



DEPOUILLEMENT DES QUESTIONNAIRES

1 (Compiled from: Questionnaire_CNA_Wastewater in Agriculture IAV.docx)

Questionnaire

to support the
Individual's Capacity Needs Assessment
In the framework of the
Joint FAO/ UNW-DPC/UNU-INWEH
Capacity Development Project on
Safe Use of Wastewater in Agriculture
Phase I

General Objective of the Questionnaire

The Food and Agriculture Organization of the United Nations (FAO), the UN-Water Decade Programme on Capacity Development (UNW-DPC), and the United Nations University Institute on Water, Environment and Health (UNU-INWEH), in collaboration with designated national coordinators, are compiling data on the existing knowledge and skills for the safe use of wastewater (including greywater) in agriculture.

The questionnaire is addressed to key institutions and organisations in developing countries or in countries in transition, with competences on safe use of wastewater in agriculture. Your organization has been identified as one of these organizations. The aim of the questionnaire is to help in the classification and prioritisation of the knowledge and skills on the safe use wastewater in agriculture that individuals working in your organization may need..

The questionnaires results will be collected by designated national coordinators and summarised in a National Report.

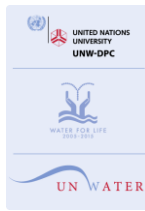
Please provide full contact information so that national coordinators may communicate directly on technical matters, if necessary.

For additional glossary and definitions related to safe use of wastewater in agriculture please refer to WHO/FAO/UNEP (2006) Guidelines for the safe use of wastewater, excreta and grey water. Volume



II: Wastewater use in agriculture. World health Organization, Geneva. (Available at http://www.who.int/water_sanitation_health/wastewater/gsuweg2/en/index.html)

Filling out this questionnaire will take about 30 min. We highly appreciate your support in this task and look forward to receiving your reply.



Structure of the Questionnaire

This Questionnaire is divided in 8 sections referring to different capacity areas on the safe use of wastewater in agriculture:

1. Assessment of health risk
2. Health protection measures
3. Monitoring and system assessment
4. Crop production aspects
5. Environmental aspects
6. Sociocultural aspects
7. Economic and financial considerations
8. Policy aspects

Any other relevant capacity area is welcome. Please use the final section “Others” for this purpose.

Each of the above mentioned capacity areas is presented in a separate table that is divided in three columns:

The first column shows selected components (e.g. microbial and chemical laboratory analysis) of each capacity area (e.g. assessment of health risk) .

The second column enquires about the current knowledge and skills of the pertinent staff in your organization in relation to the different components

The level of the knowledge and skills can be rated as follows:

Poor = No or little knowledge in this area;

Basic = Some basic knowledge with a little experience;

Good = Good knowledge with experience;

Excellent = Demonstrable specialist knowledge in this area (ability to coach/train others).

The third column enquires about the importance that your organization allocates to a specific component to effectively play its role on the safe use of wastewater in agriculture.



**Questionnaire on
knowledge and skills on
safe wastewater use in agriculture**

Organisation name.....Institut Agronomique et Vétérinaire Hassan II
.....

**Organization
type**¹University.....

**Roles and
Responsibilities**²:.....Research.....
.....
.....

Reporting Office /Department and Contact name

Reporter name:..... El Hamouri Bouchaib
.....

Title/Level:.....Professor.....
.....

Specialization:Wastewater treatment and reuse
.....

Department:.....Water Environment and Infrastructure (DEEI), School of Rural Engineering
.....

Address:..Madinat Al Irfane, BP 6202, Rabat, Morocco....
.....

Country: Institute's Web site:..http://www.iav.ac.ma
.....

Tel: .212 537 77 17 58.....Fax: 212 537 77 58 45.....
e-mail:....b.elhamouri@iav.ac.ma.....

¹ e.g., national governmental organization, local governmental organization, research organization, university, professional association, NGO, other (specify)

² Refers to roles and responsibilities related to the safe use of wastewater in agriculture. e.g. national policy making, local policy making , project planning, advocacy and communication, research, extension, training, others (specify).



Please return the filled questionnaire (either electronically or in hard copy) to:



1 - Assessment of Health Risk

	<u>How are the current knowledge and skills of the pertinent staff in your organization in relation to:?</u>	<u>What is the importance of this subject for your organization?</u>
Microbial and chemical laboratory analysis	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Epidemiological studies	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Quantitative microbial risk assessment - QMRA	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Setting health based targets	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Assessment of Health Risk – Definitions

Microbial and chemical laboratory analysis

Refers to materials and methods to implement effective laboratory analysis concerning the type and number of harmful chemical agents (e.g. heavy metals) or pathogens (viruses, bacteria, protozoa, helminths) in wastewater, soil and on crops.

Epidemiological studies

Refers to evaluation of risk of infections for farming families and local communities. This includes risk to consumers eating uncooked crops, risk to agricultural workers and their families, risk to local communities from sprinkler irrigation.

Quantitative microbial risk assessment - QMRA

Refers to the method for assessing risk from specific hazards through different exposure pathways. QMRA has four components: hazard identification, exposure assessment, dose-response assessment, and risk characterisation

Health based targets

Refers to a defined level of health protection for a given exposure. This can be based on a measure of disease, e.g. 10^{-6} DALY³ per person per year, or the absence of a specific disease related to that exposure

³ DALY (Disability Adjusted Life Years): population metric of life years lost to disease due to both morbidity and mortality)



2 - Health Protection Measures

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Wastewater treatment	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Non-treatment options	<i>Poor</i> <input checked="" type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input checked="" type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Health Protection Measures – Definitions

Wastewater treatment

Refers to design, construction, operation and maintenance of wastewater collection and treatment systems, including:

Primary treatment processes such as sedimentation tank, skimming and chemical enhanced primary treatment.

Secondary treatment processes such as Aerated Lagoon, Activated Sludge, Up-flow Anaerobic Sludge Blanket, Trickling Filters, Rotating Biological Contactors, Oxidation Ditch and Settling Basin Digester.

Natural biological treatment processes such as Waste Stabilization Pond, Constructed Wetlands, Overland Treatment, Nutrient Film Techniques, Soil Aquifer Treatment, High-Rate Algal Pond, and Floating Aquatic Macrophyte Systems.

Tertiary treatment processes such as Membrane filtration (Micro-; Nano-; Ultra- and Reverse Osmosis), Infiltration/Percolation, Activated Carbon and Disinfection.

Non-treatment options

Refer to the design and implementation of health protection measures (different than wastewater treatment), such as:

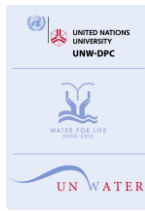
Crop restriction: that refers to growing non-food crops (e.g. cotton and jojoba); food crops that are processed before consumption (e.g. wheat) and food crops that have to be cooked (e.g. potatoes and rice).

Selection of wastewater application techniques: that refers to the selection or irrigation methods to minimize exposure of edible plants, farm workers and nearby communities to wastewater.

Cessation of irrigation: that refers to the withholding periods to allow pathogen die-off after the last wastewater application and before the consumption.

Food preparation measures that refer to hygienic practices at food markets and during food preparation and health and hygiene promotion.

Human exposure control that apply to consumers, field workers and their families, and refers to the use of personal protective equipment (e.g. gloves and boots), health and hygiene promotion, chemotherapy and immunization.



3 - Monitoring and System Assessment

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Monitoring of health protection measures	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Wastewater use system assessment	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Monitoring and System Assessment – Definitions

Monitoring of health protection measures

Refers to the observation and inspection of the system, collecting samples for analysis and establishing the necessary institutional arrangements to ensure the good management of the collected information to provide feedback to those that have implemented the health protection measures.

Monitoring has three different purposes:

1. To prove that the system is capable of meeting its desired requirements (e.g. microbial reduction targets).
2. To provide information regarding the functioning of individual components of the health protection measures (e.g. wastewater treatment).
3. To ensure that the system is achieving the specified targets (e.g testing for E.coli crop contamination). which usually takes place at the end of the process

Wastewater use system assessment

Refers to the comprehensive description and evaluation of wastewater use systems including identification of sources of hazards, the assessment of the risk and development and implementation of preventive strategies to manage the risks. It also requires an assessment of capabilities to meet targets.



4 - Crop production aspects

	<u>How are the current knowledge and skills of the pertinent staff in your organization in relation to:?</u>	<u>What is the importance of this subject for your organization?</u>
Components of wastewater harmful to crop production	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Agricultural effects of wastewater irrigation	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Management strategies for maximize crop production	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Crop Production Aspects – Definitions

Components of wastewater harmful to crop production

Refers to evaluation of the quality of wastewater in terms of concentration of elements that may have an adverse impact on the crop production (e.g. salts, toxic ions, suspended solids, etc)

Agricultural effects of wastewater irrigation

Refers to evaluation of positive effects(e.g. nutrient supply) and negative effects (e.g. salinity or sodicity) of using wastewater for crop production.

Management strategies for maximize crop production

Refers to implementing of control measures to maximize crop production when using wastewater to irrigate. The control measures refer to: crops selection (e.g. less sensitive for toxic compounds of wastewater), good conditions (e.g. scheduling of irrigation, application of correct amount and quality of wastewater), irrigation methods (e.g. drip irrigation allows to maintain high soil water potential throughout the growing season and minimize the effect of salinity).



5 - Environmental Aspects

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Components of wastewater harmful to the environment	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Environmental effects through the agricultural chain	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input checked="" type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Management strategies for reducing environmental impacts	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Environmental Aspects – Definitions

Components of wastewater harmful to the environment

Refers to evaluation of the quality of wastewater, in terms of concentration of elements that may have an adverse impact on the environment.

Environmental effects through the agricultural chain

Refers to evaluation of effects of using wastewater for agriculture on: soils (e.g. salinization and loss of soil structure), groundwater (e.g. contamination) and surface water (e.g. eutrophication).

Management strategies for reducing environmental impacts

Refers to implementing of control measures to minimise the environmental impacts. The control measures can be presented by polluting agent (e.g. control measure for excessive nitrogen is to dilute wastewater with fresh water when possible); or kind of problem (e.g. control measure for clogging of irrigation systems is to use water with low total suspended solids content).



6 - Sociocultural Aspects

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Cultural and religious beliefs	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Public acceptance	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Sociocultural Aspects – Definitions

Cultural and religious beliefs

Refers to cultural and religious factors that can limit the feasibility of a wastewater reuse system and the ways to overcome these limiting factors.

Public acceptance

Refers to the tools and methods to assess and attain communities' acceptance on wastewater use for agriculture. This includes public participation, education and information, public meetings, workshops, interviews surveys, questionnaires, etc.



7- Economic and financial considerations

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Economic feasibility	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Financial feasibility	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Market feasibility	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input checked="" type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Economic and financial consideration – Definitions

Economic feasibility

Refers to assessment whether a project is affordable and has a positive internal rate of return (projects that provide the most benefits at least cost are the most desirable).

Financial feasibility

Refers to establishment of the sources of revenues and evaluation who will pay for what for a project.

Market feasibility

Refers to assessment of the ability to sell (treated) wastewater to producers and evaluation of the marketability of products grown with wastewater or greywater.



8 - Policy aspects

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Institutional roles and responsibilities	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Laws and regulations	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Plans and programs	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Economic instruments	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Education and social awareness	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Policy aspects – Definitions

Institutional roles and responsibilities

Refer to the responsibilities, jurisdictions among public institutions and the coordination mechanisms among them

Laws and regulations

Refer to legal instruments to facilitate and govern (control) the safe use of wastewater for agriculture, (e.g. creating rights of access to wastewater, establishing land tenure, developing public health and agricultural legislation, etc.)

Economic instruments

Refer to financial tools that the public authorities can use to promote safe practices when using wastewater in agriculture and to share the costs of wastewater treatment and reuse projects (e.g. subsidies, taxes, water pricing, payment for environmental services, etc)

Education and social awareness

Refer to the education and training tools to increase knowledge and skill on the safe use of wastewater in agriculture, as well as the advocacy and communication campaigns to impact public perception and awareness



Others:		
	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Research and innovation abilities	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input checked="" type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input checked="" type="checkbox"/>
Wastewater treatment processes	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input checked="" type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input checked="" type="checkbox"/>
Adapting treatment and reuse processes to local conditions	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input checked="" type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input checked="" type="checkbox"/>
Implementation and conduct of full size projects	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input checked="" type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input checked="" type="checkbox"/>

Definitions

The experience of the Institut Agronomique et Vétérinaire Hassan II

May be appreciated through thematic web researches related to the following research workers:

Bouchaib El Hamouri - wastewater
 Choukrallah Redoine - wastewater
 Soudi Brahim – wastewater
 Khallayoune Khalid – waste water
 El Hafiane Fatiha -wastewater



2 (Compiled from: Questionnaire_CNA_Wastewater in Agriculture MAPM.docx)

Questionnaire on knowledge and skills on safe wastewater use in agriculture

Organisation Name.....MINISTERE DE L'AGRICULTURE ET DE LA
PECHEMARITIME/DIRECTION DE L'IRRIGATION ET DE L'AMENAGEMENT DE
L'ESPACE AGRICOLE.....

Organization type⁴.....FONCTION PUBLIQUE

Roles and Responsibilities⁵.AMENAGEMENT ET GESTION DE
L'IRRIGATION (POLITIQUE, REGLEMENTATION,ASSISTANCE TECHNIQUE DES
SERVICES EXTERIEURS, PLANIFICATION , CONTROLE)
.....
.....

Reporter name:.....KHAJOUR LARBI
.....

Title/Level:.....INGENIEUR DE GENIE RURAL

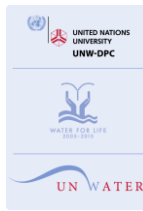
Specialization:
....HYRAULIQUE.....

Address:...461, AVENUE HASSAN II, AKKARI,RABAT

Tel: . +212537698431..... Fax:..+212537698431.....
e-mail:....larbikhajour@gmail.com

⁴e.g., national governmental organization, local governmental organization, research organization, university, professional association, NGO, other (specify)

⁵Refersto roles and responsibilities related to the safe use of wastewater in agriculture. e.g. national policy making, local policy making, project planning, advocacy and communication, research, extension, training, others (specify).



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**Questionnaire on
knowledge and skills on
safe wastewater use in agriculture**

Organisation name ORMVAH
Organization type⁶ **Agriculture** : local governmental organisation
Roles and Responsibilities⁷:.....
.....
.....

Reporting Office /Department and Contact name
Reporter name: Lahcen OUZINE
Title/Level: Chef du SGRID
Specialization: Ingénieur GR
Department: SGRID
Address ORMVAH
Country: Institute's Web site: Marrakech Maroc
Tel:Fax:.....e-mail:.....

Please return the filled questionnaire (either electronically or in hard copy) to:

⁶ e.g., national governmental organization, local governmental organization, research organization, university, professional association, NGO, other (specify)

⁷ Refers to roles and responsibilities related to the safe use of wastewater in agriculture. e.g. national policy making, local policy making , project planning, advocacy and communication, research, extension, training, others (specify).



1 - Assessment of Health Risk

	<u>How are the current knowledge and skills of the pertinent staff in your organization in relation to:?</u>	<u>What is the importance of this subject for your organization?</u>
Microbial and chemical laboratory analysis	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Epidemiological studies	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Quantitative microbial risk assessment - QMRA	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Setting health based targets	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Assessment of Health Risk – Definitions

Microbial and chemical laboratory analysis

Refers to materials and methods to implement effective laboratory analysis concerning the type and number of harmful chemical agents (e.g. heavy metals) or pathogens (viruses, bacteria, protozoa, helminths) in wastewater, soil and on crops.

Epidemiological studies

Refers to evaluation of risk of infections for farming families and local communities. This includes risk to consumers eating uncooked crops, risk to agricultural workers and their families, risk to local communities from sprinkler irrigation.

Quantitative microbial risk assessment - QMRA

Refers to the method for assessing risk from specific hazards through different exposure pathways. QMRA has four components: hazard identification, exposure assessment, dose-response assessment, and risk characterisation

Health based targets

Refers to a defined level of health protection for a given exposure. This can be based on a measure of disease, e.g. 10^{-6} DALY⁸ per person per year, or the absence of a specific disease related to that exposure

⁸ DALY (Disability Adjusted Life Years): population metric of life years lost to disease due to both morbidity and mortality)



2 - Health Protection Measures

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Wastewater treatment	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Non-treatment options	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Health Protection Measures – Definitions

Wastewater treatment

Refers to design, construction, operation and maintenance of wastewater collection and treatment systems, including:

Primary treatment processes such as sedimentation tank, skimming and chemical enhanced primary treatment.

Secondary treatment processes such as Aerated Lagoon, Activated Sludge, Up-flow Anaerobic Sludge Blanket, Trickling Filters, Rotating Biological Contactors, Oxidation Ditch and Settling Basin Digester.

Natural biological treatment processes such as Waste Stabilization Pond, Constructed Wetlands, Overland Treatment, Nutrient Film Techniques, Soil Aquifer Treatment, High-Rate Algal Pond, and Floating Aquatic Macrophyte Systems.

Tertiary treatment processes such as Membrane filtration (Micro-; Nano-; Ultra- and Reverse Osmosis), Infiltration/Percolation, Activated Carbon and Disinfection.

Non-treatment options

Refer to the design and implementation of health protection measures (different than wastewater treatment), such as:

Crop restriction: that refers to growing non-food crops (e.g. cotton and jojoba); food crops that are processed before consumption (e.g. wheat) and food crops that have to be cooked (e.g. potatoes and rice).

Selection of wastewater application techniques: that refers to the selection or irrigation methods to minimize exposure of edible plants, farm workers and nearby communities to wastewater.

Cessation of irrigation: that refers to the withholding periods to allow pathogen die-off after the last wastewater application and before the consumption.

Food preparation measures that refer to hygienic practices at food markets and during food preparation and health and hygiene promotion.

Human exposure control that apply to consumers, field workers and their families, and refers to the use of personal protective equipment (e.g. gloves and boots), health and hygiene promotion, chemotherapy and immunization.



3 - Monitoring and System Assessment

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Monitoring of health protection measures	<i>Poor</i> <input checked="" type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Wastewater use system assessment	<i>Poor</i> <input checked="" type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Monitoring and System Assessment – Definitions

Monitoring of health protection measures

Refers to the observation and inspection of the system, collecting samples for analysis and establishing the necessary institutional arrangements to ensure the good management of the collected information to provide feedback to those that have implemented the health protection measures.

Monitoring has three different purposes:

4. To prove that the system is capable of meeting its desired requirements (e.g. microbial reduction targets).
5. To provide information regarding the functioning of individual components of the health protection measures (e.g. wastewater treatment).
6. To ensure that the system is achieving the specified targets (e.g testing for E.coli crop contamination). which usually takes place at the end of the process

Wastewater use system assessment

Refers to the comprehensive description and evaluation of wastewater use systems including identification of sources of hazards, the assessment of the risk and development and implementation of preventive strategies to manage the risks. It also requires an assessment of capabilities to meet targets.



4 - Crop production aspects

	<u>How are the current knowledge and skills of the pertinent staff in your organization in relation to:?</u>	<u>What is the importance of this subject for your organization?</u>
Components of wastewater harmful to crop production	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Agricultural effects of wastewater irrigation	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Management strategies for maximize crop production	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Crop Production Aspects – Definitions

Components of wastewater harmful to crop production

Refers to evaluation of the quality of wastewater in terms of concentration of elements that may have an adverse impact on the crop production (e.g. salts, toxic ions, suspended solids, etc)

Agricultural effects of wastewater irrigation

Refers to evaluation of positive effects(e.g. nutrient supply) and negative effects (e.g. salinity or sodicity) of using wastewater for crop production.

Management strategies for maximize crop production

Refers to implementing of control measures to maximize crop production when using wastewater to irrigate. The control measures refer to: crops selection (e.g. less sensitive for toxic compounds of wastewater), good conditions (e.g. scheduling of irrigation, application of correct amount and quality of wastewater), irrigation methods (e.g. drip irrigation allows to maintain high soil water potential throughout the growing season and minimize the effect of salinity).



5 - Environmental Aspects

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Components of wastewater harmful to the environment	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Environmental effects through the agricultural chain	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Management strategies for reducing environmental impacts	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Environmental Aspects – Definitions

Components of wastewater harmful to the environment

Refers to evaluation of the quality of wastewater, in terms of concentration of elements that may have an adverse impact on the environment.

Environmental effects through the agricultural chain

Refers to evaluation of effects of using wastewater for agriculture on: soils (e.g. salinization and loss of soil structure), groundwater (e.g. contamination) and surface water (e.g. eutrophication).

Management strategies for reducing environmental impacts

Refers to implementing of control measures to minimise the environmental impacts. The control measures can be presented by polluting agent (e.g. control measure for excessive nitrogen is to dilute wastewater with fresh water when possible); or kind of problem (e.g. control measure for clogging of irrigation systems is to use water with low total suspended solids content).



6 - Sociocultural Aspects

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Cultural and religious beliefs	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Public acceptance	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Sociocultural Aspects – Definitions

Cultural and religious beliefs

Refers to cultural and religious factors that can limit the feasibility of a wastewater reuse system and the ways to overcome these limiting factors.

Public acceptance

Refers to the tools and methods to assess and attain communities' acceptance on wastewater use for agriculture. This includes public participation, education and information, public meetings, workshops, interviews surveys, questionnaires, etc.



7- Economic and financial considerations

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Economic feasibility	<i>Poor</i> <input checked="" type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Financial feasibility	<i>Poor</i> <input checked="" type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Market feasibility	<i>Poor</i> <input checked="" type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Economic and financial consideration – Definitions

Economic feasibility

Refers to assessment whether a project is affordable and has a positive internal rate of return (projects that provide the most benefits at least cost are the most desirable).

Financial feasibility

Refers to establishment of the sources of revenues and evaluation who will pay for what for a project.

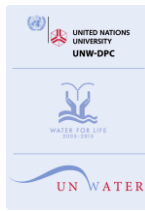
Market feasibility

Refers to assessment of the ability to sell (treated) wastewater to producers and evaluation of the marketability of products grown with wastewater or greywater.



8 - Policy aspects		
	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Institutional roles and responsibilities	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input checked="" type="checkbox"/>
Laws and regulations	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input checked="" type="checkbox"/>
Plans and programs	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input checked="" type="checkbox"/>
Economic instruments	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input checked="" type="checkbox"/>
Education and social awareness	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input checked="" type="checkbox"/>

Policy aspects – Definitions
<p>Institutional roles and responsibilities Refer to the responsibilities, jurisdictions among public institutions and the coordination mechanisms among them</p> <p>Laws and regulations Refer to legal instruments to facilitate and govern (control) the safe use of wastewater for agriculture, (e.g. creating rights of access to wastewater, establishing land tenure, developing public health and agricultural legislation, etc.)</p> <p>Economic instruments Refer to financial tools that the public authorities can use to promote safe practices when using wastewater in agriculture and to share the costs of wastewater treatment and reuse projects (e.g. subsidies, taxes, water pricing, payment for environmental services, etc)</p> <p>Education and social awareness Refer to the education and training tools to increase knowledge and skill on the safe use of wastewater in agriculture, as well as the advocacy and communication campaigns to impact public perception and awareness</p>



Others:		
	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Definitions



4 (Compiled from: Questionnaire_CNA_Wastewater in Agricultureourza.doc)

Questionnaire

to support the
Individual's Capacity Needs Assessment
In the framework of the
Joint FAO/ UNW-DPC/UNU-INWEH
Capacity Development Project on
Safe Use of Wastewater in Agriculture
Phase I

General Objective of the Questionnaire

The Food and Agriculture Organization of the United Nations (FAO), the UN-Water Decade Programme on Capacity Development (UNW-DPC), and the United Nations University Institute on Water, Environment and Health (UNU-INWEH), in collaboration with designated national coordinators, are compiling data on the existing knowledge and skills for the safe use of wastewater (including greywater) in agriculture.

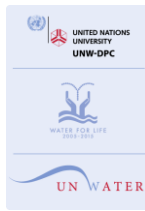
The questionnaire is addressed to key institutions and organisations in developing countries or in countries in transition, with competences on safe use of wastewater in agriculture. Your organization has been identified as one of these organizations. The aim of the questionnaire is to help in the classification and prioritisation of the knowledge and skills on the safe use wastewater in agriculture that individuals working in your organization may need..

The questionnaires results will be collected by designated national coordinators and summarised in a National Report.

Please provide full contact information so that national coordinators may communicate directly on technical matters, if necessary.

For additional glossary and definitions related to safe use of wastewater in agriculture please refer to WHO/FAO/UNEP (2006) Guidelines for the safe use of wastewater, excreta and grey water. Volume II: Wastewater use in agriculture. World health Organization, Geneva. (Available at http://www.who.int/water_sanitation_health/wastewater/gsuweg2/en/index.html)

Filling out this questionnaire will take about 30 min. We highly appreciate your support in this task and look forward to receiving your reply.



Structure of the Questionnaire

This Questionnaire is divided in 8 sections referring to different capacity areas on the safe use of wastewater in agriculture:

17. Assessment of health risk
18. Health protection measures
19. Monitoring and system assessment
20. Crop production aspects
21. Environmental aspects
22. Sociocultural aspects
23. Economic and financial considerations
24. Policy aspects

Any other relevant capacity area is welcome. Please use the final section “Others” for this purpose.

Each of the above mentioned capacity areas is presented in a separate table that is divided in three columns:

The first column shows selected components (e.g. microbial and chemical laboratory analysis) of each capacity area (e.g. assessment of health risk) .

The second column enquires about the current knowledge and skills of the pertinent staff in your organization in relation to the different components

The level of the knowledge and skills can be rated as follows:

Poor = No or little knowledge in this area;

Basic = Some basic knowledge with a little experience;

Good = Good knowledge with experience;

Excellent = Demonstrable specialist knowledge in this area (ability to coach/train others).

The third column enquires about the importance that your organization allocates to a specific component to effectively play its role on the safe use of wastewater in agriculture.



**Questionnaire on
knowledge and skills on
safe wastewater use in agriculture**

Organisation name .OFFICE REGIONAL DE MISE EN VALEUR AGRICOLE DE OUARZAZATE

Organization type⁹..ORGANISATION GOUVERN

Roles and Responsibilities¹⁰..
...DEVELOPPEMENT AGRICOLE ET VULGARISATION ET ENCADREMENT DES AGRICULTEURS.....
.....
.....

Reporting Office /Department and Contact name

Reporter name:...Ahmad
ZNINE.....

Title/Level:.. INGENIEUR
D'ETAT.....

Specialization: .BIOLOGIE VEGETALE-SCIENCES DE L'EAU.....

Department:..SERVICE DE L'EQUIPEMENT.....
.....

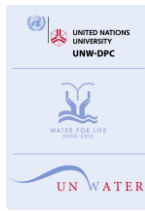
Address:...ORMVAO BP 29
OUARZAZATE.....
.

Country: Institute's Web site:.....

Tel: 0661630490.....Fax:0524883442.....e-mail:ahmadznine@gmail.com.....

⁹ e.g., national governmental organization, local governmental organization, research organization, university, professional association, NGO, other (specify)

¹⁰ Refers to roles and responsibilities related to the safe use of wastewater in agriculture. e.g. national policy making, local policy making , project planning, advocacy and communication, research, extension, training, others (specify).



Please return the filled questionnaire (either electronically or in hard copy) to:



1 - Assessment of Health Risk

	<u>How are the current knowledge and skills of the pertinent staff in your organization in relation to:?</u>	<u>What is the importance of this subject for your organization?</u>
Microbial and chemical laboratory analysis	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i>X... <input checked="" type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i>X... <input checked="" type="checkbox"/>
Epidemiological studies	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i>X... <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X... <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Quantitative microbial risk assessment - QMRA	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i>X... <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X... <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Setting health based targets	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X... <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X... <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Assessment of Health Risk – Definitions

Microbial and chemical laboratory analysis

Refers to materials and methods to implement effective laboratory analysis concerning the type and number of harmful chemical agents (e.g. heavy metals) or pathogens (viruses, bacteria, protozoa, helminths) in wastewater, soil and on crops.

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Refers to evaluation of risk of infections for farming families and local communities. This includes risk to consumers eating uncooked crops, risk to agricultural workers and their families, risk to local communities from sprinkler irrigation.

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Refers to the method for assessing risk from specific hazards through different exposure pathways. QMRA has four components: hazard identification, exposure assessment, dose-response assessment, and risk characterisation

Health based targets

Refers to a defined level of health protection for a given exposure. This can be based on a measure of disease, e.g. 10^{-6} DALY¹¹ per person per year, or the absence of a specific disease related to that exposure

¹¹ DALY (Disability Adjusted Life Years): population metric of life years lost to disease due to both morbidity and mortality)



2 - Health Protection Measures

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Wastewater treatment	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <i>X</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <i>X</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Non-treatment options	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <i>X</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <i>X</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Health Protection Measures – Definitions

Wastewater treatment

Refers to design, construction, operation and maintenance of wastewater collection and treatment systems, including:

Primary treatment processes such as sedimentation tank, skimming and chemical enhanced primary treatment.

Secondary treatment processes such as Aerated Lagoon, Activated Sludge, Up-flow Anaerobic Sludge Blanket, Trickling Filters, Rotating Biological Contactors, Oxidation Ditch and Settling Basin Digester.

Natural biological treatment processes such as Waste Stabilization Pond, Constructed Wetlands, Overland Treatment, Nutrient Film Techniques, Soil Aquifer Treatment, High-Rate Algal Pond, and Floating Aquatic Macrophyte Systems.

Tertiary treatment processes such as Membrane filtration (Micro-; Nano-; Ultra- and Reverse Osmosis), Infiltration/Percolation, Activated Carbon and Disinfection.

Non-treatment options

Refer to the design and implementation of health protection measures (different than wastewater treatment), such as:

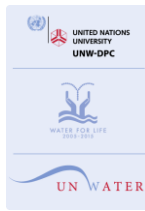
Crop restriction: that refers to growing non-food crops (e.g. cotton and jojoba); food crops that are processed before consumption (e.g. wheat) and food crops that have to be cooked (e.g. potatoes and rice).

Selection of wastewater application techniques: that refers to the selection or irrigation methods to minimize exposure of edible plants, farm workers and nearby communities to wastewater.

Cessation of irrigation: that refers to the withholding periods to allow pathogen die-off after the last wastewater application and before the consumption.

Food preparation measures that refer to hygienic practices at food markets and during food preparation and health and hygiene promotion.

Human exposure control that apply to consumers, field workers and their families, and refers to the use of personal protective equipment (e.g. gloves and boots), health and hygiene promotion, chemotherapy and immunization.



3 - Monitoring and System Assessment

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Monitoring of health protection measures	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X..... <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X..... <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Wastewater use system assessment	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i>X..... <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X..... <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Monitoring and System Assessment – Definitions

Monitoring of health protection measures

Refers to the observation and inspection of the system, collecting samples for analysis and establishing the necessary institutional arrangements to ensure the good management of the collected information to provide feedback to those that have implemented the health protection measures.

Monitoring has three different purposes:

7. To prove that the system is capable of meeting its desired requirements (e.g. microbial reduction targets).
8. To provide information regarding the functioning of individual components of the health protection measures (e.g. wastewater treatment).
9. To ensure that the system is achieving the specified targets (e.g testing for E.coli crop contamination). which usually takes place at the end of the process

Wastewater use system assessment

Refers to the comprehensive description and evaluation of wastewater use systems including identification of sources of hazards, the assessment of the risk and development and implementation of preventive strategies to manage the risks. It also requires an assessment of capabilities to meet targets.



4 - Crop production aspects

	<u>How are the current knowledge and skills of the pertinent staff in your organization in relation to:?</u>	<u>What is the importance of this subject for your organization?</u>
Components of wastewater harmful to crop production	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <i>X</i> ... <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <i>X</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Agricultural effects of wastewater irrigation	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <i>X</i> .. <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <i>X</i> ... <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Management strategies for maximize crop production	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <i>X</i> .. <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <i>X</i> .. <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Crop Production Aspects – Definitions

Components of wastewater harmful to crop production

Refers to evaluation of the quality of wastewater in terms of concentration of elements that may have an adverse impact on the crop production (e.g. salts, toxic ions, suspended solids, etc)

Agricultural effects of wastewater irrigation

Refers to evaluation of positive effects(e.g. nutrient supply) and negative effects (e.g. salinity or sodicity) of using wastewater for crop production.

Management strategies for maximize crop production

Refers to implementing of control measures to maximize crop production when using wastewater to irrigate. The control measures refer to: crops selection (e.g. less sensitive for toxic compounds of wastewater), good conditions (e.g. scheduling of irrigation, application of correct amount and quality of wastewater), irrigation methods (e.g. drip irrigation allows to maintain high soil water potential throughout the growing season and minimize the effect of salinity).



5 - Environmental Aspects

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Components of wastewater harmful to the environment	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i>X... <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X.. <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Environmental effects through the agricultural chain	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i>X.. <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X.. <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Management strategies for reducing environmental impacts	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X. <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X.. <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Environmental Aspects – Definitions

Components of wastewater harmful to the environment

Refers to evaluation of the quality of wastewater, in terms of concentration of elements that may have an adverse impact on the environment.

Environmental effects through the agricultural chain

Refers to evaluation of effects of using wastewater for agriculture on: soils (e.g. salinization and loss of soil structure), groundwater (e.g. contamination) and surface water (e.g. eutrophication).

Management strategies for reducing environmental impacts

Refers to implementing of control measures to minimise the environmental impacts. The control measures can be presented by polluting agent (e.g. control measure for excessive nitrogen is to dilute wastewater with fresh water when possible); or kind of problem (e.g. control measure for clogging of irrigation systems is to use water with low total suspended solids content).



6 - Sociocultural Aspects

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Cultural and religious beliefs	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X. <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X. <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Public acceptance	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X. <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X. <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Sociocultural Aspects – Definitions

Cultural and religious beliefs

Refers to cultural and religious factors that can limit the feasibility of a wastewater reuse system and the ways to overcome these limiting factors.

Public acceptance

Refers to the tools and methods to assess and attain communities' acceptance on wastewater use for agriculture. This includes public participation, education and information, public meetings, workshops, interviews surveys, questionnaires, etc.



7- Economic and financial considerations

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Economic feasibility	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i>X... <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X... <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Financial feasibility	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X... <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X... <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Market feasibility	<i>Poor</i>X... <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i>X... <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Economic and financial consideration – Definitions

Economic feasibility

Refers to assessment whether a project is affordable and has a positive internal rate of return (projects that provide the most benefits at least cost are the most desirable).

Financial feasibility

Refers to establishment of the sources of revenues and evaluation who will pay for what for a project.

Market feasibility

Refers to assessment of the ability to sell (treated) wastewater to producers and evaluation of the marketability of products grown with wastewater or greywater.



8 - Policy aspects

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Institutional roles and responsibilities	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X. <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X. <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Laws and regulations	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X. <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i>X. <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Plans and programs	<i>Poor</i>X. <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i>X. <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Economic instruments	<i>Poor</i>X. <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i>X. <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Education and social awareness	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X. <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i>X. <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Policy aspects – Definitions

Institutional roles and responsibilities

Refer to the responsibilities, jurisdictions among public institutions and the coordination mechanisms among them

Laws and regulations

Refer to legal instruments to facilitate and govern (control) the safe use of wastewater for agriculture, (e.g. creating rights of access to wastewater, establishing land tenure, developing public health and agricultural legislation, etc.)

Economic instruments

Refer to financial tools that the public authorities can use to promote safe practices when using wastewater in agriculture and to share the costs of wastewater treatment and reuse projects (e.g. subsidies, taxes, water pricing, payment for environmental services, etc)

Education and social awareness

Refer to the education and training tools to increase knowledge and skill on the safe use of wastewater in agriculture, as well as the advocacy and communication campaigns to impact public perception and awareness



Others:		
	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Definitions



5 (Compiled from: Questionnaire_CNA_Wastewater in AgricultureSOUS MASSA.doc)

Questionnaire

**to support the
Individual's Capacity Needs Assessment
In the framework of the
Joint FAO/ UNW-DPC/UNU-INWEH
Capacity Development Project on
Safe Use of Wastewater in Agriculture
Phase I**

General Objective of the Questionnaire

The Food and Agriculture Organization of the United Nations (FAO), the UN-Water Decade Programme on Capacity Development (UNW-DPC), and the United Nations University Institute on Water, Environment and Health (UNU-INWEH), in collaboration with designated national coordinators, are compiling data on the existing knowledge and skills for the safe use of wastewater (including greywater) in agriculture.

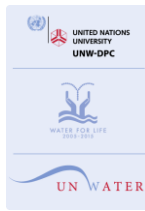
The questionnaire is addressed to key institutions and organisations in developing countries or in countries in transition, with competences on safe use of wastewater in agriculture. Your organization has been identified as one of these organizations. The aim of the questionnaire is to help in the classification and prioritisation of the knowledge and skills on the safe use wastewater in agriculture that individuals working in your organization may need..

The questionnaires results will be collected by designated national coordinators and summarised in a National Report.

Please provide full contact information so that national coordinators may communicate directly on technical matters, if necessary.

For additional glossary and definitions related to safe use of wastewater in agriculture please refer to WHO/FAO/UNEP (2006) Guidelines for the safe use of wastewater, excreta and grey water. Volume II: Wastewater use in agriculture. World health Organization, Geneva. (Available at http://www.who.int/water_sanitation_health/wastewater/gsuweg2/en/index.html)

Filling out this questionnaire will take about 30 min. We highly appreciate your support in this task and look forward to receiving your reply.



Structure of the Questionnaire

This Questionnaire is divided in 8 sections referring to different capacity areas on the safe use of wastewater in agriculture:

25. Assessment of health risk
26. Health protection measures
27. Monitoring and system assessment
28. Crop production aspects
29. Environmental aspects
30. Sociocultural aspects
31. Economic and financial considerations
32. Policy aspects

Any other relevant capacity area is welcome. Please use the final section “Others” for this purpose.

Each of the above mentioned capacity areas is presented in a separate table that is divided in three columns:

The first column shows selected components (e.g. microbial and chemical laboratory analysis) of each capacity area (e.g. assessment of health risk) .

The second column enquires about the current knowledge and skills of the pertinent staff in your organization in relation to the different components

The level of the knowledge and skills can be rated as follows:

Poor = No or little knowledge in this area;

Basic = Some basic knowledge with a little experience;

Good = Good knowledge with experience;

Excellent = Demonstrable specialist knowledge in this area (ability to coach/train others).

The third column enquires about the importance that your organization allocates to a specific component to effectively play its role on the safe use of wastewater in agriculture.



**Questionnaire on
knowledge and skills on
safe wastewater use in agriculture**

Organisation name :OFFICE REGIONAL DE MISE EN VALEUR AGRICOLE
DU SOUSS MASSA

Organization type¹²...LOCAL GOVERNMENTAL ORGANISATION.....

Roles and Responsibilities¹³: MISE EN VALEUR AGRICOLE DANS LA
REGION DU SOUSS MASSA

Reporting Office /Department and Contact name

Reporter name: BAHRI ABDERRAHIM – BAALI OUAFA

Title/Level: INGENIEUR

Specialization : GENIE RURAL

Département : OFFICE REGIONAL DE MISE EN VALEUR AGRICOLE DU SOUSS
MASSA.....

Address: Rue des Administrations Publiques, BP. 21 -AGADIR-

E-mail : ormvasm@iam.net.ma

Country: MAROC

Institute's Web site:.....

Tel:0528823545.....Fax:.0528846521.....

e-mail: E-mail : ormvasm@iam.net.ma

Please return the filled questionnaire (either electronically or in hard copy) to:

¹² e.g., national governmental organization, local governmental organization, research organization, university, professional association, NGO, other (specify)

¹³ Refers to roles and responsibilities related to the safe use of wastewater in agriculture. e.g. national policy making, local policy making , project planning, advocacy and communication, research, extension, training, others (specify).



1 - Assessment of Health Risk

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Microbial and chemical laboratory analysis	<i>Poor</i> X <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> X <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Epidemiological studies	<i>Poor</i> X <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> X <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Quantitative microbial risk assessment - QMRA	<i>Poor</i> X <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> X <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Setting health based targets	<i>Poor</i> X <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> X <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Assessment of Health Risk – Definitions

Microbial and chemical laboratory analysis

Refers to materials and methods to implement effective laboratory analysis concerning the type and number of harmful chemical agents (e.g. heavy metals) or pathogens (viruses, bacteria, protozoa, helminths) in wastewater, soil and on crops.

Epidemiological studies

Refers to evaluation of risk of infections for farming families and local communities. This includes risk to consumers eating uncooked crops, risk to agricultural workers and their families, risk to local communities from sprinkler irrigation.

Quantitative microbial risk assessment - QMRA

Refers to the method for assessing risk from specific hazards through different exposure pathways. QMRA has four components: hazard identification, exposure assessment, dose-response assessment, and risk characterisation

Health based targets

Refers to a defined level of health protection for a given exposure. This can be based on a measure of disease, e.g. 10^{-6} DALY¹⁴ per person per year, or the absence of a specific disease related to that exposure

¹⁴ DALY (Disability Adjusted Life Years): population metric of life years lost to disease due to both morbidity and mortality)



2 - Health Protection Measures

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Wastewater treatment	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Non-treatment options	<i>Poor</i> <input checked="" type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Health Protection Measures – Definitions

Wastewater treatment

Refers to design, construction, operation and maintenance of wastewater collection and treatment systems, including:

Primary treatment processes such as sedimentation tank, skimming and chemical enhanced primary treatment.

Secondary treatment processes such as Aerated Lagoon, Activated Sludge, Up-flow Anaerobic Sludge Blanket, Trickling Filters, Rotating Biological Contactors, Oxidation Ditch and Settling Basin Digester.

Natural biological treatment processes such as Waste Stabilization Pond, Constructed Wetlands, Overland Treatment, Nutrient Film Techniques, Soil Aquifer Treatment, High-Rate Algal Pond, and Floating Aquatic Macrophyte Systems.

Tertiary treatment processes such as Membrane filtration (Micro-; Nano-; Ultra- and Reverse Osmosis), Infiltration/Percolation, Activated Carbon and Disinfection.

Non-treatment options

Refer to the design and implementation of health protection measures (different than wastewater treatment), such as:

Crop restriction: that refers to growing non-food crops (e.g. cotton and jojoba); food crops that are processed before consumption (e.g. wheat) and food crops that have to be cooked (e.g. potatoes and rice).

Selection of wastewater application techniques: that refers to the selection or irrigation methods to minimize exposure of edible plants, farm workers and nearby communities to wastewater.

Cessation of irrigation: that refers to the withholding periods to allow pathogen die-off after the last wastewater application and before the consumption.

Food preparation measures that refer to hygienic practices at food markets and during food preparation and health and hygiene promotion.

Human exposure control that apply to consumers, field workers and their families, and refers to the use of personal protective equipment (e.g. gloves and boots), health and hygiene promotion, chemotherapy and immunization.



3 - Monitoring and System Assessment

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Monitoring of health protection measures	<i>Poor</i> <input checked="" type="checkbox"/> X <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> X <i>Very High</i> <input type="checkbox"/>
Wastewater use system assessment	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> X <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> X <i>Very High</i> <input type="checkbox"/>

Monitoring and System Assessment – Definitions

Monitoring of health protection measures

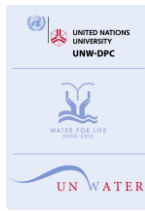
Refers to the observation and inspection of the system, collecting samples for analysis and establishing the necessary institutional arrangements to ensure the good management of the collected information to provide feedback to those that have implemented the health protection measures.

Monitoring has three different purposes:

10. To prove that the system is capable of meeting its desired requirements (e.g. microbial reduction targets).
11. To provide information regarding the functioning of individual components of the health protection measures (e.g. wastewater treatment).
12. To ensure that the system is achieving the specified targets (e.g testing for E.coli crop contamination). which usually takes place at the end of the process

Wastewater use system assessment

Refers to the comprehensive description and evaluation of wastewater use systems including identification of sources of hazards, the assessment of the risk and development and implementation of preventive strategies to manage the risks. It also requires an assessment of capabilities to meet targets.



4 - Crop production aspects

	<u>How are the current knowledge and skills of the pertinent staff in your organization in relation to:?</u>	<u>What is the importance of this subject for your organization?</u>
Components of wastewater harmful to crop production	<i>Poor</i> <input checked="" type="checkbox"/> <i>X</i> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>X</i> <i>Very High</i> <input type="checkbox"/>
Agricultural effects of wastewater irrigation	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>X</i> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>X</i> <i>Very High</i> <input type="checkbox"/>
Management strategies for maximize crop production	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input checked="" type="checkbox"/> <i>X</i> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>X</i> <i>Very High</i> <input type="checkbox"/>

Crop Production Aspects – Definitions

Components of wastewater harmful to crop production

Refers to evaluation of the quality of wastewater in terms of concentration of elements that may have an adverse impact on the crop production (e.g. salts, toxic ions, suspended solids, etc)

Agricultural effects of wastewater irrigation

Refers to evaluation of positive effects (e.g. nutrient supply) and negative effects (e.g. salinity or sodicity) of using wastewater for crop production.

Management strategies for maximize crop production

Refers to implementing of control measures to maximize crop production when using wastewater to irrigate. The control measures refer to: crops selection (e.g. less sensitive for toxic compounds of wastewater), good conditions (e.g. scheduling of irrigation, application of correct amount and quality of wastewater), irrigation methods (e.g. drip irrigation allows to maintain high soil water potential throughout the growing season and minimize the effect of salinity).



5 - Environmental Aspects		
	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Components of wastewater harmful to the environment	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Environmental effects through the agricultural chain	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Management strategies for reducing environmental impacts	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Environmental Aspects – Definitions
<p>Components of wastewater harmful to the environment</p> <p>Refers to evaluation of the quality of wastewater, in terms of concentration of elements that may have an adverse impact on the environment.</p>
<p>Environmental effects through the agricultural chain</p> <p>Refers to evaluation of effects of using wastewater for agriculture on: soils (e.g. salinization and loss of soil structure), groundwater (e.g. contamination) and surface water (e.g. eutrophication).</p>
<p>Management strategies for reducing environmental impacts</p> <p>Refers to implementing of control measures to minimise the environmental impacts. The control measures can be presented by polluting agent (e.g. control measure for excessive nitrogen is to dilute wastewater with fresh water when possible); or kind of problem (e.g. control measure for clogging of irrigation systems is to use water with low total suspended solids content).</p>



6 - Sociocultural Aspects

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Cultural and religious beliefs	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> <i>X</i> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input checked="" type="checkbox"/> <i>X</i> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Public acceptance	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input checked="" type="checkbox"/> <i>X</i> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>X</i> <i>Very High</i> <input type="checkbox"/>

Sociocultural Aspects – Definitions

Cultural and religious beliefs

Refers to cultural and religious factors that can limit the feasibility of a wastewater reuse system and the ways to overcome these limiting factors.

Public acceptance

Refers to the tools and methods to assess and attain communities' acceptance on wastewater use for agriculture. This includes public participation, education and information, public meetings, workshops, interviews surveys, questionnaires, etc.



7- Economic and financial considerations

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Economic feasibility	<i>Poor</i> <input checked="" type="checkbox"/> X <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> X <i>Very High</i> <input type="checkbox"/>
Financial feasibility	<i>Poor</i> <input checked="" type="checkbox"/> X <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> X <i>Very High</i> <input type="checkbox"/>
Market feasibility	<i>Poor</i> <input checked="" type="checkbox"/> X <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> X <i>Very High</i> <input type="checkbox"/>

Economic and financial consideration – Definitions

Economic feasibility

Refers to assessment whether a project is affordable and has a positive internal rate of return (projects that provide the most benefits at least cost are the most desirable).

Financial feasibility

Refers to establishment of the sources of revenues and evaluation who will pay for what for a project.

Market feasibility

Refers to assessment of the ability to sell (treated) wastewater to producers and evaluation of the marketability of products grown with wastewater or greywater.



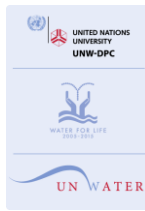
8 - Policy aspects		
	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Institutional roles and responsibilities	<i>Poor</i> <input checked="" type="checkbox"/> <i>X</i> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>X</i> <i>Very High</i> <input type="checkbox"/>
Laws and regulations	<i>Poor</i> <input checked="" type="checkbox"/> <i>X</i> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>X</i> <i>Very High</i> <input type="checkbox"/>
Plans and programs	<i>Poor</i> <input checked="" type="checkbox"/> <i>X</i> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>X</i> <i>Very High</i> <input type="checkbox"/>
Economic instruments	<i>Poor</i> <input checked="" type="checkbox"/> <i>X</i> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>X</i> <i>Very High</i> <input type="checkbox"/>
Education and social awareness	<i>Poor</i> <input checked="" type="checkbox"/> <i>X</i> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>X</i> <i>Very High</i> <input type="checkbox"/>

Policy aspects – Definitions
<p>Institutional roles and responsibilities Refer to the responsibilities, jurisdictions among public institutions and the coordination mechanisms among them</p> <p>Laws and regulations Refer to legal instruments to facilitate and govern (control) the safe use of wastewater for agriculture, (e.g. creating rights of access to wastewater, establishing land tenure, developing public health and agricultural legislation, etc.)</p> <p>Economic instruments Refer to financial tools that the public authorities can use to promote safe practices when using wastewater in agriculture and to share the costs of wastewater treatment and reuse projects (e.g. subsidies, taxes, water pricing, payment for environmental services, etc)</p> <p>Education and social awareness Refer to the education and training tools to increase knowledge and skill on the safe use of wastewater in agriculture, as well as the advocacy and communication campaigns to impact public perception and awareness</p>



Others:		
	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Identification de zonage (zones irriguées par les EU)	<i>Poor</i> <input checked="" type="checkbox"/> <i>X</i> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>X</i> <i>Very High</i> <input type="checkbox"/>
Gestion intégrée de l'utilisation des eaux usées sans danger	<i>Poor</i> <input checked="" type="checkbox"/> <i>X</i> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>X</i> <i>Very High</i> <input type="checkbox"/>
Stratégie et approche de suivi de la réutilisation des eaux usées	<i>Poor</i> <input checked="" type="checkbox"/> <i>X</i> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>X</i> <i>Very High</i> <input type="checkbox"/>
Suivi de l'utilisation des eaux usées de point de vue santé	<i>Poor</i> <input checked="" type="checkbox"/> <i>X</i> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input checked="" type="checkbox"/> <i>X</i> <i>Very High</i> <input type="checkbox"/>

Definitions



6 (Compiled from: Questionnaire_CNA_Wastewater INRA.doc)

Questionnaire

to support the
Individual's Capacity Needs Assessment
In the framework of the
Joint FAO/ UNW-DPC/UNU-INWEH
Capacity Development Project on
Safe Use of Wastewater in Agriculture
Phase I

General Objective of the Questionnaire

The Food and Agriculture Organization of the United Nations (FAO), the UN-Water Decade Programme on Capacity Development (UNW-DPC), and the United Nations University Institute on Water, Environment and Health (UNU-INWEH), in collaboration with designated national coordinators, are compiling data on the existing knowledge and skills for the safe use of wastewater (including greywater) in agriculture.

The questionnaire is addressed to key institutions and organisations in developing countries or in countries in transition, with competences on safe use of wastewater in agriculture. Your organization has been identified as one of these organizations. The aim of the questionnaire is to help in the classification and prioritisation of the knowledge and skills on the safe use wastewater in agriculture that individuals working in your organization may need.

The questionnaire results will be collected by designated national coordinators and summarised in a National Report.

Please provide full contact information so that national coordinators may communicate directly on technical matters, if necessary.

For additional glossary and definitions related to safe use of wastewater in agriculture please refer to WHO/FAO/UNEP (2006) Guidelines for the safe use of wastewater, excreta and grey water. Volume II: Wastewater use in agriculture. World Health Organization, Geneva. (Available at http://www.who.int/water_sanitation_health/wastewater/gsuweg2/en/index.html)

Filling out this questionnaire will take about 30 min. We highly appreciate your support in this task and look forward to receiving your reply.



Structure of the Questionnaire

This Questionnaire is divided in 8 sections referring to different capacity areas on the safe use of wastewater in agriculture:

33. Assessment of health risk
34. Health protection measures
35. Monitoring and system assessment
36. Crop production aspects
37. Environmental aspects
38. Sociocultural aspects
39. Economic and financial considerations
40. Policy aspects

Any other relevant capacity area is welcome. Please use the final section “Others” for this purpose.

Each of the above mentioned capacity areas is presented in a separate table that is divided in three columns:

The first column shows selected components (e.g. microbial and chemical laboratory analysis) of each capacity area (e.g. assessment of health risk) .

The second column enquires about the current knowledge and skills of the pertinent staff in your organization in relation to the different components

The level of the knowledge and skills can be rated as follows:

Poor = No or little knowledge in this area;

Basic = Some basic knowledge with a little experience;

Good = Good knowledge with experience;

Excellent = Demonstrable specialist knowledge in this area (ability to coach/train others).

The third column enquires about the importance that your organization allocates to a specific component to effectively play its role on the safe use of wastewater in agriculture.



**Questionnaire on
knowledge and skills on
safe wastewater use in agriculture**

Organisation name : National Institut of Agronomic
Resherch.....

Organization type¹⁵National Gouvernemenal organization
.....

Roles and Responsibilities¹⁶.....
.....
.....

Reporting Office /Department and Contact name

Reporter name : Riad
BALAGHI.....

Title/Level:.....

Specialization:
AGRONOMY.....

Department:.....Dept. of Envoronment and National
Resherch.....

Address:.....

Country: Institute's Web site:.....

Tel: ..05 37 20 87 70.....Fax:.....e-
mail:.....riad.balaghi@gmail.com.....

Please return the filled questionnaire (either electronically or in hard copy) to:

¹⁵ e.g., national governmental organization, local governmental organization, research organization, university, professional association, NGO, other (specify)

¹⁶ Refers to roles and responsibilities related to the safe use of wastewater in agriculture. e.g. national policy making, local policy making , project planning, advocacy and communication, research, extension, training, others (specify).



1 - Assessment of Health Risk

	<u>How are the current knowledge and skills of the pertinent staff in your organization in relation to:?</u>	<u>What is the importance of this subject for your organization?</u>
Microbial and chemical laboratory analysis	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Epidemiological studies	<i>Poor</i>X <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i>X <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Quantitative microbial risk assessment - QMRA	<i>Poor</i>X <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Setting health based targets	<i>Poor</i>X <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Assessment of Health Risk – Definitions

Microbial and chemical laboratory analysis

Refers to materials and methods to implement effective laboratory analysis concerning the type and number of harmful chemical agents (e.g. heavy metals) or pathogens (viruses, bacteria, protozoa, helminths) in wastewater, soil and on crops.

Epidemiological studies

Refers to evaluation of risk of infections for farming families and local communities. This includes risk to consumers eating uncooked crops, risk to agricultural workers and their families, risk to local communities from sprinkler irrigation.

Quantitative microbial risk assessment - QMRA

Refers to the method for assessing risk from specific hazards through different exposure pathways. QMRA has four components: hazard identification, exposure assessment, dose-response assessment, and risk characterisation

Health based targets

Refers to a defined level of health protection for a given exposure. This can be based on a measure of disease, e.g. 10^{-6} DALY¹⁷ per person per year, or the absence of a specific disease related to that exposure

¹⁷ DALY (Disability Adjusted Life Years): population metric of life years lost to disease due to both morbidity and mortality)



2 - Health Protection Measures

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Wastewater treatment	<i>Poor</i>X <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Non-treatment options	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Health Protection Measures – Definitions

Wastewater treatment

Refers to design, construction, operation and maintenance of wastewater collection and treatment systems, including:

Primary treatment processes such as sedimentation tank, skimming and chemical enhanced primary treatment.

Secondary treatment processes such as Aerated Lagoon, Activated Sludge, Up-flow Anaerobic Sludge Blanket, Trickling Filters, Rotating Biological Contactors, Oxidation Ditch and Settling Basin Digester.

Natural biological treatment processes such as Waste Stabilization Pond, Constructed Wetlands, Overland Treatment, Nutrient Film Techniques, Soil Aquifer Treatment, High-Rate Algal Pond, and Floating Aquatic Macrophyte Systems.

Tertiary treatment processes such as Membrane filtration (Micro-; Nano-; Ultra- and Reverse Osmosis), Infiltration/Percolation, Activated Carbon and Disinfection.

Non-treatment options

Refer to the design and implementation of health protection measures (different than wastewater treatment), such as:

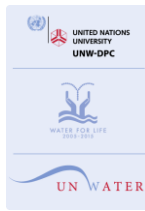
Crop restriction: that refers to growing non-food crops (e.g. cotton and jojoba); food crops that are processed before consumption (e.g. wheat) and food crops that have to be cooked (e.g. potatoes and rice).

Selection of wastewater application techniques: that refers to the selection or irrigation methods to minimize exposure of edible plants, farm workers and nearby communities to wastewater.

Cessation of irrigation: that refers to the withholding periods to allow pathogen die-off after the last wastewater application and before the consumption.

Food preparation measures that refer to hygienic practices at food markets and during food preparation and health and hygiene promotion.

Human exposure control that apply to consumers, field workers and their families, and refers to the use of personal protective equipment (e.g. gloves and boots), health and hygiene promotion, chemotherapy and immunization.



3 - Monitoring and System Assessment

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Monitoring of health protection measures	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Wastewater use system assessment	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Monitoring and System Assessment – Definitions

Monitoring of health protection measures

Refers to the observation and inspection of the system, collecting samples for analysis and establishing the necessary institutional arrangements to ensure the good management of the collected information to provide feedback to those that have implemented the health protection measures.

Monitoring has three different purposes:

13. To prove that the system is capable of meeting its desired requirements (e.g. microbial reduction targets).
14. To provide information regarding the functioning of individual components of the health protection measures (e.g. wastewater treatment).
15. To ensure that the system is achieving the specified targets (e.g testing for E.coli crop contamination). which usually takes place at the end of the process

Wastewater use system assessment

Refers to the comprehensive description and evaluation of wastewater use systems including identification of sources of hazards, the assessment of the risk and development and implementation of preventive strategies to manage the risks. It also requires an assessment of capabilities to meet targets.



4 - Crop production aspects

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Components of wastewater harmful to crop production	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i>X <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Agricultural effects of wastewater irrigation	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i>X <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Management strategies for maximize crop production	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i>X <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Crop Production Aspects – Definitions

Components of wastewater harmful to crop production

Refers to evaluation of the quality of wastewater in terms of concentration of elements that may have an adverse impact on the crop production (e.g. salts, toxic ions, suspended solids, etc)

Agricultural effects of wastewater irrigation

Refers to evaluation of positive effects(e.g. nutrient supply) and negative effects (e.g. salinity or sodicity) of using wastewater for crop production.

Management strategies for maximize crop production

Refers to implementing of control measures to maximize crop production when using wastewater to irrigate. The control measures refer to: crops selection (e.g. less sensitive for toxic compounds of wastewater), good conditions (e.g. scheduling of irrigation, application of correct amount and quality of wastewater), irrigation methods (e.g. drip irrigation allows to maintain high soil water potential throughout the growing season and minimize the effect of salinity).



5 - Environmental Aspects

	How are the current knowledge and skills of the pertinent staff in your organization in relation to:?	What is the importance of this subject for your organization?
Components of wastewater harmful to the environment	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i>X <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Environmental effects through the agricultural chain	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i>X <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Management strategies for reducing environmental impacts	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i>X <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Environmental Aspects – Definitions

Components of wastewater harmful to the environment

Refers to evaluation of the quality of wastewater, in terms of concentration of elements that may have an adverse impact on the environment.

Environmental effects through the agricultural chain

Refers to evaluation of effects of using wastewater for agriculture on: soils (e.g. salinization and loss of soil structure), groundwater (e.g. contamination) and surface water (e.g. eutrophication).

Management strategies for reducing environmental impacts

Refers to implementing of control measures to minimise the environmental impacts. The control measures can be presented by polluting agent (e.g. control measure for excessive nitrogen is to dilute wastewater with fresh water when possible); or kind of problem (e.g. control measure for clogging of irrigation systems is to use water with low total suspended solids content).



6 - Sociocultural Aspects

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Cultural and religious beliefs	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Public acceptance	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Sociocultural Aspects – Definitions

Cultural and religious beliefs

Refers to cultural and religious factors that can limit the feasibility of a wastewater reuse system and the ways to overcome these limiting factors.

Public acceptance

Refers to the tools and methods to assess and attain communities' acceptance on wastewater use for agriculture. This includes public participation, education and information, public meetings, workshops, interviews surveys, questionnaires, etc.



7- Economic and financial considerations

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Economic feasibility	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Financial feasibility	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Market feasibility	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Economic and financial consideration – Definitions

Economic feasibility

Refers to assessment whether a project is affordable and has a positive internal rate of return (projects that provide the most benefits at least cost are the most desirable).

Financial feasibility

Refers to establishment of the sources of revenues and evaluation who will pay for what for a project.

Market feasibility

Refers to assessment of the ability to sell (treated) wastewater to producers and evaluation of the marketability of products grown with wastewater or greywater.



8 - Policy aspects

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Institutional roles and responsibilities	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Laws and regulations	<i>Poor</i>X <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Plans and programs	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Economic instruments	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Education and social awareness	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Policy aspects – Definitions

Institutional roles and responsibilities

Refer to the responsibilities, jurisdictions among public institutions and the coordination mechanisms among them

Laws and regulations

Refer to legal instruments to facilitate and govern (control) the safe use of wastewater for agriculture, (e.g. creating rights of access to wastewater, establishing land tenure, developing public health and agricultural legislation, etc.)

Economic instruments

Refer to financial tools that the public authorities can use to promote safe practices when using wastewater in agriculture and to share the costs of wastewater treatment and reuse projects (e.g. subsidies, taxes, water pricing, payment for environmental services, etc)

Education and social awareness

Refer to the education and training tools to increase knowledge and skill on the safe use of wastewater in agriculture, as well as the advocacy and communication campaigns to impact public perception and awareness



Others:		
	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Crop monitoring	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Climate Change	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Definitions



7 (Compiled from: Questionnaire_CNA_Wastewater onssa.doc)

Questionnaire

to support the
Individual's Capacity Needs Assessment
In the framework of the
Joint FAO/ UNW-DPC/UNU-INWEH
Capacity Development Project on
Safe Use of Wastewater in Agriculture
Phase I

General Objective of the Questionnaire

The Food and Agriculture Organization of the United Nations (FAO), the UN-Water Decade Programme on Capacity Development (UNW-DPC), and the United Nations University Institute on Water, Environment and Health (UNU-INWEH), in collaboration with designated national coordinators, are compiling data on the existing knowledge and skills for the safe use of wastewater (including greywater) in agriculture.

The questionnaire is addressed to key institutions and organisations in developing countries or in countries in transition, with competences on safe use of wastewater in agriculture. Your organization has been identified as one of these organizations. The aim of the questionnaire is to help in the classification and prioritisation of the knowledge and skills on the safe use wastewater in agriculture that individuals working in your organization may need..

The questionnaires results will be collected by designated national coordinators and summarised in a National Report.

Please provide full contact information so that national coordinators may communicate directly on technical matters, if necessary.

For additional glossary and definitions related to safe use of wastewater in agriculture please refer to WHO/FAO/UNEP (2006) Guidelines for the safe use of wastewater, excreta and grey water. Volume II: Wastewater use in agriculture. World health Organization, Geneva. (Available at http://www.who.int/water_sanitation_health/wastewater/gsuweg2/en/index.html)

Filling out this questionnaire will take about 30 min. We highly appreciate your support in this task and look forward to receiving your reply.



Structure of the Questionnaire

This Questionnaire is divided in 8 sections referring to different capacity areas on the safe use of wastewater in agriculture:

41. Assessment of health risk
42. Health protection measures
43. Monitoring and system assessment
44. Crop production aspects
45. Environmental aspects
46. Sociocultural aspects
47. Economic and financial considerations
48. Policy aspects

Any other relevant capacity area is welcome. Please use the final section “Others” for this purpose.

Each of the above mentioned capacity areas is presented in a separate table that is divided in three columns:

The first column shows selected components (e.g. microbial and chemical laboratory analysis) of each capacity area (e.g. assessment of health risk) .

The second column enquires about the current knowledge and skills of the pertinent staff in your organization in relation to the different components

The level of the knowledge and skills can be rated as follows:

Poor = No or little knowledge in this area;

Basic = Some basic knowledge with a little experience;

Good = Good knowledge with experience;

Excellent = Demonstrable specialist knowledge in this area (ability to coach/train others).

The third column enquires about the importance that your organization allocates to a specific component to effectively play its role on the safe use of wastewater in agriculture.



**Questionnaire on
knowledge and skills on
safe wastewater use in agriculture**

Organisation name.: Office National de Sécurité Sanitaire des Produits Alimentaires.....

Organization type¹⁸.: National Governmental Organization.....

Roles and Responsibilities¹⁹.: Controle des eaux d’irrigation (loi n° 25-08 portant creation de l’ONSSA –Article2)

.....

.....

Reporting Office /Department and Contact name

Reporter name:..CHAKIB ILHAM

Title/Level:....Chef du service du Controle des Produits Végétaux et d’Origine Végétal.....

Specialization: .Ingénieur en Industrie Agro-Alimentaires.....

Department:..Division du Controle des Produits Végétaux et d’Origine Végétale/ Direction des Controles et de la Protection des Végétaux/ONSSA

Address:.....Avenue Hadj Ahmed Cherkaoui Agdal Rabat

Country: Institute's Web site: Istitues Web SITE Maroc

Tel:05 37 67 65 32.....Fax:...0537779319.....e-mail:.....ilham.chakib@gmail.com.....

¹⁸ e.g., national governmental organization, local governmental organization, research organization, university, professional association, NGO, other (specify)

¹⁹ Refers to roles and responsibilities related to the safe use of wastewater in agriculture. e.g. national policy making, local policy making , project planning, advocacy and communication, research, extension, training, others (specify).



Please return the filled questionnaire (either electronically or in hard copy) to:



1 - Assessment of Health Risk

	<u>How are the current knowledge and skills of the pertinent staff in your organization in relation to:?</u>	<u>What is the importance of this subject for your organization?</u>
Microbial and chemical laboratory analysis	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Epidemiological studies	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Quantitative microbial risk assessment - QMRA	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i>X <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i>X <input type="checkbox"/>
Setting health based targets	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Assessment of Health Risk – Definitions

Microbial and chemical laboratory analysis

Refers to materials and methods to implement effective laboratory analysis concerning the type and number of harmful chemical agents (e.g. heavy metals) or pathogens (viruses, bacteria, protozoa, helminths) in wastewater, soil and on crops.

Epidemiological studies

Refers to evaluation of risk of infections for farming families and local communities. This includes risk to consumers eating uncooked crops, risk to agricultural workers and their families, risk to local communities from sprinkler irrigation.

Quantitative microbial risk assessment - QMRA

Refers to the method for assessing risk from specific hazards through different exposure pathways. QMRA has four components: hazard identification, exposure assessment, dose-response assessment, and risk characterisation

Health based targets

Refers to a defined level of health protection for a given exposure. This can be based on a measure of disease, e.g. 10^{-6} DALY²⁰ per person per year, or the absence of a specific disease related to that exposure

²⁰ DALY (Disability Adjusted Life Years): population metric of life years lost to disease due to both morbidity and mortality)



2 - Health Protection Measures

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Wastewater treatment	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Non-treatment options	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i>X <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Health Protection Measures – Definitions

Wastewater treatment

Refers to design, construction, operation and maintenance of wastewater collection and treatment systems, including:

Primary treatment processes such as sedimentation tank, skimming and chemical enhanced primary treatment.

Secondary treatment processes such as Aerated Lagoon, Activated Sludge, Up-flow Anaerobic Sludge Blanket, Trickling Filters, Rotating Biological Contactors, Oxidation Ditch and Settling Basin Digester.

Natural biological treatment processes such as Waste Stabilization Pond, Constructed Wetlands, Overland Treatment, Nutrient Film Techniques, Soil Aquifer Treatment, High-Rate Algal Pond, and Floating Aquatic Macrophyte Systems.

Tertiary treatment processes such as Membrane filtration (Micro-; Nano-; Ultra- and Reverse Osmosis), Infiltration/Percolation, Activated Carbon and Disinfection.

Non-treatment options

Refer to the design and implementation of health protection measures (different than wastewater treatment), such as:

Crop restriction: that refers to growing non-food crops (e.g. cotton and jojoba); food crops that are processed before consumption (e.g. wheat) and food crops that have to be cooked (e.g. potatoes and rice).

Selection of wastewater application techniques: that refers to the selection or irrigation methods to minimize exposure of edible plants, farm workers and nearby communities to wastewater.

Cessation of irrigation: that refers to the withholding periods to allow pathogen die-off after the last wastewater application and before the consumption.

Food preparation measures that refer to hygienic practices at food markets and during food preparation and health and hygiene promotion.

Human exposure control that apply to consumers, field workers and their families, and refers to the use of personal protective equipment (e.g. gloves and boots), health and hygiene promotion, chemotherapy and immunization.



3 - Monitoring and System Assessment

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Monitoring of health protection measures	<i>Poor</i>X <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i>X <input type="checkbox"/>
Wastewater use system assessment	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i>X <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i>X <input type="checkbox"/>

Monitoring and System Assessment – Definitions

Monitoring of health protection measures

Refers to the observation and inspection of the system, collecting samples for analysis and establishing the necessary institutional arrangements to ensure the good management of the collected information to provide feedback to those that have implemented the health protection measures.

Monitoring has three different purposes:

16. To prove that the system is capable of meeting its desired requirements (e.g. microbial reduction targets).
17. To provide information regarding the functioning of individual components of the health protection measures (e.g. wastewater treatment).
18. To ensure that the system is achieving the specified targets (e.g testing for E.coli crop contamination). which usually takes place at the end of the process

Wastewater use system assessment

Refers to the comprehensive description and evaluation of wastewater use systems including identification of sources of hazards, the assessment of the risk and development and implementation of preventive strategies to manage the risks. It also requires an assessment of capabilities to meet targets.



4 - Crop production aspects

	<u>How are the current knowledge and skills of the pertinent staff in your organization in relation to:?</u>	<u>What is the importance of this subject for your organization?</u>
Components of wastewater harmful to crop production	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i>X <input type="checkbox"/>
Agricultural effects of wastewater irrigation	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i>X <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i>X <input type="checkbox"/>
Management strategies for maximize crop production	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Crop Production Aspects – Definitions

Components of wastewater harmful to crop production

Refers to evaluation of the quality of wastewater in terms of concentration of elements that may have an adverse impact on the crop production (e.g. salts, toxic ions, suspended solids, etc)

Agricultural effects of wastewater irrigation

Refers to evaluation of positive effects(e.g. nutrient supply) and negative effects (e.g. salinity or sodicity) of using wastewater for crop production.

Management strategies for maximize crop production

Refers to implementing of control measures to maximize crop production when using wastewater to irrigate. The control measures refer to: crops selection (e.g. less sensitive for toxic compounds of wastewater), good conditions (e.g. scheduling of irrigation, application of correct amount and quality of wastewater), irrigation methods (e.g. drip irrigation allows to maintain high soil water potential throughout the growing season and minimize the effect of salinity).



5 - Environmental Aspects

	How are the current knowledge and skills of the pertinent staff in your organization in relation to:?	What is the importance of this subject for your organization?
Components of wastewater harmful to the environment	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Environmental effects through the agricultural chain	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Management strategies for reducing environmental impacts	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Environmental Aspects – Definitions

Components of wastewater harmful to the environment

Refers to evaluation of the quality of wastewater, in terms of concentration of elements that may have an adverse impact on the environment.

Environmental effects through the agricultural chain

Refers to evaluation of effects of using wastewater for agriculture on: soils (e.g. salinization and loss of soil structure), groundwater (e.g. contamination) and surface water (e.g. eutrophication).

Management strategies for reducing environmental impacts

Refers to implementing of control measures to minimise the environmental impacts. The control measures can be presented by polluting agent (e.g. control measure for excessive nitrogen is to dilute wastewater with fresh water when possible); or kind of problem (e.g. control measure for clogging of irrigation systems is to use water with low total suspended solids content).



6 - Sociocultural Aspects

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Cultural and religious beliefs	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Public acceptance	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Sociocultural Aspects – Definitions

Cultural and religious beliefs

Refers to cultural and religious factors that can limit the feasibility of a wastewater reuse system and the ways to overcome these limiting factors.

Public acceptance

Refers to the tools and methods to assess and attain communities' acceptance on wastewater use for agriculture. This includes public participation, education and information, public meetings, workshops, interviews surveys, questionnaires, etc.



7- Economic and financial considerations

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Economic feasibility	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Financial feasibility	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Market feasibility	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Economic and financial consideration – Definitions

Economic feasibility

Refers to assessment whether a project is affordable and has a positive internal rate of return (projects that provide the most benefits at least cost are the most desirable).

Financial feasibility

Refers to establishment of the sources of revenues and evaluation who will pay for what for a project.

Market feasibility

Refers to assessment of the ability to sell (treated) wastewater to producers and evaluation of the marketability of products grown with wastewater or greywater.



8 - Policy aspects

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Institutional roles and responsibilities	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i>X <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i>X <input type="checkbox"/>
Laws and regulations	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i>X <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i>X <input type="checkbox"/>
Plans and programs	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i>X <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i>X <input type="checkbox"/>
Economic instruments	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Education and social awareness	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Policy aspects – Definitions

Institutional roles and responsibilities

Refer to the responsibilities, jurisdictions among public institutions and the coordination mechanisms among them

Laws and regulations

Refer to legal instruments to facilitate and govern (control) the safe use of wastewater for agriculture, (e.g. creating rights of access to wastewater, establishing land tenure, developing public health and agricultural legislation, etc.)

Economic instruments

Refer to financial tools that the public authorities can use to promote safe practices when using wastewater in agriculture and to share the costs of wastewater treatment and reuse projects (e.g. subsidies, taxes, water pricing, payment for environmental services, etc)

Education and social awareness

Refer to the education and training tools to increase knowledge and skill on the safe use of wastewater in agriculture, as well as the advocacy and communication campaigns to impact public perception and awareness



Others:		
	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Definitions



8 (Compiled from: Questionnaire_CNA_WastewaterMOULOUYA.doc)

Questionnaire

to support the
Individual's Capacity Needs Assessment
In the framework of the
Joint FAO/ UNW-DPC/UNU-INWEH
Capacity Development Project on
Safe Use of Wastewater in Agriculture
Phase I

General Objective of the Questionnaire

The Food and Agriculture Organization of the United Nations (FAO), the UN-Water Decade Programme on Capacity Development (UNW-DPC), and the United Nations University Institute on Water, Environment and Health (UNU-INWEH), in collaboration with designated national coordinators, are compiling data on the existing knowledge and skills for the safe use of wastewater (including greywater) in agriculture.

The questionnaire is addressed to key institutions and organisations in developing countries or in countries in transition, with competences on safe use of wastewater in agriculture. Your organization has been identified as one of these organizations. The aim of the questionnaire is to help in the classification and prioritisation of the knowledge and skills on the safe use wastewater in agriculture that individuals working in your organization may need..

The questionnaires results will be collected by designated national coordinators and summarised in a National Report.

Please provide full contact information so that national coordinators may communicate directly on technical matters, if necessary.

For additional glossary and definitions related to safe use of wastewater in agriculture please refer to WHO/FAO/UNEP (2006) Guidelines for the safe use of wastewater, excreta and grey water. Volume II: Wastewater use in agriculture. World Health Organization, Geneva. (Available at http://www.who.int/water_sanitation_health/wastewater/gsuweg2/en/index.html)

Filling out this questionnaire will take about 30 min. We highly appreciate your support in this task and look forward to receiving your reply.



Structure of the Questionnaire

This Questionnaire is divided in 8 sections referring to different capacity areas on the safe use of wastewater in agriculture:

49. Assessment of health risk
50. Health protection measures
51. Monitoring and system assessment
52. Crop production aspects
53. Environmental aspects
54. Sociocultural aspects
55. Economic and financial considerations
56. Policy aspects

Any other relevant capacity area is welcome. Please use the final section “Others” for this purpose.

Each of the above mentioned capacity areas is presented in a separate table that is divided in three columns:

The first column shows selected components (e.g. microbial and chemical laboratory analysis) of each capacity area (e.g. assessment of health risk) .

The second column enquires about the current knowledge and skills of the pertinent staff in your organization in relation to the different components

The level of the knowledge and skills can be rated as follows:

Poor = No or little knowledge in this area;

Basic = Some basic knowledge with a little experience;

Good = Good knowledge with experience;

Excellent = Demonstrable specialist knowledge in this area (ability to coach/train others).

The third column enquires about the importance that your organization allocates to a specific component to effectively play its role on the safe use of wastewater in agriculture.



**Questionnaire on
knowledge and skills on
safe wastewater use in agriculture**

Organisation name..Office Régional de Mise en Valeur Agricole de la Moulouya
.....

Organization type²¹..Organisme Regional de Developpement
Agricole.....

Roles and Responsibilities²²:...Developpement
Agricole.....
.....
.....

Reporting Office /Department and Contact name

Reporter name:.....Abdellah
Bouyaddid.....

Title/Level:.....
Ingénieur
Specialization: Sciences du sol
.....

Department:.....Agriculture
.....

Address:.....ORMVA DE La Moulouya-Berkane-
Maroc.....

Country: Institute's Web site:.....

Tel: ...06 70 97 66 58.....Fax:..05 36 61 29 28.....e-
mail:.....Bouyaddid@hotmail.com.....

Please return the filled questionnaire (either electronically or in hard copy) to:

²¹ e.g., national governmental organization, local governmental organization, research organization, university, professional association, NGO, other (specify)

²² Refers to roles and responsibilities related to the safe use of wastewater in agriculture. e.g. national policy making, local policy making , project planning, advocacy and communication, research, extension, training, others (specify).



1 - Assessment of Health Risk

	<u>How are the current knowledge and skills of the pertinent staff in your organization in relation to:?</u>	<u>What is the importance of this subject for your organization?</u>
Microbial and chemical laboratory analysis	<i>Poor</i>X <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i>X <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Epidemiological studies	<i>Poor</i>X <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i>X <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Quantitative microbial risk assessment - QMRA	<i>Poor</i>X <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i>X <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Setting health based targets	<i>Poor</i>X <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i>X <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Assessment of Health Risk – Definitions

Microbial and chemical laboratory analysis

Refers to materials and methods to implement effective laboratory analysis concerning the type and number of harmful chemical agents (e.g. heavy metals) or pathogens (viruses, bacteria, protozoa, helminths) in wastewater, soil and on crops.

Epidemiological studies

Refers to evaluation of risk of infections for farming families and local communities. This includes risk to consumers eating uncooked crops, risk to agricultural workers and their families, risk to local communities from sprinkler irrigation.

Quantitative microbial risk assessment - QMRA

Refers to the method for assessing risk from specific hazards through different exposure pathways. QMRA has four components: hazard identification, exposure assessment, dose-response assessment, and risk characterisation

Health based targets

Refers to a defined level of health protection for a given exposure. This can be based on a measure of disease, e.g. 10^{-6} DALY²³ per person per year, or the absence of a specific disease related to that exposure

²³ DALY (Disability Adjusted Life Years): population metric of life years lost to disease due to both morbidity and mortality)



2 - Health Protection Measures

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Wastewater treatment	<i>Poor</i>X <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Non-treatment options	<i>Poor</i>X <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Health Protection Measures – Definitions

Wastewater treatment

Refers to design, construction, operation and maintenance of wastewater collection and treatment systems, including:

Primary treatment processes such as sedimentation tank, skimming and chemical enhanced primary treatment.

Secondary treatment processes such as Aerated Lagoon, Activated Sludge, Up-flow Anaerobic Sludge Blanket, Trickling Filters, Rotating Biological Contactors, Oxidation Ditch and Settling Basin Digester.

Natural biological treatment processes such as Waste Stabilization Pond, Constructed Wetlands, Overland Treatment, Nutrient Film Techniques, Soil Aquifer Treatment, High-Rate Algal Pond, and Floating Aquatic Macrophyte Systems.

Tertiary treatment processes such as Membrane filtration (Micro-; Nano-; Ultra- and Reverse Osmosis), Infiltration/Percolation, Activated Carbon and Disinfection.

Non-treatment options

Refer to the design and implementation of health protection measures (different than wastewater treatment), such as:

Crop restriction: that refers to growing non-food crops (e.g. cotton and jojoba); food crops that are processed before consumption (e.g. wheat) and food crops that have to be cooked (e.g. potatoes and rice).

Selection of wastewater application techniques: that refers to the selection or irrigation methods to minimize exposure of edible plants, farm workers and nearby communities to wastewater.

Cessation of irrigation: that refers to the withholding periods to allow pathogen die-off after the last wastewater application and before the consumption.

Food preparation measures that refer to hygienic practices at food markets and during food preparation and health and hygiene promotion.

Human exposure control that apply to consumers, field workers and their families, and refers to the use of personal protective equipment (e.g. gloves and boots), health and hygiene promotion, chemotherapy and immunization.



3 - Monitoring and System Assessment

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Monitoring of health protection measures	<i>Poor</i>X <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Wastewater use system assessment	<i>Poor</i>X <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Monitoring and System Assessment – Definitions

Monitoring of health protection measures

Refers to the observation and inspection of the system, collecting samples for analysis and establishing the necessary institutional arrangements to ensure the good management of the collected information to provide feedback to those that have implemented the health protection measures.

Monitoring has three different purposes:

19. To prove that the system is capable of meeting its desired requirements (e.g. microbial reduction targets).
20. To provide information regarding the functioning of individual components of the health protection measures (e.g. wastewater treatment).
21. To ensure that the system is achieving the specified targets (e.g testing for E.coli crop contamination). which usually takes place at the end of the process

Wastewater use system assessment

Refers to the comprehensive description and evaluation of wastewater use systems including identification of sources of hazards, the assessment of the risk and development and implementation of preventive strategies to manage the risks. It also requires an assessment of capabilities to meet targets.



4 - Crop production aspects

	<u>How are the current knowledge and skills of the pertinent staff in your organization in relation to:?</u>	<u>What is the importance of this subject for your organization?</u>
Components of wastewater harmful to crop production	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X. <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i>X. <input type="checkbox"/>
Agricultural effects of wastewater irrigation	<i>Poor</i>X <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i>X. <input type="checkbox"/>
Management strategies for maximize crop production	<i>Poor</i>X. <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i>X. <input type="checkbox"/>

Crop Production Aspects – Definitions

Components of wastewater harmful to crop production

Refers to evaluation of the quality of wastewater in terms of concentration of elements that may have an adverse impact on the crop production (e.g. salts, toxic ions, suspended solids, etc)

Agricultural effects of wastewater irrigation

Refers to evaluation of positive effects(e.g. nutrient supply) and negative effects (e.g. salinity or sodicity) of using wastewater for crop production.

Management strategies for maximize crop production

Refers to implementing of control measures to maximize crop production when using wastewater to irrigate. The control measures refer to: crops selection (e.g. less sensitive for toxic compounds of wastewater), good conditions (e.g. scheduling of irrigation, application of correct amount and quality of wastewater), irrigation methods (e.g. drip irrigation allows to maintain high soil water potential throughout the growing season and minimize the effect of salinity).



5 - Environmental Aspects

	How are the current knowledge and skills of the pertinent staff in your organization in relation to:?	What is the importance of this subject for your organization?
Components of wastewater harmful to the environment	<i>Poor</i>X <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Environmental effects through the agricultural chain	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Management strategies for reducing environmental impacts	<i>Poor</i>X <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Environmental Aspects – Definitions

Components of wastewater harmful to the environment

Refers to evaluation of the quality of wastewater, in terms of concentration of elements that may have an adverse impact on the environment.

Environmental effects through the agricultural chain

Refers to evaluation of effects of using wastewater for agriculture on: soils (e.g. salinization and loss of soil structure), groundwater (e.g. contamination) and surface water (e.g. eutrophication).

Management strategies for reducing environmental impacts

Refers to implementing of control measures to minimise the environmental impacts. The control measures can be presented by polluting agent (e.g. control measure for excessive nitrogen is to dilute wastewater with fresh water when possible); or kind of problem (e.g. control measure for clogging of irrigation systems is to use water with low total suspended solids content).



6 - Sociocultural Aspects

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Cultural and religious beliefs	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Public acceptance	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Sociocultural Aspects – Definitions

Cultural and religious beliefs

Refers to cultural and religious factors that can limit the feasibility of a wastewater reuse system and the ways to overcome these limiting factors.

Public acceptance

Refers to the tools and methods to assess and attain communities' acceptance on wastewater use for agriculture. This includes public participation, education and information, public meetings, workshops, interviews surveys, questionnaires, etc.



7- Economic and financial considerations

	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Economic feasibility	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Financial feasibility	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Market feasibility	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X.. <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i>X.. <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Economic and financial consideration – Definitions

Economic feasibility

Refers to assessment whether a project is affordable and has a positive internal rate of return (projects that provide the most benefits at least cost are the most desirable).

Financial feasibility

Refers to establishment of the sources of revenues and evaluation who will pay for what for a project.

Market feasibility

Refers to assessment of the ability to sell (treated) wastewater to producers and evaluation of the marketability of products grown with wastewater or greywater.



8 - Policy aspects		
	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
Institutional roles and responsibilities	<i>Poor</i> <input type="checkbox"/> <i>Basic</i>X. <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i>X <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Laws and regulations	<i>Poor</i>X <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X. <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Plans and programs	<i>Poor</i>X <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Economic instruments	<i>Poor</i>X. <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
Education and social awareness	<i>Poor</i>X <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i>X. <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Policy aspects – Definitions
<p>Institutional roles and responsibilities Refer to the responsibilities, jurisdictions among public institutions and the coordination mechanisms among them</p> <p>Laws and regulations Refer to legal instruments to facilitate and govern (control) the safe use of wastewater for agriculture, (e.g. creating rights of access to wastewater, establishing land tenure, developing public health and agricultural legislation, etc.)</p> <p>Economic instruments Refer to financial tools that the public authorities can use to promote safe practices when using wastewater in agriculture and to share the costs of wastewater treatment and reuse projects (e.g. subsidies, taxes, water pricing, payment for environmental services, etc)</p> <p>Education and social awareness Refer to the education and training tools to increase knowledge and skill on the safe use of wastewater in agriculture, as well as the advocacy and communication campaigns to impact public perception and awareness</p>



Others:		
	How are the <u>current knowledge and skills</u> of the pertinent staff in your organization in relation to:?	What is the <u>importance</u> of this subject for your organization?
	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>
	<i>Poor</i> <input type="checkbox"/> <i>Basic</i> <input type="checkbox"/> <i>Good</i> <input type="checkbox"/> <i>Excellent</i> <input type="checkbox"/>	<i>Very low</i> <input type="checkbox"/> <i>Low</i> <input type="checkbox"/> <i>High</i> <input type="checkbox"/> <i>Very High</i> <input type="checkbox"/>

Definitions