

Handbook on Biofuels

By Kalbande And Gangdel

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Handbook on **BIOFUELS**

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FOREWORD

As global warming and oil crisis are becoming a major concern, intensive works have been conducted to secure sources of energy and preserve the environment of the earth. Renewable energy has emerged as a promising option to resolve the environmental problems and energy issues towards global sustainability. Global energy scenario in recent year have been drastically changed and it also changing with adoption of the new energy conversion technologies. The energy produced have showed and influenced on the global warming of change in climate rapidly. The efficient energy conversion technologies have now emerging as the tool for the development. Limited resources of energy and the ever growing demands of energy will be stagnate development in very near future. Many energy resources have available in nature abundantly of which farm waste is the important resource in India. The conversion of farm waste i.e. agriculture residue into energy is the crucial task which require state-of-art system configuration.

The successful diffusion and adoption of biomass energy systems at the village level is predicated on organizational and institutional issues more than technical ones. Development of a successful bioenergy sector in both developed and developing nations will make a useful long-term contribution to diversity, security and self-sufficiency of energy supply. Biomass energy will play a leading role in mitigating the environmental effects of fossil fuel energy use as it can offer major reductions in harmful emissions particularly greenhouse gases and sulphurous oxides. Continuous growth in the biomass energy industry to provide bioheat, biopower, transport biofuels and organic waste utilization as well as chemicals and bio-materials, will create employment opportunities (particularly among small to medium enterprises) and promote social cohesion and economic stability, particularly in remote and rural regions. It will also provide a platform for long-term co-operation between industrialized nations and developing countries whose energy demands are expected to grow dramatically in the coming years.

Bioenergy systems rely on natural process for the management of natural resources. However, increased

urbanization, dependence on mechanical technologies coupled with changing lifestyles and market driven economic centralism, natural resources are depleted in an un-sustainable way. In questioning the sustainability of lifestyles and commercial activities, old approaches to bioenergy systems are to be re-assessed and refined of rural areas. In this process, new technologies and their management has become critical as the systems require greater efficiency than natural systems to bring out the required outcomes. The winter school of theme “Efficient utilization of farm waste for energy generation” will emphasize on the issues of resources assessment, state-of-art conversion technology and the economy for fitting the appropriate tools in rural areas for the employment generation and the energy security. I am confident enough that this documentation in the form of training manual would be immensely useful to the scientists, student, extension personnel, development agencies in understanding the potential of bioenergy and adoption of efficient energy conversion technologies. I appreciate the efforts of Dr. P. M. Nimkar, Dean Faculty of Agricultural Engineering, Dr. C. N. Gangde, Course Director and his colleagues in bringing out such excellent documentation.

V. M. Mayande
Vice-Chancellor

PREFACE

India is facing energy crisis due to depletion of non renewable fossil fuel reserves. In this scenario renewable sources of energy have to play an important role in years to come. Biomass (specially that based on agriculture and forestry) in this respect is expected to play a major role particularly in India. The efficient utilization of farm and forestry waste through appropriate technologies in the rural sector will provide ample opportunities for rural employment and income generation besides energy generation and saving of environment.

The winter school aims to address the issues related that would help the participating scientists / teachers in updating their knowledge in the area of efficient utilization of farm waste for energy generation. This compendium has been prepared to provide the teaching material to the participants of this winter school. It contains the lecture notes delivered by the expert scientist related to advanced technique of biomethanation, biogasification, briquetting, electricity generation from biomethanation and producer gas routes etc.

The comprehensive contents of this compendium have been planned with a definite purpose. Therefore, I am sure that this attempt will go a long way in helping farmers, extension workers, students, agricultural scientists, agricultural engineers, administrators and planners of our country and abroad in their efforts for integrated rural development.

I am grateful to Dr. V. M. Mayande, Vice Chancellor, Dr. PDKV, Akola for support and inspiration for conducting this winter school. I would like to express my sincere gratitude to the Indian Council of Agricultural Research, New Delhi for providing financial assistance and giving this opportunity to conduct the winter school. Thanks are due to the Dr. P. M. Nimkar, Dean, Faculty of Agricultural Engineering and Prof. S. R. Gadge, Head, Deptt. of Unconventional Energy Sources & Electrical Engineering for guidance, constant encouragement, provision of required facilities and active involvement in organizing this winter school.

I hope this compendium will provide a valuable source of information and will help to lead further advancement in utilization of farm waste.

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Waste is Wealth – An Overview

V.V. Kulkarni

Dear friends,

Welcome to the summer school on “Wealth from waste of poultry farm, livestock farm and poultry meat processing plants”.

Growth of human population along with rapid urbanization, industrialization is posing a great challenge for appropriate waste management initiatives and environmentalists. Another angle to waste utilization is augmenting profit to the producer. Technologies are available for waste utilization however some constraints like non availability of raw material in bulk, improper marketing strategies and unawareness etc. are the stumbling blocks in proving the theme - Waste is wealth.

What is waste?

Waste is the left over of the primary product

Waste is a material which is no longer required in the present form

Waste is the commodity not of much use to the processor

Waste is the inferior value product from main product

Waste is the used / overused / unserviceable item

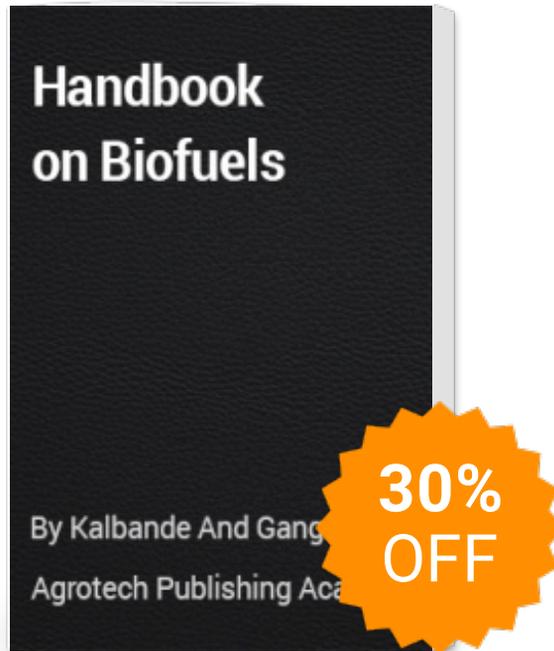
Waste is commodity having low marketing potential

Waste is a material which is in excess or surplus

Waste is the waste due to lack of awareness /importance/ technical know how

The Ministry of Environment has adopted the “5R's” as guiding factors in its approach to waste management

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