

Schriften  
der Deutschen Stiftung für Entwicklungsländer

---

Band 2

# Water Development in Less Developed Areas

Transactions of an International Conference  
held in Berlin from 17 to 21 May 1963

With an Analysis by  
H. P. Michael



Duncker & Humblot · Berlin

## **Water Development in Less Developed Areas**

**Schriften der Deutschen Stiftung für Entwicklungsländer**

**Band 2**

# Water Development in Less Developed Areas

Transactions of an International Conference  
held in Berlin from 17 to 21 May 1963

With an Analysis by

H. P. Michael



DUNCKER & HUMBLLOT / BERLIN

**DOK 169 A**

---

**IT 10/63**

**Alle Rechte vorbehalten**

**© 1965 Duncker & Humblot, Berlin**

**Gedruckt 1965 bei Albert Sayffaerth, Berlin 61**

**Printed in Germany**

## Table of Contents

<b>A. Preface</b> .....	<b>7</b>
<b>B. Water Development in Less Developed Areas</b>	
An analysis by <i>H. P. Michael</i> .....	<b>9</b>
I. Introduction .....	<b>9</b>
II. The Background of the Conference .....	<b>11</b>
III. Criteria for Decision Making .....	<b>14</b>
IV. General Problems and Conclusions .....	<b>19</b>
V. Technical Considerations .....	<b>30</b>
VI. The Lessons of Water Development as Affecting Foreign Aid Programmes .....	<b>37</b>
VII. Postscript .....	<b>43</b>
<b>C. Papers Presented to the Conference</b> .....	<b>45</b>
I. Water Development as Part of a Development Aid Policy by <i>Gilbert F. White</i> .....	<b>45</b>
II. Community Water Supply in the Developing Countries by <i>H. G. Batty</i> .....	<b>57</b>
III. Flood Control and River Training in East Pakistan by <i>Khan Mohammad Azam</i> .....	<b>74</b>
IV. Factors Influencing Planning and Operation of Irrigation and Drainage Projects in Developing Countries by <i>A. de Vajda</i> .....	<b>81</b>
V. Special Problems on Water Development in Less Developed Areas by <i>K. L. Rao</i> .....	<b>104</b>
VI. Erosion et Transport des Sediments par <i>L. J. Tison</i> .....	<b>123</b>
VII. Hydrologic Investigations in the Absence of Long Range Records by <i>A. Volker</i> .....	<b>135</b>

VIII. Mapping and Photo Interpretation by <i>E. Gigas</i> .....	147
IX. Die Mitarbeit der Geologie, Geophysik und Bodenkunde bei dem Ausbau der natürlichen Wasservorkommen in Entwick- lungsländern von <i>H. Flathe, H. Kleinsorge, O. Strebel</i> und <i>E. Schönhals</i> ..	154
X. Hydro-Electric and Integrated River Basin Development in Less Developed Countries by <i>A. H. Naylor</i> .....	163
XI. Aspects of Organization of a Water Development Department. Training of Staff. International Co-operation by <i>L. J. Mostertman</i> .....	171
XII. General Principles of Water Legislation at Different Stages of Development by <i>H. P. Michael</i> .....	179
<b>D. Annex</b> .....	<b>185</b>
Recommendations and Findings .....	185
List of Participants .....	201

## A. Preface

Hardly another tool of economic progress appeals so deeply to the imagination, to the hopes and to the political consciousness of the emerging nations as water development. This volume gives the substance of a Conference which the German Foundation for Developing Countries has called from May 17th to 21st, 1963, to evaluate the economic, social, administrative, and technical lessons of far flung water management activities in recent years. The worldwide scope of the problems under consideration and the existing variety of opinions made the holding of an international conference appear to be the best of all available methods to obtain without delay universal and far-reaching answers.

The Foundation was fortunate in having the cooperation of some of the world's leading experts who by virtue of their activities as advisers to the United Nations and to national governments or as first water development executives to the nations of Southern Asia and other countries with underdeveloped areas were able to make distinguished contributions to the Conference. More subjects might have been treated, yet five days represented the most generous sacrifice of time which could be asked for; so the agenda was already overloaded.

The size of the papers presented has been shortened to meet the requirements of publication; an exception was made in respect of such central subjects for the discussion of which the Conference had been originally planned.

Acknowledgements are due to Professor *H. Press*, President of the Berlin Water Congress and Exhibition, 1963, for the patronage given to the Conference. Special appreciation goes to Mr. *H. P. Michael*, Head of the Hydrology and Water Development Section, Federal Ministry of Transport, who suggested the holding of the Conference, directed it and analysed its results. I wish to express my gratitude to the authors of papers and recommendations for their outstanding work and to all participants for their active help.

**Dr. Gerhard Fritz**  
Director-General,  
German Foundation for Developing Countries





## **B. Water Development in Less Developed Areas**

An analysis by H. P. Michael

### **I. Introduction**

Political pressure for a rapidly accelerated pace in development as well as worldwide recognition of water resources management as one of the shortcuts to economic and social advance of the less developed areas have helped to sharpen the technical and administrative tools of water development work in recent years. The United Nations in particular with their special agencies and other international organizations with territorial or technical responsibility have taken initiatives for the improvement of techniques and procedures which lend themselves to application in the tropics and subtropics.

Such activity is gauged to take the angle of the developing countries. The governments of economically more advanced nations certainly benefit by it in respect of their foreign aid schemes, yet comprehensive answers to their principal problems in this sphere are still missing, and in spite of this worldwide effort that has achieved so much in a short period of time the difference in outlook on major water development schemes remains disturbing: on the one hand enthusiasm and complete faith is shown by the sponsoring nations, whereas a deep-seated reluctance of the taxpayer in Western Europe vis-à-vis such projects is not easy to overcome. He knows that from the economic, social, technical, and administrative angle the majority of water projects offers a complexity of problems and dependence on regional knowledge almost unknown in connection with other efforts in the public works sphere; and as it is his prerogative to have all expenditure from public funds critically examined by his representatives, he insists on conclusive evidence that for foreign aid adequate standards of social and economic efficiency, of technical planning and execution and of administrative care are applied.

A review of the state of our knowledge in this sphere of activity must soon arrive at gaps and deficiencies which in numerous instances are responsible for sharp disappointment at the relatively poor contribution made to the national economic advancement by otherwise

immensely popular projects; irrespective of capital assistance being received or the cost of the whole scheme being financed from revenue, low income nations cannot afford to indulge in some of the rather lavish expenditures which their richer fellowmen occasionally favour. If water development — this potentially very dynamic tool of economic and social progress — goes on to have a conspicuous share in the national investment programmes, an analysis of the world-wide experience of such schemes is needed to enforce better efficiency for the future. Such evaluation will have to concern itself with the social and economic part which water projects can play in the framework of a development programme and, consequently, with the choice of schemes; it will have to analyse technical and administrative policies to be followed if the objective of such undertakings is to be reached and, finally, will have to deal with technical methods and procedure.

An activity, in which so many men of eminence in many lands have excelled for many years, has brought forth experiences which yield useful and immediate answers at a time when research will have to go on for an indefinite period before its results can be effectively evaluated. This consideration, and awareness of a clear need have induced the German Foundation for Developing Countries to ask the following questions:

1. Is it possible in the absence of economic and social surveys on the impact of water projects to develop a sufficiently reliable technique of decision making which will enable the government agencies concerned, both in the country sponsoring a scheme and in the country giving financial aid, to be aware of the full implication of the work they are undertaking?
2. Is it possible to sum up the manifold technical and administrative experiences gained from water management in developing countries as background knowledge for a foreign aid policy in this sector? Can general principles and technical methods be derived from the investigation and execution of water projects in developing countries, and can general rules for the administration of water be suggested?

It is justifiable to explain these questions in some detail.