

TECHNOLOGY FOR RURAL DEVELOPMENT

VOLUME 1

PRODUCTION
ORIENTED &
EMPLOYMENT
GENERATING
TECHNOLOGIES

X90bA:m.2.31.N8
d3M3
204661

X90bA:m.2.31.N8
d3M3
204661



COUNCIL OF SCIENTIFIC AND
INDUSTRIAL RESEARCH
NEW DELHI-110001
OCTOBER, 1983

**PRODUCTION
ORIENTED &
EMPLOYMENT
GENERATING
TECHNOLOGIES**

**T
E
C
H
N
O
L
O
G
Y
F
O
R
R
U
R
A
L
D
E
V
E
L
O
P
M
E
N
T**



**COUNCIL OF SCIENTIFIC AND
INDUSTRIAL RESEARCH
NEW DELHI
OCTOBER, 1983**

PRINTED BY INSDOC, NEW DELHI-110012

FOREWORD

In the 17th century, foreign merchants who came to India usually complained that India was a bottom-less pit in which all the gold and silver they brought, disappeared. This was because the product of Indian industry was sought for in many countries abroad. The foreign products, on the other hand, could not compete with the Indian products in the home market.

Gradually, situation began to change. Modern science and technology brought about an industrial revolution in the West and Indian technology could not keep pace with these developments. It became obvious that dichotomy was not possible between the skills available in the cities and those in the rural markets. The two became totally inter-dependent on one another.

And yet in a country like ours, the bulk of the people living in rural areas was denied its share of the advantages of science and technology. While the country cannot progress without industrialisation on a massive scale, it is becoming clear that apart from agriculture, S&T can serve as a tool to improve the quality of life of the villagers.

The agents of change, by virtue of their aims and objectives and with the active participation of scientific community, can catalyse the use of S&T complementaries in the sphere of rural development which should help in achieving rapid and successful results. This needs educating and opening the minds of rural people towards the benefits of S&T. Different media can be used for this purpose in bridging the communication and information gap through audio-visuals, training and demonstration.

I am glad to note that scientists of CSIR have joined hands in this task and the techniques, tools and technologies developed by them can be adopted by people staying in rural and backward areas. The main raw materials of many of these technologies are available there. The present publication is an effort to convey the message of application of science and technology to prospective users and clients.

These technologies generally aim at optimum and scientific utilisation of local raw material and resources for generation of gainful employment. The publication meets the objectives of our Prime Minister's 20 Point Programme and will help in setting up industries in those districts where none exists.

I would, however, like to add that to help the scientists better, even their best promoters and users of these technologies should provide the necessary feedback. Similarly, for scientists, technologists and engineers, it will require an increasing awareness of rural realities and needs and increased efforts on their part to meet them.

I am specially impressed by the tabular presentation of this publication as at one place it provides a quick view of technologies under different heads and their claims from various angles of utilization. This will, I am sure, serve as a ready reckoner to all those who are engaged in taking the fruits of S&T to rural areas for employment generation and human resources development and especially to those who are looking forward to new entrepreneurship/projects and improved skills. The publication, I hope, will be useful as basic material for the Council for Advancement of Rural Technology (CART) in the Ministry of Rural Development, Government of India and the emerging State Councils of Science & Technology.



S. Nurul Hasan
Vice-President
Council of Scientific & Industrial
Research (CSIR)

P R E F A C E

There is, perhaps, no area of human activity which cannot benefit from science and technology (S&T). This potent source has, however, not been fully tapped for the socio-economic development of people in rural areas especially in creating gainful employment. There is thus a need for undertaking a judicious application of S&T in an integrated manner coupling natural and human resources with modern techniques and technologies and to demonstrate these to the rural population at their door-steps. This calls for identification of needs and expectations of people and the matching technologies and their promotion according to their ability to absorb them in different agro-climatic and ecological zones in the country.

Scientists of CSIR laboratories have developed many technologies which have direct and indirect relevance to rural development. A compendium of such technologies was first published in 1978 under the title "CSIR in the service of rural society". This was warmly welcomed by different sectors. Since then, there has been a constant demand for information on those technologies which have a direct bearing on generation of gainful employment in rural and backward areas. In view of this and the national objective of eradication of poverty and of employment generation in rural and backward areas, an attempt has been made to prepare such a publication. Most of the technologies discussed here either have been successfully commercialized or are in various stages of utilisation.

This publication aims at providing relevant data pertaining to selected technologies developed by different CSIR laboratories with economic and production objectives specially

- to optimise utilisation of local raw materials and resources;
- to help in production of value added products near the source;
- to help in economic utilization of byproducts and recycling of wastes; and
- to project new and modern technologies for self-employment.

These technologies generally aim at optimum and scientific utilisation of local raw material and resources for generation of gainful employment. The publication meets the objectives of our Prime Minister's 20 Point Programme and will help in setting up industries in those districts where none exists.

I would, however, like to add that to help the scientists better, even their best promoters and users of these technologies should provide the necessary feedback. Similarly, for scientists, technologists and engineers, it will require an increasing awareness of rural realities and needs and increased efforts on their part to meet them.

I am specially impressed by the tabular presentation of this publication as at one place it provides a quick view of technologies under different heads and their claims from various angles of utilization. This will, I am sure, serve as a ready reckoner to all those who are engaged in taking the fruits of S&T to rural areas for employment generation and human resources development and especially to those who are looking forward to new entrepreneurship/projects and improved skills. The publication, I hope, will be useful as basic material for the Council for Advancement of Rural Technology (CART) in the Ministry of Rural Development, Government of India and the emerging State Councils of Science & Technology.



S. Nurul Hasan
Vice-President
Council of Scientific & Industrial
Research (CSIR)

CONTENTS

	Page
FOREWORD	i
PREFACE	iii
TRANSPLANTATION OF TECHNOLOGY	1
AGRO-BASED TECHNOLOGIES	5
SPICE-BASED TECHNOLOGIES	11
MUSHROOM CULTIVATION AND PROCESSING	15
FERMENTATION-BASED TECHNOLOGIES	19
FOREST-BASED TECHNOLOGIES	23
POULTRY-BASED TECHNOLOGIES	27
MARINE-BASED TECHNOLOGIES	31
FISH-BASED	33
OTHER MARINE-BASED	34
MEDICINAL AND AROMATIC PLANTS	35
CULTIVATION OF MEDICINAL PLANTS	37
CULTIVATION & PROCESSING OF AROMATIC PLANTS	39
PLANT DRUGS AND ESSENTIAL OILS TECHNOLOGIES	41
PLANT DRUGS	43
ESSENTIAL OILS	44
LEATHER PROCESSING/TECHNOLOGIES	46

OTHER TECHNOLOGIES	51
UNITS WHICH HAVE GONE INTO PRODUCTION USING CSIR TECHNOLOGIES	55
ABBREVIATIONS OF CSIR LABORATORIES MENTIONED IN THE PUBLICATION	67
REGIONAL EXTENSION CENTRES/FIELD STATIONS OF CSIR LABORATORIES	69
INDEX (According to Raw Material)	71
INDEX (According to Cultivable Plants)	73

List of Abbreviations used

gal	-	gallon(s)
ha	-	hectare(s)
hp	-	horse power
hr	-	hour(s)
kg	-	kilogram(s)
kl	-	kilolitre(s)
kW	-	kilowatt(s)
kWh	-	kilowatt(s) per hour
q	-	quintal(s)
Rs	-	Rupees
t	-	tonne(s)
W	-	watt(s)
yr	-	year(s)

INDEX (ACCORDING TO RAW MATERIAL)

<i>Raw material</i>	<i>Technique/technology reference No.</i>	<i>Raw material</i>	<i>Technique/technology Reference No.</i>
1. Animal casings	68	31. Foliage	103
2. Apple	12	32. Fruits	10,12,24
3. Asafoetida	26	33. Garlic	29,
4. Aspergillin	47	34. Ginger	30,36,37
5. Bagasse	50	35. Gram	8
6. Bajra	72	36. Grapes	11,12,20
7. Banana	1,12	37. Grass	51
8. Beet root	9	38. Guava	12
9. Carbon-steel plates	104	39. Isapgol	84
10. Cardamom	37	40. Jajoba	71
11. Cashew nut	99	41. Jasmine flowers	86
12. Castor seeds	2	42. Kokum	9
13. Cedrus deodara	52	43. Leather	94-97
14. Cement	102	44. Leaves	106
15. Chicken broiler	57	45. Lemon grass	91
16. Chillies	27,28,36	46. Lime/Lime oil	16,90
17. Chir-resin	55	47. Maize	13
18. Cinnamon leaves	91	48. Milk	44
19. Citronella grass	88,91	49. Mint oil	92
20. Citrus oil	90	50. Mushroom	39-42
21. Clay	100, 113	51. Muskmelon seeds	108
22. Cocoa beans	3	52. Mustard seeds	31
23. Coconuts	4,5,6	53. Onion	72
24. Corncobs	48	54. Oranges	46
25. Cotton linters/rags	7,109	55. Paddy	21
26. Dhaincha seeds	53	56. Paddy straw	42,50
27. Egg	58,59,60,61	57. Palmarosa grass	91
28. Eucalyptus	89	58. Papaya latex	14,15
29. Fish	63-69,	59. Paper board	110
30. Flowers	86,87,93,103	60. Paper, waste	51

<i>Raw material</i>	<i>Technique/technology Reference No.</i>
61. Pepper	32-35
62. Pig iron	101
63. Pine apple peels	48
64. Pine needles	49,50,54
65. Plastic sheet	111
66. Potato	17,18
67. Pulses	19
68. Pyrethrum flowers	85
69. Ragi	8
70. Rhizopus, strain of	45
71. Rice husk ash	112
72. Rose flower	86,93

<i>Raw material</i>	<i>Technique/technology Reference No.</i>
73. Salt	107
74. Sea weeds	70
75. Sesame seeds	22
76. Sugar beet	72
77. Sugary material	48
78. Tamarind	56
79. Turmeric	9,36,38
80. Vegetables	10,24,98
81. Walnuts	23
82. Wheat	25
83. Wheat straw	50

INDEX (ACCORDING TO CULTIVABLE PLANTS)

<i>Plant</i>	<i>Technology/technique Reference No.</i>
1. Balladonna	73
2. Dioscorea	74
3. Germanium	78
4. Japanese mint	79
5. Java citronella	80
6. Lemon grass	81
7. Mushroom	39, 42
8. Palmarosa	82
9. Peppermint	83
10. Periwinkle	76
11. Pyrethrum	75
12. Serpentina root	77
