

खण्ड ५८ संख्या १० नेपाल राजपत्र भाग ५ मिति २०६५।३।२

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 | Remarks |
|------|----------------|----------------------------|--|
| 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 | Cadmium toxicity depends upon hardness of water. |
| | | Hardness:60– 120 mg/L | |
| | | Hardness:120– 180mg/L | |
| | | Hardness: >180 mg/L | |
| 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 (Secchi 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 | 10 | 100 |
| | | At pH >6.5:10 | 20 | 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) | <ul style="list-style-type: none"> 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 ($\mu\text{g/L}$) | ≤ 2 | 3.6 | 36 |

आज्ञाले,

शंकरप्रसाद कोइराला
नेपाल सरकारको सचिव

(३५)

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पत्राचार

Effect

आचार्य
राष्ट्रीय प्रशासनिक
संस्थान, दिल्ली

सिंहदरवार
मुद्रण विभाग,

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