CIWM Water Testing Laboratory

In many areas of Bangladesh, arsenic contamination in ground water has exceeded the permissible limit of WHO and Bangladesh standard. In connection to this, CIWM has established a water testing laboratory in the centre. The laboratory has capacity to test biotic contaminants like arsenic, pH, iron, manganese, sulphete, water hardness and turbidity, trace elements etc. and also biotic contaminants like coli-form bacteria and harmful microbes beyond internal use. Any outside individual or organization can use the lab facility.

Importance

Water is controlled and regulated to serve a wide variety of purpose. For water resource development, water quality is one of the criteria to the looked into. Several ingredients present in water in optimum level are necessary for living creatures. On the other hand a large number of elements present in water may be toxic to plants or animals or human beings. So what kind of ingredients present in water and its optimum level or not it's only way to know by the testing of water, for this reason water quality test is a most important thing. So water testing laboratory is needed for the ensuring of safe water quality. For this intention CIWM has established a water testing laboratory in 2003.

2. Objectives

i)   To analysis water quality for measuring of present ingredients;

ii) To analysis water quality for measuring of concentration elements up to the guidelines of Bangladesh and World Health Organization(WHO) standard or not;

iii) To reduce water borne diseases; and

iv) To improve quality of life.

CIWM, RDA Water Testing Laboratory

Testing facility:

Below parameters testing facility provide from CIWM laboratory

Sl. No.	Water Quality Parameters	Unit	Concentration Present	WHO Guidelines Values 1996	Bangladesh Standard for drinking water (ECR'97)
1	Iron, Fe	mg/L		0.3	0.3-1.0
2	Arsenic, As	μg/L		10	50
3	pH	-		6.5-8.5	6.5-8.5
4	Fluoride, F	mg/L		1.5	1
5	Chloride, CI	mg/L		250	150-600
6	Manganese, Mn	mg/L		0.5	0.1
7	Nitrate-Nitrogen, NO_3-N	mg/L		50 as NO_3	10 as N
8	Nitrite, NO_2	mg/L		<1	<1
9	Total Hardness as $CaCO_3$	mg/L		500	200-500
10	Salinity	%		0.04	0.04
11	Conductivity	μs/cm		50-1500	50-1500
12	Total Dissolved Solids (TDS)	mg/L		1000	1000
13	Sulfate, SO4	mg/l		400	400
14	Turbidity	NTU		5	10
15	Coliform (Total)	N/100mi		0	0

Introduction

Rural Development Academy, Bogra is a National level Training and Research Institute of Rural Development established in 1974 under the Ministry of Local Government, Rural Development and Co-operatives. The major objectives of the Academy are to (i) offer training to the personnel of different nation building departments and agencies involved in rural development works; (ii) conduct research and action research or pilot experiments in different aspects of rural development; and (iii) offer consultancy services to different national and international agencies as well as NGOs on various rural development issues.

Centre for Irrigation and Water Management (CIWM), mainly dealing with action research to find out appropriate solutions and replicable models for rural development, was established in 2003 to reach rural people with the benefits of RDA-developed irrigation and water management models.

Water is essential for all living being and plants. No living organism in the earth can survive without water. Human civilization and settlement have been developed on the basis of water sources along the rivers, besides lakes or near natural springs. A few liter of water per day is sufficient for a person for his basic drinking and food preparation purposes, which is depending on climate and lifestyle. A big amount of water is necessary when water is used for other purposes such as personal hygiene, cleaning cooking, washing, utensils and laundry. Safe adequate and accessible supplies of water, combined with proper sanitation, are surely basic need of primary health care. Safe drinking water is the key important factor in controlling many diseases such as diarrhea, cholera, typhoid and paratyphoid fever, infectious hepatitis, amoebic and basillary dysentery. It has been estimated that about 80 percent diseases are associated with unsafe water.

Centre for Irrigation and Water Management (CIWM) RDA, Bogra has successfully carried out experimentation in the field of water resources development, especially in respect of optimum utilization of water resources and has developed a number of irrigation models. The irrigation models are: (i) Partial buried pipe irrigation system; (ii) Low and medium cost lined channel; (iii) Compacted earthen channel; (iv) Domestic water supply from irrigation well (v) Installation of Low-Cost DTW with water filtration plants etc. In order to replicate other new models the Academy undertakes several schemes for demonstration and

provides training to the concerned officials and farmers under its mandated functions.

The purpose of water treatment is to convert the raw water from ground or surface source into drinking, industrial and other domestic purposes. Most important thing of treatment plant is the removal of pathogenic organisms and toxic substances such as heavy metals causing health hazards. Other substances may also need to be removed or at least considerably reduced imparting a better test or laundry activity. These include; suspended matter causing turbidity, iron and manganese compounds and excessive carbon dioxide corroding concrete and metal parts. Various water treatment process have been developed are given in Table 1.

Table-1: Effectiveness of water treatment processes in removing various impurities

+++ etc.	=	Increasing positive effect
o	=	no effect
−	=	Negative effect

Treatment process → Water ↓ quality parameter	Aeration	Chemical Coagulation and Floc	Sedimenta-tion	Rapid Filtration	Slow sand filtration	Chlorination
Dissolved Oxygen Content	+	o	o	-	--	+
Carbon Dioxide Removal	-	o	o	+	++	+
Turbidity* Reduction	o	+++	+	+++	++++	o
Colour Reduction	o	++	+	+	++	++
Taste and Odour Removal	++	+	+	++	++	+
Bacteria Removal	o	+	++	++	++++	++++
Iron and Manganese Removal	++	+	+	++++	++++	o
Organic Matter Removal	+	+	++	+++	++++	+++

* Turbidity of water is caused by the presence of suspended matter scattering and absorbing light rays, and thus giving the water a non-transparent, milky appearance.

Table-2: Guidelines for drinking water quality

Water quality parameter	Measured as	Highest desirable level	Maximum permissible level	Bangladesh standard for drinking water	WHO guideline for drinking water
Total dissolved solids*	mg/1	500	2000	1000	1000
Turbidity	FTU	5	25	10	5
Colour	mg pt/1	5	50	15	15
Iron	mg Fe^+/1	0.1	1.0	0.3-1.0	0.3
Manganese	mg Mn^{++}/1	0.05	0.5	0.1	0.1
Nitrate	mg NO_3/1	50	100	10	10
Nitrite	mg N/1	1	2		
Sulphate	mg SO_4/1	200	400		
Fluoride	mg F/1	1.0	2.0	1.0	1.5
Sodium	mg Na^+/1	120	400		
Arsenic	mg As^+/1	0.05	0.1	0.05	0.01

This includes the major dissolved solids such as SO_4, CI, HCO3, Ca^{++}, MG^{++} and Na^+. The levels indicated depend on open the climate, the type of food, and the workload of the water users. In some recorded cases, people who lived for months on water having a total dissolved solid content in excess of 5000 mg/l.