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## FOREWORD

Bangladesh Agricultural University Research System (BAURES) is coordinating, organizing and monitoring all non-degree oriented research programmes undertaken by the teachers of this university. At present 169 projects are being carried out by the teachers and researchers in different disciplines of agricultural sciences. The annual review workshop is a regular process to present, discuss and evaluate the progress of researches carried out in the preceding year. I am very happy that the publication of the 24 volume of the Bangladesh Agricultural University Research Progress in the form of proceedings of the workshop held on 05-06 October 2013 is coming out of the press. This volume contains 108 abstracts of on-going/completed research projects conducted in the fiscal year 2012-2013. I am confident that the research findings documented in this report would be much helpful to the researchers working in the field of agricultural sciences.

I am taking the opportunity to congratulate the Principal Investigators/Project Directors and all other investigators/researchers of different research projects for presenting their research findings to make the workshop a success. My heartfelt thanks are due to the former Director of BAURES, Editor and the Editorial Board for their sincere and painstaking efforts in publication of this volume.

Special appreciation and thanks are expressed to the national and international donor agencies for funding and implementing the research projects under BAURES. Finally, the encouragement and supports extended by the honorable Vice-Chancellor of BAU are gratefully acknowledged.

**Professor Dr. Lutful Hassan**

Director  
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## EDITORIAL NOTE

Bangladesh Agricultural University Research System (BAURES) is responsible for the overall administration, supervision and execution of the project based researches conducted by the teachers and researchers of different faculties of Bangladesh Agricultural University (BAU), Mymensingh. BAU is providing fund for the research projects. In addition, various research projects are received from different national and international donor agencies. The findings of these researches are presented in the annual workshop held every year and the progress of the projects is evaluated as part of the monitoring and evaluation of BAURES. The present volume of the proceeding includes abstracts of 108 research projects presented in the workshop held on 05-06 October 2013, where 70 projects are funded by BAURES and the rest are funded by the national and international donor agencies.

The aim of publishing this proceeding is to provide information generated through these projects based researches by the teachers, researchers and extension workers engaged in agricultural development of Bangladesh. This volume of the proceeding is edited by an editorial board consisted of intellectual expert members from six faculties of BAU. We have tried our best for quality publication of the proceeding. However, suggestions are always highly appreciated regarding the improvement and standard of the publication and our best effort will be continued for improving the standard of the proceedings.

I would like to extend my sincere thanks and appreciation to the contributors and to the learned members of the editorial board for their sincere cooperation and help in preparing, improving and proof reading of the manuscripts. I would also like to acknowledge and appreciate the help and efforts of Mr. Md. Abul Hashem, Assistant Director, Paresh Kumar Sarma, Scientific Officer and Md. Nazrul Islam, Computer Operator, BAURES for the publication of this proceeding.

I wish you all the best.

**Professor Dr. Md. Zainul Abedin**

Editor

&

Associate Director

Bangladesh Agricultural University Research System (BAURES)

Bangladesh Agricultural University, Mymensingh, Bangladesh

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## **CHAPTER V**

**Faculty of Agricultural Engineering and Technology**

