

ARID COMMUNITIES AND TECHNOLOGIES: CAPACITY BUILDING PROGRAMME

Three levels of programmes are offered:

1. 1st Step Para Professional - Para Water engineer
2. 2nd Step Advance Training in water resource development
3. 3rd Step Internship Program on geo-hydrology study and groundwater management - Young Technologist (graduate, masters from geology & agriculture sector, civil engineers) for water resource development and management

Curriculum of para engineer training

Module 1: Understanding Kachch

Methodology: Self-learning through literature review i.e., proposals, reports, reference books and consultation with experts in NRM sector.

Objectives: 1. How to understand Kachch, its different aspects i.e., natural resources, women's role, socio-economic condition, occupations and role of NGOs in its development; 2. How to collect knowledge/information from literature and resource people

Module 2: Impact of drought

Identify the impact of drought on rainfed farming, animal husbandry, drinking water, agriculture and over-exploitation of groundwater and salinity in coastal and the Rann areas

Methodology: Self-learning by visiting the village and consulting villagers. The trainees have studied the relevant issues of two but reports and presentations are done individually

Objectives: How to understand regional level issues and compile information

Module 3: Integrated approach towards sustainable development in Kachch

Methodology: Self-learning by visiting the villages, consulting with the villagers and discussing with the people and how they are involved in the sustainable development of villages. The trainees are to understand issues, problems (from the past to the present), their solutions and take an integrated approach towards development. The trainees have studied in teams and sent to a village to understand sustainable approaches. To supplement their understanding, they are sent to another village where substantial work has already been done. They discuss their experiences among themselves and make individual reports

Objectives: To understand the process of sustainable development and how it can make villages self-dependent, including equity; how the activities from one village can be applied to others

Module 4: Rock type and identification

Methodology: Exposure on geology and related problems on Kachch


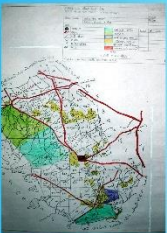




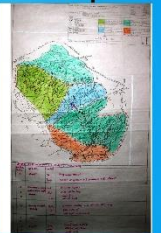
Objectives: To understand the Kachch with their different geology, this helps in NRM planning.

Module 5: Prepare thematic maps

Methodology: Collect revenue maps and topographical sheets, trace and superimpose features, mark known points in consultation with villagers on the maps to prepare the base map and add on additional layers in consultation with the villagers. Conduct a well inventory

Objectives: Learn to compile information on maps and establish linkages between different geo-hydrological parameters for planning. These maps include base map, land use map, geo-morphological, surface geology map, geo-hydrological map, watershed map and watershed planning map

LEARNING THROUGH THEMATIC MAPS *Water Resource planning*

Base Map	Land Use Map	Surface Geology Map	Water Resource Map	Land Foam Map	Watershed Map	Strategic Planning Map
						
<ul style="list-style-type: none">• Beginning of understanding of village• Superimposing of topographic and revenue information on one map• Identification of land mark on map with villagers	<ul style="list-style-type: none">• Mapping of grazing land, source wise irrigation etc.• Area calculation form the map	<ul style="list-style-type: none">• Identification of rocks especially aquifer rocks• Mapping of surface exposures of aquifer rock	<ul style="list-style-type: none">• Mapping of existing surface water resource development• Well inventory• Beginning of sub-surface• Understanding of water depth and quality (TDS pH)	<ul style="list-style-type: none">• Identification of land foam conducive for water resource development	<ul style="list-style-type: none">• Mapping of micro-watershed• Water demand in each micro-watershed• Run-off calculation	<ul style="list-style-type: none">• Specific strategy for each micro-watershed• Identification site and activity

Module 6: Understand sustainable approaches and different watershed related activity

Methodology: Self learning by visiting study villages

Objectives: To understand aspects of sustainability useful for villages to become self-reliant regarding equity point of view and how to relate activities of different area and learning on required modification as per our characteristic of working area and to understand forest ecology.

Module 7: Water harvesting strategies and technologies

Methodology: Identify the types of structures through in site selection and engineering survey used for design, estimation and consultation in NRM

Objectives: To identify appropriate sites for different structures, conduct engineering surveys for these structures, make hydrological designs for the structures, learn to make estimates for the structures, how to work with different organizations in NRM sector and what points to consider while planning water harvesting structures

Module 8: Grassland development and agriculture development

Methodology: Exposure in one village, consultation with NGO for grassland development and practical training and theory class on farm bunding for agriculture

Objectives: To identify suitable proper sites for different structures to promote grassland and agriculture.

After each module, every participant makes an individual report.

Annexure 2: Curriculum of internship

Module: 1 Introduction

- Orientation - Internship Programme
 - Mission
 - Aim and objectives
 - Working sector
 - Methodology
 - Program Outcome
 - Role of interns
- Project Introduction
 - Groundwater monitoring in Mundra region
 - Village wise Drinking water Source Protection Guideline in Abadasa taluka
 - Groundwater in Urban Watershed Management
- Geographical Information of Kachch
 - Demographic information of district and study area
 - Population
 - Basic amenities
 - Natural Resources based Occupation of Kachch
 - Agriculture: potential and problems
 - Animal husbandry: potential and problems
 - Fisheries: potential and problems
 - Climate of Kachch and its relation with water resource
 - Rainfall and rain cycle
 - Temperature, evaporation and Eva-transpiration
 - Wind
 - Geographical Division Kachch
 - Characteristics of each division

Module: 2 Computer Applications

- Basic Knowledge of Computer- MS office
- GIS skill for mapping
 - Carta links
 - Arc View

Module: 3 Introduction to Geology

Geology of Kachch and study area

- What is geology
 - Definition and Geology
 - Geological evaluation of Kachch
 - Origin of different types of rock (i.e., Igneous, Metamorphic and sedimentary)
 - Salinity and its Sources
 - Tectonic aspects, Structure and its impact on water resources
- Rock identification Criteria/Tips
 - Igneous
 - Metamorphic
 - Sedimentary
- Exposure on geology and related problems in Kachch
- Constraints and potential with respect to geology
 - Water Resource Availability
 - Problems of Groundwater Quality
 - Prospects of Groundwater Recharge

Understand Geo-morphology of the area and its influence on water resource

- Type of landform and their origin
- Geomorphic processes e.g. weathering, erosion, deposition.
- Landform identification
- Drainage pattern and characteristics
- Concepts on Watershed Basin
- Geomorphology as Tool in Water Resource Investigation

Module: 4 Geo-hydrology

- What is geo-hydrology
- Fundamental of geo-hydrology
 - Groundwater Occurrence & Distribution
 - Porosity
 - Permeability
 - Transmissibility

- Specific Yield and Specific Retention
- Geo-hydrological Aspect of Kachch
 - Aquifer properties
 - Groundwater Potential and Problems
 - Salinity types and its effect
- Aquifer Categorization based on
 - Spread- vertical and horizontal
 - Porosity and permeability
 - Specific yield
 - Zone of influence
 - Recharge and discharge estimation and Boundary Conditions
 - Water balance

Module: 5 Methodology for Geo-hydrological Study

Data collection of groundwater through Well Inventory

- How to understand groundwater resources through well inventory
 - Groundwater occurrence
 - Identification of aquifer and its properties
 - Groundwater level
 - Groundwater quality
 - Changes and fluctuation in water level and quality

Introduction to Geophysical Exploration Techniques

- Principle of Electrical Resistivity Survey
- Field procedure
- Qualitative & Quantitative Interpretation

Pumping Test

- Field Procedure
- Data Collection
- Data Analysis

Module: 6 Understanding on Groundwater Chemistry

- Water quality standards
 - Source of chemical
 - Impact on health
- Water sample analysis
 - Exercise
- Data Analysis
- Report writing

Module: 7 Mapping

- Map reading
 - What is a map
 - Type of maps – revenue map, Topo - sheet
 - Scale and Coordinates
 - Information reading like Bench Mark, Spot Heights & Contours
- Basic understanding on GIS (Geographic Information System)
- Preparation of Thematic Maps
 - Geological map
 - Geomorphology map
 - Drainage map
 - Water level contour map
 - TDS contour map

Module: 8 Role of Geo-hydrology in Planning

- Exposure of well-planned activity in villages of Kachch and Gujarat
- Consultation with local experts and developmental agencies
- Exercise on village level water resource planning and protection
- Rural Water Management