

HANDBOOK
ON
BORING & DEEPENING OF
WELLS



MINISTRY OF FOOD AND AGRICULTURE
DEPARTMENT OF AGRICULTURE

Agr. 77
2,000

HANDBOOK ON BORING & DEEPENING OF WELLS



सत्यमेव जयते

MINISTRY OF FOOD AND AGRICULTURE

DEPARTMENT OF AGRICULTURE

Price : Inland Rs. 3.20 nP.

Foreign 7 sh. 6 d. or 1 \$ 16 cents

December 1962 (Pausa 1883)

PRINTED IN INDIA BY THE MANAGER, GOVERNMENT OF INDIA PRESS,
FARIDABAD FOR THE MANAGER OF PUBLICATIONS, CIVIL LINES, DELHI-6, 1963

FOREWORD

THIS publication is the first of a series of technical publications by the experts on minor irrigation in the Ministry of Food & Agriculture. The need for technical manuals dealing with various problems connected with the implementation of the different types of minor irrigation schemes and their solutions is urgent. Nearly Rs. 300 crores are proposed to be spent on this programme during the Third Plan period. With investment of this magnitude and the extension of the programme to new areas, care has to be taken that every rupee is utilised to the maximum advantage.

Among the sources of irrigation, wells account for 1/3rd of the total area under irrigation in the country. There is considerable scope for the construction of new wells. Simultaneously, the existing wells have to be properly maintained and utilised.

An additional area of 3.8 lakh acres will be brought under irrigation through boring and deepening of about 1.4 lakh wells during the Third Five Year Plan. The techniques and methods of boring and deepening and the equipment used are described in detail in the publication. The economics of the various types of operation have also been indicated.

It is hoped that the hand book will be found useful by the technical staff in the States. It is only by pooling the experience in the States that maximum advantage can be taken of the technical know-how which forms the basis of this handbook.

K. R. DAMLE

*Secretary to the Government of India,
Ministry of Food & Agriculture,
Department of Agriculture,
New Delhi.*

New Delhi,
Date 5-1-1962.

PREFACE

BORING and deepening of wells are among the most important items of works under minor irrigation for development of ground water resources. Operations involved are of fairly technical nature. Appreciable amount of literature has been available in the country on most parts of the subject, but not at one place in a consolidated form. An attempt has, therefore, been made in this handbook to put together the essential technical information that may be needed for planning and carrying out boring and deepening operations. In compiling the handbook, technical material was obtained from number of sources and also advantage taken of the notes on visits to works and discussions during tours in the various States. A bibliography of the books consulted is given at the end.

The work has been carried out under the guidance of Shri Mahavir Prasad, Irrigation Adviser to the Government of India, Ministry of Food & Agriculture and Shri J. P. Mital, Adviser Irrigation, Ministry of Community Development. Shri O. P. Kumra, Assistant Irrigation Adviser assisted me in drafting portions of the handbook and the Chapter on 'Deepening of Wells by Blasting' is largely his contribution, after making a special visit to the deepening work being carried out in Rajasthan by the Underground Water Board.

The handbook is a first attempt of its kind on the subject and may contain many an error and omission. Suggestions for improving and rectifying the defects will be most welcome and will pave the way for a suitable revision of the handbook at a later date.

JAGAT KISHORE JAIN
*Deputy Irrigation Adviser to the
Government of India,
Ministry of Food & Agriculture,
New Delhi.*

CONTENTS

| | PAGE |
|--|-------|
| Foreword | (iii) |
| Preface | (v) |
| 1. Introduction | 1 |
| 2. Source of water supply in wells—its origin, nature and occurrence .. | 4 |
| 3. Flow of groundwater in wells—criteria of good water bearing formation | 9 |
| 4. Open wells—their types, usual performance and limitations .. | 12 |
| 5. Boring and deepening—their scope for improving well discharge .. | 17 |
| 6. Boring methods | 25 |
| 7. Percussion boring | 28 |
| 8. Rotary boring | 50 |
| 9. Other methods | 63 |
| 10. Choice of boring method | 69 |
| 11. Observations during boring | 72 |
| 12. Setting screens after boring | 74 |
| 13. Development and testing yield of wells | 83 |
| 14. Installation of a suitable lifting appliance | 96 |
| 15. Deepening wells by blasting | 98 |
| 16. Organisation and programming | 108 |
| 17. Economics of operations | 111 |
| 18. Some do's and don't's for boring and deepening operations .. | 113 |
| 19. Bibliography | 116 |