Abstract of Final Report

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1. Please itemize your own personal goals in the units and the results of the trainings per unit concisely. (Wrap up all the Crystal Water descriptions)

Unit of Training	Your own objectives	The Result of the Training
(1) Water Storage and Supply Facilities / Facility Management	•Usage and maintenance of various storage and supply facilities; •Check dam system designing in watershed; •Check earth dam duration improvement	•Non-destructive and destructive methods of diagnosing deterioration of concrete, experimental research on the durability of concrete canal, and prediction of thermal cracks in actual RC box culvert; •Agricultural by-products such as rice husk ash using as construction material and it's characteristics; •Basic theory of seepage flow, seepage flow analyses and slope stability; •Dam accidents and safety problems, type of dam and differences of design methods, roller compacted concrete dam method, problems of water storage dams and supply facilities in Japan
(2) Farm / Forest Management and Food Policy	•Rational land utilization designing to obtain a maximum yield; •Ways/methods for restoring vegetation quickly; •Water resources development and food production	•Method of farming survey and farm management information analysis; •Computerization in farm management; •World food supply and economic significance of agricultural development in arid-land areas; • Statistical analysis of the food economy; •Functions and financial evaluation of forests
(3) Ground Water	•Ground water and runoff calculation and modeling; •Ways to utilize groundwater rationally	•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; •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.
(4) Soil/Water Quality Assessment	•Ways to increase field soil more efficiently for crop production and vegetation restoration •Indices systems of soil/water quality assessment	• The chemical properties of arid soils and the main parameter indexes, classification of salt-affected soils, features of saline and sodic soils, and methods to measure PH and EC; •Water pollution sources and measures, standard indexes of effluent and agricultural water, processing methods of wastewater treatment and sludge composting, and the reuse of purified wastewater and sludge for agriculture

(5) Field Water and Soil Management	•Water-saving methods in fields; •Soil moisture content and infiltration rate observation and modeling	•Water management for salinity control, reclamation of saline soils and sodic soils; •Field irrigation methods, and the factors affecting the selection of water irrigation methods; •Components, concept, recent trends and study subjects of irrigation system, parameters/ indices to evaluate the performance of a complete or components of irrigation system and water distribution system, negative impacts of irrigation and it's mitigating measures; •Observation and estimation of evapotranspiration from the vegetated land: energy balance method and soil moisture depletion method, Penman-Monteith estimation model (FAO recommended); •Methods for estimating consumptive use of water of upland farms (soil moisture depletion method and water balance methods), and soil moisture management and evaluation of water-saving irrigation on farms; •Principles and measurements of soil water flow and solute transport; •Drip irrigation system, factors and countermeasures of salinization of groundwater and river water resources and desertification due to irrigated agriculture, soil reclamation techniques of silinazation and soil erosion in the arid and semi-arid area.
(6) Practice on the Design of Water Supply/Distribution Systems	•Regulation of demand and supply of water resources	•The 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
(7) Crops/Plants suitable for Arid Regions	•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
(8) Preservation of Greens/ Assessment of Vegetation	•Inter-responding relationships between re-vegetation and environment factors in arid region	•Definition, causes, environmental characteristics and re-vegetation of arid land; •Formation, natural environment, vegetation, fixation procedures and problems of sand dune in Japan; •Physiological regulation of growth, water potential and movement and drought and flooding stress of woody plants; •Ecological impact assessment procedures and mitigation measures; •Principal, key factors, satellite types and applications of remote sensing; •Affecting factors, appearance, analysis methods and applications of tree-ring

2. Please itemize the training contents that you acknowledged as effective and give clear summaries of the supportive reasons.
（More than three subjects，Mark all that apply.）

Unit of Training	Training Contents	Reasons
Execution Case of E.I.A.	•Watershed management in the mountainous area and it's environmental assessment; •The process, system, and checklist of EIA;	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

	•Environmental guideline for infrastructure projects	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.
Water Storage and Supply Facilities	•[1] Characteristics of agricultural by-products (ash of rice husk, rice straw, wheat straw); •[2] Basic theory of seepage flow, seepage flow analyses and slope stability	•[1] On the Loess Plateau, the reason of soil erosion 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, also can improve soil fertility. •[2] The basic theory of seepage flow and slope stability are important aspects in soil erosion study and soil and water conservation works, especially in mechanical conservation measures construction.
Farm / Forest Management and Food Policy	•[1] Method of farming survey and farm management information analysis; •[2] Functions and financial evaluation of forests	•[1] Method of survey of farming and farm management information analysis are closely related to soil and water conservation work in watershed management program. Though survey and analysis, give advice to farmers to adjust their farming, and motivate them to soil and water conservation works. •[2] Functions and financial evaluation of forests are important basis on decision-making in soil and water conservation planning and afforestation.
Ground Water	•The field techniques for measuring the soil hydraulic properties of unsaturated soil	Soil hydraulic properties are relevant factors in mechanism and prediction studies of runoff generating and soil erosion process.
Soil / Water Quality Assessment	•The chemical properties of arid soils and the main parameters	ESP and SAR are important factors that lead to serious soil erosion in sodic soil case. In soil erosion and soil conservation research, should pay attention to these indexes.
Field Water and Soil Management	•[1] Field irrigation methods, the factors affecting the selection of water irrigation methods; •[2] Observation and estimation of evapotranspiration from the vegetated land; •[3] Principle and measurement of soil water flow and solute transport; •[4] Soil reclamation techniques of silinazation and soil erosion in the arid and semi-arid area	•[1] In order to prevent irrigation-affected soil erosion, proper irrigation method should be applied in slope fields, 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. •[2] The evapotranspiration is a very important factor for re-vegetation and soil-water conservation forest/grass planning on the loess plateau due to the shortage of water resources. •[3] Soil water flow and solute transport are not only important in vegetation production, but also in soil erosion mechanism and prediction study. •[4] To choose suitable soil reclamation techniques are quiet important for the comprehensive control and good ecological environment construction on the Loess Plateau.
Crops Suitable for Arid Area; Plant Nutrition	•Drought and salt tolerant crops and plants	To get good achievements on re-vegetation, food production, soil-water conservation, etc. is depended on choosing suitable crops and plants.
Preservation of Greens; Assessment of Vegetation	•Ecosystems and re-vegetation in semi-arid land; •Sand dune ecosystems and sand fixation methods; •Growth and physiology of woody plants; •Ecological impact assessment and mitigation planning;	All the knowledge and methodology acquired in this section is closely relevant to vegetation restoration on the Loess plateau. Remote sensing is a helpful tool to monitor land use changes and can provide related information for soil-water conservation planning and benefits estimation, soil erosion prediction, etc.

	•Introduction to environmental remote sensing; •Tree-ring analysis	

3. Please itemize briefly and to the point on the contents of the project(s) and/or action plan(s) that you are planning to carry out or to set up. Please title each project planned and/or action plan to present a concise picture of the contents as well as practical problem(s) to be settled.
（More than three subjects，Mark all that apply.）

Title(s)	The outline of the project (s) or action plan(s)	Practical Problems to be settled for the stated plan
Prediction on sediment-reducing benefit of returning slope cropland to forest/grass on the Loess Plateau region in China	•Mutual dynamic responding between vegetation restoration and soil environment in the abandoned cropland --Vegetation and soil environment characteristics in different restoration conditions --Effects of vegetation restoration in different conditions on soil environment improvement --Effects of different soil conditions on vegetation restoration --Mutual dynamic responding between vegetation restoration and soil environment	--To evaluate the restoration ability of erosion-effected soil in abandoned cropland under different re-vegetation conditions, and the bearing capacity of abandoned cropland soil for re-vegetation; --To establish responding allocation model of vegetation and soil environment conditions for re-vegetation, and direct returning different slope cropland to suitable forest/grass
	•Sediment-reducing effectiveness of forest/grass in different living conditions --Effective coverage of forest/grass for soil and water conservation --Potential coverage of forest/grass in different living conditions --Estimation on sediment-reducing effectiveness of forest/grass in different living conditions	--To interpret the required coverage of forest/grass under a certain required control standard, and the actual coverage degree that can be achieved in different environmental conditions or positively artificial efforts, and their sediment-reducing effectiveness; --To obtain the suitable vegetation types for different cropland locations to achieve maximum soil and water conservation benefit
	•Sediment-reducing benefit of returning slope cropland to forest/grass --The possible area to be converted from slope cropland to forest/grass and it's distribution features in typical watershed of different topography regions --Scaling transfer from watershed to the Loess Plateau region using RS and GIS --Sediment-reducing benefit prediction	--To evaluate the degree of sediment-reducing benefit of the project of returning slope cropland to forest/grass on the Loess Plateau region, and the contribution of sediment-reducing to the Yellow River; --To provide scientific designing standard and decision-making basis for vegetation construction, soil and water conservation planning, returning slope cropland to forest/grass, and flood control on the Loess Plateau region.