Price of 8 Booklets Rs 2,600  US$350
Postage (1 Set) Rs 200

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Subtitle</th>
<th>Price</th>
<th>US$</th>
<th>Postage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Agricultural Technologies</td>
<td>(Crop Science)</td>
<td>350</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>2.</td>
<td>Agricultural Technologies</td>
<td>(Horticulture Science - Vol. I)</td>
<td>350</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>3.</td>
<td>Agricultural Technologies</td>
<td>(Horticulture Science - Vol. II)</td>
<td>350</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>4.</td>
<td>Agricultural Technologies</td>
<td>(Animal Science)</td>
<td>350</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>5.</td>
<td>Agricultural Technologies</td>
<td>(Natural Resource Management)</td>
<td>350</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>6.</td>
<td>Agricultural Technologies</td>
<td>(Agricultural Engineering - Vol. I)</td>
<td>350</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>7.</td>
<td>Agricultural Technologies</td>
<td>(Agricultural Engineering - Vol. II)</td>
<td>350</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>8.</td>
<td>Agricultural Technologies</td>
<td>(Fisheries)</td>
<td>150</td>
<td>25</td>
<td>50</td>
</tr>
</tbody>
</table>

Copies available from:
Business Manager
Directorate of Knowledge Management in Agriculture
ICAR Krishi Anusandhan Bhavan-I, Pusa, New Delhi 110 012
E-mail : bmicar@gmail.com; Website: www.icar.org.in
Indian agriculture has overcome several challenges in the past and achieved phenomenal success ensuring self-sufficiency in food production. The technologies generated within the National Agricultural Research system (NARS) have significantly contributed to the transformation of Indian agriculture and ushering Rainbow Revolution representing Green, White, Golden, Brown and Blue revolutions defining outstanding technology-led performance in foodgrain, milk, oilseeds and pulses, horticulture and fisheries sectors. Agriculture along with other primary sectors is a major source of strength for the Indian economy. However, burgeoning population, increasing demand for food, feed and fodder, decreasing land availability, natural resource degradation, decreasing factor productivity, climate change, slow growth in farm income and new global trade regulations have put new challenges threatening food, nutritional and livelihood security.

Technological interventions by the NARS have led to spectacular accomplishments relating to input use efficiency, climate resilience, mechanization and secondary agriculture leading to economic transformation. These coupled with the application of information and communication technology will play a critical role in our future endeavours to accelerate agricultural growth in the country. I am glad that the Subject Matter Divisions of Indian Council of Agricultural research (ICAR) have synthesized and compiled practical and useful technologies in this series of seven publications on Agricultural Technologies in a user-friendly mode. I am sure this information will be useful to farming user-friendly mode. I am sure this information will be useful to farming community, extension agencies, entrepreneurs and agro-industries in their efforts to make Indian agriculture economically viable and ecologically secure.

Krishi Bhavan
New Delhi - 110001

(Sharad Pawar)
Agriculture is the corner-stone of Indian economy. About 70% of India’s 1.27 billion population live in rural areas with small and marginal land holdings. India with a geographical area of over 328 million hectares is endowed with diversity of climate, soils and vegetation. This rich resource endowment is, however, threatened with ever increasing population, vagaries of nature and climate change. The National Agricultural Research System (NARS) comprising the Indian Council of Agricultural Research (ICAR), 55 State Agricultural Universities, five Deemed Universities, four Central Universities with agriculture faculty, one Central Agricultural University and 636 Krishi Vigyan Kendras have attained excellence in several frontier areas of agricultural sciences and technology contributing significantly towards the spectacular growth of Indian agriculture during past 60 years.

Initiatives by NARS in the country have led to notable accomplishments resulting in the socio-economic transformation of farmers. The agriculture sector is, however, witnessing radical changes and challenges both at national and global level. The emerging challenges and opportunities necessitate wider and faster adoption of the improved technologies by all the stakeholders right from production to consumption in a food chain. In an effort to achieve this, the divisions of crop science, horticulture, animal science, natural resources management, fisheries and agricultural engineering in the ICAR have compiled the technologies already commercialised and the technologies ready for commercialisation. This series of publications, brings out the salient features of the technologies with details on potential users and contact details of the developers for ready and easy access. It will be our endeavour to periodically update this Technology Series. I hope that this publication would be useful to the farming community, extension agencies, entrepreneurs and industry. I greatly appreciate the efforts put in by my colleagues in the Council, research institutes and State Agricultural Universities (SAUs) in bringing out this compilation.

(S. Ayyappan)
Secretary
Department of Agricultural Research & Education
and
Director General
Indian Council of Agricultural Research
New Delhi

January 2014
New Delhi
The agricultural engineering division of ICAR is primarily involved in the areas of farm mechanization, precision farming, energy in agriculture, post-harvest management and value addiction of agricultural, livestock and aquatic produce. The technologies developed by the institutes and the AICRPs are disseminated to the stakeholders through various channels. Transfer of technology to the farmers and the entrepreneurs has always remained a challenge. Engineering interventions in agriculture have become imperative to improve productivity, reduce the cost of production and drudgery, and improve livelihood opportunities. Farm mechanization for timeliness of operations, precision farming for improved input use efficiency, processing technologies for value addition and reduction in post-harvest losses, conservation of natural resources and energy management are the core areas. Technologies have been developed and commercialized in these areas.

Over the years, the network of institutions have been strengthened, but it still cannot reach the vast majority of stakeholders. The Engineering Division of ICAR has compiled two publications in the form of compendium of “Agricultural Engineering Technologies – Commercialised” and “Agricultural Engineering Technologies – Ready for Commercialisation”. The publications have been subdivided into sections on Seed Bed Preparation, Equipment, Value-Added Products, Irrigation and Renewable Energy and Miscellaneous Technologies to easily locate the relevant technologies. The salient features, performance results, cost (the cost is indicative depending on the place and year of development) impact and benefits, address of manufacturers and the institute where it has been developed have been included for each technology. I am confident that this publication will be useful to all the stakeholders involved in agriculture including extension personnel and entrepreneurs. I appreciate the efforts put in by my colleagues Dr K K Singh, ADG (PG), Dr K K Singh ADG (Engg.), Dr S Ganesan, Dr Devinder Dhingra, Dr K P Singh, Dr K N Aggarwal, Dr Nilesh Gaikwad and Ms Monika Sharma in compilation of the document.

Dr Rama Rao
National Director
NAIP, ICAR, New Delhi
# CONTENT

Message iii
Foreword v
Preface vii

## Seedbed Preparation Machinery

Cotton Stalk Puller 1
Animal Drawn Tendua Iron Plough 2
Animal Drawn Improved Blade Harrow 3
Animal Drawn IGKV Biasi Plough 4
Wheeled Type Multipurpose Tool Carrier 5
Tractor Operated Peg Type Puddler 6
Tractor Operated Post Hole Digger 7

## Seeding and Planting Machinery

CRRI Manual Drum Seeder 8
CRRI Manual Rice Transplanter 9
CRRI Two-Row Manual Seed Drill 10
Manual Onion Drum Seeder 11
Multi-Row Manual Jute Seed Drill 12
Manually Operated Eight-Row Improved Direct PaddySeeder 13
Women Friendly Direct Paddy Seeder 14
Women Friendly Fertilizer Broadcaster 15
Animal Drawn Three-Row Seed-cum-Fertilizer Drill 16
Animal Drawn Rice Drum Seeder 17
Animal Drawn Bhoram Deo Seed Drill 18
Animal Drawn VL Seed-cum-Ferti Drill 19
Animal Drawn Seed-cum-Ferti Drill 20
Rabi Seed-cum-Ferti Drill 21
Indira seed-cum-Fertilizer drill (Animal Drawn) 22
Animal Drawn Three-Row Inclined Plate Planter 23
Zero-Till Drill (Power Tiller Operated) 24
CRRI Tractor Operated Seed Drill 25
Tractor Operated Zero-Till Drill 26
Tractor Operated Strip Till Drill 27
Tractor Operated 6-row Inclined Plate Planter 28
Tractor Operated 6-Row Pneumatic Planter 29
Tractor Operated Seed-cum-Fertilizer Drill for Onion 30
<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tractor Drawn Cultivator Tines Zero Till Seeds-cum-Fertilizer Drill</td>
<td>31</td>
</tr>
<tr>
<td>Pusa Aqua-Ferti-Seed Drill</td>
<td>32</td>
</tr>
<tr>
<td>Tractor Drawn Automatic Potato Planter</td>
<td>33</td>
</tr>
<tr>
<td>Motor Operated Rotary Dibber and Vacuum Seeder</td>
<td>34</td>
</tr>
<tr>
<td>Media Filling, Levelling, Dibbling, Sowing and Watering Machine</td>
<td>35</td>
</tr>
<tr>
<td><strong>Weeding and Plant Protection Machinery</strong></td>
<td>36</td>
</tr>
<tr>
<td>Gender Friendly Rice Weeder</td>
<td>36</td>
</tr>
<tr>
<td>CIAE Bullock Drawn Sprayer</td>
<td>37</td>
</tr>
<tr>
<td>Tractor Operated Rotary Weeder</td>
<td>38</td>
</tr>
<tr>
<td>Tractor Operated Air Sleeve Boom Sprayer</td>
<td>39</td>
</tr>
<tr>
<td>Tractor Operated Raised Bed Weeder</td>
<td>40</td>
</tr>
<tr>
<td><strong>Harvesting Machinery</strong></td>
<td>41</td>
</tr>
<tr>
<td>Manual Fruit Harvester</td>
<td>41</td>
</tr>
<tr>
<td>Manual Mango Harvester</td>
<td>42</td>
</tr>
<tr>
<td>Manual Lime Harvester</td>
<td>43</td>
</tr>
<tr>
<td>Manual Sapota and Guava Harvester</td>
<td>44</td>
</tr>
<tr>
<td>Manual Cassava Harvester</td>
<td>45</td>
</tr>
<tr>
<td>Self-Propelled Vertical Conveyor Reaper (Walk behind Type)</td>
<td>46</td>
</tr>
<tr>
<td>Tractor Operated Turmeric Digger</td>
<td>47</td>
</tr>
<tr>
<td>Tractor Drawn Hydraulic Platform for Harvesting, Pruning and Spraying</td>
<td>48</td>
</tr>
<tr>
<td>Self-propelled Hydraulic Multi-purpose System</td>
<td>49</td>
</tr>
<tr>
<td>Women Friendly Sugarcane Detrasher</td>
<td>50</td>
</tr>
<tr>
<td>Tractor Operated Straw Reaper-cum-Trailer</td>
<td>51</td>
</tr>
<tr>
<td>Tractor Operated Straw Combine</td>
<td>52</td>
</tr>
<tr>
<td><strong>Threshing Machinery</strong></td>
<td>53</td>
</tr>
<tr>
<td>Groundnut Stripping Frame</td>
<td>53</td>
</tr>
<tr>
<td>Women Friendly Pedal Operated Rice Thresher</td>
<td>54</td>
</tr>
<tr>
<td>VL Rice Thresher</td>
<td>55</td>
</tr>
<tr>
<td>Manual Double Drum Rice Thresher</td>
<td>56</td>
</tr>
<tr>
<td>High Capacity Multi-crop Thresher</td>
<td>57</td>
</tr>
<tr>
<td>Whole Crop Maize Thresher</td>
<td>59</td>
</tr>
<tr>
<td>High Capacity Multi-crop Thresher</td>
<td>60</td>
</tr>
<tr>
<td><strong>Post Harvest</strong></td>
<td>62</td>
</tr>
<tr>
<td>Power operated winnower</td>
<td>62</td>
</tr>
<tr>
<td>Portable Winnower</td>
<td>63</td>
</tr>
<tr>
<td>CRRI Power Operated Paddy Winnower-cum-Cleaner</td>
<td>64</td>
</tr>
<tr>
<td>Turmeric Washing and Polishing Machine</td>
<td>65</td>
</tr>
<tr>
<td>Single Drum Rotary Screen Grain Pre-cleaner</td>
<td>66</td>
</tr>
<tr>
<td>Cotton Pre-cleaner</td>
<td>67</td>
</tr>
</tbody>
</table>
Pedal-cum-Power Operated Cleaner 68
Pedal-cum-Power Operated Double Screen Cleaner-Grader 69
Spices Cleaner-cum-Grader 70
Grain Cleaner – (Manual / Motorized) 71
Fruit and Vegetable Washing Machine 72
Fruit Grader 73
Fruit and Vegetable Grader 74
Raw Mango Grader 75
Maize Dehusker Sheller 76
Groundnut Decorticator for Women 77
Groundnut/Sunflower Decorticator with Feeder and Separator 78
Pedal Operated Maize Dehusker Sheller 79
Mahua Seed Decorticator 80
Chilli Seed Extractor 81
Onion Seed Extractor 82
Motorized Vegetable Seed Extractor 83
Garlic Bulb Breaker 84
Pomegranate Aril Extractor 85
Banana Comb Cutter 86
Manual Pineapple Peeler-cum-Corer 87
Raw Mango Peeler 88
Garlic Clove Peeler 89
Hand Operated Pomegranate Aril Remover 90
White Pepper Decortication Machine 91
Oil Palm Empty Fruit Bunch Fibre Extractor 92
Cassava Peeling knife 93
Banana Fibre Extractor 94
Portable Gins 95
Hand Tool for Easy Separation of Arils from Pomegranate 96
Millet thresher-cum-pearler 97
Soybean Dehuller 98
Automatic Custard Apple Pulper 99
Manual Arecaanut Dehusker 100
Women Friendly Rotary Arecaanut Dehusker 101
Cassava Chipping Machine 102
Palmyrah Fibre Separator 103
Miniature Spinning System 104
Makhana Popping and Decortication Machine 106
PKV Mini Dal Mill 107
CIAE Mini Dal Mill 109
Multi-purpose Grain Mill 110
Rice Flaking Machine 111
Grain Puffing Machine
Soybean Flaking Machine
Cottage Scale Soy Paneer Plant
Paneer Pressing Device
Raw Mango Slicer
Raw Mango Cube Cutter
Tamarind Dehuller-cum-Deseeder
Bio Mass Fired Copra Dryer
Small Scale Lac Processing Unit
Dal Chakki
Mini Dal Mill
Multi Purpose Grinder
Autoclavable Microencapsulation System
Microencapsulator for Production of Microcapsule
Ohmic Heating System for Stabilization of Rice Bran
Urea Molasses Mineral Block (UMMB) Machine
PUSA Mobile Feed Block Machine
Complete Animal Feed Block Formation Machine
Powered Animal Feed Mixer
Feed Granulator
Animal Feed Crusher
Evaporative Cooled Structure (5-7 ton)
Evaporative Cooled Room (2 ton)
Porous Bricks

Post Harvest Processes and Products
Nutraceuticals from Food and Non-Food Crops
Pusa Fruit Drinks
Nutri Aonla Candy/ Pusa Aonla Candy
Technology for Fruit Bar
Osmotic Dehydration of Fruits and Vegetables Slices
Banana Health Drink
Banana Flower Pickle (Thokku)
Banana Stem Pickle
Banana Flour Soup Mix using Dried Banana Flower and Flour
Enzyme Clarified Ready to Serve Banana Beverage
Fruit Beverage Concentrate
Mahua Flower Products
Value Added Products from Bael (Stone Apple)
Osmo-Dehydrated Pineapple Products
Cashew Apple Beverages
Cherry Squash
Plum Appetizer 154
Cherry Candy 155
Whey based Mango-Herbal Beverages 157
Bottled Sugarcane Juice 158
Liquid Jaggery Production Process 159
Method of Determining Maturity of Intact Mango on Tree 160
Green Chilli Puree and Powder 161
Dried Onion Flakes and Powder 162
Coriander Dal Milling 163
Animal Feed from Potato Processing Waste 164
Banana Flour based Biscuits 165
Banana Flour 166
Finger Millet Biscuits 167
Full Fat Soyflour Biscuits 168
Process for Pusa Bajra Puff 169
Value Added Fried Food Products from Cassava Composite Flour 170
Pusa – Shakti (Quality Protein Maize Chatpati) 171
Dilkhush (Quality Protein Maize Instant Kheer Mix) 172
Ready to Constitute Makhana Kheer Mix 173
Proteino-H (Kadhi Mix) 174
Soy Shrikhand 175
Soy Sattu 176
Process for Pusa Soy Nut 177
Soymilk and Soypaneer (Tofu) 178
Groundnut Beverage, Curd and Paneer 179
Pickled Quail Eggs 181
Chicken Gizzard Pickle 182
Cooked Chicken Stock (One Minute Curried Chicken) 183
Mixed Chicken Loaf 184
Cooked Chicken Roll 185
Functional Chicken Nuggets 186
TANUVAS Chicken Patties and Sausage 187
Value Added Products from Fish 188
Ready-to-Serve Fish Curry 189

Irrigation and Renewable Energy Gadgets 190
Low Lift Hand Pump (Manual) 190
Multipurpose Poly house Solar Dryer 191
Solar Tunnel Dryer (One tonne and Two tonne capacity) 192
Walk in Type Solar Tunnel Dryer 193
Packed Bed Solar Air Heater / Dryer 195
Solar Tent Dryer 197
Solar PV Refrigerator 198
Low Height tunnel solar dryer 199
Double reflector solar cooker 201
Solar cocoon stifler 202
Solar cabinet dryer 204
Large Capacity Fixed Dome High TSC Animal Dung Based Biogas Plants
SPRERI Domestic Cook Stove 207

**Miscellaneous Equipment** 208
Coconut Tree Climber 208
Auto-Grooving Machine 209
Compost Sieving Machine 210
Motorised Media Siever 211
Media Mixer (Motor Operated) 212
Rooting Media Sieve, Mixer and Bag filler 213
Spawn Innoculators 214
Treated Rubber Wood Canoes and Rubber Wood Canoes Coated with FRP
Cheaper Wood Canoes Coated with Fibre Reinforced Plastic (FRP) 215
Boiled Grain and Chalk Powder Mixer
Cotton Stalk Puller

Salient features

- Manually operated by single person to uproot the cotton stalks.

Performance

- Effective field capacity: 0.025 ha/h

Cost

- Unit cost: ₹ 700

Impact and benefits

- Uprooting of cotton stalks requires less force due to firm grip of jaws and mechanical advantage of the lever arm.
- Reduction in drudgery in cotton stalk uprooting.

Manufacturer

- M/s Samad Engg Works
  Parbhani (Maharashtra)

Contact

Head
Department of Farm Machinery and Power
College of Agricultural Engineering
Marathwada, Krishi Vidyapeeth, Parbhani 431402 (Maharashtra)
Animal Drawn Tendua Iron Plough

Salient features
- Tendua iron plough developed as substitute to traditional wooden plough of Chhattisgarh. A steel shovel is fixed at lower end of plough, which can be replaced after being worn out.

  Dimension (l×w×h) : 23×7.5×620 mm
  Weight with beam : 22.5 kg

Performance
- Field capacity : 0.015 ha/h
- Draught : 634 N
- Power required : 0.38 kW

Cost
- Unit cost : ₹ 2,000

Impact and benefits
- Working life increases to 5 years compared to 2 years of traditional wooden plough and higher field capacity.
- Reduced cost of cultivation due to improvement in service life.

Manufacturers
- M/s Batala Engineering Works
  Hirapur Road Sarvodaya Colony, Telibandha, Raipur (Chhattisgarh)
  Tel.: 0771-6065555  E-mail: batalaengg@gmail.com
- M/s Asian Trading Company, Station Road
  Raipur (Chhattisgarh)
  Tel.: 098261-55595; 094255-01352  E-mail: replayatco@yahoo.co.in

Contact
Research Engineer
AICRP on Utilization of Animal Energy
College of Agricultural Engineering
Indira Gandhi Krishi Vishwavidyalaya, Raipur 492006 (Chhattisgarh)
Tel.: 0771-2102575 Fax: 0771-2442131, 2442302
Animal Drawn Improved Blade Harrow

Salient features
- Blade harrow is used for shallow tillage, weed control and in-situ soil moisture retention. The blade width has been standardized as 600 mm for bullocks of Madhya Pradesh. One roller attachment has been provided for light pressing of top soil.
  - Blade size: 600 mm
  - Weight: 65 kg

Performance
- Draught: 60 kg
- Field capacity: 0.072 ha/h

Cost
- Unit cost: ₹2,500
- Cost of operation: ₹365/ha

Impact and benefits
- Life of improved blade harrow is 5 years as compared to 2 years of traditional blade harrow. Due to proper matching of blade size as per draught ability of bullocks, it is possible to achieve a higher field capacity (0.072 ha/h) for improved blade harrow as compared to conventional blade harrow (0.059 ha/h). There is a saving in ₹92/ha for each operation of blade harrow.

Manufacturers
- M/s Narayana Agril.Works
  Dewas Indore Road, Dewas (Madhya Pradesh)
- M/s Farm Tools Works
  PO - Khurai, Sagar (Madhya Pradesh)
- Prototype Production Centre
  Central Institute of Agricultural Engineering, Bhopal 462038 (Madhya Pradesh)

Contact
Director
Central Institute of Agricultural Engineering, Nabi Bagh, Berasia Road, Bhopal 462038 (Madhya Pradesh)
Tel.: (0755) 2737191, Fax: (0755) 2734016
E-mail: director@ciae.res.in
Animal Drawn IGKV Biasi Plough

**Salient features**
- Biasi is a traditional intercultural operation carried out in line sown/ broadcast rice in paddy fields under standing water. The tynes are made of MS flat and the desired curvature is given to the tynes by forging. A shoe type furrow opener is used.
  - Dimensions (l×w×h) : 800×500 ×850 mm
  - Ground clearance : 285 mm
  - No. of tynes : 3
  - Spacing of tynes : 200 mm

**Performance**
- Field capacity : 0.11 ha/h
- Draught : 550-650 N

**Cost**
- Unit cost : ₹ 4,500
- Cost of operation : ₹ 600 / ha

**Impact and benefits**
- As compared to the traditional plough, there is 50% saving in time and cost of operation.
- Improvements in traditional technology, therefore, ease in adoption and higher social acceptance.

**Manufacturers**
- M/s Batala Engineering Works
  Hirapur Road Sarvodaya Colony, Telibandha, Raipur (Chhattisgarh)
  Phone: 0771-6065555  Email: batalaengg@gmail.com
- M/s Asian Trading Company, Station Road
  Raipur (Chhattisgarh)
  Tel.: 098261-55595; 094255-01352  E-mail: replayatco@yahoo.co.in

---

**Contact**
Research Engineer
AICRP on Utilization of Animal Energy
College of Agricultural Engineering, Indira Gandhi Krishi Vishwavidyalaya,
Raipur 492012 (Chhattisgarh)
Tel.: 0771-2102575, 2442575  Fax: 0771-2442131, 2442302
E-mail: sjogdand2000@yahoo.com
Wheeled Type Multipurpose Tool Carrier

Salient features
- Consists of a rectangular shaped toolbar frame, pneumatic wheels with screw jack and beam. Operations possible with toolbar frame are ploughing, secondary tillage with cultivator, sowing, bed forming, and bund making. In addition it has a trailer attachment as well as provision for attaching water tank.

Performance
- Field capacity: 0.05-0.32 ha/h with different attachments
- Draught: 280-710 N

Cost
- Unit cost: ₹ 30,000
- Cost of operation: ₹ 170-1,000/ha

Impact and benefits
- The major advantages are 300-400% increased field capacity.

Manufacturers
- M/s M.M. Engineering Works
  M. I.A. Near UCCI Office, Road No. 12, Plot No. G1-469B
  Udaipur 313 003 (Rajasthan)
- M/s Kalpana Enterprises
  NB Complex, Plot No. 48, Near Pratap Nagar Thane ke pass
  Udaipur 313 001 (Rajasthan)
- M/s Jain Engineering Works
  Udaipur (Rajasthan)

Contact
Research Engineer
AICRP on Utilization of Animal Energy
College of Agricultural Engineering
MPUAT, Udaipur 313001 (Rajasthan)
Tel.: 0294-2471056, Fax: 0294-2470682 E-mail: dean@ctae.ac.in
Tractor Operated Peg Type Puddler

Salient features
- The puddler is operated in 50-100 mm of standing water and produces a good puddle.
  - Dimension (l×w×h) : 2,000×630×680 mm
  - Weight : 90 kg

Performance
- Field capacity : 0.40 ha/h

Cost
- Unit cost : ₹ 9,000
- Cost of operation : ₹ 800-1,000/ha

Impact and benefits
- It saves two passes and ₹ 2,200/ha. It can cover 12 ha more command area in a season of 100 h of use. The economic benefit per unit per season is ₹ 26,000.
- Reduces drudgery and allows timeliness of operation.

Manufacturers
- M/s Mahindra and Mahindra Ltd.
  FES Tractor Division, Akurli Road, Kandivli East,
  Mumbai 400 101 (Maharashtra)
  Tel.: 022-66483630, 66483682
  E-mail: shirvaikar.rajeev@mahindra.com; bhade.madhav@mahindra.com

Contact
Director
Central Institute of Agricultural Engineering
Nabi Bagh, Berasia Road, Bhopal 462038 (Madhya Pradesh)
Tel.: 0755-2521001, 2737191, Fax: 0755-2734016
E-mail: director@ciae.res.in
Tractor Operated Post Hole Digger

Salient features
- Consists of an auger driven through tractor power take off for plantation of horticultural and forestry crop. The size of auger defines the size of pit formed. The augers of size 450-600 mm diameter and 900 mm working length are commonly used.

Performance
- Capacity : 40-50 pits/h

Cost
- Unit cost : ₹ 60,000
- Cost of operation : ₹ 450/h

Impact and benefits
- Easy to operate with higher output capacity besides timeliness of operation, and considerable saving of manual labour, time and money.

Manufacturers
- M/s Jhandeana Industries  
  C-70, Focal Point, G.T. Road, Moga 142 001 (Punjab)  
  Phone: 01636-228511 Email: jhandeanac_70@yahoo.co.in
- M/s Rattan Agro Industries  
  C-68-70, Focal Point, G.T. Road, Moga 142 001 (Punjab)  
  Tel.: 01636-228511, 231208 E-mail: rattan_c69@yahoo.co.in

Contact
Project Coordinator  
AICRP on Farm Implements and Machinery  
Central Institute of Agricultural Engineering  
Nabi Bagh, Berasia Road, Bhopal 462038 (Madhya Pradesh)  
Tele Fax: 0755-2733385  
E-mail: fim@ciae.res.in; director@ciae.res.in
CRRI Manual Drum Seeder

**Salient features**
- Suitable for seeding of rice in puddled soil.

  - **Dimension:** 1,800×1,540×1,320 mm
  - **Row spacing:** 150-200 mm
  - **Hill spacing:** 100-150 mm
  - **Seed rate:** 60-80 kg/ha
  - **Weight:** 10 kg

**Performance**
- **Field capacity:** 0.057 ha/h

**Cost**
- **Unit cost:** ₹ 5,500
- **Cost of operation:** ₹ 800/ha

**Impact and benefits**
- The weeding of drum-seeded rice field can be easily done using paddy weeder.
- Net manpower saving of 148 man-hours/ha and 70% time.
- Reduces drudgery of the rice cultivators.

**Manufacturers**
- M/s Sidheswar Engineering
  Bidhyadharpur, P.O. Naya Bazar, Cuttack 753004 (Odisha)
  Mobile: 09937413942  Email: banshidhar.ojha@gmail.com
- Odisha Farm Machinery Research and Development Centre (OFMRDC)
  Satyanagar, Bhubaneswar 751007 (Odisha)
  Tel.: 0674-2572710  E-mail: ofmrdc.dag@nic.in

**Contact**
- Director
  Central Rice Research Institute
  Cuttack 753006 (Odisha)
  Tel.: 0671-2367777-287
  E-mail: directorcrri@sify.com, crrictc@nic.in
CRRI Manual Rice Transplanter

Salient features

- A manually operated implement suitable for transplanting of rice seedling in puddled soil.
  
  Type of seedling: Mat type
  
  Tray size: 480×220×15 mm

Performance

- Field capacity: 0.02 ha/h

Cost

- Unit cost: ₹ 7,000
- Cost of operation: ₹ 2,416/ha

Impact and benefits

- Reduces drudgery
- Avoid bending posture of farm women for longer duration

Manufacturers

- M/s Sidheswar Engineering
  Bidhyadharpur, P.O. Naya Bazar, Cuttack 753004 (Odisha)
  Mobile: 09937413942  Email: banshidhar.ojha@gmail.com

- Odisha Farm Machinery Research and Development Centre (OFMRDC)
  Satyanagar, Bhubaneswar 751007 (Odisha)
  Tel.: 0674-2572710  E-mail: ofmrdc.dag@nic.in

Contact

Director
Central Rice Research Institute
Cuttack 753006 (Odisha)
Tel.: 0671-2367777-287
E-mail: directorcrri@sify.com, crrictc@nic.in
CRRI Two-Row Manual Seed Drill

Salient features
- It is useful for line sowing of rice for wet and dry soil condition. It saves seed and labour.
  - No. of rows : 2
  - Row spacing : 200 mm

Performance
- Field capacity : 0.05 ha/h

Cost
- Unit cost : ₹ 1,500
- Cost of operation : ₹ 950/ha
- Payback period : less than a year

Impact and benefits
- The ease in weeding operation, using paddy weeder, in line sown paddy field.
- Saving in time and manpower.
- Ease in adaptation owing to less weight.
- It reduces drudgery of farmers in seeding and weeding operation.

Manufacturers
- M/s Sidheswar Engineering
  Bidhyadharpur, P.O. Naya Bazar, Cuttack 753004 (Odisha)
  Mobile: 09937413942  Email: banshidhar.ojha@gmail.com
- Odisha Farm Machinery Research and Development Centre (OFMRDC)
  Satyanagar, Bhubaneswar 751007 (Odisha)
  Tel.: 0674-2572710  Email: ofmrdc.dag@nic.in

Contact
Director
Central Rice Research Institute
Cuttack 753006 (Odisha)
Tel.: 0671-2367777-287
E-mail: directorcrri@sify.com, crrictc@nic.in