaddin (MoA), Malak Abu Zeineh (MoA), Abdullah Naimet (MoA), Nayf Al-Rabadi (MoA), Mohammad Katbeh (MoA), Bassem Sukar (MoA), Mohammed Abadi (MoH), Fatimeh Al-Tawalbeh (MoH), Dr. Basheer Al-Qasir (MoH), Dr. Ahmad Barmawi (JFDA), Ashraf Suliman (JFDA), Safa Qaqish (JFDA), Fuad Salama (JEPAFV), Dr. Ahmad Boulad Mirza (NCARTT), Margret Will (GTZ), Ned Kingcott (GTZ), Mai Al-Dorgham (GTZ/RWP) and Thomas Ziegelmayer (GTZ/RWP).

The working group program had been elaborated according to the RWP project planning matrix:

- Evaluation of the institutional set up of existing health related monitoring programs
- Identification of additional monitoring requirements
- Development of a proposal for a systematic and comprehensive state crop monitoring system
- Development of a proposal for a health related crop quality guideline.

Now, the results of the working group meetings have to be approved by the responsible Secretary Generals of MoH and MoA and of the Director General of JFDA. Afterwards, an implementation of particular monitoring activities with regard to health related parameters in the responsible governmental bodies can be carried out. Once sampling and analyzing activities have begun, crop quality data will have to be evaluated.

4. Legal and institutional set-up

4.1. Legal framework conditions

A proposal for improving and establishing a state crop monitoring system has to respect the existing legal framework conditions regarding responsibilities of the related governmental bodies. In Jordan, one can find the following adherent regulations:

Law of Agriculture No 44/2002 [8]

- Art 3 b:

The ministry shall work on ..., including the following: ... 4. Do lab analysis in the fields related to agricultural production

- Art. 7:

... the Ministry (of Agriculture) must take all the necessary SPS (Sanitary and Phytosanitary) measures to achieve the following objectives: ...

b. Protect the human and the animal health in the Kingdom from risks resulting from additives, contaminants, toxins or organic creatures that cause diseases and are found in the agricultural products or in the agricultural production inputs.

c. Protect the human health from risks resulting from diseases that agricultural products carry or from the entry and spread of pests.

d. Prevent or control any other harms resulting from the entry of pests in the Kingdom or their spread therein.

Law of Public Health No 54/2002 [10]

- Art. 20 b:

The Ministry of Health must take the appropriate measures in case of an epidemic outbreak of a disease in order to prevent its dissemination through monitoring public and private sources of water in addition to foods and other sources that may contribute to the outbreak of this disease

- Art. 23 a:

In order to avoid the outbreak of any diseases that arise from wastewater, the empowered person (director, doctor, ... etc.) has the right to charge the responsible authorities - within a certain period which will be determined by the empowered person - to set the necessary measures (e.g. monitoring programs,....) so as to protect the public health.

Decision of the Minister of Health on 2/6/1996 [14]

All the vegetables irrigated with Zarqa River water within the area between Khirbet As-Samra wastewater treatment plant and King Talal Reservoir (3,000-3,500 dunum) have to be destroyed. The use of this water for irrigation is prohibited, except for field crops and trees (under the condition to stop irrigation two weeks before harvesting).

Agricultural Policy Charter (11/1996) [9]

NCARTT has two main mandates:

- Agricultural research alone or in collaboration with other scientific and technical organizations inside and outside Jordan and
- Technology transfer including technical support, publication, recommendation, training for extension personnel, on-farm trials and demonstrations, regular flow of information and feedback between researchers, extension agents and producers.

Law of Jordan Food and Drug Administration No 31/2003 [3]

Art. 5:

The administration should undertake the following:

- a. food control, in terms of quality and validity, and in accordance to the followed standards and metrology and technical bases
- c. any monitoring activity related to food and drug which are monitored according to the Law of Food Control and the Law of Drug and Pharmaceuticals.

Memorandum of Understanding between MoH and JFDA 2003 [11]

The Jordan Food and Drug Administration was founded in accordance with the law no. 31 for the year 2003, aiming at ensuring food safety and fitness for human consumption in all stages of handling and circulation in addition to ensuring drug safety efficiency and quality.

- Art.7:

JFDA commits itself, within the available potentials, to the following:

- setting suitable programs for food controlling and providing the Ministry (of Health) with those programs to put them at work
- preparation of guidelines, instruction booklets and standard procedures for different activities in food controlling to be followed by Ministry personnel involved in executing food control procedures.

- Art.8 a:

JFDA should prepare an annual plan for food controlling activities to be done in the Kingdom and disseminate this plan on the health directorates during the last month of the year that proceeds the year of activating the plan.

- Art.8 c:

JFDA should evaluate food control activities that are done by the Health Directorates to ensure the efficiency, effectiveness and commitment to the programs and standards agreed upon.

- Art.8 f:

Addressing and communication between the Administrations and the Health Directorate should be direct in order to simplify and speed up procedure.

4.2. Current monitoring activities

A number of authorities have already started sampling, analyzing and evaluating the quality of fresh fruit and vegetables with respect to health-related parameters:

- MoA monitors at market level organic pesticides on crops,
- JVA monitors at farm level heavy metals on crops,
- NCARTT carries out scientific studies related to crop quality.

Additionally,

- MoH controls irrigation practice in Wadi Zarqa,
- JFDA analyses imported and local, processed, frozen and canned food,
- JEPAFV asks NCARTT to analyze some crops to be exported,
- RWP has carried out surveys on the bacteriological load of fresh fruit and vegetables irrigated with diluted treated wastewater.

In detail, the following crop monitoring activities are currently taking place in Jordan:

Ministry of Agriculture (MoA)

The legal basis for the activities can be found in the Law of Agriculture, see chapter 4.1.

MoA has its own running state crop monitoring program, see Annex 1. The main goal for MoA in this regard is to improve crop marketing and to demonstrate the absence of banned (prohibited) kinds of pesticides. The protection of public health is also considered.

Each day, 10 randomized samples are taken from the Amman Central Wholesale Market and analyzed by the MoA-laboratory in Baqa'a for the most important organic pesticides. The evaluation is done by the "Plant Protection Directorate" according to limits of the Codex Alimentarius Commission (CAC) and/or according to European Standards.

With reference to the records of the residue lab in Baqa'a, no violation was detected so far regarding the usage of forbidden pesticides; on the other hand many kinds of pesticides are found every now and then above the recommended limits such as Formothion, Triadimenol, Methidathion, Dithiocarbamate, Pyrazophos, Chlorpyrifos, Cypermethrin and Iprodion.

From time to time, farmers apply non-recommended pesticides on their crops. Consequently, recommended limits cannot be found in the adopted standards for these applied pesticides on the specific crops and the analysis results cannot really be evaluated.

Jordan Valley Authority (JVA)

A legal basis for JVA regarding responsibility for crop monitoring could not be found. However, contracted Royal Scientific Society (RSS) takes 10 crop samples yearly, each of leaves and of fruits, from farm units using different irrigation water qualities. RSS analyses several heavy metals and evaluates according to European standards or according to comparison values from the "Environmental Handbook" [2].

The analyses of heavy metal concentrations on crops revealed that all results are very low in fruits and comply with the international requirements.

National Center for Agricultural Research and Technology Transfer (NCARTT)

Many studies have been carried out concerning crop quality, for example an environmental impact assessment for the Jordan Valley [12] or a study on the effects of the environmental conditions and the agricultural practice on quality and quantity of crops in Deir Alla [13]. The analyses on heavy metals, bacteria and pesticides etc. were carried out by NCARTT-laboratories in Baqa'a; the evaluation was done aligned with Codex Alimentarius.

The results of crop quality studies in Jordan Valley can be summarized as follows:

- Generally, pesticide residues on citrus and vegetables were within the standard, except 2 samples (tomato and potato). However, the concentration of cobalt and cadmium were above the limit.
- Cd concentration in tomato was higher in covered than in uncovered fields.
- Attempts had been made to demonstrate the influence of irrigation water quality on crop quality for lettuce and citrus: Some parameters (lettuce: Fe, NO₃, Ca, K, P; citrus: Hg, As, Cd, Zn) were higher in crops irrigated by King Talal Reservoir (KTR) water than irrigated by King Abdullah Canal water (KAC). On the other hand, for potato the parameters Zn, Fe, Mg, Ca, Se, Cd, Ni were higher in KAC-water irrigated than in KTR-water irrigated farm land.

NCARTT also carries out analyses for members of the Jordan Exporters and Producers Association for Fruit and Vegetables (JEPAFV). Several importers, e.g. from Romania, request chemical analyses.

Ministry of Health (MoH)

The legal basis for crop monitoring concerning health aspects can be found in the Law of Public Health and the Decision of the Minister of Health, see chapter 4.1.

The target of state crop monitoring for MoH is to protect consumers and the public health. However, MoH at present does not regularly analyze fresh fruit and vegetables on health related parameters.

MoH (Environmental Health Directorate, EHD) is in charge of controlling that no farmer in the side wadis of Jordan Valley uses pure treated wastewater for crops eaten raw, which is prohibited according to Article 5.2.2.2. of Jordanian Standard 893/2002 [4] and also with reference to the decision of the Minister of Health on 2/6/1996 [14].

Accordingly, EHD staff destroyed yields of about 55-60 dunum yearly between 1999 and 2002. For the year 2003, no violation was detected concerning unlawful irrigation practice.

Jordan Food and Drug Administration (JFDA)

The legal basis for the activities can be found in the Law of Jordan Food and Drug Administration, see chapter 4.1.

The Amman Food Laboratory (AFL), which belongs to JFDA, analyses around 2,000 samples per month of different types of imported and local, frozen, canned or processed food in addition to raw materials.

AFL sends the results to the Food Control Department (FCD) in JFDA, where the decisions are taken in case of violation:

- Imported commodities are prohibited from release at the customhouse; they are sent back to the country of origin or to a third country.
- The producer of local commodities is only warned at first; at a second violation, JFDA closes the utility (temporarily or permanently).

It is estimated that each month 10 to 15 samples are rejected due to their exceeding limits of either bacteriological parameters or chemical parameters.

Reclaimed Water Project (RWP)

In December 2003 and May 2004, RWP initiated two surveys to obtain first indications of the bacteriological load of a variety of food crops irrigated by different water qualities [1]. Sampling and analyses had been carried out by RSS; the results of the surveys revealed that the analyzed parameters Yeast & Molds, Salmonella and E. coli were within the acceptable limits for all sampled crops.

5. Requirements on monitoring

At present, a systematic and comprehensive state crop monitoring does not exist in Jordan. However, and as mentioned before, some authorities have begun sampling, analyzing and evaluating crop quality related to health relevant parameters.

The governmental bodies, which could run a state crop-monitoring program hereafter, should fulfill the following criteria: a legal basis must be existent and sampling and laboratory staff as well as technical equipment must be available.

Because of the legal regulations and their already existing potential, the Ministry of Health (MoH) together with the Jordan Food and Drug Administration (JFDA) and the Ministry of Agriculture (MoA) shall play the leading role in terms of state monitoring of fresh fruit and vegetables.

Sampling locations

As a first step, sampling locations for crops should take account of farm units with different irrigation water sources (e.g. water from King Talal Reservoir (KTR), from King Abdullah Canal (KAC) and from the mixture of the two) and the most important Wholesale Market Amman. Later, also samples from other farmland and markets (e.g. supermarkets, small shops) all over Jordan should also be taken.

Samples from farmland should be taken during harvesting: if samples were taken too early, the results of analysis would not reflect the impact on consumers due to natural changes between crop sampling and crop consuming.

Sampling frequency

Due to the large number of farm units and markets, neither a control of each location nor of each crop can be scheduled on a regular basis. As a first step, a sampling program should be carried out including 10 crop samples per week, taken from farm units with different irrigation water qualities. The type of crop to be sampled depends on seasonal availability.

List of parameters

The variety of analyzed parameters should be selected on the basis of the objectives to be achieved. The parameter selection will be different for export marketing purposes on the one hand and for public health purposes on the other. Nevertheless, the recently proposed "Safety Control Guideline for fresh fruit and vegetables" [6] should be taken into consideration and analysis of the following parameters is recommended:

- Heavy Metals like Lead (Pb) and Cadmium (Cd); also Chromium (Cr), Copper (Cu) and Mercury (Hg) since in crops they could have a direct health impact
- Bacteriological parameter like E. coli and Salmonella; these parameters could have a direct health impact or serve as an indicator for a possible load of faecal substances
- Nitrate: this parameter could have a direct negative impact on public health
- Pesticide residues: these substances could have an hazardous impact on public health and on environment.

Organizational questions

The proposed "State Monitoring System for fresh fruit and vegetables" follows two parallel tracks, for being able to implement in due time monitoring measures of improvement (MoA) and establishment (MoH/JFDA): the already existing program within the MoA for pesticide analysis and a program to be established within the MoH/JFDA for other health related parameters.

To avoid duplications or gaps in performance between these organizations, in the long run only one single body should be responsible for a systematic state monitoring system for fresh fruit and vegetables. This joint and comprehensive system shall consider the subjects "regular sampling of different crops in different locations", "analyses of all important parameters" and "evaluation according to related standards". However, that future system is beyond the present scope of RWP.

Necessary Regulations

The development of a technical guideline for state monitoring of fresh fruit and vegetables would be helpful. This guideline should compile the state-of-the-art requirements on sampling and analyzing techniques.

The recently proposed "Safety Control Guideline for fresh fruit and vegetables" [6] gives already hints how to evaluate analyses results.

There is also a need for clear ministerial Directives on the following:

- Inspectors (sampling staff) must have the right to enter markets and farmland with only a brief welcome and without the visit being announced beforehand.
- Evaluation units must be instructed how to deal with cases of non-compliance.

6. Further steps

STEP 1

Decision of MoH, how to organize the crop monitoring program

At present, MoH does not regularly monitor fresh fruit and vegetables for health related parameters. For MoH three options could be identified to implement the necessary state crop monitoring:

- MoH could contract a private laboratory (e.g. RSS) or another governmental laboratory (e.g. National Center for Agricultural Research and Technology Transfer, NCARTT) for sampling and analyzing. Contracting a private laboratory would certainly be the most costly option.
- MoH could establish a state crop-monitoring program for fresh fruit and vegetables in their "Environmental Health Directorate" (EHD). The staff of EHD-laboratory could take samples, transport the samples to the lab and probably analyze most of the required health related parameters. However, this lab specializes in water monitoring.
- The Health Directorates (HD of MoH), which are distributed all over the Kingdom, take crop samples and transport them to the Amman Food Laboratory (AFL of JFDA) for analyzing the samples and evaluating the results.

The working group is in favor of the last option, which is described in more detail in Annex 2. It is in line with the Memorandum of Understanding (see chapter 4.1) [11].

The decision, which approach to take, has to be made within the MoH and JFDA. Afterwards, Reclaimed Water Project can try to support establishing or improving the monitoring program as described in the following Steps 2 to 7.

STEP 2

Training for sampling staff

Since the Health Directorates' staff is not very experienced in taking samples of fresh fruit and vegetables, there is a need for training on international standards for sampling of fresh fruit and vegetables in both areas: theoretical and practical. The training should include the visit of different sampling locations (farmland, markets) and the requirements of proper sample transportation.

Therefore, and after getting official approval, RWP intends to conduct a 1 to 2 day training course in September 2004 regarding this Step 2 by asking NCARTT or the RSS experts to train the inspectors of MoH.

The inspectors of MoA should also participate in the training course, even if they are obviously already more experienced in taking crop samples.

STEP 3

Training for lab staff

Since AFL's staff is specialized in analyzing canned, processed and frozen food, there might be a lack of experience regarding analyzing fresh fruit and vegetables. Consequently, RWP intends to conduct a 2 to 3 day training course in coordination with Step 2 in terms of analyzing the samples once they arrived in AFL. The result evaluation process should be part of the training.

The training course should be held in September 2004 by specialists of RSS and NCARTT and should include analysis methods at least for the parameters Nitrate, E. coli, Salmonella and some heavy metals (Pb, Cd, etc.) in fresh fruit and vegetables.

STEP 4

Getting started in a pilot phase with sampling and analyzing

After obtaining official approval from the Secretary General of MoH and the Director General of JFDA, the monitoring program should begin with a pilot phase in terms of sampling, analyzing, and evaluating the results. This pilot phase should start in October 2004, immediately after the training courses of Step 2 and Step 3, and will comprise the following:

- Health directorate's staff takes approx. 10 samples per week (focus is on Jordan Valley) and transports them to the AFL in Amman
- AFL staff analyzes these samples on the required parameters
- the supervisor of AFL evaluates the results and informs the MoH immediately about the results.

All activities should be oriented on national and international standards, as provided in the training courses of Step 2 and 3. If needed, NCARTT or RSS experts could give further recommendations on request.

This pilot phase should last at least until the end of the year 2004 and it will form the first step towards implementing a state crop-monitoring program on a larger scale in future.

STEP 5

Seconding an expert to help and train lab staff on the job in JFDA

An expert from Jordan (e.g. RSS) or from abroad (e.g. Germany) could be the consultant for:

- assisting and training AFL technicians in carrying out the analyses of fresh fruit and vegetables
- preparing and developing a reference manual for analyzing fresh fruit and vegetables concerning heavy metals, bacteriological load and nitrates

Since several farmers start planting their crops in the beginning of September, some fresh produce such as sweet pepper and cucumber can be harvested after middle of October. Therefore, it is planned to second a laboratory expert to AFL for 4 weeks after the start of harvesting in October 2004.

STEP 6

Improvement of crop monitoring systems

The state crop monitoring program in MoA is already in operation. The following measures should be undertaken at the latest by December 2004 to improve the system in MoA (and, if necessary also for MoH/JFDA)

- cool the crop samples during their transport from the sampling location to the laboratory
- sampling at markets: take note of the route back to the farmer from whom the crop sample has been taken (at the Wholesale Market in Amman: copy the information sheet of the driver entering the market, take the sample directly from the vehicle)
- regulate the consequences for farmers or markets violating the standards and act accordingly.

STEP 7

Data transfer among authorities / publication

The state crop monitoring of fresh fruit and vegetables in Jordan is divided into two branches: the pesticides analyses by MoA and the analyses of other health related parameters by MoH. It is necessary to establish a data transfer system from MoH to MoA and vice versa. Because of the sensitivity of data, the transfer modalities (who reports, at what time, to whom and which data) as well as the procedures of publication must be fixed and agreed upon. This information and publication system should be established in January 2005.

7. References

- [1] Al-Dergham, M.: RWP - Info: Bacteriological load of crops and irrigation water, JVA-GTZ Reclaimed Water Project (RWP), Amman 2004
- [2] German Federal Ministry for Economic Cooperation and Development (BMZ): Environmental Handbook, Volume I - III, Braunschweig/Germany 1995
- [3] Jordan Food and Drug Administration (JFDA): Provisional Law of Jordan Food and Drug Administration No 31 / 2003, Official Gazette, Amman 2003
- [4] Jordan Institution for Standards and Metrology (JISM): Jordanian Standard JS 893/2002 "Water - Reclaimed Domestic Wastewater", Amman 2002
- [5] Jordan Valley Authority (JVA) / German Technical Cooperation (GTZ) - Reclaimed Water Project (RWP): Baseline Report, Amman 2003
- [6] Jordan Valley Authority (JVA) / German Technical Cooperation (GTZ) - Reclaimed Water Project (RWP): Proposal: A Safety Control Guideline for fresh fruit and vegetables, Amman 2004
- [7] Kingcott, E.W.: A Crop Quality Assurance System, JVA-GTZ Reclaimed Water Project (RWP), Amman 2004
- [8] Ministry of Agriculture (MoA): Provisional Law No 44 for 2002, Law of Agriculture, Official Gazette, Amman 2002
- [9] Ministry of Agriculture (MoA): Agricultural Policy Charter (November 1996), quoted in: NCARTT - 5 years work plan 2001 - 2005, page 2-3
- [10] Ministry of Health (MoH): Law of Public Health No 54 for 2002, Official Gazette, Amman 2002
- [11] Ministry of Health (MoH) and Jordan Food and Drug Administration (JFDA): Memorandum of Understanding between MoH and JFDA, issued on 23/7/2003, Amman 2003
- [12] National Center for Agricultural Research and Technology Transfer (NCARTT): Environmental impact assessment for the agricultural system in the Jordan Valley, Baqa'a 2003
- [13] National Center for Agricultural Research and Technology Transfer (NCARTT): Effects of the environmental conditions and agricultural practices on quality and quantity of some kinds of vegetables and citrus in Deir Alla, 1st and 2nd report, Baqa'a 2001/2002
- [14] The Minister of Health: Decision, issued on June 02, 1996 according to the Articles No 30 and 31 of the Public Health Law No 21/1971, Amman 1996 (in Arabic language)
- [15] Will, M.: RWP - Info: Review of European standards on selected fruits and vegetables, JVA-GTZ Reclaimed Water Project RWP, Amman 2004
- [16] Will, M.: RWP - Info: Recommendations on setting a safety control guideline for fresh fruit and vegetables with special reference to irrigation water related parameters, JVA-GTZ Reclaimed Water Project RWP, Amman 2004
- [17] Will, M.: Food Quality and Safety Standards as required by EU Law and the Private Industry - with special reference to the MEDA countries' exports of fresh and processed fruit & vegetables, herbs & spices; edited by German Technical Cooperation (GTZ), GTZ Headquarter Eschborn/Germany, 2003

Annex 1

Existing crop monitoring program in the Ministry of Agriculture

SAMPLING

	Samples taken from local goods	Samples taken from imported goods
Location	Amman Central Whole Sale Market	Quarantines: Airport area, Zarqa area, Zarqa Free Zone, King Hussein Bridge, Prince Mohammed Bridge and Jaber (Border area)
Frequency	Minimum 10 samples/day, except Thursday	1 sample/shipment
Staff	MoA, Agricultural Marketing Department	MoA, Plant Protection Directorate
Equipment and transportation	<ul style="list-style-type: none"> • Sterile bags and gloves • Samples are transported to the lab by MoA cars; no coolers exist to preserve the samples 	<ul style="list-style-type: none"> • MoA employees collect the samples using sterile bags and gloves • Samples are sealed and transported to the lab by goods broker (agent) car
	<ul style="list-style-type: none"> • Information which is needed to identify the sample is written in a special sampling form. This information is then registered in lab's records and disseminated to lab's technicians so as to analyze them. • Samples are delivered to the lab (MoA, Baqa'a) on the same day as sampled and analyzed in the next day 	

ANALYSES

	Samples taken from local goods	Samples taken from imported goods
Method used for analyses	Lock Method (multi-residual method), according to the Association of Official Agriculture Chemists (AOAC) Devices: gas-chromatography and mass spectral analyses	
Responsibility	MoA, Supervisor of Labs (Mr. Moh'd Katbeh or the Supervisor of pesticides residues Lab: Mr. Bassim Sucker). Location: Baqa'a	
Parameter	4 groups of pesticides: <ul style="list-style-type: none"> • Organophosphorus (e.g. Dimethoate, Pyrazophos) • Chlorinated Hydrocarbon (e.g. Dicofol, Praccymidon, DDTs) • Pyrethroides (e.g. Cypermethrin, Deltamethrin) • Dithiocarbamate (e.g. Zineb, Maneb, DithaneM45) 	3 groups of pesticides: <ul style="list-style-type: none"> • Organophosphorus • Chlorinated Hydrocarbon • Pyrethroides

Evaluation

	Samples taken from local goods	Samples taken from imported goods
	<ul style="list-style-type: none"> • Results are placed in a form and submitted to the director of Lab division for evaluation • Results are evaluated according to Codex Alimentarius (FAO Standards) • If a sample does not meet standards, the Director of the Plant Protection Directorate informs the involved Agriculture Directorate (27 all over Jordan) to take necessary action; farmer is put on a "Black List" and is fined 	<ul style="list-style-type: none"> • Results are placed in a form and submitted to the good broker (agent) to release (clear) the goods from the customhouse in the quarantine • If the sample does not meet the Jordanian specifications, an official letter is addressed to Quarantine station at the entry border to take action

Planned crop monitoring program in the Ministry of Health and Jordan Food and Drug Administration

The target of crop monitoring for MoH/JFDA is to protect the public health and the consumers.

Sampling	<ol style="list-style-type: none"> 1. MoH / HDs' staff has its own staff which is distributed over all the governorates 2. MoH / HDs' staff will take samples of fresh fruit and vegetables directly from the farmland or from markets and transport the samples to JFDA-lab (located in Amman city center) in a cooled manner 3. HDs' staff has to be trained on standards how to take samples
Analyses	<ol style="list-style-type: none"> 1. JFDA, Division of Amman Food Lab (AFL) location: Amman city center, Salt Street 2. The lab could analyze the proposed 10 crop samples / week 3. Staff, materials and equipment will be identified according to the procedure that has to be applied to analyze the samples 4. Required parameters to be analyzed are: <ul style="list-style-type: none"> - Microbiological parameters (Salmonella, E. coli) - Heavy metals: Pb, Cd, if needed also Cr, Cu, Hg - Additionally: NO₃ 5. The laboratory is specialized in analyzing processed, frozen and canned food. Therefore, JFDA-staff of the lab has to be trained on how to analyze fresh fruit and vegetables 6. JFDA laboratory has lack of equipment capacities (Atomic Absorption Spectro-photometer: lamps for Cu, Hg, As, Cd, Zn, Pb)
Evaluation	<ol style="list-style-type: none"> 1. Results will be submitted to the JFDA - Lab Supervisor, where the analyses results will be evaluated 2. Jordanian crop quality guidelines have to be established

PROPOSAL:

Safety Control Guidelines

for fresh fruit and vegetables

Jordanian Interdisciplinary Working Group
June 2004

The proposal for these Jordanian *Safety Control Guidelines for fresh fruit and vegetables* has been developed by an interdisciplinary working group consisting of: Ministry of Health (MoH), Ministry of Agriculture (MoA), Jordan Food and Drug Administration (JFDA), National Center for Agricultural Research and Technology Transfer (NCARTT), Jordan Valley Authority (JVA) and Jordan Exporters and Producers Association for Fruit and Vegetables (JEPAFV). German Technical Cooperation (GTZ) served as facilitator.

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1. Abbreviations

The following abbreviations are used for the purpose of these *Safety Control Guidelines for fresh fruit and vegetables*:

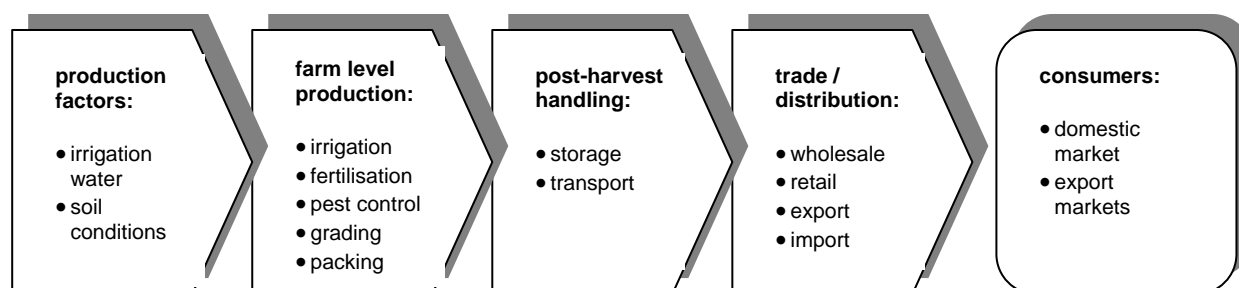
CAC	Codex Alimentarius Commission (Commission of the World Health Organisation (WHO) and Food and Agriculture Organization (FAO) of the United Nations)
Cd	Cadmium
EU	European Union
GTZ	Deutsche Gesellschaft fuer Technische Zusammenarbeit (German Technical Cooperation)
ICMSF	International Commission on Microbiological Specifications for Foods
JEPAFV	Jordan Exporters and Producers Association for Fruit & Vegetables
JFDA	Jordan Food and Drug Administration
JVA	Jordan Valley Authority
MoA	Ministry of Agriculture
MoH	Ministry of Health
MRL	Maximum Residue Limits
NCARTT	National Center for Agricultural Research and Technology Transfer
NO ₃	Nitrate
Pb	Lead
RWP	Reclaimed Water Project
UK	United Kingdom

2. General conditions

Generally, monitoring is composed of sampling, analyzing and evaluating the obtained analysis results. The main purpose of these *Safety control guidelines for fresh fruit and vegetables* is to facilitate evaluating governmental food safety analyses on fresh fruit and vegetables.

To achieve this, these Safety Control Guidelines provide guidance to the Jordanian authorities by recommending internationally recognised science-based standards for chemical and biological parameters.

The present *Safety control guidelines for fresh fruit and vegetables* form only one part of an integrated approach towards assuring food safety for crops considering the diverse possible sources of contamination along the fresh produce chain (see diagram below).



Both, the public and the private sectors, have a stake in protecting consumers' health and in strengthening international competitiveness. The underlying rationale for this shared responsibility is that

- the private sector has to control food hazards at all stages of the food chain by applying appropriate production and handling practices (production, grading, packaging, transport, wholesale and retail trade, export handling etc.)
- the public sector has to monitor food hazards with a view of assuring public health and enforcing existing regulations in an adequate way in order not to disturb market forces inappropriately (MoH, JFDA, MoA).

Randomized and risk-based food safety control cannot test all lots entering the wholesale and retail level or all shipments intended to be exported. It also cannot analyze all potential biological and chemical parameters. Additionally, the sporadic nature of most contamination makes it unlikely that testing will identify food hazards with absolute certainty.

However, state safety monitoring is a necessary accompanying measure to private sector driven Good Agricultural and Hygiene Practices along the fresh produce chain. Food safety thus needs joint effort and shared responsibility between the public and private sectors.

These *Safety control guidelines for fresh fruit and vegetables* come in line with a set of further necessary state regulations and monitoring activities to be established. Worth mentioning are a comprehensive and systematic state crop monitoring program and also *Irrigation Water Quality Guidelines* since diluted treated wastewater is used for irrigation purposes in some parts of Jordan.

Together with the above mentioned public and private sector regulations and activities these Safety Control Guidelines assist to

- protect the health of consumers, both in Jordan and in export markets
- strengthen the international competitiveness of the Jordanian horticultural export sector.

Notes:

1. The present guidelines cover a selection of fresh fruit and vegetables only, which is relevant for Jordan. Further standards, for example for special sorts of agricultural produce or processed fruit and vegetables, would need further investigation.
2. It is recommended to check regularly, whether these guidelines have to be amended due to frequent changes in international legal and private industry requirements. Parameters could also be added or limits for certain parameters could be changed depending on the composition of the food basket in Jordan that might differ from those in other countries. But this also needs further investigation.
3. The proposed limits for different parameters in these guidelines have to be recognized as Europe oriented target values due to the fact that the EU market is one export market for Jordanian farmers with increasing importance. If crops do not comply with these values, they will not be accepted at European markets. The reasons for non-compliance with these guidelines would need further investigation.

3. Recommended target values

3.1. Heavy metals

Potential sources of heavy metal contamination in fresh fruit and vegetables are found in irrigation water and the applied irrigation technique, soil conditions and fertilization.

Both, the Codex Alimentarius Commission (CAC) and the European Union (EU) limit crop parameters for heavy metals to Cadmium (Cd) and Lead (Pb). However, for exporting horticultural products to the EU, Jordanian exporters have to meet EU standards, which are for some products below Codex standards. Consequently, the compliance with the following EU oriented limits on Pb and Cd is recommended:

Beans, Cucumber, Dates, Eggplant, Olives, Onion, Oranges, Pepper, Red Beet, Spinach, Squash / Zucchini, Strawberry, Sweet Corn, Tomato, Watermelon	
Pb (mg/kg)	0.10
Cd (mg/kg)	0.05
Asparagus, Carrots, Potato, Radish,	
Pb (mg/kg)	0.10
Cd (mg/kg)	0.10
Cabbage (red, white), Cauliflower	
Pb (mg/kg)	0.30
Cd (mg/kg)	0.05
Grapes	
Pb (mg/kg)	0.20
Cd (mg/kg)	0.05
Herbs (Parsley, Rockett, Mint, Coriander...)	
Pb (mg/kg)	0.30
Cd (mg/kg)	0.20
Wheat	
Pb (mg/kg)	0.20
Cd (mg/kg)	0.20

Source: Commission Regulation (EC) No. 466/2001 [2], consolidated text

The performance criteria for sampling and for methods of analysis are laid down in Commission Directive 2001/22/EC [5]. Besides, Jordanian Standard 1239/1999 on sampling of fresh fruits and vegetables [7] has to be considered.

3.2. Nitrate

Potential sources of Nitrate contamination in fresh fruit and vegetables are found in irrigation water as well as the applied irrigation technique, soil conditions and fertilization.

The EU sets Nitrate limits for spinach and lettuce only. These standards on Nitrate have to be respected when goods are intended for export to EU Member States. Thus, the compliance with the following EU oriented limits on Nitrate is recommended, considering the climate as well as the growing conditions:

Product	Maximum level (mg NO ₃ /kg)
1.1 Fresh spinach (Spinacia oleracea)	2 500
1.2 Fresh lettuce (Lactuca sativa L.) (protected and open-grown lettuce) excluding lettuce listed in point 1.3	2 500
1.3 "Iceberg" type lettuces	2 000

Source: Commission Regulation (EC) No. 466/2001 [2], consolidated text (including Commission Regulation (EC) No. 563/2002 [3])

The maximum levels for fresh spinach do not apply for fresh spinach subjected to processing and which is directly transported in bulk from field to processing plant.

A specific reference analysis method is not given, whereas the sampling method is laid down in Commission Directive 79/700/EEC [4]. However, the minimum number of units per laboratory sample for fresh lettuce and "Iceberg" type lettuces is 10. Besides, Jordanian Standard 1239/1999 on sampling of fresh fruits and vegetables [7] has to be considered.

3.3. Microbiological contaminants

Microbiological contamination may be caused by contamination from a range of sources including water and/or personnel hygiene. Potential sources of contamination include irrigation water and the applied irrigation technique, grading, packing, storage and transport of the produce throughout all stations of the trade/distribution/consumer chain.

The EU Regulation (EC) No. 852/2004 on the hygiene of foodstuffs [10] prescribes general requirements, but no specific microbiological criteria. The EU is considering the possibility of microbiological criteria for foods, but these are not yet finalised.

For the needs of Jordan, the UK "Guidelines for the microbiological quality of some ready-to-eat foods sampled at the point of sale" [6] could be used as guidance, especially the indicator organism *Escherichia coli* (total) and the pathogen *Salmonella* spp:

Parameter	Microbiological quality			
	satisfactory	acceptable	unsatisfactory	unacceptable
Escherichia coli (total)	< 20	20 - < 100	≥ 100	not applicable
Salmonella spp	not detected in 25g	---	---	detected in 25g

Grades of microbiological quality:

- satisfactory – test results indicating good microbiological quality
- acceptable – an index reflecting a borderline limit of microbiological quality
- unsatisfactory – test results indicating that further sampling / hygiene investigations may be necessary
- unacceptable – potentially hazardous: test results indicating that urgent enforcement action needed including location of the source of the problem

Source: Guidelines for the microbiological quality of some ready-to-eat foods sampled at the point of sale [6]

Specific reference sampling and analysis methods are not laid down in the UK guideline. The publications “Sampling for microbiological analysis: Principles and specific applications” [11] and “Compendium of methods for the microbiological examination of foods” [1] could serve as a guidance. Besides, Jordanian Standard 1239/1999 on sampling of fresh fruits and vegetables [7] has to be considered.

3.4. Pesticide Residues

Main source of contamination with pesticide residues is the contamination through irrigation water and also inappropriate pest control measures at farm level. As for example:

- use of prohibited active agents
- excessive dosage
- inappropriate application techniques
- disregard of waiting periods between application and harvesting.

It is recommended for Jordan to compare analysis results with the Maximum Residue Limits (MRL) of Codex Alimentarius Commission (CAC), since differences in local pest control requirements have been taken into consideration when defining these limits. MRL of CAC are established only where evidence is given about food risks for human use; thus they represent residue levels which are toxicologically acceptable.

Due to the impossibility to list the vast number of existing pesticide MRL on the one hand and the frequent changes in MRL on the other hand, parameters cannot be listed in the present guideline. MRL can be searched for under [12]:

http://apps.fao.org/CodexSystem/pestdes/pest_q-e.htm

This website also provides Extraneous Maximum Residue Limits (EMRL), which refer to residues of compounds, which are not anymore registered but arise from environmental contamination (including former agricultural use of pesticides and/or contamination of

irrigation water) or uses of these compounds other than agricultural uses. These residues are treated as contaminants.

The above mentioned website indicates MRL for most of the relevant crops in Jordan, e.g. Tomato, Eggplant, Pepper, Carrots etc., and for a vast number of pesticides. The website was lastly updated in 1999. More recent MRL, also in Arabic language, is available at [13]:

<http://www.codexalimentarius.net/archives.asp>

ALINORM 01/24 - Appendices II, III, VI and ALINORM 01/24A – Appendices II, III, VI and at

<http://www.codexalimentarius.net/reports.asp>

ALINORM 03/24 - Appendices II, IV and ALINORM 03/24A – Appendices III, IV, VI.

The EU Commission submitted a proposal in May 2003 for a regulation on MRL for pesticides, aimed at harmonizing the different regulations currently applicable. With enforcement of the new regulation (not before 2005), MRLs will be harmonised across all Member States. Exports to the EU have to meet the EU MRL as listed in the database [14]:

http://europa.eu.int/comm/food/plant/protection/pesticides/index_en.htm.

Alternatively to the CAC and EU websites, pesticide MRL are also available at the website [15]:

www.freshquality.org.

The Jordanian Standard 432/1985 on methods of sampling for fresh fruits and vegetables intended for analysis of pesticides residue [8] has to be considered.

4. Monitoring / Control

The principle of primary responsibility for the private sector in terms of food safety is complemented and supported by adequate and effective controls organised by the competent state authorities (MoA, MoH, JFDA). Nature and frequency of routine controls must be risk-based in order to protect consumers while not disturbing market forces inappropriately.

To streamline controls and to avoid duplication between different authorities, monitoring programs should be jointly planned and evaluation results shared.

Field inspections might be appropriate on lots suspected of bearing food-borne illness, or of having been produced under hygienically unsatisfactory conditions. The same applies to other types of contaminations such as heavy metals, nitrates or pesticides. Considering the legal background in Jordan [9], randomized field inspections should take place regarding unlawful irrigation with:

- untreated wastewater
- treated wastewater for fruit and vegetables which are consumed uncooked
- treated wastewater which is used for sprinkler irrigation.

5. References

- [1] American Public Health Association (APHA), Technical Committee on Microbiological Methods for Foods: Compendium of methods for the microbiological examination of foods, Washington D.C., 1984
- [2] Commission Regulation (EC) No. 466/2001 of 8 March 2001 setting maximum levels for certain contaminants in foodstuffs (consolidated text)
- [3] Commission Regulation (EC) No. 563/2002 of 2 April 2002 amending Regulation (EC) No. 466/2001 maximum levels for certain contaminants in foodstuffs (consolidated text)
- [4] Commission Directive 79/700/EEC of 24 July 1979 establishing Community methods of sampling for the official control of pesticide residues in and on fruit and vegetables (no longer in force; according to the Proposal for a Regulation on official feed and food controls (COM 2003/0030) of 05.02.2003, methods of sampling and analyzing should follow the performance criteria accepted by the European Committee for Standardization (CEN))
- [5] Commission Directive 2001/22/EC of 8 March 2001 laying down the sampling methods and the methods of analysis for the official control of the levels of lead, cadmium, mercury and 3-MCPD in foodstuffs (consolidated text)
- [6] Health Protection Agency UK (Public Health Laboratory Service): Guidelines for the microbiological quality of some ready-to-eat foods sampled at the point of sale, Journal: "Communicable Disease and Public Health", September 2000; Vol. 3, No 3, p. 163-167
- [7] Jordan Institution for Standards and Metrology (JISM): Jordanian Standard JS 1239/1999 "Vegetables, fruits and derived products -Sampling of fresh fruits and vegetables"
- [8] Jordan Institution for Standards and Metrology (JISM): Jordanian Standard JS 432/1985 "Vegetables and fruits (fresh) -Methods of sampling for fresh fruits and vegetables intended for analysis of pesticides residue"
- [9] Jordan Institution for Standards and Metrology (JISM): Jordanian Standard JS 893/2002 "Water – Reclaimed Domestic Wastewater"
- [10] Regulation (EC) No. 852/2004 of the European Parliament and of the Council of 29 April 2004 on the hygiene of foodstuffs
- [11] The International Commission on Microbiological Specifications for Foods (ICMSF) of the International Association of Microbiological Societies: Microorganisms in Foods, Volume 2, Sampling for microbiological analysis: Principles and specific applications, University of Toronto Press (1978)
- [12] Website of FAO Statistical Databases (FAOSTAT):
http://apps.fao.org/CodexSystem/pestdes/pest_q-e.htm
- [13] Websites of Codex Alimentarius Commission:
<http://www.codexalimentarius.net/archives.asp> and <http://www.codexalimentarius.net/reports.asp>
- [14] Website of European Commission (EC) - Health and Consumer Protection Directorate-General:
http://europa.eu.int/comm/food/plant/protection/pesticides/index_en.htm
- [15] Website of Freshfel Europe:
www.freshquality.org
- [16] Will, M. (2003): Food Quality and Safety Standards as required by EU Law and the Private Industry – With special reference to the MEDA countries' exports of fresh and processed fruit & vegetables, herbs & spices; edited by GTZ, Eschborn



Ministry of Water and Irrigation
Jordan Valley Authority
Reclaimed Water Project



Proposed steps to a Crop Quality Assurance System

with focus on irrigation water quality
in the Jordan Valley



Prepared by Edmund William Kingcott
Commissioned by German Technical Cooperation (GTZ)
- May 2004 -

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1. Abbreviations

EU	European Union
EUREPGAP	Euro-Retailer Produce Good Agricultural Practices
FAO	Food and Agriculture Organisation of United Nations
GAP	Good Agricultural Practice
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (German Technical Cooperation)
HACCP	Hazard Analysis Critical Control Point
JEPAFV	Jordan Exporters' and Producers' Association for Fruit and Vegetables
JEDCO	Jordan Export Development and Commercial Centers Corporation
JFDA	Jordan Food and Drug Administration
JISM	Jordan Institution for Standards and Metrology
JVA	Jordan Valley Authority
MoA	Ministry of Agriculture
MoH	Ministry of Health
NCARTT	National Center for Agricultural Research and Technology Transfer
QA	Quality Assurance
RWP	Reclaimed Water Project
WHO	World Health Organisation

2. Introduction

2.1 One of the main objectives of the Reclaimed Water Project (RWP) is to ensure, that there is no negative impact of agricultural irrigation, which at least partly uses treated wastewater, on groundwater, soil and crops in the Jordan Valley. This includes facilitating marketing of fruit and vegetables grown in the Jordan Valley, especially for export into Western Europe, where higher prices can be obtained [4]. Some of the leading farmers have already achieved this. Consumers in Western Europe and elsewhere are demanding ever higher standards of food safety and quality. EU food law and commercial buyers' specifications reflect this concern. In order to ensure consistent compliance with the law and with commercial specifications, it is essential for farmers to have some form of quality assurance system linked to hazard analysis. This has been confirmed by other donor funded studies in Jordan [6].

2.2 Given the potential contamination hazards, it is particularly important for the growing, harvesting and handling of fruits and vegetables irrigated with treated wastewater, even in a diluted form, to be subject to a robust quality assurance system.

2.3 The recent development of international crop (or produce) assurance schemes has provided a practical way for farmers to implement and manage systems that integrate quality management with risk analysis, environmental protection and worker safety. Some schemes provide for farmer group certification. This allows groups of small farmers to be registered for certification through centrally managed, administered and audited systems.

2.4 It should be emphasised that quality assurance is an industry initiative, to be implemented and operated by the private sector. It is not a legal requirement. EU food law clearly places the responsibility for safe food with the food industry.

2.5 Industry quality assurance has an important role in assuring food safety. Where farms have quality assurance systems, EU inspectors, for example, can adjust their approach to enforcement accordingly [8]. For those businesses not covered by assurance schemes, which at present is the case with the vast majority of the farms in the Jordan Valley, state monitoring and inspection is the main protection against public health hazards. The JVA-GTZ Working Group on State Crop Monitoring is working on recommendations for improvements on state crop monitoring which should result in an effective system of monitoring when implemented.

3. Background and Overview

3.1 This mission was related to three components of the Reclaimed Water Project (RWP): (i) a “safety control guideline for fresh fruit and vegetables”, (ii) a “state crop monitoring system” and (iii) “steps to a crop quality assurance system”.

3.2 The main Jordanian bodies responsible in this area are the Ministry of Health (MoH), the Jordan Food and Drug Administration (JFDA), the Ministry of Agriculture (MoA) and the Jordan Exporters and Producers Association for Fruit and Vegetables (JEPAFV).

3.3 In a previous mission in 1996 for the Amman Agricultural Marketing Organisation and GTZ, Dr Martin Dietz had considered possible chemical and microbiological hazards in relation to fruit and vegetable production in Jordan [1]. He suggested preventive measures and a system to implement and monitor these measures. The recommendations contained in this report are fully in line with Dr Dietz’s report.

3.4 The present mission has a narrower remit than Dr Dietz, in that it is concerned with fruit and vegetables irrigated with diluted treated wastewater. However, any quality assurance system will not be confined solely to the irrigation aspect. That said, the microbiological and chemical safety of the irrigation water is, of course, potentially critical for the safety of the products.

3.5 This mission was undertaken in tandem with GTZ Consultant Mrs Margaret Will who was concerned with national and international produce standards and recommendations for the development of a Jordanian guideline as a basis for a systematic state monitoring program on crop quality. Therefore this report should be read together with Mrs Will’s reports: “RWP – Info: Review of European standards on selected fruits and vegetables” [12] and “RWP – Info: Recommendations on setting a safety control guideline for fresh fruit and vegetables with special reference to irrigation water related parameters” [13].

3.6 Mrs Will’s pre-visit research [12] had established that there are no standards explicitly related to the use of treated wastewater or diluted treated wastewater for irrigation, although a number of chemical and microbiological parameters in EU and international law and guidelines are relevant to contaminants that could be derived from contaminated irrigation water.

3.7 There is international concern over the potential contamination of fruit and vegetables from contaminated irrigation water. There have been large outbreaks of infectious intestinal disease in the UK and other countries worldwide, traced to the consumption of contaminated fruits and vegetables e.g. salmonellosis due to contaminated iceberg lettuce. There is also a certain amount of emotive consumer concern over what might be presented as the

use of marginal water qualities or 'treated sewage' for crop irrigation, both domestically in Jordan and internationally.

3.8 There was a strong feeling among some of those who were met during the mission that it would be wrong to create a 'two class' system, one for the Jordanian domestic market and one for export. Jordanian consumers are entitled to the same standards of health protection as those in export markets.

3.9 In order to address these concerns, the use of treated wastewater and diluted treated wastewater for the irrigation of fruits and vegetables should be subjected to a scientific risk assessment for each type of crop, taking into account the characteristics of the crop, the method of application of the water and the quality of the water. The Jordanian legal regulation [3] prohibiting the use of reclaimed irrigation water for vegetables that are eaten uncooked (raw) is an example of a risk based control. The hazards identified will need to be closely managed and assurance provided to confirm that they are under full control all the times.

4. Quality Assurance

4.1 Quality Assurance (QA) in the food industry has largely arisen in order to meet consumer demand for safe food of consistent quality. Quality is not a finite property; it has no single definition. QA is about systems designed to provide assurance that whatever parameters are chosen can be delivered consistently all of the time. QA systems are usually designed to assure compliance with both legal requirements and commercial specifications. In relation to foodstuffs there is a close link between QA and the Hazard Analysis Critical Control Point (HACCP) concept. HACCP is required in EU food hygiene law, but only *after* the food has left the 'farm gate'. Commercial specifications may require a form of HACCP on farms. Some leading authorities on HACCP say that HACCP use is increasing in the primary production sector, but has not been well established historically [7]. However, farmers should have some form of crop assurance linked to hazard analysis in place.

Why is QA important for fruit and vegetable growers in Jordan?

This is perhaps best answered in the report "Assessment of Jordanian Marketing System for Fresh Fruits and Vegetables" [6]. It makes a number of recommendations aimed at improving quality and promoting exports. The report says that "the increasing importance of produce quality and safety requires that farmers supplying exporters to the EU become EUREPGAP certified".

It could be added that it is even more important where treated wastewater, even in a diluted form, is used for irrigation.

4.2 Advanced forms of quality assurance certification such as those contained in the ISO 9001:2000 series, may be too demanding in terms of time, cost and complexity for small farmers such as those forming the majority in the Jordan Valley. The full implementation of the HACCP approach is also proving difficult for small businesses. This is reflected in the recently adopted EU Regulation on food hygiene [9] which does not require full HACCP at the farm level.

Some recently developed international assurance schemes (e.g. EUREPGAP) are designed as a practical way for farmers to satisfy industry requirements for QA, Good Agricultural Practice (GAP) and HACCP based controls.

It should be emphasised that QA is an industry responsibility not a legal requirement.

4.3 Discussions were held with senior representatives of the leading government and non-government bodies with an interest in this Reclaimed Water Project (except the Farmers Union who were not available at the time). In addition, the reports from the other donor funded missions cited above were reviewed.

In this above mentioned report [6] it is said that 'there is general agreement that there is a need for a private sector institutional body capable of organizing exporters and farmers and delivering needed services to increase productive capacity, high quality production, and expanding market linkages

to export buyers'. It is suggested that JEPAFV would be the appropriate body, with the reservation that JEPAFV as currently structured, financed and operated cannot serve this purpose. The report suggests that JEPAFV must be revitalized and strengthened if it is to be effective in expanding production and exports of high quality produce.

An election to Board membership of JEPAFV took place while the mission was in Jordan and the author had the impression that the change in Board membership will facilitate this process. Certainly, the newly elected Board members the mission met were very positive and enthusiastic about the proposed role for JEPAFV in crop assurance.

4.4 Among those interviewed general agreement was found that the most appropriate body to take this initiative forward is JEPAFV. There was also unanimous agreement on the need to improve standards through crop assurance certification in order to improve export opportunities.

4.5 All of the farming and business representatives the author met were of the view that the most effective way of extending assurance certification to a greater number of farmers is through the 'outgrower' or 'satellite farmer' approach (also referred to as 'contracting' or 'pre-contracting'). It was mentioned that the wholesale markets in Jordan operate to the disadvantage of farmers and do not help to promote high standards of quality. The farmer group approach has the potential advantages of helping the smaller farmers with marketing, especially in export markets and enabling the farmer group certification process.

The establishment of farmer groups calls for mutual trust among the members which will need to be supported by adequate legally binding contractual arrangements. The large farmers and commercial representatives the author met did not seem to think this will present a major obstacle. It is apparently already working satisfactorily in the case of *Modern Valley Farms*. The above mentioned report [6] says that most of the original 22 farmers in the Modern Valley Farmers Group were unable to adhere to EUREPGAP standards, but they are now better prepared to expand from the current group of 4 satellite farmers. A large strawberry grower we met also advocates the farmer group certification approach as the way forward. He is currently studying EUREPGAP.

4.6 The Jordan Institute for Standards and Metrology (JISM) is the Government Certification Body for fruit and vegetables. It has produced a Jordan Standard Water: Reclaimed Domestic Wastewater [3] which sets out chemical and biological parameters for reuse treated wastewater in irrigation. The JISM officials who were interviewed felt that it was for JISM to take the lead with the MoA in promoting crop assurance. This seems to overlook the fact the crop assurance must be an industry initiative. Moreover, JISM is not registered with any crop assurance scheme as a Certifying Body. Nor does it employ specialists in horticulture as required by most schemes for a Certifying Body. However, given the present weaknesses in JEPAFV as identified in the report [6], the MoA and possibly JISM could play a positive role in helping to encourage a more proactive role for JEPAFV and generally helping to drive up standards.

4.7 The fact that quality assurance is an industry responsibility does not mean that there is no role for the government. In Jordan where agribusiness accounts for a high percentage of GDP and also for the fresh fruit and vegetable sector it is important for the responsible government bodies to encourage the establishment of a high quality image for Jordanian produce. Food poisoning outbreaks linked to farm produce, as mentioned above, can have a devastating effect on export opportunities.

4.8 JEDCO, a private/state organisation under the Ministry of Industry and Trade has an active export promotion project for fruit and vegetables. The project includes:

- study tours for farmers
- trade fairs
- development of a National Standards Manual for exporters, including legal requirements for different markets
- development of a database for fruit and vegetable production, including varieties grown, export markets and data on quantities exported
- identifying obstacles to exports
- EUREPGAP training for about 15 farmers, provided by a Dutch Company, the Centre for Promotion of Imports (CBI).

5. State Crop Monitoring

5.1 As already mentioned, quality assurance is an industry function. The *State* is responsible for protecting public health and preventing fraud by implementing appropriate food laws and ensuring their enforcement. The State also has an interest in promoting the commercial viability of industry, including agriculture. In addition, the State will need to ensure that adequate surveillance and research are undertaken, either directly or indirectly, in order to inform its food safety decision making.

State crop monitoring may be carried out for several different reasons, including sanitary, phytosanitary and marketing standards. This report is concerned with safety and health, not marketing standards or phytosanitary standards.

5.2 Although not all the relevant Jordanian laws have been seen, the author had meetings with senior officials of MoH and MoA. The mission has also seen a paper giving the results of a JVA-GTZ Working Group “Crop Monitoring” and we attended a meeting of that Working Group where a presentation was given on the results of pesticides residues monitoring over seven years from 1996 – 2002. The results for samples containing residues in excess of MRLs ranged from 0.3 % to 2.1 %. Bearing in mind that if pesticides in excess of MRLs are detected in produce on sale in EU Member States, a rapid alert may be issued by the EU Commission to all Member States; such levels of contamination are not acceptable for export consignments.

5.3 The Working Group works on a proposal for a State Crop Monitoring System and sets out a range of chemical and microbiological parameters for consideration. The MoH, the JFDA and the MoA are identified as having the leading roles in this sampling program. The already existing MoA sampling program is reported as running well. Its main target is to improve the crop marketing and to “prove the absence” of prohibited pesticides. The Working Group has made recommendations for the improvement of the sampling process.

5.4 On the question of “proving absence” it is important here to stress the limitations of end product testing as a means of proving safety. Dr Dietz summarises this very clearly in his 1996 paper [1]. In essence, while a negative result may prove the absence of the contaminant in a particular sample, that certainly does not prove absence in the whole consignment or more widely. One of the reasons for this is the heterogeneous distribution of contaminants and the difficulty in collecting representative samples. There is a place for state crop sampling as a useful source of data and trend plotting, but it is important not to be led into believing that absence of contaminants in some samples is necessarily proof of absence more widely. State crop monitoring, providing it is properly enforced, does however serve as a warning to farmers to comply with the law.

5.5 The regular inspection of farms to ensure compliance with legal requirements and GAP (including checks on the application of irrigation water)

is a more effective means of assuring safety than sampling. The role of end product sampling should not be over-emphasised: Taking only a few samples per week from a pool of over 3,000 farmers will provide a very small probability of detecting non-compliance.

5.6 There is no single, agreed international model for state crop monitoring against which the Jordanian model to be established can be measured. Even within the EU, the food law enforcement systems vary widely between the Member States. There is, however, a strong trend globally (supported by WHO/FAO) towards the formation of State Food Safety Agencies at national level. These vary in their responsibilities and the Government Departments to which they report. The parent Minister is usually the Health or Agriculture Minister. In most cases, Health Ministers are seen by consumers (rightly or wrongly) to be more objective in balancing the protection of public health against the economic interests of the food and agriculture industries than Agriculture Ministers. In some countries the Food Safety Agencies are government bodies that are completely independent of ministerial control.

5.7 In many countries, the monitoring of food, i.e. sampling for chemical or microbiological analysis, for compliance with statutory standards and codes takes place mainly at the point of retail sale. There is little available guidance on the number of samples to be taken by food control authorities. A rough guide of between 2 and 5 samples per thousand of the population per year has been used in some countries, but this is of little relevance to the situation in the Jordan Valley. Health Ministries do not often get involved in sampling at farm level. In countries such as Jordan where the agricultural industry is a significant contributor to the GDP, agriculture ministries may take on a more active monitoring role at farm level in order to help ensure compliance with quality and marketing standards. The inspectors employed for farm visits should be qualified in horticulture. However, the trend is more towards industry operated 'farmer assurance' programs, sometimes linked to 'Seals of Quality' or other logos that can be placed on produce packaging. Traceability is an important feature of such schemes.

5.8 JFDA has expertise in applying a risk assessment approach to its imported food sampling program. This expertise should be brought to bear on the development of the state crop monitoring and inspection program for fruits and vegetables grown in the Jordan Valley, especially in the areas where diluted treated wastewater is used for irrigation.

This program should include risk related sampling plans and arrangements for sampling and conveying samples to laboratory, but acknowledge limitations of end product testing for safety assurance.

5.9 In devising a state crop monitoring program, it may be helpful to take into consideration the recently adopted EU Regulation on the Hygiene of Foodstuffs [9]. Annex I of this Regulation sets out general hygiene provisions for primary production and associated operations. The EU Regulation on official controls performed to ensure the verification of compliance with feed and food law [8] is particularly relevant to state crop monitoring. These two

Regulations are key elements of the EU food safety strategy and reflect the latest policy on food control.

5.10 A program of accreditation for all laboratories involved in official crop analysis should be developed by the government departments responsible for the laboratories, or in the case of private laboratories by the management.

5.11 A risk related hygiene and safety standard for harvesting, handling, packaging, transport and storage of produce should be developed jointly by MoA, MoH, JFDA, JISM and JEPAFV.

6. Conclusions and Recommendations

6.1 It is recommended that quality assurance certification by an appropriate body for fruit and vegetables irrigated with diluted treated wastewater should be promoted in the Jordan Valley as a means of helping to access foreign markets, especially in Western Europe. For the small farms in the Jordan Valley, Farmer Group Certification should be explored. This certification will not guarantee acceptance in all cases, as individual commercial buyers may have their own specific standards. However, the certification standard should be designed to be a framework which can form the basis for the addition of more specific requirements.

6.2 Quality assurance is an industry initiative and it should be implemented in Jordan primarily through private sector organisations. In addition, there are roles for Government Departments to facilitate and encourage the adoption of assurance schemes by the farming industry e.g. by funding the provision of training and consultancy advice.

6.3 There are also possibilities for the JVA/GTZ RWP to provide assistance through, for example

- developing GAP and quality assurance manuals
- facilitating training and visits to other countries to see assurance schemes in operation
- helping with pilot Farmer Group Certification projects
- supporting awareness campaigns for environmental, health and exporters organizations addressing farmers' use of diluted treated wastewater and handling of agricultural produce.

6.4 The Jordan Exporters and Producers Association for Fruit and Vegetables (JEPAFV) would seem to be the appropriate body (subject to the availability of adequate funding) to take the lead in promoting crop quality assurance. A number of Government Departments and NGOs have an interest in the safety and profitability of farming in Jordan and it is essential that all these stakeholders are fully involved at all stages in the development of the initiative.

6.5 For the small farmers who form the great majority of farmers in the Jordan Valley, it is recommended that the Farmer Group Certification approach should be adopted. The mission was informed that there are about 10-15 'innovative farmers' who may be prepared to act as the 'lead farmers' who will take the initiative in contracting with other, probably smaller farmers, to form groups for certification purposes.

6.6 The implementation of quality assurance certification will be a gradual process over a number of years. While it is becoming established in the Jordan Valley there should be a program of initiatives aimed at gradually educating and encouraging the JV farmers to adopt Good Agricultural Practice.

6.7 The number of farmers implementing the former JVA-GTZ Integrated Pest Management Project (IPM-Project) appears to be declining owing to a lack of tangible financial benefits for the farmers. It is important that the proposed quality assurance initiative is closely linked to marketing opportunities so that more farmers will clearly see the benefits and thus be encouraged to join in.

6.8 During a Discussion Meeting on April 29, 2004 at the Marriott Hotel / Amman, the main ideas of this report were discussed with representatives of JVA, MoH, JFDA, MoA, NCARTT, JISM, JEPAFV, JORICO, JEDCO, Dajani Agribusiness, Modern Valley Farms, Farmers Union, Farmers from the Jordan Valley.



Discussion Meeting on 29th April 2004, Marriott Hotel / Amman

6.9 Action Plan:

Actions to be carried out by JEPAFV:

- Identify the various relevant donor funded initiatives and liaise with donors to ensure best use of resources
- Set up GAP/Crop Assurance Steering Group with membership from JVA, MoA, MoH, JISM, JEDCO, JFDA and other appropriate bodies
- The Steering Group should appoint a smaller Implementation Working Group to develop the detailed and technical aspects of the project
- Publicise the initiative among the Jordan Valley farming community
- Develop a Jordanian GAP/crop assurance manual for farmers with special reference to use of marginal irrigation water quality
- Identify appropriate international GAP Crop Assurance Standard and establish dialogue with Accreditation Body
- Identify appropriate national or international Certifying Body or Bodies
- Identify Jordanian or international GAP/crop assurance consultants to assist farmers with preparation for certification
- Develop guidelines on formation and operation of Farmer Groups for certification purposes
- Identify potential 'lead' farmers who could initiate 'Farmer Group Certification'
- Arrange programme of training for Jordan Valley farmers on GAP/crop assurance
- Secure adequate funding for this initiative from membership and/or Government

Actions to be carried out by Reclaimed Water Project (RWP):

- If necessary, encourage JEPAFV to accept their leading role
- Provide assistance with farmer training on GAP/crop assurance
- Arrange study tours for Jordan Valley farmers to see crop assurance in action in other countries
- Support development of GAP/crop assurance manual for fruit and vegetables irrigated with water of marginal quality
- Support awareness campaigns of environmental, health and exporters organisations addressing farmers on the use of diluted treated wastewater and handling agricultural produce
- Seek support of Ministries at high level; explore and implement possibilities for Government financial support for JEPAFV projects; help agreeing which should be the lead Government Agency to support JEPAFV with GAP/crop assurance

6.10 Several foreign donor bodies are currently funding initiatives in the fruit and vegetable growing sector, some of which appear to be, or are at least potentially, overlapping. In order to maximise the value of these inputs there is a need for coordination and close cooperation to maintain an overview of all activities.

7. References

- [1] Dietz,M.: Development of a Quality Assurance System for Fruit and Vegetable Production in Jordan, AMO-GTZ Export Promotion Project, Amman 1996
- [2] FAO/WHO: Assuring food safety and quality: Guidelines for strengthening national food control systems, FAO Food and Nutrition Paper (76), 2003
- [3] Jordan Institution for Standards and Metrology (JISM): Jordanian Standard JS 893/2002 "Water – Reclaimed Domestic Wastewater", Amman 2002
- [4] Jordan Valley Authority (JVA) / German Technical Cooperation (GTZ) – Reclaimed Water Project (RWP): Baseline Report, Amman 2003
- [5] Long,S.; Adak,G.; O'Brien,S.; Gillespie,I.: General outbreaks of infectious intestinal disease linked with salad vegetables and fruit, England and Wales, 1992-2000, Communicable Disease and Public Health 2002; 5: p. 101-105
- [6] Magnani,R.; Assad,R.; El-Habbab,S.: Assessment of Jordanian Marketing System for Fresh Fruits and Vegetables, JVA-USAID Kafa'a Project, Amman 2004
- [7] Mortimer,S.; Wallace,C.: Food Industry Briefing Series: HACCP, Blackwell Science, 2001 (ISBN 0-632-05648-7)
- [8] Regulation (EC) No 882/2004 of the European Parliament and of the Council of 29 April 2004 on official controls performed to ensure the verification of compliance with feed and food law, animal health and animal welfare rules
- [9] Regulation (EC) No. 852/2004 of the European Parliament and of the Council of 29 April 2004 on the hygiene of foodstuffs
- [10] UK Chilled Food Association: Microbiological Guidance for Produce Suppliers to Chilled Food Manufacturers, 2002 (ISBN 1-901-79803-8)
- [11] Websites:
 - Eurepgap: <http://www.eurep.org>
 - Irish Horticultural Board: <http://www.bordglas.ie>
 - UK Fresh produce Consortium: <http://www.freshproduce.org.uk>
 - UK Chilled Food Association: <http://www.chilledfood.org>
- [12] Will,M: RWP – Info: Review of European standards on selected fruits and vegetables, JVA-GTZ Reclaimed Water Project RWP, Amman 2004
- [13] Will,M: RWP – Info: Recommendations on setting a safety control guideline for fresh fruit and vegetables with special reference to irrigation water related parameters, JVA-GTZ Reclaimed Water Project RWP, Amman 2004
- [14] Will,M.: Food Quality and Safety Standards as required by EU Law and the Private Industry – with special reference to the MEDA countries' exports of fresh and processed fruit & vegetables, herbs & spices; edited by German Technical Cooperation (GTZ), GTZ Headquarter Eschborn/Germany, 2003