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Websites and weblinks:

12. <https://www.fssai.gov.in/cms/food-safety-and-standards-regulations.php>
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14. <https://www.fao.org/fao-who-codexalimentarius/en/>

Watershed Planning and Management

3 (2+1)

Objective

To acquaint the students with different aspects of watershed planning and management including participatory approaches and also on the integrated watershed management practices

Theory

Watershed- introduction and characteristics; Watershed management- concept, objectives, factors affecting watershed planning based on land capability classes, hydrologic data for watershed planning, watershed codification, delineation and prioritization of watersheds – sediment yield index.

Community mobilization and participatory institution building: participatory watershed management, role of watershed associations, user groups and self-help groups; Participatory Rural Appraisal, understanding gender in relation to agriculture.

Water budgeting in a watershed; Management measures - rainwater conservation technologies *in-situ* and *ex-situ* storage, water harvesting and recycling; Dry farming techniques - inter-terrace and inter-bund land management; Integrated watershed management- concept, components, arable

lands - agriculture and horticulture, non-arable lands- forestry, fishery and animal husbandry; Effect of cropping systems, land management and cultural practices on watershed hydrology.

Application of remote sensing and GIS in watershed planning and management; Introduction to Remote Sensing and GIS, Map projections and co-ordinate system. Spatial data structure: Raster, vector. Spatial relationship. Topology. Delineation of watersheds and generation of stream network; Preparation of various thematic maps in watershed; Hydrological Response Unit (HRU); Prioritization of watersheds; Watershed characterization; Watershed action plan; Analytical Hierarchy Process; Watershed evaluation and impact assessment; Quantification of surface and groundwater resources in watersheds; Computer models used for hydrologic and watershed modelling; Soil water assessment tool (SWAT); Case studies.

Watershed programme- execution, follow-up practices, maintenance, monitoring and evaluation; Planning and formulation of project proposal for watershed management programme including cost-benefit analysis; Financial management and accounting procedure

Practical

Delineation of watersheds using toposheets; Surveying and preparation of watershed map; Quantitative analysis of watershed characteristics and parameters; Investigations on watershed for planning and development including PRA; Analysis of hydrologic data for planning watershed management; Measurement of discharge and sediment in a watershed; Water budgeting of watersheds; Study of thematic maps using remote sensing; Study of watershed action plan using GIS; Prioritization of watersheds based on sediment yield index; Study of functional requirement of watershed development structures; Study on components of earth embankments and its design; Study of watershed management technologies; Study of role of various functionaries in watershed development programs; Study of accounting and financial management systems in watershed entities; Visit to watershed development project areas.

Suggested Readings

1. Das, G. 2008. *Hydrology and Soil Conservation Engineering: Including Watershed Management*. 2nd edn. Prentice-Hall of India Learning Pvt. Ltd., New Delhi.
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4. Rajora, R. 2019. *Integrated Watershed Management*. Rawat Publications, New Delhi.
5. Sharda, V. N., Sikka, A. K. and Juyal, G. P. 2006. *Participatory Integrated Watershed Management: A Field Manual*. Central Soil and Water Conservation Research and Training Institute, Dehradun.
6. Singh, G. D. and Poonia, T. C. 2003. *Fundamentals of Watershed Management Technology*. Yash Publishing House, Bikaner.
7. Thomas, C. G. 2010. *Land Husbandry and Watershed Management*. Kalyani Publishers, Ludhiana.