

भाग ५

नेपाल सरकार

जलस्रोत मन्त्रालयको सूचना

नेपाल सरकारले जलस्रोत ऐन, २०४९ को दफा १८ को उपदफा (१) ले दिएका अधिकार प्रयोग गरी जलस्रोतको देहायको उपयोगको सम्बन्धमा देहाय बमोजिमको गुणस्तर तोर्केकोले यो सूचना प्रकाशन गरेको छ ।

(a) The water quality constituents for irrigation water
Microbiological constituents:

S.N.	Parameter name	Target Water Quality Range	Remarks
1.	Coliforms (faecal)	< 1 count /100 ml	1 – 1000 count / 100 ml could be used for plants for which edible parts are not wetted.

Physical Constituents:

S.N.	Parameter name	Target Water Quality Range	Remarks
1	pH	6.5 – 8.5	Adverse effect on plants outside this range
2.	Suspended Solids	< 50 mg/L	Above the limit problem with sedimentation and irrigation system
3.	Electrical Conductivity	< 40 mS/m	Up to 540 mS/m depending upon sensitivity of crops.

Chemical Constituents:

S.N.	Parameter name	Target Water Quality Range	
1.	Aluminium	< 5 mg/L	Upto 20 mg/L maximum (max) acceptable concentration.
2.	Arsenic	< 0.1 mg/L	> 2 mg/L creates severe problem
3.	Beryllium	< 0.1 mg/L	0.1 – 0.5 mg/L max. acceptable concentration.
4.	Boron	< 0.5 mg/L	Upto 15 mg/L depending upon species.
5.	Cadmium	< 0.01 mg/L	0.01 – 0.05 mg/L max. acceptable concentration.
6.	Chloride	< 100 mg/L	Upto 700 mg/L depending upon species
7.	Chromium	< 0.1 mg/L	Upto 1.0 mg/L max. acceptable

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S.N.	Parameter name	Target Water Quality Range	
			concentration.
8.	Cobalt	< 0.05 mg/L	Upto 5.0 mg/L max. acceptable concentration.
9.	Copper	< 0.2 mg/L	Upto 5.0 mg/L max. acceptable concentration.
10.	Fluoride	< 2.0 mg/L	Upto 15 mg/L max. acceptable concentration.
11.	Iron	< 5.0 mg/L (non-toxic)	> 1.5 mg/L creates problem in drip irrigation system
12.	Lead	< 0.2 mg/L	Upto 2.0 mg/L max. acceptable concentration.
13.	Lithium	< 2.5 mg/L	For citrus < 0.75 mg/L
14.	Manganese	< 0.02 mg/L	Upto 10 mg/L max. acceptable concentration.
15.	Molybdenum	< 0.01 mg/L	Upto 0.05 mg/L max. acceptable concentration.
16.	Nickel	< 0.2 mg/L	Upto 2.0 mg/L max. acceptable concentration.
17.	Nitrogen (inorganic)	< 5 mg/L	Higher concentration may affect sensitive plants and may contaminate ground water
18.	Selenium	< 0.02 mg/L	Upto 0.05 mg/L max. acceptable concentration.
19.	Sodium Adsorption Ratio (SAR)	< 2.0	Upto 10 depending upon sensitivity of crops.
20.	Sodium	< 70 mg/L	Upto 460 depending upon sensitivity of crops
21.	Total Dissolved Solids (as EC)	< 40 mS/m	Upto 540 mS/m depending upon sensitivity of crops.
22.	Uranium	< 0.01 mg/L	Upto 0.1 mg/L max. acceptable concentration.
23.	Vanadium	< 0.1 mg/L	Upto 1.0 mg/L max. acceptable concentration.
24.	Zinc	< 1.0 mg/L	Upto 5 mg/L max. acceptable concentration.

(b) The water quality constituents of water for aquaculture

S.N.	Constituents	Target Water Quality Range	Remarks
1.	Algae	No criteria	

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S.N.	Constituents	Target Water Quality Range	Remarks
2.	Alkalinity	20 – 100 mg/L as CaCO ₃	High alkalinity reduces natural food production in ponds below optimal production
3.	Aluminium	< 30µg/L (pH >6.5), < 10 µg/L (pH < 6.5)	Highly toxic to trouts (1.5 µg/L is fatal to brown trout)
4.	Ammonia (for cold water fish)	0 – 25 µg/L	
5.	Ammonia (for warm water fish)	0 – 30 µg/L	
6.	Arsenic	0 – 0.05 mg/L	
7.	Bacteria (E. Coli)	< 10 counts of E.coli /g of fish flesh	
8.	BOD ₅	< 15 mg/L	
9.	Cadmium	Hardness: 0 – 60 mg/L < 0.2 mg/L Hardness: 60– 120 mg/L < 0.8 mg/L Hardness: 120– 180mg/L < 1.3 mg/L Hardness: >180 mg/L < 1.8 mg/L	Cadmium toxicity depends upon hardness of water.
10.	Carbon Dioxide	< 12 mg/L , upto 75 mg/L for warm water fish	
11.	Chloride	Value not recommended (fish can survive at < 600 mg/L Chloride but the production is not optimum)	
12.	Chlorine	< 2 µg HOCl /L for cold water fish < 10 µg HOCl/L for warm water fish	
13.	Chromium (VI)	< 20 µg/L	
14.	COD	< 40 mg/L	
15.	Colour	< 100 Pt-Co unit	
16.	Copper	< 5 µg/L	0.006 and 0.03 µg/L are upper limits for hard and soft water
17.	Cyanides	< 20 µg/L as HCN	LC ₅₀ starts from 100 µg/L upwards
18.	Dissolved oxygen	6 – 9 mg/L for cold water species 5 – 8 for intermediate water species, 5 – 8 for warm water species.	
19.	Fluoride	< 20 µg/L	

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S.N.	Constituents	Target Water Quality Range	Remarks
20.	Iron	< 10 µg/L	0.2 - 1.75 general lethal threshold for fish
21.	Lead	< 10 µg/L	30 µg/L max. conc. limit for brook trout
22.	Magnesium	< 15 mg/L	
23.	Manganese	< 100 µg/L	Above 500 µg/L increasing risk of lethal effect
24.	Mercury	< 1 µg/L	Bioaccumulation and biomagnification occurs
25.	Nickel	< 100 µg/L	
26.	Nitrate-N	< 300 mg/L	1000 mg/L is below the 96-hour LC ₅₀ values for most fish
27.	Nitrite-N	0 - 0.05 mg/L for cold water fish 0.06 - .25 mg/L for warm water fish	> 7 mg/L is LC ₅₀ for many fish species
28.	Nuisance plants	Less than 10 % of the fish pond should be covered by aquatic plants.	
29.	Oils and Greese (including Petrochemicals)	< 300 µg/L	
30.	PCBs	No quantitative guidelines, should not be detected in fish	
31.	pH	6.5 - 9.0	Outside this range the health of fish is adversely affected
32.	Phenols	< 1 mg/L	> 7.5 mg/L 24 hr. LC ₅₀ starts for most fish
33.	Phosphorus	< 0.6 mg/L as orthophosphate	
34.	Selenium (VI)	< 0.3 mg/L	> 12.5 mg/L 96 hr. LC ₅₀ starts for most fish
35.	Sulphide as H ₂ S	< 0.001 mg/L	> 0.002 mg/L long term health hazard for fish

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S.N.	Constituents	Target Water Quality Range			Remarks
36.	Temperature	4 – 18 for cold water fish 16 – 32 for intermediate species 24 – 30 for warm water fish			
37.	Total Dissolved Gases as Total Gas Pressure (TGP)	< 100 % for cold water fish < 105 % for warm water fish			Mortality increases with increasing TGP
38.	Total Dissolved Solids	< 2000 mg/L			
39.	Total Hardness as CaCO ₃	20 – 100 mg/L ,			In > 175 mg/L osmoregulation of fish is affected.
40.	Total Suspended Matter,	< 20000 mg/L for turbid water species, < 25 NTU for clear water species			
41.	Zinc, depends upon water hardness: mg/L dissolved Zn	Hardness:	Coldwater	Warm water	
		10 mg/L	0.03	0.3	Warm water fish are more tolerant
		50 mg/L	0.2	0.7	
		100 mg/L	0.3	1.0	
		500 mg/L	0.5	2.0	
Pesticides: No guideline values provided.					

(c) The water quality constituents of water for livestock watering

S.N.	Constituent	Proposed concentration
1.	Algae	No visible blue-green scum
2.	Aluminium	< 5 mg/L
3.	Arsenic	< 0.2 mg/L
4.	Beryllium	< 0.1 mg/L
5.	Boron	< 5 mg/L
6.	Cadmium	< 0.01 mg/L
7.	Calcium	< 1000 mg/L
8.	Chloride	
9.	Chromium (VI)	< 1 mg/L
10.	Cobalt	< 1 mg/L
11.	Copper	< 0.5 mg/L
12.	Electrical Conductivity	< 1.5 dS/m
13.	Fluoride	< 2 mg/L
14.	pH	6.5 – 8.5
15.	Iron	Not Toxic
16.	Lead	< 0.1 mg/L
17.	Magnesium	< 500 mg/L

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S.N.	Constituent	Proposed concentration
18.	Manganese	< 10 mg/L
19.	Mercury	< 10 µg/L
20.	Molybdenum	< 0.01 mg/L
21.	Nickel	< 1 mg/L
22.	Nitrate/Nitrite	< 100 mg/L as nitrate
23.	Nitrite – N	< 10 mg/L
24.	Selenium	< 0.05 mg/L
25.	Sodium	< 2000 mg/L
26.	Sulphate	< 1000 mg/L
27.	Total Dissolved Solids	
		Dairy Cattle < 7100 mg/L
		Sheep < 12800 mg/L
		Horse < 6400 mg/L
		Pigs < 4300 mg/L
		Poultry < 2800 mg/L
28.	Vanadium	< 0.1 mg/L (FAO)
29.	Zinc	< 24 mg/L (FAO)
Pathogens:		
1.	Faecal coliform count	< 200 count /100ml < 1000 counts for < 20 % of the samples
Pesticides: Human Guidelines apply.		
Chlorinated Hydrocarbons: Human Guidelines apply		

(d) The water quality constituents for recreational water

Biological Parameters:

S.N.	Parameter Name:	Full contact	Partial contact	Non contact
1	Algae, macrophytes, phytoplankton scum, etc.	Should not be present in excessive amount		
Indicator Organism				
	Total coliform Bacteria			
	Faecal coliform	<130 count/100 ml	<1000 count/100ml	No target value
	Escherichia coli	<130 count/100 ml	No target value	No target value
	Enterococci	<30 count/100 ml	0 – 230 count/100 ml	No target value
	Faecal Streptococci			
	Coliphage	< 20 count/100 ml	No target value	No target value
	Schistosoma/ Bilharzia	No snails capable of acting as the intermediate host of the bilharzia	No snails capable of acting as the intermediate host of the bilharzia	No target value

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S.N.	Parameter Name:	Full contact	Partial contact	Non contact
		parasite	parasite	
Nuisance plants				
		Swimmer should not be entangled	Boats should not be entangled.	
Chemical Irritant				
The criteria are qualitative and no specific irritant and quantitative measures are given				
Chemical Parameters:				
	pH	6.5 – 8.5	6.5 – 8.5	No target value
Physical Parameters:				
1.	Clarity	> 1.6 (Sechchi disc depth Metres)	No target value	No target value
2.	Colour	100 Pt-Co units	100 Pt-Co units	No Target value
3.	Floating Matter and refuse	Free of floating or submerged debris	No target value	No target value
4.	Odour	No objectionable or unpleasant odour	No objectionable or unpleasant odour	No objectionable or unpleasant odour
5.	Residual Chlorine	0.1 mg/L	No target value	No target value
6.	Surface films	Should not be noticeable	Should not be noticeable	Should not be noticeable
7.	Turbidity	0.5 NTU		

(e) The water quality constituents for industrial water use

S.N.	Parameter Name:	Recommended value			
		Category 1	Category 2	Category 3	Category 4
1	Alkalinity	<50 mg/L	< 120 mg/L	< 300 mg/L	< 1200 mg/L
2	COD	< 10 mg/L	< 15 mg/L	< 30 mg/L	< 75 mg/L
3	Chloride	< 20 mg/L	< 40 mg/L	< 100 mg/L	< 500 mg/L
4	Iron	< 0.1 mg/L	< 0.2 mg/L	< 0.3 mg/L	< 10 mg/L
5	Manganese	< 0.05 mg/L	< 0.1 mg/L	< 0.2 mg/L	< 10 mg/L
6	pH	7.0 – 8.0	6.5 – 8.0	6.5 – 8.0	5 – 10
7	Silica	< 5 mg/L	0 – 10 mg/L	< 20 mg/L	< 150 mg/L
8	Sulphate	< 30 mg/L	< 80 mg/L	< 200 mg/L	< 500 mg/L
9	Suspended solids	< 3 mg/L	< 5 mg/L	< 5 mg/L	< 25 mg/L
10	Total dissolved solids	TDS: < 100 mg/L EC: < 15 mS/m	TDS: < 200 EC: < 30	TDS: < 450 EC: < 70	TDS: < 1600 EC: < 250

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S.N.	Parameter Name:	Recommended value			
		Category 1	Category 2	Category 3	Category 4
11	Total Hardness	< 50 mg/L as CaCO ₃	< 100 mg/L as CaCO ₃	< 250 mg/L as CaCO ₃	< 1000 mg/L as CaCO ₃

(f) The water quality constituents for protection of aquatic ecosystem

S.N.	Parameter name		Target Water Quality Range	Chronic Effect Value	Acute Effect Value
1.	Aluminium (mg/L)		At pH <6.5: 5 At pH >6.5: 10	10 20	100 150
2.	Ammonia (µg/L)		< 7	< 15	< 100
3.	Arsenic (µg/L)		< 10	< 20	< 130
4.	Atrazine (µg/L)		< 10	< 19	< 100
5.	Cadmium				
	Soft water	(60 mg/L CaCO ₃)	< 0.15	0.3	3
	Medium water	(60 – 119 mg/L)	< 0.25	0.5	6
	Hard water	120 – 180 mg/L	< 0.35	0.7	10
	Very Hard	> 180 mg/L	< 0.40	0.8	13
6.	Chlorine (Residual) µg/L		< 0.2	0.35	5
7.	Chromium (VI) µg/L		7	10	200
8.	Chromium (III) µg/L		< 12	24	340
9.	Copper µg/L				
	Soft water	(60 mg/L CaCO ₃)	< 0.3	0.53	1.6
	Medium water	(60 – 119 mg/L)	< 0.8	1.5	4.6
	Hard water	120 – 180 mg/L	< 1.2	2.4	7.5
	Very Hard	> 180 mg/L	< 1.40	2.8	12
10.	Cyanide µg/L		1	4	110
11.	Dissolved Oxygen (% saturation)		80 – 120	> 60	> 40
12.	Endosulphan (µg/L)		< 0.01	0.02	0.2
13.	Fluoride (µg/L)		< 750	1500	2540
14.	Iron		The iron concentration should not be allowed to vary by more than 10 % of the background dissolved iron concentration for a particular site or case, at a specific time.		
15.	Lead µg/L				
	Soft water	(60 mg/L CaCO ₃)	< 0.2	0.5	4
	Medium	(60 – 119	< 0.5	1.0	7

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S.N.	Parameter name	Target Water Quality Range	Chronic Effect Value	Acute Effect Value
	water mg/L)			
	Hard water mg/L	< 1.0	2.0	13
	Very Hard > 180 mg/L	< 1.2	2.4	16
16.	Manganese (µg/L)	< 180	370	1300
17.	Mercury (µg/L)	< 0.04	0.08	1.7
18.	Nitrogen (inorganic)	Inorganic nitrogen concentrations should not be changed by more than 15 % from that of the water body under local unimpacted conditions at any time of the year; and The trophic status of the water body should not increase above its present level, though a decrease in trophic status is permissible (see Effects); and The amplitude and frequency of natural cycles in inorganic nitrogen concentrations should not be changed.		
19.	pH			
	All aquatic ecosystems	pH values should not be allowed to vary from the range of the background pH values for a specific site and time of day, by > 0.5 of a pH unit, or by > 5 %, and should be assessed by whichever estimate is the more conservative.		
20.	Phenols (µg/L)	<30	60	500
21.	Phosphorus (inorganic) All surface waters	Inorganic phosphorus concentrations should not be changed by > 15 % from that of the water body under local, unimpacted conditions at any time of the year; and The trophic status of the water body should not increase above its present level, though a decrease in trophic status is permissible (see Effects); and The amplitude and frequency of natural cycles in inorganic phosphorus concentrations should not be changed.		
22.	Selenium (µg/L)	< 2	5	30
23.	Temperature (All aquatic ecosystems)	Water temperature should not be allowed to vary from the background average daily water temperature considered to be normal for that specific site and time of day, by > 2 °C, or by > 10 %, whichever estimate is the more conservative.		
24.	Total Dissolved Solids (All inland waters)	- TDS concentrations should not be changed by > 15 % from the normal cycles of the water body under unimpacted conditions at any time of the year; and - The amplitude and frequency of natural cycles in		

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S.N.	Parameter name	Target Water Quality Range	Chronic Effect Value	Acute Effect Value
		TDS concentrations should not be changed.		
25.	Total Suspended Solids (All inland waters)	Any increase in TSS concentrations must be limited to < 10 % of the background TSS concentrations at a specific site and time.		
26.	Zinc (µg/L)	≤ 2	3.6	36

आज्ञाले,

शंकरप्रसाद कोइराला
नेपाल सरकारको सचिव

(३५)

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पत्राचार

Effect

आचार्य
राष्ट्रिय प्रमुख
राष्ट्रिय प्रमुख

सिंहदरवार
मुद्रण विभाग,

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