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REPORT OF THE SEMINAR/STUDY TOUR ON WATER
MANAGEMENT AND USE

(Tashkent, USSR, 15-26 August 1989)

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I. WORK PROGRAMME

Place and date

1. The Seminar and Study Tour took place between 15 and 26 August 1989. The Seminar was held in Tashkent, Uzbekistan, in co-operation with the Ministry of External and Economic Affairs and the Ministry of Water Economics of the Union of Soviet Socialist Republics and the Central Asia Research-Production Association on Irrigation (SANIIRI). During the study tour visits were made to irrigation projects, hydroelectric projects and experimental farms in Uzbekistan. A list of the institutions and of projects visited can be found in annexes 1 and 2.

Participants

2. Experts from nine countries of Latin America participated in the seminar.
3. Experts from the USSR also participated in the seminar (see annex 3).

Agenda

4. The meeting adopted the following agenda:
 1. Opening session.
 2. Presentation of papers on the development and use of water resources in the Uzbek Socialist Soviet Republic.
 3. Presentation of country papers on the development and use of water resources under conditions of water scarcity in Latin America.
 4. Discussion and adoption of recommendations and conclusions.
 5. Study tour.
 6. Final session.

Opening session

5. At the opening session, the inaugural speech was made by S.A. Akramkhanov, President of the Central Asian affiliate of the All-Union

Agricultural Academy and Deputy Chairman of the State Committee on Agro-Industrial Enterprises, Uzbek SSR, who stressed the importance of good irrigation management to the Uzbek economy and he welcomed the participants, saying he hoped they would constitute the first of many exchanges between Uzbekistan and Latin America.

6. Speaking on behalf of ECLAC, Mr. Axel Dourojeanni, the Officer-in-Charge of the ECLAC Division of Natural Resources and Energy, thanked the Soviet authorities for the initiative which made the seminar and study tour possible. He pointed out that this was the first of a series of seminars being organized by ECLAC and institutions of the Soviet Union.

7. Finally, Mr. V.A. Dukhovny, Director-General of the Research-Production Association for Irrigation in Central Asia (SAIIRI) spoke on the nature of the work of the Association, the evolution of the irrigation system in Central Asia and the challenges currently facing the management of water resources in the region.

8. The seminar was chaired by Mr. Axel Dourojeanni, Officer-in-Charge of the ECLAC Division of Natural Resources and Energy.

II. ACCOUNT OF PROCEEDINGS

The development of irrigation agriculture under conditions of water shortage in the Uzbek SSR

9. The discussion held under this item began with the presentation of the design and correction of master plans for irrigation development within the river basin context. This was followed by the presentation of a description of the historical development of the irrigation system of the Republic of Uzbekistan and of the evolution of the system of water management for purposes of irrigation. It was emphasized that there was not enough water to satisfy existing demand so that it was absolutely essential to increase the efficiency of irrigation water use. Significant changes had recently been made in the responsibilities for the management of the irrigation systems of the Uzbek SSR. Those changes included the decentralization of the managerial authority to the government of the Republic. In a parallel innovation, the State and collective farms in the Republic had been given the responsibility for their own financing. Prices were expected to play an important role in water management as a result of the efforts to improve the efficiency of the use of water. The discussion ended with a detailed description of the Central Asian irrigation system's computerized system for water control.

The management of river basins in conditions of water scarcity (present and future) in the Uzbek SSR

10. Within the context of the anticipated directions of future change in the economic development of Central Asia, a model has been constructed to forecast and conciliate the supply and demand for water within a river basin. The model is made up of a series of interrelated submodels for forecasting

the supply of water, both surface and groundwater, and for the forecasting of the different demands for the use of the available water resources. It has been designed specifically to be an aid for long-term planning and to enable the best possible --from both the economic and the ecological points of view-- decisions on water use to be reached.

Control of water use within river basins

11. Under this topic, a model was described which has been developed to assist in decision-making on water control in a large river basin. The model was based on the example provided by the Syrdarya river basin. It took a systems approach to the problem, was characterized by comprehensive consideration of the issues related to the supply of water, the nature of the demands presented and the flow-regulation alternatives and permitted the selection of the best possible control alternatives by taking the basin-wide control strategy into account. Following the presentation of the model, there was a discussion of its possible applicability to water management problems in Latin America.

Integrated water use management and the conservation of the water resource

12. The intensification of the human use of water resources has made it necessary to consider the establishment of limits on water withdrawals from both surface water and groundwater; to introduce careful management of soil moisture conditions in irrigated areas, on-line monitoring and forecasting of water quality and to intensify the effective regulation of flows within river basins. Central Asia provides a striking example of a rapid increase in the use of water in conditions of water scarcity. This has resulted in serious environmental problems, including an increase in salinity and pollution, a deficit in the flow to the lower reaches of rivers, a draw-down in the level of the Aral Sea and desertification in the region around the Aral Sea. Improvements in water management in Central Asia required to reverse the situation include the reduction of drainage flows from the irrigated areas into the rivers, the modernization of the older irrigation systems so as to lower water demands, the general introduction of water-saving measures, a better understanding of the effect on water and soils of agricultural chemicals and industrial wastes and an intensive programme of nature conservation measures for the Aral Sea. In the discussion of this topic, it was noted that many of these water management problems were also to be found in Latin America.

The selection of optimum designs for irrigation drainage systems and its role in reducing the environmental impact of complex water systems

13. Two papers discussing aspects of the optimum design of drainage systems for irrigation projects were presented. Soil moisture régimes in areas under irrigation differ from natural soil régimes and require a controlled combination of irrigation, drainage and agrotechnical measures to maintain optimum water and air, nutrition and toxicity conditions in the root zone under situations of minimum irrigation-water supply. Differentiation of soil

régimes should be based on ongoing processes in the soil. Experimentation carried out by SANIIRI in Uzbekistan has permitted the development of parameters for the best soil reclamation régimes it is possible to have under different drainage systems. Three advanced types of drainage are used in Central Asia. The most widely applied type is subsurface horizontal drainage. Vertical pumped drainage is used in areas of heterogeneous soil structure. In conditions of poorly permeable soil cover with a penetrable sandy gravel layer underneath, combined systems comprising horizontal subsurface drains and vertical artesian wells are used. In the discussion of these papers, considerable interest was expressed in the possible application of such drainage systems in irrigated areas in Latin America.

The economic efficiency of the use of water resources in Central Asia

14. In relation to this topic a paper was presented on modelling the economic aspects of the multipurpose use of rivers. The proposed model ranks water users by comparing their economic efficiencies in water use. The solution is derived through multipurpose priority organization of low-cost techniques.

15. In this process of optimization, users without alternatives for water substitution are ranked not by economic indices but according to the degree to which they are able to meet their water requirements. On the basis of estimates of the availability of water resources, water is assigned to users in priority order until points of equal efficiency of use are reached, both capital and operational costs being taken into account.

16. Following the presentation of the model, a detailed exposition was given of the water resource situation in Central Asia. In this assessment, it was pointed out that in the last 15 years, yields, particularly of cotton, had decreased although average gross agricultural production had increased by almost 50%. In large measure this was due to the expansion of production into new lands but it can also be attributed to the increased planting of fine-fibre varieties. At the same time, although water-use efficiency has increased, it is vital that it be increased further. To achieve such an increase it is necessary not only to seek technological solutions but also to use prices effectively. It has therefore been decided that as from 1991 the price structure will be changed to reflect the costs of production better. Through such means as the institution of a new charge for water and the provision of incentives for improved production efficiency.

The development and use of water resources under conditions of water scarcity in Latin America

17. In this part of the seminar a discussion was held concerning the current state of water resources development and of water use in areas subject to water scarcity in the different countries of Latin America represented in the seminar. In each presentation, considerable emphasis was placed on current issues confronting the management of irrigation and on policies that had been adopted to promote the efficient development of irrigation systems.

18. Papers were presented assessing the situation in the following countries: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico and Peru.

III. CONCLUSIONS

19. After devoting considerable time to an exchange of opinions, the participants arrived at the following conclusions:

1. Contemporary challenges to water-resources management in Latin America

It was generally agreed that the major challenge facing water management in Latin America was the design of appropriate institutional structures. It was also recognized that conditions of water management varied among the countries of the region but that they shared some characteristics which should be taken into account in the development and modification of institutional structures. In designing new institutional structures, it was particularly important to take account of the multipurpose use both of the resource and of the infrastructure built for its control. A second major challenge was the need to ensure that water projects did not affect the environment adversely. It was agreed that there was an urgent need to increase efficiency of water use particularly in irrigation and domestic water supply. Finally, the participants emphasized the need for better training of both water managers and water users.

2. The relevance to Latin America of the Central Asian experience in water management and possible means and forms of co-operation

It had been shown in the seminar that many aspects of recent experience in Central Asia in water resource management in general and irrigation management in particular were relevant to the situation in Latin America. The seminar should be regarded as only a first step in the formulation of a programme of co-operation between the different countries in Latin America and the water resources institutions of Central Asia. In particular, a lesson could be learned from the Central Asian ability to act and implement appropriate solutions to the problems encountered. In this connection mention was made of drainage systems and the machinery for laying drains, modelling of water systems, co-ordinated operation of reservoirs and the experience acquired in dealing with the environmental degradation caused by large water systems. By the same token Latin American experience provided much that could be of utility to Central Asia, particularly in the realms of user participation in management, self-management of irrigation systems by farmers, decentralized administration in water management and the development and application of pricing systems for water. Latin America could be of great assistance in the process of restructuring water management in the USSR.

3. The significance of prices and of the market mechanism in general in water management

It was generally recognized by the participants that the adoption of a rational pricing policy for water and other inputs was an important means of improving the efficiency of water use. Emphasis was placed on the need to charge for water, and it was stressed that such charges must at the very least cover operation and maintenance costs. While it was acknowledged that charging for water would initially raise production costs, it was recognized that in the long term it would contribute to a better balance between social benefits and social costs.

4. Appropriate institutional structure at the river basin level for water resources management in conditions of water scarcity

It was recognized by the participants that in both Central Asia and Latin America, an appropriate institutional structure should provide for the following:

- separation of management of supply from management of demand or use;
- decentralization of authority and delegation of responsibility to those levels of management where problems occurred with a co-ordinated water system;
- sharing of management authority between the State and the water users. Both had a role to play in the management of water resources.

IV. RECOMMENDATIONS

20. The participants in the seminar made the following recommendations:
1. A means should be sought of incorporating joint USSR-Latin American seminars on different aspects of water management into a permanent co-operation programme to be carried out under the auspices of ECLAC.
 2. The countries of Latin America should continue to strengthen their mutual co-operation in water resources management.
 3. An effort should be made to reach a common understanding of the definitions and terms used for evaluating and analysing water management problems. Too often methodological differences hamper communication.
 4. Co-operation between Latin America and the USSR in water resources management should be strengthened in all its forms: seminars, technical assistance, commercial links, etc.

5. The ECLAC Division of Natural Resources and Energy should publish the papers presented by the Latin American delegates at the seminar for distribution in both Latin America and the USSR.

V. FINAL SESSION

21. At the final meeting in the seminar, Mr. E.T. Tursunov, Chairman of the State Committee for Land Reclamation and Water Management of the Uzbek SSR, spoke on the development of irrigated agriculture in conditions of insufficient water resources.

22. The Latin American participants thanked the authorities of the Uzbek SSR and the USSR for the hospitality shown to them.

Annex 1

VISITS TO WATER RESOURCE INSTITUTIONS IN TASHKENT

Within the activities related to the seminar, the participants visited the following institutions in the water resources sector in Tashkent:

1. Water Control Service of the State Committee for Land Reclamation and Water Management of the Uzbek SSR.
2. Research-Production Association on Irrigation for Central Asia (SANIIRI).
3. State Specialized Design Bureau on Irrigation (SANIIRI).

Annex 2

STUDY TOUR

The purpose of the study tour was to visit water projects in the Golodnaya Steppe and Tashkent, Syrdarya and Samarkhand regions. The visits were aimed at demonstrating the experience accumulated in water project construction and operation and in water resources use in the arid zones of Uzbekistan. The following projects were visited.

- The headworks of the Charvak Dam and Hydroelectric Power Station and the Parkent Head Regulations of the Parkent Canal;
- The Syrdarya Experimental Farm, a testing ground for experiments in the accelerated development of highly saline soils;
- Irrigation and land reclamation complexes on the Golodnaya and Djizok steppes;
- The Zaamin Experimental Farm;
- The Regional Water Management Department, Ak-Karadarya headworks and the Zarafshan River automated management system in Samarkhand.

Annex 3

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Annex 4

LIST OF DOCUMENTS
(Lectures and papers)

1. E.T. Tursonov, "Development of irrigated agriculture under conditions of insufficient water resources", USSR.
2. V.A. Dukhovny, "Management of river basins water resources in conditions of water shortage (at present and in future)", USSR.
3. G.S. Tsurikov, "Formulation and correction of master plans for irrigation development in river basins", USSR.
4. Yu. V. Tolstunov, "Dispatching control of water resources use in river basins", USSR.
5. R.M. Razakov, "Problems of integrated use and protection of water resources", USSR.
6. S.A. Polinov, "Management and economic aspects of multi-purpose use of rivers in arid zones (today and in future)", USSR.
7. M.L. Tolchinsky, "New machinery for irrigation of agricultural crops", USSR.
8. H.I. Yakubov and R.K. Ikramov, "Selection of optimum designs of irrigation and drainage systems and their role in minimizing environmental effects of water complexes", USSR.
9. P.D. Umarov, "Advanced types of drainage and methods of its construction", USSR.
10. F.K. Kayumov, "Economic efficiency of water resources use in Central Asia", USSR.
11. M.G. Khorst, "Comparative efficiency of different types of irrigation systems", USSR.
12. T.I. Palvanov, "Efficiency of drip irrigation systems and technical means for their establishment", USSR.
13. H.T. Tashev, "Integrated development of the Djizak Steppe", USSR.
14. ECLAC, Latin America and the Caribbean: The management of water scarcity (LC/R.774), Santiago, Chile, 21 July 1989.
15. Armando Llop, "La gestión de los recursos hidricos en la zona árida Argentina" (Argentina).

16. Javier Zuleta, "El riego en la Argentina: Análisis de su desarrollo y de su impacto en el crecimiento de las áreas con escasez de agua" (Argentina).
17. Edgar Claros, "Saneamiento y preservación de cuencas hidrográficas, el ejemplo del Río Pirai" (Bolivia).
18. Roberto Moreira Coimbra, "Areas subject to water scarcity: The Brazilian experience" (Brazil).
19. Estevam Strauss, "Seminario de estudios sobre gestión integral de recursos hídricos de escasez del agua. Administración de recursos hídricos para la irrigación" (Brazil).
20. Nelson Pereira Muñoz, "Situación del riego en Chile" (Chile).
21. Jorge I. Valencia Franco, "La gestión de los recursos hídricos en Colombia" (Colombia).
22. José Almeida Albán, "Gestión integral de recursos hídricos en situaciones de escasez de agua" (Ecuador).
23. Santos Galarza Bejarano, "Gestión integral del recurso hídrico en el Perú" (Perú).
24. Adolfo G. Ramírez Valle, "Gestión integral de recursos hidráulicos en situación de escasez de agua" (México).