

PADDY STORAGE AND PROCESSING SYSTEMS UNDER RURAL SETTING

by

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**CENTRE FOR RURAL DEVELOPMENT AND
APPROPRIATE TECHNOLOGY**

SUBMITTED

***IN FULFILMENT OF THE REQUIREMENTS
OF THE DEGREE OF
DOCTOR OF PHILOSOPHY***



to the

INDIAN INSTITUTE OF TECHNOLOGY, DELHI

February 1990

**DEDICATED TO THE CAUSE OF
RURAL DEVELOPMENT**

CERTIFICATE

This is to certify that the thesis entitled PADDY STORAGE AND PROCESSING SYSTEMS UNDER RURAL SETTING submitted by Mr. NARESH KUMAR GANDHI to the Indian Institute of Technology, Delhi for the Award of Degree of DOCTOR OF PHILOSOPHY in Rural Development and Appropriate Technology is a record of bonafide research work carried out by him. Mr. NARESH KUMAR GANDHI has worked under our supervision and guidance and has fulfilled the requirement for submission of this thesis. In our opinion, the thesis is worthy of consideration for the Award of Degree of DOCTOR OF PHILOSOPHY in accordance with regulations of the Institute.

The research work embodied in this thesis have not been submitted, in part, or in full, to any other University or Institute for the Award of any other Degree or Diploma.



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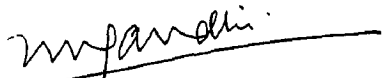
ACKNOWLEDGEMENT

The author is deeply indebted to Dr. (Mrs.) P. Vasudevan and Dr. Santosh and expresses his sincerest thanks for their esteemed guidance and help both in carrying out the field work as well as preparation of thesis. They have provided encouragement and ideas for carrying through the complete cycle of work.

For field data collection the support and cooperation has been received from Deputy Director (Agriculture), Gurgaon; Coordinator, Coordinated Research Project on Drainage, A.P. Agricultural University, Machilipatnam; Presidents of Primary Agricultural Cooperative Societies at Kurumaddalli and Elakurru; Sarpanches of villages Silani and Ghangola; Rice mill owners at Silani and Elakurru and Shri B.R.K. Reddy; the same is greatly acknowledged. Valuable assistance has been provided by Dr. N.K. Arora and in analysis of samples; thanks are extended for the same.

Useful discussions have been held and suggestions obtained from a number of experts on the subject. In this regard, author is highly thankful to Dr. T.D. Yadav, Shri K. Bhatia, Dr. G.K. Girish, Shri S.K. Tucker and Shri J.K. Sharma. Besides facilities and valuable support extended by Dr. A.W. Sohoni is gratefully acknowledged.

Thanks are also due to Ms. Sunil Bala, Mr. S.R. Koshal and Ms Kiran Bala for their valuable assistance in typing the thesis and preparing the charts and graphs with best of their efforts.


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ABSTRACT

A major proportion of foodgrain production is stored at farm level in traditional storage structures. The methods and practices followed by the farmers to preserve the grains need improvements. Currently, a sizeable proportion of the harvest is being lost due to various factors such as insects, rodents, micro-organisms, moisture, etc. Not only this, the farmers get their paddy processed in rice mills, utilising obsolete technology for which they pay heavy milling charges. These mills recover less rice with high percentage of broken grains and also generate bye-products of lower economic value.

Scientific advancements have resulted in the development of a wealth of technologies which can protect, preserve and process the paddy with minimum of losses and produce quality rice. But due to vastness of country and diverse technological requirements of the farmers in different regions, the assimilation of these technologies has not been to the desired level. The reason for this may be attributed to the lack of availability of location-specific technologies, non-availability of necessary resources and socio-cultural factors.

This study is an attempt in establishing the existing status of paddy storage & processing methods and suggesting appropriate methods for their adoption at farm level in two regions of country. The regions are located in most suitable and least suitable climates for storing grains. A field survey of households with different land holding was conducted to know the existing storage and processing methods used by the farmers. The samples at different time intervals were also drawn from storage structures and tested to assess the efficacy of storage. Milling efficiency of existing paddy processing systems was also determined.

During study, it was observed that farmers in least suitable climate (Region-I) store paddy in puri, pucca godowns and jute bags and in most suitable climate (Region-II) in jute bags or open in a corner of a room or kuthla. These structures are neither rat proof nor insect proof. As a result, rats and insects cause extensive damage. The stocks retained in puris lost almost 50 percent of germinative capacity in 6 months of storage and 100 percent in 12 months time. Paddy stored in godown lost the germinative capacity very sharply to almost one third in 6 months and to zero in 12 months of storage. Storage of paddy in jute bags retained the germinative capacity to a large extent. A loss of about 10 percent was observed in 6 months of storage. A weight loss of 1.21 percent in Region-I and 0.86 percent in Region-II was observed in 6 months period

due to weevilling. It increased to 2.09 percent in Region-I and 1.1 percent in Region-II during subsequent 6 months of storage.

Rhizopertha dominica, Sitotrogra cerealella, Laemophloeus minutus and psocids in Region-I Rhizopertha dominica, Psocids and Sitophilus oryzae in Region-II, were observed in paddy stored at farm level. To prevent and control the losses being caused by insects and rats, certain measures which can easily be implemented and require very little investment have only been suggested. These included the use of solar absorbance bed for drying paddy, erection of a base for puri and construction of a dwarf wall of 2 ft. height in the door of godown to control the menace of rats have been suggested.

To ensure an early adoption of the suggestions, involvement of research and extension agencies and the cooperatives has been suggested.

In order to save the farmer from exploitation by the miller and to improve the recovery of rice from his paddy, various technological and organisational alternatives have been examined. Setting of modern mini rice mill by cooperative society was observed to be an appropriate alternative. The suggested technology processed paddy into quality rice and generated bye-products of higher economic value than the traditional system. Profitability analysis indicated that the suggested alternative would break even

around one third of its capacity and enable the farmers to obtain higher quantity of quality rice at a lower cost. Further analysis indicated that the mill would be able to recover its investment at hundred percent capacity utilisation in an year.

The suggested measures are being implemented with the help of cooperative societies in two villages in one of the regions. The study has clearly brought out that to reduce storage and processing losses being incurred by the farmers, location-specific studies need to be carried out to identify their technological requirements. Suggested alternatives should be easy to comprehend and implement and require little or no cost for its implementation.

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