

2.7 Activities of Foreign Researchers

(1) Professor Ben-Asher, J.

Visiting Professor (January 1, 1998 - March 31, 1999)

Ben-Gurion University of the Negev, The Jacob Blaustein Institute for Desert Research. Sede Boqer Campus Israel.

Publications Submitted during the Sabbatical period in Tottori.

1. Qui, Y.G., Ben-Asher, J. Yano, T. and Mommi, K. (1999) : Estimation of soil evaporation using the differential temperature method, Soil Sci. Soc. Amer. J., Revised
2. Ben-Asher, J., Yano, T. and Shainberg, I. (1999) : Dripper discharge and the hydraulic properties of the soil, Soil Sci. Soc. Amer. J., Revised
3. Ben-Asher, J., Yano, T. and Kitamura, Y. (1999) : Analysis of water and salt environment in a trickle irrigated lysimeter, Soil Sci. Soc. Amer. J., Submitted
4. Tsuyuki, I. and Ben-Asher, J. (1999) : Transpiration and photosynthesis of grapevine irrigated with saline water: a model for deciduous plants, Agric. Forest Meteor., Submitted

Seminars

The following seminar was given at a number of meetings with suitable modifications:

July 1998: Irrigation of Arid lands and agroproductivity: A closed circuit between theories, models, laboratory tests and field applications. Presented in the Annual meeting of the Japanese Agricultural Engineers Kyoto

July 21 1988: Committee of Irrigation, Drainage and Reclamation Engineering, Science Council of Japan. Kyoto University

October 20 1998: International mini-meeting on "Perspective for Higher Plant Productivity in Arid Land under Water and Salinity Constraints", Faculty of Agriculture, Kyoto University.

November 1998: Agricultural Meteorology of Chukoku and Shikoku, No 11 Chapter of the Society of Agricultural Meteorology of Japan, Zen Tsu Gi

December 9 1998: Annual meeting of the Arid Land Research Center Tottori

January 4 1998: Israel-Japan Workshop on Hi Tech in Agriculture, New Ohtani Tokyo

January 7 1998: Israel-Japan Workshop on Hi Tech in Agriculture, New Ohtani Osaka.

May 1998: Keren, R., J. Ben-Asher, A.G.T. Babiker and S. Inanga: Combating Desertification. A lecture presented to the Asian meeting of National Focal points of the convention to combat desertification (CCD) Arid Land Research Center, Tottori University, Tottori, Japan

November 25 1998 Contamination Of Irrigation Water and its Impact on Agroproductivity in Coastal Desert -The Case Coastal Gaza Strip, Seminar on Combating Desertification in the Middle East (Organized by JICA) Tottori

Lectures to Students and Staff

May 1998: Salinity and fertilization, Informal Lecture to the Students of Prof. Yano

During March 1999: Trickle/drip irrigation.

A series of lectures by Jiftah Ben-Asher visiting Prof. from BGU:

1. Soil and Water Relations under Surface Drip Irrigation
 - 1.1. The ponded zone

- 1.2 The wetted volume
 - 1.3. Effect of discharge rates
 - 1.4. Pulse irrigation
 - 1.5 Energy balance and evapotranspiration
 - 1.6. Economic considerations
2. Soil and Water Relations Under Sub-Surface Drip Irrigation.
 - 1.2. The saturated zone
 - 2.2. The wetted volume
 - 2.3. Effects of discharge rates.
 - 2.4 Internal pressure
 - 2.5 Energy balance and evapotranspiration .
 - 2.6 Comparison with surface drip.
 - 2.7. Design criteria.
3. Water Harvesting:
 - 3.1 Overview
 - 3.2 Soil requirements
 - 3.3 Microcatchments
 - 3.4 Relation to traditional and modern hydrology.

Students Assistance:

1. Supervising the Ph.D. Study of Itaru Tsuyuki: Faculty of Agriculture, Kyoto University, Oiwakecho, Kitashirakawa, Sakyo-ku, Kyoto.
2. Discussions with MS Students: Crop response to salinity, and physical principles of energy conservation evaporation and condensation.
3. Reviewing (peer review) papers of Ph.D. and MS students

Research:

Water and salt regime in a trickle irrigated lysimeter. Data analysis and analytical and numerical modeling (First draft of the analytical model paper completed: **Mathematical analysis of time dependent root zone salinity and the leaching cycle**. Numerical modeling not completed).

**Contamination of Irrigation Water and its Impact on Agroproductivity in Coastal Desert
- The Case Coastal Gaza Strip -**

J. Ben-Asher

Abstract

Sources of usable water in the coastal desert region are limited. This problem is intensified due to the human factor. The growth rate of the population leads to and therefore is expressed in increasing demand for food as well as consequent increase in demand for water used for both irrigation and domestic consumption. This course of events may accelerate the process of the pollution of fresh water sources, particularly in the semi-arid coastal region. This study analyzes the process of groundwater contamination and its impact on agroproductivity in a geographical region which we characterize as a coastal desert. The theoretical models and empirical methods developed in this study are applied to the Gaza Strip, but can

serve as practical tools for policy planning in coastal deserts in general.

The core argument of the study is that massive population growth creates a chain reaction ending in a contamination catastrophe. The research questions and hypotheses address this argument in several stages and from different angles. A combination of the demand and supply equations shows that in the current situation the demand for water in the Gaza Strip reaches the maximal amount of water which can be supplied from the aquifer meaning that further accelerated pumping will deteriorate the contamination catastrophe.

This prediction leads to the main conclusion of the study. Settlement planning in coastal deserts should consider the fact that local agriculture production means increasing consumption of water which leads to the destruction of existing cultivated areas as well as to salination of ground water resources. In other words, there should be an efficient management of existing water resources based on the parameters and constraints which the study illuminates. The uniqueness of the study lays in the theoretical and empirical tools for planning and implementing efficient policy regarding water resources in coastal deserts.

(2) Professor Rami Keren

Visiting professor (April 1, 1998 - January 31, 1999)

Permanent Address: Institute of Soil, Water and Environmental Sciences, Volcani Center, ARO, Bet Dagan 50250, Israel

My stay at the Arid Land Research Center of Tottori University has been a pleasure both professionally and socially. It was an honor to be a Visiting Professor and to collaborate with the Land Conservation Group of Professor T. Yamamoto. I was pleased to work closely with Associate Professor M. Inoue, to instruct two students for their dissertations, to help undergraduate and graduate students and to conduct series of lectures on physical chemistry of soils.

Thanks to those who have worked hard helping us to communicate and to make our stay here so enjoyable.

My activities in the Arid Land Research Center during April 1, 1998 and January 31, 1999 were as follows:

Seminars and Lectures

1. The role of clay swelling and dispersion in hydraulic properties of clay-sand mixtures. University of Tokyo, Tokyo, Japan. 1998.
2. Soil properties under saline conditions. Kimura Chemical Plants, Amagasaki, Japan. 1998.
3. The properties of clay minerals and their behavior in aqueous media. Arid Land Research Center, Tottori University, Tottori Japan. 1998.
4. Clay swelling and dispersion processes and their roles in soils hydraulic properties. Arid Land Research Center, Tottori University, Tottori Japan. 1998.
5. Hydraulic properties of soils and their relation to water quality. Arid Land Research Center, Tottori University, Tottori Japan. 1998.
6. Water quality assessment for irrigation in arid land regions. Arid Land Research Center, Tottori University, Tottori Japan. 1998.
7. Kinetics of gypsum dissolution and its solubility in aqueous media. Arid Land Research Center, Tottori University, Tottori Japan. 1998.
8. Sodic soil reclamation under semi arid and arid conditions. Arid Land Research Center, Tottori University, Tottori Japan. 1998.

National Symposiums

1. Arid lands irrigation and agroproductivity: Theories and their implementations. National conference on construction of field studies. Japan Academy of Sciences. Kyoto University. July, 1998.
2. Soil properties under sodic and saline conditions. Seminar of Joint Research of Arid Land Research Center, Tottori University, Tottori Japan. Dec. 9, 1998.

International Symposiums and Workshops

1. Japan - Israel cooperation in research. Ministry of Science and Ministry of Foreign Affairs, Tokyo, Japan. July, 1998.
2. Sodic saline soil reclamation. International Conference, Arid Land Research Center, Tottori University, Tottori Japan. 1998.
3. Soil properties and combating desertification. Arid Seminar on Combating Desertification in the Middle East, Japan International Cooperation Agency (JICA). Tottori, Japan. Nov. 1998.
4. Combat Desertification - the agricultural approach. International Conference, The CCD organization. Arid Land Research Center, Tottori University, Tottori Japan. 1998.
5. Sandy soils and their agricultural potentialities. Jianli County, Hubei Province, China. January 11-15, 1999.

Research

Instruction of two students for MS on the following topics:

1. Hydraulic conductivity of soils with 2:1 and 1:1 clay minerals as affected by water quality under saturated condition. This study was carried out using soil columns under constant water head device.
2. Water infiltration rate and soil erosion of two soils having 2:1 and 1:1 clay minerals, respectively, at two aggregate size ranges as affected by sodicity and water quality.

This study was carried out in the Arid Dome using the excellent rainfall simulator.

Discussions with MS and Ph.D. students on basic principals of water-soil relations, sodicity, salinity and water infiltration and sodic-saline soil reclamation.