

Crystal Water 2002

—The sheet for facilitating maximization of your training outcome—

Name	Juying JIAO	Country	China
------	-------------	---------	-------

Training Group Name	Domestic/Regional Problems (Loess Plateau Region)	Contents (Subjects) to be studied in each unit	Results of Training	Additional Information Hoped for
Execution Case of E.I.A. (Aug.5-8)	•Fragile ecological environment; •Insufficient cooperation on various environmental problems	•Benefits assessment on soil and water conservation; •Assessment systems/indexes of E.I.A	Soil and water conservation is a comprehensive work, include natural, social and economical factors, so watershed management in mountainous area and its environmental assessment, EIA method and environmental guideline for infrastructure projects acquired in this training session are very useful and helpful to the ecological environment rehabilitation on the Loess Plateau, and in this way, various environmental problems will be considered together, so the crucial factors which confine watershed conservation will be selected, and a rational harness plan can be made.	•Environmental guideline for river and erosion control, regional development, water supply; •Environmental prevention target; •Soil erosion prediction and the benefits estimation of protecting measures
Water Storage and Supply Facilities (Aug.12-16)	•Poor duration of earth structure facilities (reservoir, dam, canal); •Low utilization efficiency of water resources	•The subjects provided in training curricula; •Usage and maintenance of various storage and supply facilities; •Check dam system designing in watershed, and earth check dam duration improvement	Though this training session: •The training of non-destructive and destructive methods of diagnosing deterioration of concrete, the experimental research on the durability of concrete canal, and the prediction of thermal cracks in actual RC box culvert are very helpful to improve the low utilization efficiency of water resources and save the limited water resources on the Loess Plateau. •About the training of agricultural by-products using as construction material and their characteristics, it can be used in soil erosion control on the Loess Plateau. The reason of soil erosion on Loess Plateau is that the rainfall intensity is bigger than the soil infiltration rate. The agriculture products such as rice husk ash have high water absorption capability, when it used as soil erosion control materials, it not only can reduce runoff and prevent soil erosion, it also can improve soil fertility. •The basic theory of seepage flow, analyses of seepage flow and slope stability can be used in soil erosion and soil-water conservation research work. •On the site observation of concrete dam and fill dam, the re-vegetation measures (soil, fertilizers and seeds in a holey bag) used in dam construction can be a good method of re-vegetation in some cases on the Loess Plateau.	•Slope stability analysis; •Method of dam site selection
Farm / Forest Management and Food Policy (Aug.20-24)	•More sloping fields and less productive farmland; •Low survive rate of afforestation; •Poor food yield and low food price	•Rational land utilization designing to obtain a maximum yield; •Ways/methods for restoring vegetation quickly; •Water resources developing and food production	• In the farm management training, the method of survey of farming and farm management information analysis, computerization in farm management, functions and financial evaluation of forest can be used in soil and water conservation work of watershed management program on the Loess Plateau region. Though analysis, give advice to farmers to adjust farming, and motivate them to soil and water conservation works. • In the statistical analysis of the food economy training, the conception of elasticity, slope, elasticities of demand and Cobb-Douglas Demand Function can give me some helps and ideas in my research work.	The detailed evaluation method of public benefits of forest
Ground Water (Aug.26-29)	•Ground water is short and deep in level; •Water level dropping and ground sinking because of excessive groundwater exploitation in some places	•The subjects provided in training curricula; •Ground water and runoff calculation and modeling; •Ways to utilize groundwater rationally	Though this training session, I obtained the following basic knowledge and methodology on groundwater: •Principles of groundwater flow (Darcy's law, Governing equations for different form of flows); •Causes, investigation methods (boreholes and electrical sounding) and countermeasures of saline water intrusion; •The point and non-point sources of groundwater pollution and countermeasures against groundwater pollution; •The characteristics of underground dam, Geographical features suitable for underground dam, facilities of underground dam and underground dam designing; •Engineering methods for groundwater lowering;	Detailed information about the constant head pressure infiltrometer method

			•Soil hydraulic properties, different analysis methods of steady and unsteady state flow with pumping and slug test data, and field techniques for measuring the soil hydraulic properties of unsaturated soil. The soil hydraulic is also very important in mechanism and prediction study of runoff generating and soil erosion.	
Soil / Water Quality Assessment (Sep.9-12)	•Severe soil erosion, degradation and desertification; •Super-nourished water due to soil and water loss; •Water pollution made the available water resources more limited	•The subjects provided in training curricula; •Ways to increase field soil more efficiently for crop production and vegetation restoration; •Index systems of soil/water quality assessment	Trough the soil/water quality assessment training, I understand the following knowledge and methodology: • The chemical properties of arid soils and the main parameter (PH, EC, CEC, ESP, SAR, TDC) indexes; Classification of salt-affected soils, and the features of saline and sodic soils; The method of saturation extract and water ratios of 1:5 to measure PH and EC. Though this training, I realized that the ESP and SAR are very important factors that lead to serious soil erosion in sodic soil case. In soil erosion and control research, should pay more attention to these indexes. •Water pollution sources and measures; Terminology and principles of sewage, the indexes of BOD, COD, DO, SS, T-N, MLVSS, EC and PH, the standard of effluent and agricultural water; The processing methods of wastewater treatment and sludge composting; and the reuse of purified wastewater and sludge for agriculture. And trough the site observation of Inaba compost center, Togo town rural sewage treatment facilities, Tottori city water works bureau and SANYO wastewater treatment system, I got a deep understanding of the treatment of wastewater, sludge and their recycling, the importance, and the environment-friendly consideration. In the arid and semi-arid area, it is very important to extend this method for saving water for agriculture production and improving soil quality with compost fertilizer.	The properties of erosion-affected soils and the countermeasures
Field Water and Soil Management (Sep.24-Oct.3)	•Low soil moisture content and soil fertility; •Lacking irrigation water resources and facilities	•The subjects provided in training curricula; •Water-saving methods in fields; •Soil moisture content and infiltration rate observation and modeling	Trough the field water and soil management training, I understand the following knowledge and methodology: •Water management for salinity control, reclamation of saline soils (leaching requirement, leaching fraction, estimation of LR) and sodic soils. •Field irrigation methods, the factors affecting the selection of water irrigation methods, the selection of irrigation method to use water effectively and economically. •Management of irrigation system: components, concept, recent trends and study subjects of irrigation system; Parameters (e_c, e_d, e_a, e_u, e_p) to evaluate the performance of a complete irrigation system or components of a system; Indices (P_A, P_F, P_D, P_E) to assess the performance of water distribution system; Negative impacts of irrigation and it's mitigating measures; The irrigation system in Kazakhstan and Israel. •Observation and estimation of evapotranspiration from the vegetated land: Energy balance method and soil moisture depletion method; Penman-Monteith estimation model (FAO recommended). •The methods for estimating consumptive use of water of upland farms (soil moisture depletion method and water balance methods); Soil moisture management and evaluation of water-saving irrigation on farms (case study in volcanic soil to select efficient method for irrigation). •Principle and measurement methods of soil water flow and solute transport. Measurement and calculation of soil water content, water storage, soil water pressure head and gradient, hydraulic conductivity and water flux. •Drip irrigation system; Factors and countermeasures of groundwater and river water resources salinization and desertification due to irrigated agriculture; Soil reclamation techniques of silinazation and soil erosion in the arid and semi-arid area. The observation and estimation method of evapotranspiration from the vegetated land, and the principle and measurement of soil water flow and solute transport are very important items in re-vegetation research work. In order to prevent irrigation-affected soil erosion, the sprinkler/drip method can be applied in slope field, and also the water discharge rate should be matched to soil intake rate. The water intake rate and water holding capacity of a soil are not only important factors in irrigation system, but also in soil erosion process.	Information about soil erosion prediction and benefits evaluation of control measures

Design and Practice in Water Supply / Service System (Oct.8-10)	•Pointed conflict of demand and supply of water; •Poor water utilization management and even no flow in the lower reaches of Yellow River in some periods	•The subjects provided as in training curricula; •Regulation of demand and supply of water resources	Trough this section, I obtained the following knowledge: •The control mechanism of pressure, flow and level control by automatic pressure-reducing valve, variable constant flow valve and float type constant flow valve •The function of self-priming pump and non-water hammer check valve •The function and operating mechanism of automatic check gate for open-channel (constant upstream water stage gate on supply-oriented basis; content downstream water stage gate on demand-oriented water management) •The business and products of Hokoku •The agriculture irrigation system and management of Okayama plain From this training course, what I should keep in mind are: •Whenever developing a new technology, we should consider the harmonious relationship between human beings and nature •Control and utilize nature by using it's dynamism without additional power and following environmentally friendly ideas	
Crops Suitable for Arid Area; Plant Nutrition (Fertilization) (Oct.15-17)	•Low crop yield; •Fertilizer washed away and soil productivity decreased by serious soil erosion	•The subjects provided in training curricula; •Plants suitable for arid regions to prevent soil erosion more quickly and effectively	•Drought and salt tolerant crops and plants, especially the characteristics and environmental use of sedum plants •Basic technique for water culture •Japan mushroom center mycological research institute and mushrooms	
Preservation of Greens; Assessment of Vegetation (Oct.28-Nov.1)	•Natural vegetation destroyed seriously; •Re-vegetation is quiet difficult	•The subjects provided in training curricula; •Inter-respond between re-vegetation and environment factors (water, soil, etc.) in arid region	•Ecosystems and re-vegetation in semi-arid land Definition of arid land; Causes of arid land and desertification; Environmental characteristics of arid land; Re-vegetation of arid land •Sand dune ecosystems and sand fixation methods Formation of sand dune; Natural environment of sand dune (temperature, precipitation, wind and sand movement, measurement of sand movement, drying, salinity); Vegetation in sand dune; Fixation procedures of sand dune; Problems of sand dune in Japan •Growth and physiology of woody plants Abiotic and biotic stress of woody plants; Physiological regulation of growth; Wood structure of trees; Water potential and movement; Drought and flooding stress of woody plants •Ecological impact assessment and mitigation planning Concept, key factors, importance, protection strategies, red list, hot spots and threatened habitats of biodiversity; Procedures of ecological impact assessment (scooping; ecological research; data analysis; selection of target species and target habitats type; predicting impact; planning; design of mitigation site; mitigation measures: avoidance, minimization and compensation; construction work; management); Mitigation case study in Japan •Introduction to environmental remote sensing Principal of remote sensing; Five key words for R/S; Types of satellite R/S; Spatial resolution and spectral resolution; Contents of applications •Tree-ring analysis Affecting factors of tree ring; Appearance of annual ring; Tree-ring analysis methods; Application to hydrology	•Communities and distribution of plants and their specific characteristics in arid areas; •The development of vegetation and relationships between water and nutrient dynamic •The detailed information about application of tree-ring to hydrology, especially to precipitation and river runoff estimation •Ground truth technology of remote sensing

Remark:

The ideas shown in this table and the courses listed by the training staff in Tottori University are relevant to the region I came from. Courses on E.I.A. and Appropriate Research methods are also very instrumental in my case and the region I came from.