



Republic of the Philippines
Department of Agriculture
OFFICE OF THE SECRETARY
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Administrative Order No. 11
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SUBJECT: "REVISED GUIDELINES ON THE PROCEDURES AND TECHNICAL REQUIREMENTS FOR THE ISSUANCE OF A CERTIFICATION ALLOWING THE SAFE RE-USE OF WASTEWATER FOR PURPOSES OF IRRIGATION AND OTHER AGRICULTURAL USES, PURSUANT TO SECTION 22.C OF R.A. 9275 OTHERWISE KNOWN AS THE PHILIPPINE CLEAN WATER ACT OF 2004"

WHEREAS, it is the policy of the State to carry out agriculture and fisheries development compatible with the preservation of ecosystems and care and judicious use of the country's resources, under the framework of sustainable development;

WHEREAS, water is an important component of agriculture activities which account for 80% of the total freshwater withdrawal;

WHEREAS, the availability, quantity, and quality of freshwater for irrigation and other agricultural uses are being affected by extreme climate events brought about by climate change and anthropogenic activities;

WHEREAS, freshwater is becoming scarce to sufficiently support the demands of increasing population, agriculture and other activities, while increased population and economic growth has led to a corresponding increase in wastewater production;

WHEREAS, wastewater irrigation and fertilization are established agricultural practices worldwide, and agriculture and fisheries sector can benefit from the proper use of wastewater as an additional resource for irrigation, as liquid fertilizer and for aquaculture activities;

WHEREAS, Section 22 (c) of RA 9275 provides that the Department of Agriculture (DA) shall coordinate with the Department of Environment and Natural Resources (DENR) in the formulation of guidelines for the re-use of wastewater for irrigation and other agricultural uses;

WHEREAS, the DA-Administrative Order 2007-26 was issued in 2007 and there is a need to review and revise the guidelines based on new research findings and recent developments;

WHEREAS, all wastewater generators that will re-use wastewater for the purposes of irrigation, fertilization, and aquaculture shall secure a Certification of Safe Wastewater Re-use from the concerned agencies;

NOW, THEREFORE, I, WILLIAM D. DAR, Secretary of the DA in accordance with Section 13 of RA 9275, otherwise known as the Philippine Clean Water Act of 2004 and Rule 13.3 of its Implementing Rules and Regulations hereby issue, in coping with increasing scarcity of freshwater, this Order governing the re-use of wastewater for irrigation, as liquid fertilizer and aquaculture purposes.

PART I. GENERAL PROVISIONS

Section 1 Definition of Terms

The following terms when used in this Administrative Order (AO) shall mean as follows:

- A. **Access areas** – in landscape irrigation, are areas open for public entry such as golf courses, public and private parks, playgrounds, schoolyards and playing fields, residential landscapes and industrial park landscapes.
- B. **Agricultural land application** - the incorporation and/or application of wastewater through safe available methods for its distribution into the land surface for agricultural production and utilization purposes.
- C. **Agriculture** - the art and science or practice of producing food, feed, fiber and many other desired goods by systematic raising of plants and animals. It denotes a broad array of activities essential to food and material production, including all techniques for raising and processing livestock and those essential to crop planting and harvesting.
- D. **Applicant** – a wastewater generator who applied for certification to re-use wastewater for irrigation, fertilization, and aquaculture. Wastewater generators shall include but not limited to the different primary users enumerated in Section 5 of this Order.
- E. **Aquaculture** – fishery operation involving all forms of raising and culturing fish and other fishery species in fresh, brackish and marine water areas.
- F. **Aquifer** – a layer of water-bearing rock (e.g. sandstone, limestone, and heavily fractured rock) and unconsolidated materials (e.g., sand and gravel) located underground that transmits water in sufficient quantity to supply pumping wells or natural springs.
- G. **Contamination** – the introduction of substances not found in the natural composition of water that make the water less desirable or unfit for intended use.
- H. **Crop irrigation** – includes the irrigation of areas for food crops (consumed raw and/or not commercially processed, or commercially processed) and non-food crops (e.g. fiber, ornamentals, medicinal, etc.). Food crops that are commercially processed refer to those crops that have undergone chemical or physical processing prior to sale to public or others.
- I. **Discharge** – includes, but is not limited to, the act of spilling, leaking, pumping, pouring, emitting, emptying, releasing or dumping of any material into a water body or onto land from which it might flow or drain into said water.
- J. **Drip irrigation system** – refers to the slow application of water to the soil or individual plant through small orifices or emitters.

- K. **Effluent** – discharges from known source, which is passed into a body of water or land, or wastewater flowing out of a manufacturing plant, industrial plant including domestic, commercial, and recreational facilities.
- L. **Fertilization** – the act or process of applying fertilizer with essential elements to promote growth and yield of a crop.
- M. **Freshwater** – water containing less than 500 parts per million dissolved common salt, sodium chloride, such as that in groundwater, rivers, ponds and lakes.
- N. **Grantee** – an applicant who was granted a certification to re-use wastewater for irrigation, fertilization, aquaculture, and other agricultural purposes.
- O. **Groundwater** – subsurface water that occurs beneath a water table in soils and rocks, or in geological formations.
- P. **Intake rate** – refers to the initial surface vertical entry of water into the soil horizon, wherein water accumulates as a result of the natural formation of a wetting front within the A-horizon.
- Q. **Irrigation** – the application of water to the soil to supplement low rainfall and to provide moisture timely and appropriate in quantity and distribution for plant growth.
- R. **Landscape irrigation** – includes the irrigation of non-agricultural areas that include but are not limited to access and restricted areas.
- S. **Liquid/Foliar fertilizer** – any liquid that contains macronutrients and/or micronutrients, which may be applied into the soil or be sprayed into the aerial portion of the plant. The effectiveness and the method of application of the liquid fertilizer shall be determined from the results of the efficacy test done before the registration of the fertilizer product.
- T. **Pathogens** – organisms (microorganisms and infective parasites) that can cause negative effects on human, animal and plant health.
- U. **Pollutant** – any substance, whether solid, liquid, gaseous or radioactive, which directly or indirectly:
- alters the quality of any segment of the receiving water body or land resource so as to affect or tend to affect adversely any beneficial use thereof;
 - is hazardous or potentially hazardous to health;
 - imparts objectionable odor, temperature change or physical, chemical or biological change to any segment of the water body or land; or
 - is in excess of the allowable limits or concentrations or quality standards specified, or in contravention of the condition, limitation or restriction prescribed in these Guidelines.
- V. **Recycling** – the act of using treated wastewater within the same system.

- W. **Restricted Areas** – in landscape irrigation, are areas with limited entry such as freeway landscape, highway medians and other similar areas.
- X. **Re-use** – means taking wastewater from one industry or process, treating it and then using it in another process or industry such as for irrigation, as liquid fertilizer and for aquaculture.
- Y. **Secretary** – the Secretary of the DA.
- Z. **Setback distance** – the distance from the perimeter of the irrigation area to the community or area of concern that is sensitive to contamination.
- AA. **Small volume wastewater generator** – an entity that generates wastewater not exceeding 10 m³/day.
- BB. **Small volume wastewater re-user** – an entity that re-uses all or a portion of wastewater generated for irrigation not exceeding 10 m³/day.
- CC. **Sprinkler system** – the application of water to the surface of the soil in the form of spray, simulating that of rain. The spray is produced by the flow of water under pressure through small orifices or nozzles.
- DD. **Surface irrigation system** – refers to water application that depends on gravity to spread water across the surface of the land (e.g. furrow, border or basin).
- EE. **Surface water** – all water that is open to the atmosphere and subject to surface runoff.
- FF. **Treatment** – any method, technique, or process designed to alter the physical, chemical, biological, or radiological character or composition of any waste or wastewater to reduce or prevent pollution or maximize and/or optimize its re-use potential.
- GG. **Waste** – any material either solid, liquid, semi-solid, contained gas or other forms resulting from industrial, commercial, mining, or agricultural operations, or from community and household activities that is devoid of usage and discarded.
- HH. **Wastewater** – waste in liquid state containing pollutants.
- II. **Water quality** – the characteristics of water, which define its use in terms of physical, chemical, biological, bacteriological or radiological characteristics by which the acceptability of water is evaluated.
- JJ. **Water body** – means both natural and man-made bodies of fresh, brackish and saline waters, and includes, but is not limited to, aquifers, groundwater, springs, creeks, streams, rivers, ponds, lagoons, water reservoirs, lakes, bays, estuarine, coastal and marine waters. It does not refer to those constructed, developed and used purposely as water treatment facilities and/or water storage for recycling and re-use which are integral to process industry or manufacturing.

Section 2 Framework

This Order is formulated within a framework that considers the protection of environment, human, animal and plant health, and attainment of safe agriculture and fishery production while utilizing wastewater for agriculture and aquaculture purposes.

The quality and quantity of wastewater and the method of application shall conform to the standards and guidelines set herein. Wastewater shall be subjected to a treatment process, as may be required, to achieve the quality limits before use for irrigation, fertilization and aquaculture as secondary uses. Its quantity shall be determined based on requirements specific to the land application and site peculiar conditions. The method of wastewater application shall not, in anyway, result to negative impacts to the environment.

This Order provides for monitoring to determine impacts of wastewater application to soils, surface water and groundwater and responses of plants.

Section 3 Scope and Coverage

This Order shall cover the requirements for the issuance of certification pertaining to quality, quantity, and distribution methodology for the safe use and re-use of wastewater for on-site and off-site irrigation, fertilization and aquaculture.

This Order applies to all establishments that re-use their wastewater for purposes of irrigation, fertilization, or aquaculture.

Section 4 Policy on the Re-Use of Wastewater for Irrigation, Fertilization, and Aquaculture Purposes

The re-use of wastewater for irrigation, fertilization, and aquaculture shall require a certification from the following agencies:

Table 1. Agencies in-charge of the issuance of certification for safe re-use of wastewater.

Concerned Agency	Purpose of Re-use
National Irrigation Administration (NIA)	Irrigation
Fertilizer and Pesticide Authority (FPA)	Fertilization
Bureau of Fisheries and Aquatic Resources (BFAR)	Aquaculture

No person or entity shall be allowed to re-use wastewater for irrigation, fertilization, and aquaculture without a certification issued by the concerned agency in accordance with this Order.

Section 5

Sources of Wastewater

Under this Order, wastewater for treatment and/or re-use may originate from the following sources but not limited to:

1. Livestock – includes piggeries, beef and dairy feedlots
2. Food and agro-industrial processes – include food handling; processing and manufacturing plants; sugar mills, refineries and distilleries including biofuels production; slaughterhouses and poultry dressing plants
3. Aquaculture – includes ponds, tanks, and aquaria.
4. Municipal/ domestic wastewater - Sewage/Septage Treatment Plants (STPs)

The FPA and Regional Offices of NIA and BFAR shall issue a certification for the re-use of wastewater from these sources provided that they comply with the requirements as provided for in this Order.

PART II. GENERAL REQUIREMENTS AND PROCEDURE FOR THE ISSUANCE OF CERTIFICATION

Section 6

General Requirements for the Issuance of Certification

The FPA and Regional Offices of NIA and BFAR shall issue a certification for the re-use of wastewater for fertilization, irrigation, and aquaculture, respectively, upon compliance with the prescribed general requirements.

A. Irrigation

An applicant for the re-use of wastewater for irrigation shall submit the following documents:

1. Description of the proposed irrigation site
 - a. Location and access
 - b. Topographic map of the area
 - c. Soils and land use map
 - d. Distance to nearest surface water including the name of the water body
 - e. Location and number of existing wells
2. Characteristics of wastewater based on the parameters listed in Table 3 (Section 9) of this Order
3. Plan on the re-use of wastewater

- a. Area to be irrigated, proposed crop/s, irrigation system, method of application and layout of distribution facilities
- b. Calculated water requirements for irrigation through water balance analysis or equivalent methods
- c. Quantity of wastewater to be re-used for irrigation
- d. Schedule of irrigation
- e. Nutrient management plan
- f. Storage or impoundment provision during rainy months or when irrigation is not permitted

4. Baseline conditions for the following using the prescribed form (Annex 4.):

- a. Groundwater
- b. Surface water
- c. Soils
- d. List of pests and diseases existing in the area (Form 1 of Annex 6).

An applicant for small volume re-use (i.e. less than or equal to 10 m³/day) for irrigation shall not be required to submit items 1b, 1c, 3b, and 3f. Table 2 summarizes the requirements for re-use of wastewater for irrigation.

Table 2. Requirements for Re-use of Wastewater for Irrigation.

Documents	Small Volume Re-use (≤ 10 m ³ /day)	Other Re-users (> 10 m ³ /day)
1. Description of the proposed irrigation site		
a. Location and access	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
b. Topographic map		<input checked="" type="checkbox"/>
c. Soils and land use map		<input checked="" type="checkbox"/>
d. Nearest surface water body	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
e. Location and number of existing wells	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2. Characteristics of Wastewater (Table 3 in Section 9)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3. Plan on the Re-use of wastewater		
a. Area to be irrigated, proposed crops, etc.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
b. Calculated water requirements		<input checked="" type="checkbox"/>
c. Quantity of wastewater to be re-used	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
d. Schedule of irrigation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
e. Nutrient management plan	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
f. Storage or impoundment provision		<input checked="" type="checkbox"/>
4. Baseline conditions (Annex 4.)		
a. Surface water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
b. Groundwater	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
c. Soils	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
d. List of pests and diseases	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

B. Fertilization

For commercial purposes, the applicant shall apply for Registration Certificate (RC) directly to the FPA following the procedures in the FPA Service Guide. This RC shall be the basis for the issuance of certification including the information on volume of wastewater allocated for fertilization.

For non-commercial purposes, an applicant shall submit the following:

1. Description of the proposed application site
 - a. Location and access
 - b. Topographic map of the area
 - c. Soil and land use maps
 - d. Distance to nearest surface water including the name of the water body
 - e. Location and number of existing wells
2. Characteristics of wastewater
 - a. Concentration of macronutrients, micronutrients, and heavy metals, if applicable
 - b. pH level and Electrical Conductivity (EC)
 - c. Presence of pathogens, if applicable
3. Plan on the re-use of wastewater
 - a. Area to be fertilized, proposed crop/s, method of application
 - b. Quantity of wastewater to be re-used for fertilization
 - c. Schedule of application
 - d. Nutrient management plan
 - e. Storage or impoundment provision during rainy months or when fertilization is not permitted.
4. Baseline conditions for the following using the prescribed forms (Annex 4.)
 - a. Surface water
 - b. Groundwater
 - c. Soils

C. Aquaculture

An applicant who will re-use wastewater for aquaculture shall submit the following:

1. Description of the aquaculture site
 - a. Location and access
 - b. Topographic map of the area
 - c. Distance to nearest surface water including the name of the water body

2. Characteristics of wastewater based on the parameters listed in Table 4 (Section 9) of this Order
3. Plan on the re-use of wastewater
 - a. Total area of the farm
 - b. Farm design and construction
 - c. Lay-out of treatment ponds
 - d. Distribution system
 - e. Culture system and species to be cultured
4. Baseline data on the following:
 - a. Adjacent surface water
 - b. Pond bottom soils
 - c. Pests and diseases of aquatic species
 - d. Quantity and quality of wastewater to be discharged to the environment

Section 7

Fees and Other Expenses for the Issuance of Certification

The concerned agency shall collect an application fee in the amount of One Thousand Eight Hundred Pesos (Php 1,800.00) and an additional Six Hundred Pesos (Php 600.00) for the actual issuance of the certification, with a total amount of Two Thousand Four Hundred Pesos (Php 2,400.00). These fees are subject to adjustment based on existing schedule of fees as determined by the concerned certifying agency.

The cost of evaluation and validation of documents related to the certification, which includes but not limited to, transportation, laboratory analysis, and site inspection shall also be borne by the applicant.

Section 8

Application Procedure for the Issuance of Certification

The application procedure for the issuance of Certification for the re-use of wastewater for first-time applicants is presented in the process flow in Annex 1. The renewal of Certification shall require submission of all the documents listed in Table 2 except for the baseline data on surface water, groundwater, and soils.

An applicant shall submit accomplished application form and the required documents to the regional office of the concerned agencies enumerated in Table 1 which covers the area where the wastewater is generated. The concerned agencies shall evaluate the completeness and compliance of the documents and shall issue the Certification for re-use.

The Certification is one of the requirements for the issuance of Discharge Permit from the Environmental Management Bureau (EMB) of DENR.

PART III. TECHNICAL REQUIREMENTS FOR THE RE-USE OF WASTEWATER

Section 9

Quality of Wastewater for Land Application

The quality of wastewater is herein set to safeguard crop/fish productivity, human and animal health and to protect the environment.

A. Irrigation

Table 3 outlines the major parameters of wastewater and the required quality or limits for irrigation as set in this Order. Except for fecal coliform and EC, same limits were set for landscape and crop irrigation. Values exceeding these limits may cause detrimental impact to crop productivity, animal and human health, and environment. The limits of trace elements and heavy metals in wastewater for irrigation were adopted from the 2012 United States Environmental Protection Agency (USEPA) Guidelines for Water Reuse.

A.1 Methods of Analysis

Standard analytical procedures for measurement of wastewater quality requirements for irrigation purposes that must be used in the effluent quality monitoring are those specified in EMB's Memorandum Circular (MC) No. 012, series of 2016 (EMB Approved Methods of Analysis for Water and Wastewater) dated 21 November 2016. The analytical procedures for other parameters not indicated in EMB MC 2016-012 shall be determined by the DA.

The list of analytical methods shall be used as references for laboratories in the conduct of testing wastewater in accordance with the latest edition of the "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association/American Water Works Association/Water Environment Federation (APHA/AWWA/WEF), the latest edition of the USEPA test methods contained in SW-846: *Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods*, and/or in accordance with such other methods of analysis as the EMB or DA may prescribe.

Laboratory analysis shall be conducted by DENR-recognized environmental laboratories or ISO/IEC 17025:2017 (International Organization for Standardization, 2017) certified laboratories.

Table 3. Limits on wastewater quality for irrigation.

Table 5: Limits on wastewater quality for irrigation				
Parameters	Landscape Irrigation	Crop Irrigation		
		Foods eaten raw and not commercially processed	Food crops commercially processed	Non-food crops
For crop productivity and protection of environment				
Bicarbonates ¹ (mg/L)	<500	<500	<500	<500
Biochemical Oxygen Demand (BOD ₅) (mg/L)	< 150	< 150	< 150	< 150
EC (µS/cm)	< 2000	< 1000	< 1000	< 2000
Free residual chlorine (mg/L)	< 1	< 1	< 1	< 1
pH	6.5 – 8.0	6.5 – 8.0	6.5 – 8.0	6.5 – 8.0
Sodium Adsorption Ratio (SAR)	< 18	< 18	< 18	< 18
Sodium (Na) (meq/L)	< 3	< 3	< 3	< 3
Total Nitrogen (TN) ¹ (mg/L)	< 30	< 30	< 30	< 30
Total Phosphorous (TP) ¹ (mg/L)	< 30	< 30	< 30	< 30
Total Suspended Solids [TSS] (mg/L)	< 140	< 140	< 140	< 140
For protection of animal and human health				
Fecal coliform (MPN/100 mL)	< 200	ND ²	< 200	< 200
Limits of trace elements in wastewater for irrigation waters				
Parameters		Landscape/Crop Irrigation		
Trace elements (mg/L) (if applicable)				
Aluminum ³	5.00			
Barium	6.0			
Beryllium	ND ⁴			
Boron	0.75			
Cobalt	0.05			
Fluoride	1.00			
Iron	5.00			
Lithium ⁵	2.50			
Manganese	0.20			
Molybdenum	0.01			
Nickel	0.20			
Selenium	0.02			
Vanadium	0.10			
Zinc ⁶	2.00			
Heavy Metals (mg/L) (if applicable)				
Arsenic	0.10			
Cadmium ⁷	0.01			
Chromium	0.10			
Copper	0.20			
Lead	5.00			
Mercury	0.002			

¹ None to moderate degree of restriction

² Not detectable (ND)– means the total number of fecal coliform organisms shall not exceed 14 MPN /100 mL in any sample

³ High toxicity in acid soils, not a concern if soil pH > 6.5

⁴ Not detectable

⁵ Citrus: 0.075 mg/L

⁶ 1 mg/L recommended for sandy soil (pH< 6)

⁷ Higher toxicity in acid soils

B. Fertilization

The major constituents of wastewater for fertilizer used as foliar spray or applied in the soil are the following:

B.1 Crop Productivity

1. Macronutrients – groups of nutrients needed by plants in large amount.

Primary plant nutrients – include the readily available forms of Nitrogen (N), Phosphorus (P), and/or Potassium (K) or any combinations of these nutrients.

Secondary plant nutrients – include readily available forms of Sulfur (S), Calcium (Ca) and Magnesium (Mg).

2. Micronutrients – group of nutrients, which are essential for plant growth in small amount. These include readily available forms of Iron (Fe), Manganese (Mn), Boron (B), Molybdenum (Mo), Copper (Cu), Zinc (Zn), Chlorine (Cl) and Cobalt (Co).

The declared nutrient composition shall be plus or minus two percent (2%) of the declared % content of each of the essential nutrients.

3. pH – 6.5 – 8.0

B.2 Methods of Analysis

Samples for the above parameters shall be analyzed by FPA-recognized or ISO/IEC 17025:2017 accredited laboratories. Methods of analysis used shall include Association of Official Analytical Chemists (AOAC) and other standard methods duly recommended by FPA.

C. Aquaculture

Pond water shall be free from toxic chemicals, heavy metals and microorganisms (e.g., bacteria, parasites, viruses, and fungi), which are harmful to fishes. The potential danger of pathogen transmissions present in the fish and in the culture environment to handlers and the consumers must be prevented.

Wastewater for grow-out culture of fishes and other fishery resources must comply with the limits outlined in Table 4.

C.1 Methods of Analysis

Methods used for water quality analysis for aquaculture operation shall follow Laboratory Protocols for Fish Health Management and Water Quality Analysis using AOAC Method.

Table 4. Limits on wastewater quality for fresh and brackish water fish culture.

Parameter	Quality requirements (concentration)	
	Freshwater	Brackish water
For Fish Productivity		
1. Alkalinity (CaCO ₃) (mg/L)	20 - 300	> 80
2. Ammonia-Nitrogen (NH ₃ -N) (mg/L)	≤ 0.06	≤ 0.01
3. Bacterial Count		
a. Vibrio sp. (cfu/ mL)	Not applicable	≤ 1.3 x 10 ³
b. Luminous Bacteria (cfu/mL)	Not applicable	≤ 2.0 X 10 ²
5. BOD ₅ (mg/L)	≤ 9	≤ 9
4. Carbon Dioxide (CO ₂) (mg/L)	≤ 7	≤ 15
5. Dissolved Oxygen (mg/L)	> 5	> 5
6. Hydrogen Sulfide (H ₂ S) (mg/L)	≤ 0.003	≤ 0.02
7. Nitrate-Nitrogen (NO ₃ -N) (mg/L)	≤ 0.067	≤ 0.4
8. pH	6.5 - 9.0	7.5 - 8.5
9. Phosphate (PO ₄ ³⁻) (mg/L)	≤ 0.025	0.2 - 0.4
10. Salinity (ppt)	> 5	25 - 30
11. Temperature (°C)	25 - 32	25 - 32
12. TSS (mg/L)	≤ 1000	≤ 1000
For Human Health		
1. Coliform bacteria (MPN/100mL)	≤ 5,000	≤ 1,000

Section 10

Quantity of Wastewater for Re-use

A. Irrigation

Application rates of wastewater for irrigation shall be based on:

A.1 Hydraulic loading rate

Irrigation needs shall be used in setting hydraulic loading rates. As such, wastewater shall only be applied if soil moisture conditions will not allow runoff or ponding in the ground surface. Intake rate of different soils is outlined in Annex 3. Irrigation application shall only be carried out under dry weather conditions to satisfy the crop soil moisture deficit.

Soil samples from the proposed irrigation area shall be collected for chemical characterization. Soil properties such as soil structure, texture, chemistry, and hydraulic characteristics shall be compatible with the wastewater land application system. Hence, the following points shall be considered in the design and selection of potential site:

1. The most suitable soils are moderately permeable and deep with good water holding capacity.

2. Avoid sandy and gravelly soils (i.e., highly permeable) and heavy clay soils of extremely low permeability.
3. Slightly acid soils (pH 5.5) are generally the most suitable as these could balance the slight alkalinity of wastewater; avoid soils that are too acidic (pH < 4) or too alkaline (pH > 8.5) that could restrict plant growth.
4. Soil depths of > 1.0 m are preferred for the efficient utilization of applied wastewater. Lesser depths can be considered for shallow rooted crops such as pasture grasses.

B. Fertilization

The quantity of liquid fertilizer to be used/applied shall depend on the crop's requirements. Soil analysis should be conducted to determine the quantity of nutrients to be supplied to the soil to meet crop's nutrient requirements.

C. Aquaculture

Wastewater for culture of fish shall maintain a level of at least one meter depending on the type of species being cultured. During abnormal/adverse water condition (e.g. occurrence of disease, very turbid water, abnormal water coloration, etc.), at least 1/3 of the pond water shall be replaced.

Section 11 Distribution Methodology and Design

A. Irrigation

A.1 Delivery and Conveyance Method

Delivery of wastewater from the source to the users' farm could either be through a pipeline or tanker trucks and shall follow the requirements below:

1. When using pipelines in conveying wastewater from the source to the point of use, the following conditions shall be satisfied:
 - a. The pipes should be properly marked (i.e. can be easily viewed and recognizable) within its length of its owners' name and the kind of water (wastewater) it is delivering;
 - b. The wastewater generator shall always ensure that there are no leaks in between both ends and should be free from tampering of mischievous elements.
 - c. Schedules of delivery shall be in strict adherence to the irrigation plan submitted in the application for use. Should there be a need to deviate from schedule for

valid reasons; the wastewater generator shall inform the responsible government entity in writing or through e-mail at least a day before the delivery.

- d. The pipes shall in no way store/keep wastewater after the volume approved for the schedule was delivered.
2. When using tanker trucks or to deliver wastewater from the source to the users' farm/pond as agreed upon by both parties, the said tanker truck shall:
 - a. Carry complete documentation of its cargo which include among others:
 - i. Valid copy of the Certification
 - ii. Source (from where and from whom) and destination (to where and for whom)
 - iii. Volume and purpose of wastewater cargo (for irrigation, fertilization, or fish culture)
 - iv. LTO registration
 - b. Be properly labeled (the kind of cargo and the generator's name are easily recognizable and viewed)
 - c. Free from leaks and should ensure there will be no spill at any time and place between the generator's place to the users' pond or field.
 - d. In case where the wastewater is to be directly applied from the trucks to the field, the trucks should be equipped with booms or hose to distribute wastewater to the field. Persons applying the water should wear safety garments with nametags and the generator's name easily recognizable.
 - e. Schedules of application should be in strict adherence to the approved irrigation plan. Should there be a need to deviate from schedule for valid reasons, the wastewater generator shall inform the responsible government entity in writing or through e-mail at least a day before the application.

A.2 Selection of Irrigation Methods

Under normal conditions the type of irrigation method selected will depend on water supply conditions, climate, soil, crops to be grown, cost of irrigation method and the ability of the farmer to manage the system. However, when using wastewater as the source of irrigation, other factors such as contamination of plants and harvested product, farm workers and the environment, and salinity and toxicity hazards need to be considered. The choice of irrigation method in using wastewater shall be governed by the following technical factors:

1. Choice of crops
2. Wetting of foliage, fruits and aerial parts

3. Distribution of water, salts and contaminants in the soil
4. Ease with which high soil water potential could be maintained
5. Efficiency of application, and
6. Potential to expose farm workers and the environment to contamination or pollutants. Set back distances shall be established based in Table 5.

Table 5. Required type of irrigation and setback distances.

	Landscape irrigation		Crop Irrigation		
	Restricted Area	Access Area	Foods eaten raw and not commercially processed	Food crops commercially processed	Non-food crops
Type of irrigation system	Sprinkler and drip	Sprinkler and drip	Furrow and drip	Furrow and sprinkler	Furrow and sprinkler
Set back distances	90 m away from potable water supply wells 30 m away from area accessible to the public if sprinkler or spray irrigation	25 m away from potable water supply wells	25 m away from potable water supply wells	90 m away from potable water supply wells 30 m away from area accessible to the public if sprinkler or spray irrigation	90 m away from potable water supply wells 30 m away from area accessible to the public if sprinkler or spray irrigation

Source: USEPA (2012).

A.3 Precautionary Measures when Re-Using Wastewater for Irrigation

The following precautions shall be required to protect the health of workers and others that may be affected:

1. Direct contact of irrigation water with people shall be avoided.
2. One of the important considerations in sprinkler system is spray drift. Sprinklers that produce coarser droplets shall be used instead of fine mist for spray to minimize the risk of aerosol dispersion by wind drift.
3. In case wastewater is be conveyed through pipe network, appropriate measures shall be made such that wastewater pipe will be not be mistaken for a potable water supply pipe.

- a. Appropriate pipeline identification shall be made, which shall be reflected in a written plan for the maintenance of the whole system.
 - b. Operation and maintenance personnel shall be properly informed to avoid cross/improper connection.
 - c. Potable and wastewater lines shall not cross-connect.
 - d. All pipes for wastewater shall be clearly identifiable and each outlet shall be color coded and marked that the water is not for drinking.
 - e. For both above and below ground installation, wastewater pipeline shall be installed far enough from a parallel potable water pipeline.
4. Storage facilities shall be carefully designed to prevent seepage (e.g., lining with compacted clay, polyethylene sheets) and to maintain adequate freeboard. Analyses of monthly precipitation and evaporation shall be done to determine the time of cessation of wastewater irrigation and storage requirements.

Wastewater containing nutrients when stored for a long period may result to algal bloom. Once this situation is observed, irrigation with wastewater shall be stopped immediately.

A.4 Design of Irrigation System

Design of the irrigation system shall be undertaken by a competent registered Agricultural and Biosystems Engineer. The following factors shall be considered in designing sprinkler and drip irrigation system:

1. *Application rate.* Water shall not be applied at a rate faster than the soil can absorb it, but fast enough to prevent excessive evaporation losses.
2. *Depth of application.* The amount of water applied shall not exceed the field capacity of the soil within the root zone of the crop. Field capacity refers to the percentage of water remaining in a soil, two or three days after having been saturated and after free drainage has practically ceased.
3. *System capacity.* There shall be enough equipment, and of sufficient size, to replenish the soil moisture at a rate that shall not exceed the peak rate of water use of the crop.
4. *Uniformity of application.* The point of lightest application usually shall have a depth of application of at least 80 % of the average depth applied over the field.
5. *Water losses.* These are results of wind drift and evaporation and shall not exceed 15%.

B. Fertilization

In general, the following protocol for application of wastewater for fertilization shall be observed:

B.1 Application

1. Avoid application of liquid by-product fertilizer when wind direction is gusting towards urban residential areas, in order to avoid potential odor issues, toxic contamination, etc.
2. Avoid application to fields near residential areas early in the morning or late in the evening where noise and dust may pose a nuisance to nearby residents,
3. Match application rates to crop needs through soil and leaf testing analysis,
4. Apply to dry or moist soil to minimize potential losses occurring through unexpected heavy rainfall.

B.2 Storage for Liquid By-Product Fertilizer

1. Tank materials should be non-corrosive, non-porous, well maintained and have lockable inspection hatches,
2. Located on level land, free of potential flooding and more than 40m away from waterways, bunded to contain 110% of maximum storage capacity,
3. Easily accessed by contract delivery tankers away from overhead power lines,
4. Emergency procedures for spillage from tanks should be posted in conspicuous places, along with product material safety data sheets (MSDS), and
5. Sandbags, sawdust, rice hulls, or any inert adsorbents should be located 2-3 meters from the storage facility for clean-up operations in the event of tank spillage or rupture.

B.3 On-Farm Record Keeping

A system of record keeping should be implemented to record information on nutrient inputs, changes in soil fertility, weather records, crop details, soil and leaf test results, and crop productivity.

B.4 Environmental Protection

1. Do not exceed recommended fertilizer application rates,
2. Ensure that the contractor delivering the fertilizer has calibrated application equipment and applies the product as recommended,

3. Do not apply liquid fertilizer when heavy rainfall is expected,
4. Apply liquid fertilizer to dry or moist soils in order to minimize any potential losses that may occur during unexpected rainfall events,
5. Manage irrigation to minimize runoff,
6. Ensure that liquid fertilizer products stored for short durations on farm are in secure locations,
7. Ensure that any unused fertilizer or wastes resulting from clean-up of a fertilizer spill are disposed of in a suitable manner and location.
8. Implement measures to reduce the potential for odor or noise nuisance caused when applying liquid fertilizers near residential areas.
9. If near surface water bodies such as creeks, rivers, lakes, irrigation canals, etc., maintain and enhance buffer areas in order to intercept nutrients and enhance dissolved oxygen levels in water ways through lower water temperatures and
10. Establish and maintain vegetated headlands and filter strips in order to slow down and trap particulates.

B.5 Safety Considerations

It is recommended that gloves and safety glasses are worn when handling liquid fertilizer to avoid contact with the skin. However, in the event of spilling or splashing liquid fertilizer onto the skin, it is important to wash off the affected area thoroughly with water. It is mandatory for all people to wear closed in shoes, long trousers, a long sleeve shirt, high visibility vest (provided) and safety glasses while on the site.

Smoking is not permitted anytime on site.

In addition, applicators of liquid fertilizer shall follow the direction of use in the label for crops that were used in the registration. The direction of use shall be based on the result from the bio-efficacy tests as required in the registration procedure.

C. Aquaculture

To attain an environmentally-sound aquaculture operation, distribution methodology and design shall follow good aquaculture practices pursuant to Fisheries AO 214, Series of 2001, otherwise known as the Code of Practice for Aquaculture:

C.1 Site selection/evaluation

Potential sites for aquaculture shall be thoroughly evaluated by BFAR in consultation with the DENR, Local Government Unit (LGU), and the National Fisheries and Aquatic Resources Management Council (NFARMC) to ensure that the ecological and social

conditions are sustained and protected. The following practices shall ensure that sites selected are appropriate for aquaculture farms:

1. Water source in the area shall be evaluated as to its quality and quantity
2. Tidal patterns, freshwater influences and flood levels, offshore currents and existing water uses shall be determined
3. Alternatives to mitigate potential negative environmental and social impacts shall be considered

C.2 Farm design and construction

Proven and accepted designs and construction procedures shall be adopted to overcome problems related to flood levels, storms, erosion, seepage, water intake and delivery points and encroachment on mangroves and wetlands as well as social impacts.

1. Farm shall be properly designed. Arrangement of the pond compartments, water control structures and all other facilities are mutually harmonized with each other giving the most efficient water management and manipulation of stocks.
2. An ideal farm shall have wastewater treatment and settling pond areas, which are necessary for conditioning intake water as well as settling wastewater before discharging to the environment.

C.3 Water usage

A good environment within the pond system shall be influenced by the following practices on water usage as well as the pond water quality management:

1. Closed recirculating water system shall be considered in the intensive and semi-intensive farming systems;
2. Water exchange shall be minimized by maintaining good water quality through moderate stocking densities and feeding rates, using high quality feeds and good feeding practices.

C.4 Water delivery and sludge/effluent management

Awareness of proper waste management in the aquaculture industry shall be increased to enhance the protection of coastal land and water resources through the following practices:

1. Effluents, sediments and other wastes shall be properly disposed of through the use of wastewater treatment and settling ponds;
2. Delivered water shall meet the BFAR water quality standards (determined qualitatively and quantitatively). Qualitative standards shall include prohibition of the release of turbid and odorous water to the receiving water while quantitative

standards shall include the maximum and/or minimum levels of suspended solids, measure of acidity, dissolved oxygen, ammonia and other nitrogenous compounds, phosphorous, BOD, etc.

C.5 Use of drugs, chemicals, potentially toxic pesticides and fertilizers

The following shall be practiced to foster awareness on the proper use of therapeutic agents and other chemicals without endangering food safety or threatening the environment:

1. Drugs, chemicals, pesticides and fertilizers including lime shall be used only when clearly justified to treat specific problems;
2. If chemicals are used, pond water shall not be discharged until they have degraded/dissipated or until the compound have naturally decomposed to non-toxic form;
3. Records shall be maintained regarding the use of chemicals in ponds as suggested by the Hazard Analysis and Critical Control Points (HACCP) method;
4. Banned chemicals shall not be used for any purpose;
5. Drugs, antibiotics and other chemical treatments shall be in accordance with recommended practices and comply with national and international regulations; and
6. Aquaculture producers shall follow the information on product labels regarding dosage, withdrawal period, proper use, storage, disposal and other uses of the chemicals to safeguard environmental and human safety;

PART IV. MONITORING AND REPORTING

Section 12 Agri/Aqua Self-Monitoring Report

The grantee shall submit an Agri/Aqua Self-Monitoring Report (ASMR) to the concerned certifying agencies using the prescribed forms (Annex 5) every six (6) months to be signed by the Pollution Control Officer (PCO) of the wastewater generator. The submitted ASMR may be validated by the concerned certifying agency as it deems necessary.

The monitoring and reporting on plant's pest and diseases as well as on the aquaculture shall be conducted by the grantee. The agency concerned shall provide technical assistance on how to conduct the field monitoring.

Monitoring for crops would deal on the incidence of pests and diseases that is possibly due by the application of wastewater. Monitoring of pests (e.g., insects, fungi, vertebrates and diseases, their types and population in the area) will be one component of the cultural management activities which will be required from the grantee.

Monitoring shall be weekly except for outbreaks wherein monitoring will be done on a daily basis. Reporting shall be done monthly (except for outbreaks where the concerned agency will be informed immediately) and reports submitted to the Bureau of Plant Industry (BPI). Report shall include a narrative on the actions taken to manage/control the pest if any and an accomplished Pest Monitoring Form attached as Annex 6.

Monitoring of different water quality parameters in the culture pond shall be done during aquaculture operation for at least twice in every culture operation to determine its suitability for fish culture. Monitoring forms are attached as Annex 7.

Section 13

Impact Assessment

An impact assessment shall be conducted by the DA concerned agencies every five years or as the need arises (e.g., in case of water/soil contamination) on groundwater, surface water, and soils.

A. Groundwater

Monitoring of groundwater is required if the depth of the static water level is within 10 meters below the ground surface and existing field conditions indicate that the groundwater quality is at risk from the effluent irrigation scheme.

The minimum requirement for monitoring of well for groundwater quality shall be as follows:

1. One well upstream of the field of application or outside the affected area of the land application site for baseline or background monitoring
2. One well downstream of the field of application
3. All monitoring wells must extend to sufficient depth to sample seasonal fluctuations of the water table.
4. Monitoring wells shall be provided with a casing and properly designed screens

Establishment of monitoring wells shall be the responsibility of the grantee. Monitoring of the groundwater under the Certification may require measurement of the different critical parameters as applicable to the type of wastewater source.

Gathering of data shall be taken from monitoring wells at least once a year during dry season. However, for groundwater level, pH, and EC, monitoring shall be done every three months. If the groundwater depth is shallow (less than six meters from the ground) or where the soils are highly permeable, monthly monitoring maybe required.

B. Surface Water

Monitoring shall be conducted by the grantee following EMB-DENR's Water Quality Monitoring Manual for sampling, handling and preservation of water samples. It shall be done in accordance with Section 6.3 of DENR AO 2016-08.

C. Soil

Soil monitoring in the application site shall be conducted annually. Composite samples shall be analyzed for the different parameters identified by the concerned agencies.

Table 6 summarizes the frequency of impact monitoring on groundwater, surface water, soil, crops, and aquaculture.

Table 6. Monitoring frequency on the impacts of wastewater on groundwater, surface water, soils, crops, and aquaculture.

Environment	Monitoring Frequency
Groundwater	Annually (for other parameters)
	Quarterly (for groundwater level, pH, EC only)
	Monthly (if water table is < 6 m below ground surface)
Surface water	In accordance with Section 6.3 of DENR AO 2016-08
Soils	Annually
Crops	Weekly (incidence of pests and diseases)
	Daily (in case of outbreaks)
Aquaculture	Twice in every culture operation

PART V. ADMINISTRATIVE PROVISIONS

Section 14 Validity of Certification

The initial certification shall have a validity period of one (1) year. Thereafter, the Certification shall have the following validity periods subject to compliance with ASMR submission:

- Three (3) years – if grantee proves to be in good standing within the first year of validity
- Five (5) years - if grantee proves to be in good standing after the second and succeeding renewal of Certification

Renewal of Certification shall be applied for at least 90 working days before expiration. Issued Certificate shall be displayed/posted in conspicuous locations in the office or facility of the applicant.

Section 15

Procedures for Revocation of Certification

The concerned agencies, after proper evaluation, may suspend or revoke the issued certification. Prior to any revocation, the concerned agency shall issue a Notice of Violation/Non-Compliance to the wastewater re-user/generator on the following grounds:

1. Violation of any condition as stipulated in the certification;
2. Non-submission of two (2) consecutive ASMR; and
3. Refusal to allow inspection by concerned agency duly authorized monitoring and validation team.

The wastewater generator/re-user is given 15 calendar days upon receipt of the Notice of Violation/Non-Compliance to submit in writing all the facts to explain otherwise. Failure to comply will lead to issuance of Notice of Preventive Suspension by the concerned agency. Upon receipt of Notice of Preventive Suspension from the concerned certifying agency, the grantee shall be given 15 working days to submit in writing all the facts and reasons why certification should not be revoked. Failure to comply shall result to outright revocation of certification.

The concerned certifying agency shall inform the grantee of the decision within 15 working days upon receipt of the written explanation.

The period of preventive suspension shall not exceed 30 working days from receipt of the order of suspension.

In the event of revocation of certification, concerned Regional Offices of the EMB shall be officially informed within 72 hours by the concerned certifying agencies. Establishments whose certificates were revoked shall be subject to applicable provisions under RA 9275 and its IRR.

In the case of revocation of Discharge Permit by DENR-EMB, the Certification for wastewater re-use for agriculture will also be suspended.

PART VI. MISCELLANEOUS PROVISIONS

Section 16

Research, Development, and Training

The BFAR, FPA, NIA, and BSWM are mandated to identify and conduct their research, development, and training needs for the effective implementation of this Order. These agencies are instructed to include these needs in their proposed regular annual budgets. Likewise, the said agencies are encouraged to source out from research, development, and training institutions.

Section 17 Creation of DA Oversight Committee

An oversight committee within the DA shall be created to oversee the smooth implementation and enforcement of this Order. The committee shall be headed by DA Undersecretary for Field Operations Service (FOS) with Directors of BSWM, NIA, FPA, BFAR, BPI, NMIS, BAI, and other concerned agencies as members. This oversight committee must be supported by the National Technical Working Group.

Section 18 Reconstitution of the National Technical Working Group

A National Technical Working Group (NTWG) composed of members from different national government agencies and concerned stakeholders shall be reconstituted and convened, as needed, for the purpose of monitoring the implementation of this Order and providing recommendation for the updating of this Guidelines. Secretariat support to the NTWG shall be provided by the agency of the Chairperson. The NTWG shall report to the Secretary of DA. The NTWG members are listed in Table 7.

Table 7. Members of the NTWG for the updating of the Guidelines on Safe Re-Use of Wastewater for Irrigation and Other Agricultural Uses.

POSITION	AGENCY
Chairperson	DA-BSWM
Co-Chairperson	DA-FOS
Member	DA-BSWM
Member	DA-BAFS
Member	DA-BFAR
Member	DA-PRS
Member	DA-BAI
Member	DA-BPI
Member	DA-NMIS
Member	NIA
Member	FPA
Member	DENR-EMB
Member	DOST-ITDI
Member	DOH
Member	DILG-BLGS
Member	SUC
Member	Industry Associations
Member	SRA
Secretariat	DA-BSWM

Section 19
Separability

The provisions of this Order are hereby declared to be separable. In the event that one or more of its provisions are held to be invalid, the validity of the other provisions shall not be affected thereby.

Section 20
Repealing Clause

The DA AO No. 26, Series of 2007 is hereby repealed. All other orders, rules and regulations, and administrative issuances or parts thereof inconsistent with the provisions of this Order are hereby amended, modified, or repealed accordingly.

Section 21
Effectivity

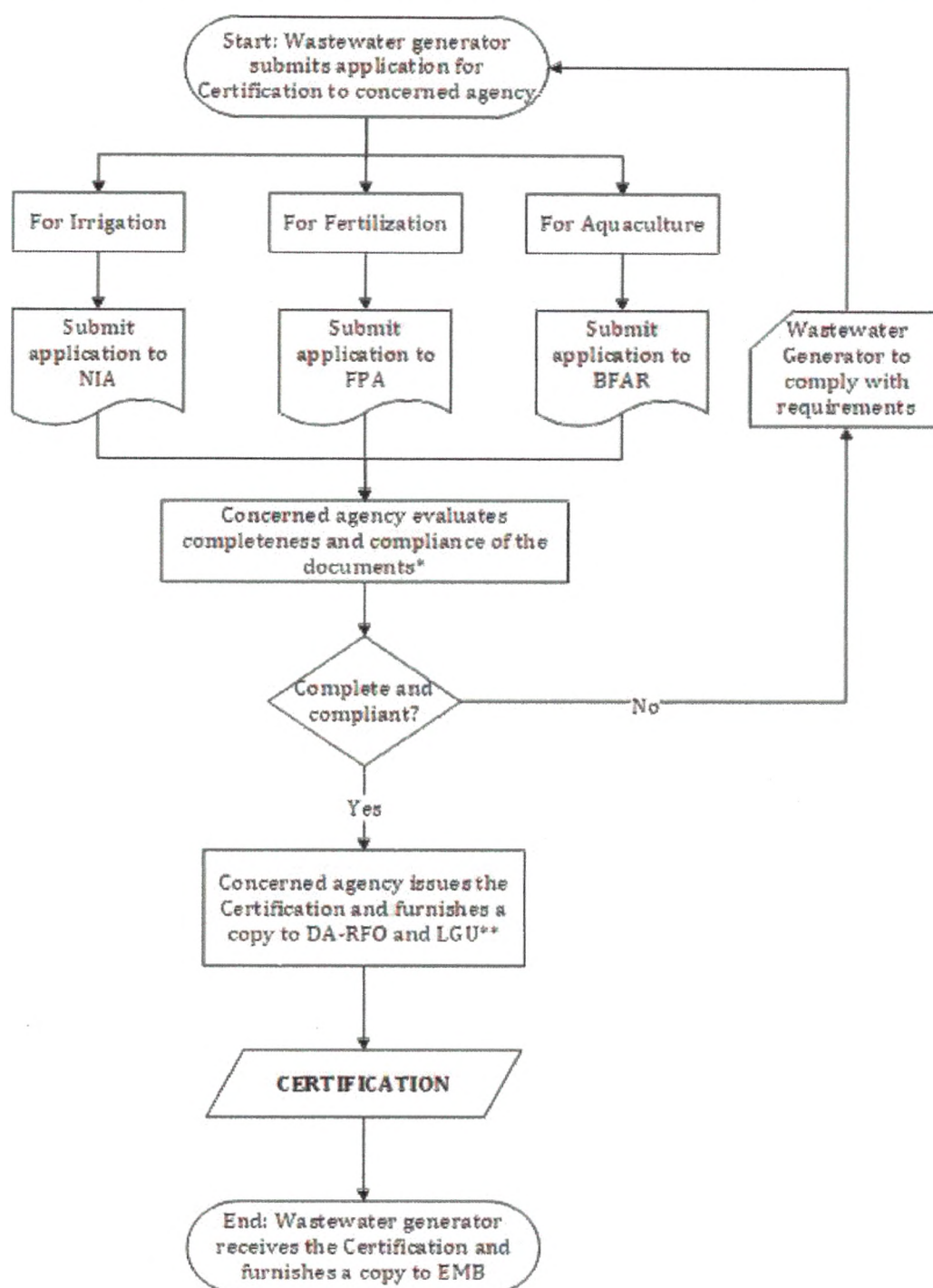
This Order shall take effect 15 days after its publication in a newspaper of general circulation and upon acknowledgement of receipt of a copy hereof by the Office of the National Administrative Register.


WILLIAM D. DAR, Ph.D.
Acting Secretary

DEPARTMENT OF AGRICULTURE

In replying pls cite this code :
For Signature: S-09-19-0357
Received : 09/13/2019 08:07 AM

Annex 1. Process Flow for the Issuance of Certification on Safe Re-Use of Wastewater



* 15 working days allotted for the processing of application

** 5 working days allotted for the issuance of Certification to applicant

- Per RA 11032 (2018), all applications shall not be longer than three (3) working days for simple transactions, and seven (7) working days for complex transactions from the date the request and/or complete application or request was received. Actions or requests that involve activities which could be a threat to public health, safety, morals, policy, or a highly technical application should be done within 20 days or as determined by the agency concerned, whichever is shorter.

APPLICATION FORM FOR CERTIFICATION FOR WASTEWATER RE-USE

Application No.: _____

INSTRUCTION: Fill in all appropriate spaces. Mark all appropriate boxes with an "X."**NOTE:** Checklist of documents required for application of certification for different agricultural purposes is found on the latter part of this form. The Office will not accept/process an improperly filled-up application form and incomplete supporting documents.**Purpose:**☐ **Irrigation**

1. Location of farm/point of use: _____
2. Distance of farm from wastewater source: _____
3. Distance to nearest surface water and name of water body: _____
4. Distance to existing wells and number: _____
5. Crops to be irrigated: _____
6. Distribution methodology: _____
7. Irrigation system: _____

☐ **Fertilization**

1. Location of farm/point of use: _____
2. Distance of farm from wastewater source: _____
3. Distance to nearest surface water and name of water body: _____
4. Distance to existing wells and number: _____
5. Declared guaranteed composition: _____
6. Crops to be fertilized: _____
7. Distribution methodology: _____

☐ **Aquaculture**

1. Location of farm/point of use: _____
2. Distance of pond from wastewater source: _____
3. Distance to nearest surface water and name of water body: _____
4. Culture system and species to be cultured: _____
5. Distribution methodology: _____

GENERAL INFORMATION

Name of Applicant: _____

Name of Establishment: _____

Type of Establishment: _____

PSIC Code: _____

Address: _____

Contact No.: _____

Phone: _____

Fax: _____

Email: _____

Cellphone: _____

Legal Classification:

☐ Single Proprietorship ☐ Private Corporation ☐ Partnership ☐ Others

Sources of Water Supply	Average Water Consumption (m ³)		Water Use/ Sources of Wastewater	Estimated Flow (m ³ /day)	
	Daily	Annual		Water Consumed	Wastewater Generated
MWCI/MWSI (MWSS)			Livestock and Poultry		
Local Water District			Agriculture and Food Industrial processes		
Deep Well			Aquaculture		
Surface Water (lake, river, creek, etc.)			Domestic and municipal sewage		
Others (specify)			Others (specify)		
Total			Total		
			Maximum Daily Flow Rate		

CHECKLIST OF DOCUMENTS REQUIRED FOR IRRIGATION USE

1. Description of the proposed irrigation site:	
a. Topographic map of the area	<input type="checkbox"/>
b. Soil and Land Use Map	<input type="checkbox"/>
2. Characteristics of wastewater prior to use based on the parameters indicated in Table 2 of this Order.	<input type="checkbox"/>
3. Plan on the re-use of wastewater:	
a. Area, proposed crop/s, irrigation system, method of application and layout of distribution facilities	<input type="checkbox"/>
b. Calculated water requirements for irrigation through water balance analysis or equivalent methods	<input type="checkbox"/>
c. Nutrient management plan	<input type="checkbox"/>
d. Storage or impoundment provision during rainy months or when irrigation is not permitted, if applicable	<input type="checkbox"/>
4. Baseline data for the following:	
a. Surface Water	<input type="checkbox"/>
b. Groundwater	<input type="checkbox"/>
c. Soils	<input type="checkbox"/>
d. List of pests and diseases in the area	<input type="checkbox"/>

CHECKLIST OF DOCUMENTS REQUIRED FOR FERTILIZATION USE

1. Description of the proposed application site:	
a. Topographic map of the area	<input type="checkbox"/>
b. Soil and Land Use Map	<input type="checkbox"/>
2. Characteristics of wastewater (macro and micro nutrients, pH, EC)	<input type="checkbox"/>
3. Plan on the re-use of wastewater:	
a. Area to be fertilized, proposed crop/s, method of application	<input type="checkbox"/>
b. Quantity of treated wastewater available for fertilization	<input type="checkbox"/>
c. Storage and impoundment provision during rainy season or when fertilization is not permitted.	<input type="checkbox"/>
4. Baseline conditions for the following:	
a. Surface Water	<input type="checkbox"/>
b. Groundwater	<input type="checkbox"/>
c. Soils	<input type="checkbox"/>

CHECKLIST OF DOCUMENTS REQUIRED FOR AQUACULTURE USE

1. Description of the proposed application site:	
a. Topographic map of the area	<input type="checkbox"/>
b. Soil and Land Use Map	<input type="checkbox"/>
2. Characteristics of wastewater prior to use based on the parameters indicated in Table 4 of this Order	<input type="checkbox"/>
3. Plan on the re-use of wastewater:	
a. Lay-out of treatment ponds	<input type="checkbox"/>
b. Distribution systems	<input type="checkbox"/>
c. Description of wastewater delivery.	<input type="checkbox"/>
d. Description of wastewater process.	
4. Baseline conditions for the following:	
a. Surface Water	<input type="checkbox"/>
b. Soils	<input type="checkbox"/>
c. Pests and diseases	<input type="checkbox"/>
d. Quantity and quality of wastewater to be discharged to the environment	<input type="checkbox"/>

I hereby certify that the above information is true and correct to the best of my knowledge.
Done this _____ day of _____ of 20____.

Name and Signature of Pollution Control Officer

Name and Signature of Managing Head

SUBSCRIBED AND SWORN to before a Notary Public this _____ day of _____, 20_____.
Affiant exhibiting to me his/her Community Tax Receipt as follows:

Name	Community Tax Receipt No.	Place Issued	Date Issued

NOTARY PUBLIC

Doc No. _____

Page No. _____

Book No. _____

Series of _____

**GENERAL GUIDELINES AND REFERENCE ON THE MOVEMENT OF RE-USED WASTEWATER
RELATIVE TO SOIL TYPES**

Soil Types/Textural Classification	Intake Rate, cm h ⁻¹	Classification ¹	Hydraulic Conductivity ² , cm h ⁻¹	Classification ²	Remarks
Clay	0.01 - 0.8	Very Slow - Slow	<0.125 - 0.5	Very Slow- Slow	Very high buffering potential, High ponding potential
Silty Clay	0.8 - 2.0	Moderately Slow	0.5 - 2.0	Moderately slow	Moderate buffering potential, Moderate ponding potential
Clay Loam	2.0 - 6.0	Moderate	2.0 - 6.25	Moderate	Moderate buffering potential, Moderate ponding potential
Loam	6.0 - 12.0	Moderately Rapid	6.25 - 12.5	Moderately Rapid	Moderate buffering potential, Low ponding potential
Sandy Loam	12.5 - 25.0	Rapid	12.5 - 25.0	Rapid	Low buffering potential, very low ponding potential
Sand	> 25.0	Very Rapid	> 25.0	Very Rapid	No buffering and ponding potential

¹ Based from Israelsen & Hansen (1962)

² Based from Food and Agriculture Organization (FAO) of the United Nations (2006)

BASELINE DATA FORM FOR ENVIRONMENTAL IMPACT MONITORING

Name of Grantee: _____
 Address: _____
 Location of farm: _____
 Irrigated/fertilized area (ha): _____
 Crop/s/cropping pattern: _____
 Date and time of sampling: _____
 Weather condition: _____

Required baseline data for groundwater impact monitoring

Parameters	Baseline Data	
	Upstream Well	Downstream Well
No. of Well		
Coordinates		
Distance from irrigated/fertilized farm (m)		
Depth of monitoring well (m)		
Depth of water level (mbgl)		
EC ($\mu\text{S}/\text{cm}$)		
pH		
Total N (mg/L)		
Nitrate, NO_3 (mg/L)		
Total Phosphorus (mg/L)		
Available Phosphorus (mg/L)		
Heavy metals (mg/L)		

Required baseline data for surface water impact monitoring

Parameters	Baseline Data	
	Upstream Well	Downstream Well
Name of river/creek:		
Distance to irrigated/fertilized farm (m)		
Flow (m^3/s)		
EC ($\mu\text{S}/\text{cm}$)		
pH		
BOD (mg/L)		
Fecal coliform (MPN/100 mL)		
Total N (mg/L)		
Nitrate, NO_3^- (mg/L)		
Ammonia, NH_3^- (mg/L)		
Total Phosphorus (mg/L)		
Orthophosphate, PO_4 (mg/L)		
Heavy metals (mg/L), if applicable		

Required baseline data for soil quality impact monitoring for a specific soil type

Parameters	Concentration	Qualitative Description
Soil bulk density (g/cc)		
Soil pH		
Organic matter content (%)		
Nitrate-Nitrogen, NO ₃ -N (%)		
Available P, ppm		
Cation Exchange Capacity (meq/100 grams)		
Exchangeable bases (meq/100 grams)		
Ca ²⁺		
Mg ²⁺		
K ⁺		
Na ⁺		
Trace elements (ppm)		
Zn ²⁺		
Cu ⁺		
Fe ²⁺		
Mn ²⁺		
Heavy metals (ppm)		
Cd ²⁺		
Pb		
Hg		

AGRI/AQUA SELF MONITORING FORM

Name of Grantee:	
Type of Establishment:	
Address:	
Semester:	Year:

I. Wastewater Re-use for Irrigation and Other Agricultural Purposes

Type of Wastewater to be Re-used	Site of Irrigation/Other Agricultural Purposes	Average Rate of wastewater delivered (m ³ /day)*days	Volume of wastewater for irrigation and other agricultural purposes (m ³ /month)		

II. Characteristics of Wastewater Re-used for Irrigation

Parameters	Values
FOR CROP PRODUCTIVITY AND PROTECTION OF ENVIRONMENT	
Bicarbonates (mg/L)	
Biochemical Oxygen Demand (BOD ₅) (mg/L)	
Electrical Conductivity (μS/cm)	
Free residual chlorine (mg/L)	
pH	
Sodium Adsorption Ratio (SAR)	
Sodium (Na) (meq/L)	
Total Nitrogen (TN) (mg/L)	
Total Phosphorous (TP) (mg/L)	
Total Suspended Solids (mg/L)	
FOR PROTECTION OF ANIMAL AND HUMAN HEALTH	
Fecal coliform (MPN/100 mL)	
MAXIMUM CONCENTRATIONS	
A. Trace Elements (mg/L), if applicable	
Aluminum	
Barium	
Beryllium	
Boron	
Cobalt	
Fluoride	
Iron	
Lithium	
Manganese	
Molybdenum	
Nickel	
Selenium	
Vanadium	

Zinc	
B. Heavy Metals (mg/L),, if applicable	
Arsenic	
Cadmium	
Chromium	
Copper	
Lead	
Mercury	

III. Characteristics of Wastewater Re-used for Fertilization

Parameters	Values
FOR CROP PRODUCTIVITY AND PROTECTION OF ENVIRONMENT	
Macro nutrients (+ 2% of declared value)	
Micro nutrients (+ 2% of declared value)	
pH	
Electrical Conductivity	
MAXIMUM CONCENTRATIONS	
A. Trace Elements (mg/L)	
Aluminum	
Beryllium	
Boron	
Cobalt	
Fluoride	
Iron	
Lithium	
Manganese	
Molybdenum	
Nickel	
Selenium	
Vanadium	
Zinc	
B. Heavy Metals (mg/L), if applicable	
Arsenic	
Cadmium	
Chromium	
Copper	
Lead	
Mercury	

IV. Characteristics of Wastewater Re-used for Aquaculture

Parameters	Values
FOR FISH PRODUCTIVITY	
1. Alkalinity (CaCO ₃) (mg/L)	
2. Ammonia-Nitrogen (NH ₃ -N) (mg/L)	
3. Bacterial Count	
a. Vibrio sp. (cfu/ mL)	
b. Luminous Bacteria (cfu/mL)	
4. BOD ₅ (mg/L)	
5. Carbon Dioxide (CO ₂) mg/L)	
6. Dissolved Oxygen (mg/L)	

7. Hydrogen Sulfide (H ₂ S) (mg/L)	
8. Nitrate-Nitrogen (NO ₃ -N) (mg/L)	
9. pH	
10. Phosphate (PO ₄ ³⁻) (mg/L)	
11. Salinity (ppt)	
12. Temperature (°C)	
13. TSS (mg/L)	
FOR HUMAN HEALTH	
1. Coliform bacteria (MPN/100mL)	
2. Heavy Metals (mg/L), if applicable	
Arsenic	
Cadmium	
Chromium	
Copper	
Lead	
Mercury	

I hereby certify that the above information is true and correct to the best of my knowledge.
 Done this ____ day of _____, 20____.

 Name and Signature of PCO

 Name and Signature of Managing Head

SUBSCRIBED AND SWORN to before a Notary Public this ____ day of _____, 20____. Affiant
 exhibiting to me his/her Community Tax Receipt as follows:

Name	Community Tax Receipt No.	Place Issued	Date Issued

NOTARY PUBLIC

Doc No. _____
 Page No. _____
 Book No. _____
 Series of _____

PEST AND DISEASE MONITORING FORM

Date: _____

Address: _____

Location of Farm: _____

Crop/s Planted: _____

Area irrigated/fertilized: _____

Observed Beneficial Insects:

1.	6.
2.	7.
3.	8.
4.	9.
5.	10.

Observed Major Pests and Diseases Present in the Farm (e.g. rats, etc.)

1.	6.
2.	7.
3.	8.
4.	9.
5.	10.

Pest Management Practices

For insects/arthropod pest (identify the pest managed)

1.
2.
3.
4.
5.
6.

For Diseases (identify the disease managed)

1.
2.
3.
4.
5.
6.

Form 2. IPM Impact Monitoring

PLANT PESTS MONITORING FORM

Name of Farmer:	Crop Planted:
Location of Farm:	
Area (ha):	Cropping Season:
Data Gathered:	Weather Condition:
Fertilizer Application:	Date:
Pesticide Application:	Date:

Sample Plants																					
Pests	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
Beneficial Insects																					

Recommendations:

Prepared by: _____

Date: _____

Environmental Impact Monitoring for Pond Culture

FIELD MONITORING FORM

Requested by: _____
 Name of Farmer/Owner: _____
 Physical Area (ha/m²): _____
 Source of Water: River (☐) Tidal River (☐)
 Type of Aqua Farm: Pond: Freshwater (☐) Brackish water (☐)
 Tank: Freshwater (☐) Brackish water (☐)
 Culture System: Monoculture (☐) Polyculture (☐) Others _____
 Management System: Extensive (☐) Intensive (☐) Semi-Intensive (☐)
 Stocking Density: _____

Description of Aquaculture Site:

- a. Location and access: _____
 b. Physical area (size and topography): _____
 c. Farm design and construction: _____

Plan on the Re-use of Wastewater: (description of wastewater treatment and settling pond layout, wastewater delivery and treatment process)

Input Utilization:

Feeds: Commercial (☐) Trash Fish (☐) Others: _____
 Fertilizer: _____
 Pesticides: _____
 Antibiotics/Probiotics: _____
 Others: _____

Problems Encountered:

Disease Occurrence: Yes (☐) No (☐)
 Specify causes: Parasites (☐) Bacteria (☐) Fungi (☐) Virus (☐)
 Pollution: Yes (☐) No (☐)
 Specify causes: _____
 Fish Kill: Yes (☐) No (☐)
 Specify causes: _____

Remarks: _____

Inspected/verified by: _____

Date: _____

LIST OF ABBREVIATIONS

ACR	-	Agri/Aqua Compliance Report
AO	-	Administrative Order
AOAC	-	Association of Official Analytical Chemists
APHA	-	American Public Health Association
AWWA	-	American Water Works Association
BAFS	-	Bureau of Agriculture and Fisheries Standards
BFAR	-	Bureau of Fisheries and Aquatic Resources
BAI	-	Bureau of Animal Industry
BLGS	-	Bureau of Local Government Supervision
BOD	-	Biochemical Oxygen Demand
BPI	-	Bureau of Plant Industry
BSWM	-	Bureau of Soils and Water Management
DA	-	Department of Agriculture
DA-RFO	-	Department of Agriculture – Regional Field Office
DENR	-	Department of Environment and Natural Resources
DILG	-	Department of Interior and Local Government
DOH	-	Department of Health
DOST-ITDI	-	Department of Science and Technology-Industrial Technology Development Institute
EC	-	Electrical Conductivity
EMB	-	Environmental Management Bureau
FAO	-	Food and Agriculture Organization
FOS	-	Field Operations Service
FPA	-	Fertilizer and Pesticides Authority
HACCP	-	Hazard Analysis and Critical Control Points
IPM	-	Integrated Pest Management
IRR	-	Implementing Rules and Regulations
ISO	-	International Organization for Standardization
LGU	-	Local Government Unit
LTO	-	Land Transportation Office
MSDS	-	Material Safety Data Sheets
NFARMC	-	National Fisheries and Aquatic Resources Management Council
NIA	-	National Irrigation Administration
NMIS	-	National Meat Inspection Service
NTWG	-	National Technical Working Group
PCO	-	Pollution Control Officer
PRS	-	Policy Research Service
RC	-	Registration Certificate
SAR	-	Sodium Adsorption Ratio
SRA	-	Sugar Regulatory Administration
STP	-	Sewage/Septage Treatment Plant
SUC	-	State Universities and Colleges
TN	-	Total Nitrogen
TP	-	Total Phosphorus
TSS	-	Total Suspended Solids
USEPA	-	United States Environmental Protection Agency
WEF	-	Water Environment Federation

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