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# Women in Agri-Tech: Reducing Drudgery, Boosting Productivity

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In India, rural women continue to form the majority of the agricultural workforce, with recent labour statistics showing that around 64.4 % of people engaged in agriculture are women — a figure that has been rising steadily in the last few years. This reflects not only the sheer scale of women's involvement in farming but also a broader social shift, where women now shoulder a significant share of farm operations from land preparation to post-harvest work. According to the latest Periodic Labour Force Survey data, about 76.9 % of rural women were engaged in agriculture in 2024, up from previous years, even as rural male participation declined. This suggests that two out of every three rural women are actively involved in agricultural processes, managing key tasks such as sowing, weeding, harvesting, and grain processing.

This "feminisation of agriculture" has been driven by several factors, including male out-migration to urban areas, limited alternative employment opportunities in villages, and entrenched social norms assigning agriculture and household responsibilities to women. Despite their immense contribution, many women in agriculture remain unpaid family workers and have limited access to productive resources like land, credit, or technology. The predominance of women in agriculture makes it all the more critical to address the physical strain they endure due to outdated tools and drudgery, which can affect their health and productivity. Improving access to ergonomically designed equipment and supportive technologies not only eases this burden but also enhances productivity and contributes to women's social and economic empowerment in rural communities.

## Drudgery in Agriculture and Its Adverse Effects

In rural India, women form the backbone of farm labor, yet they often face intense physical strain due to traditional agricultural practices. Drudgery, defined as hard, repetitive, and physically exhausting work, is a persistent challenge in agriculture, particularly for women who combine fieldwork with household responsibilities. Research shows that rural women typically spend 8–10 hours daily in farm activities, including sowing, weeding, harvesting, and post-harvest handling, followed by domestic chores.

The primary causes of drudgery include prolonged bending, heavy manual labor, repetitive use of non-ergonomic tools, and exposure to harsh environmental conditions. This continuous physical exertion leads to musculoskeletal disorders, fatigue, and other health issues, which not only compromise their well-being but also reduce their productivity (Table 1). Drudgery has broader socioeconomic implications: it limits women's participation in income-generating activities, reduces their efficiency on the farm, and can prevent them from

engaging in education or skill development. Addressing this issue through women-friendly tools, ergonomic practices, and supportive technologies is essential to improve their health, productivity, and empowerment.

**Table 1: Adverse Effects of Drudgery on Rural Women in Agriculture**

| Problem Area | Causes | Effects |
|---|---|---|
| Musculoskeletal Disorders | Prolonged bending and manual labor | Chronic back pain, spinal deformities, joint issues |
| Energy Wastage | Manual tools requiring repetitive effort | Reduced efficiency, lower yield per unit effort |
| Health Risks | Exposure to dust, pesticides, and extreme weather | Respiratory problems, skin ailments, fatigue |

## Advanced Tools for Women-Friendly Farming

To reduce drudgery and improve productivity, agricultural engineering and home science have introduced women-centric tools designed for ergonomic use. These innovations help women perform labor-intensive tasks safely, efficiently, and with less physical strain.

Improved Serrated Sickle allows for faster harvesting with lightweight serrated edges, an ergonomic handle, and a durable steel blade, reducing wrist strain and sharpening frequency. Long-Handle Weeder (Cono Weeder) enables standing weeding with rotating blades, saving back and knee strain while doubling efficiency. Maize Sheller is a small tube-shaped device that separates grains safely, protecting fingers and saving time. Groundnut Decorticator operates in a seated position, allowing one woman to shell 30–40 kg per hour without hand pain. Dibbler for Seed Sowing reduces bending by creating uniform holes for seeds, improving crop spacing and yields. mCollectively, these tools enhance health, efficiency, and crop productivity, while empowering women by reducing physical burden and enabling better participation in farm operations (Table 2).

**Table 2: Features and Benefits of Women-Friendly Agricultural Tools**

| Tool | Feature | Benefit |
|---|---|---|
| Improved Serrated Sickle | Lightweight, serrated edges | Cuts crops efficiently without wrist strain |
| | Ergonomic handle design | Reduces wrist and hand pain by 15–20% |
| | Durable steel blade | Reduces frequency of sharpening |
| Long-Handle Weeder | Long handle with rotating blades | Work while standing, reduces back/knee strain |
| | Lightweight | Doubles weeding speed and efficiency |
| | Easy to maneuver | Saves energy, increases productivity |
| Maize Sheller | Small tube-shaped device with internal teeth | Separates grains without breaking |
| | Hand-safe operation | Protects fingers and nails |
| | Simple rotation-based mechanism | Reduces shelling time |
| Groundnut Decorticator | Oscillating mechanism, seated operation | Eliminates manual shelling pain |
| | Efficient throughput | 30–40 kg peanuts shelled per hour |
| Dibbler for Seed Sowing | Stick-like implement with pointed end | Creates uniform seed holes |
| | Reduces need for bending | Ensures consistent seed spacing |

## Ergonomics and Safe Farming Practices for Women

Reducing drudgery in agriculture is not only about advanced tools; how tasks are performed is equally important. Ergonomics — the science of designing tasks, tools, and workspaces to fit the human body — plays a critical role in preventing injuries and enhancing productivity. Proper posture and movement can significantly reduce musculoskeletal strain. For example, lifting heavy loads close to the body's center using strap bags or wheeled trolleys reduces pressure on the spine. Standing while weeding with long-handle tools minimizes back and knee stress. Additionally, taking micro-breaks every 1–2 hours allows muscles to relax, prevents fatigue, and maintains efficiency throughout the day. Stretching hands, legs, and back during breaks also reduces the risk of repetitive strain injuries.

Equally important is personal protective equipment (PPE). Wearing gloves, aprons, masks, and boots while spraying pesticides or handling fertilizers prevents respiratory, skin, and eye-related health hazards. Combined with ergonomic tools and safe working postures, PPE ensures women can work longer hours without compromising their health (Table 3).

**Table 3: Ergonomic Practices and Safety Measures for Women in Agriculture**

| Practice | Implementation | Benefits |
|---|---|---|
| Proper Load Handling | Use strap bags or wheeled trolleys | Reduces spinal and shoulder strain |
| Micro-Breaks | 10–15 minutes every 1–2 hours | Prevents fatigue, maintains efficiency |
| Correct Posture | Stand while weeding or planting | Minimizes back and knee stress |
| Stretching | Hands, arms, legs, and back | Reduces risk of repetitive strain injuries |
| Protective Equipment | Gloves, aprons, masks, boots | Prevents respiratory, skin, and eye hazards |

## Women-Friendly Drudgery-Reducing Equipment

Women constitute a significant share of India's agricultural workforce, yet much of their work involves repetitive, labor-intensive tasks performed with traditional tools that increase physical strain. Women-friendly drudgery-reducing equipment is specifically designed with ergonomic principles to minimize bending, excessive force, and repetitive motion. These tools are lightweight, easy to operate, and adapted to women's physical comfort and safety. By reducing musculoskeletal stress, fatigue, and time consumption, such equipment improves both work efficiency and overall well-being. For example, long-handle weeders allow women to work in a standing posture, preventing chronic back pain, while improved serrated sickles reduce wrist strain during harvesting. Small mechanized devices like maize shellers and groundnut decorticators save time and protect hands from injury. Access to these tools—supported through government subsidies and Custom Hiring Centers—enables women to increase farm productivity, save labor hours, and participate more actively in decision-making. Ultimately, drudgery-reducing technologies contribute to economic empowerment, better health outcomes, and sustainable agricultural development (Table 4).

**Table 4: Women Drudgery-Reducing Equipment, Benefits and Price**

| S. No. | Women Drudgery Equipment | Key Features | Detailed Benefits | Approx. Price (₹) |
|---|---|---|---|---|
| 1 | Improved Serrated Sickle | Lightweight, serrated blade, ergonomic handle | 15–20% less wrist strain, faster cutting, reduced sharpening frequency | 250 – 400 |
| 2 | Long-Handle Weeder (Cono Weeder) | Long handle, rotary blades, easy maneuvering | Enables standing posture, reduces back/knee pain, doubles weeding efficiency | 2,000 – 3,500 |

| | | | | |
|---|---|---|---|---|
| 3 | Maize Sheller | Hand-held tube with internal teeth | Prevents finger injury, reduces shelling time by 50%, easy to carry | 200 – 500 |
| 4 | Groundnut Decorticator | Oscillating/seated operation, manual or pedal type | Shells 30–40 kg/hr, minimizes hand pain, improves output quality | 4,000 – 8,000 |
| 5 | Dibbler for Seed Sowing | Pointed stick-type tool, adjustable depth | Reduces bending, ensures uniform spacing, improves germination rate | 300 – 800 |
| 6 | Pedal-Operated Thresher | Foot-operated mechanism, stable frame | Faster threshing, saves labor cost, suitable for small farmers | 12,000 – 20,000 |
| 7 | Battery-Operated Sprayer | Rechargeable battery, adjustable nozzle | Eliminates manual pumping, uniform spray coverage, saves time and energy | 3,000 – 6,000 |
| 8 | Wheel Hoe | Dual wheels, interchangeable blades | Reduces drudgery in interculture operations, 2–3 times faster than hand hoe | 3,500 – 6,000 |
| 9 | Drum Seeder (Paddy) | Multi-row seed drum, lightweight frame | Direct seeding without transplanting, saves labor and time | 5,000 – 10,000 |
| 10 | Manual Rice Transplanter | Lightweight frame, row spacing mechanism | Maintains uniform spacing, reduces bending during transplanting | 4,000 – 7,000 |
| 11 | Trolley/Hand Cart | Wheeled structure, load-support frame | Reduces spinal strain during load carrying, increases transport efficiency | 6,000 – 15,000 |
| 12 | Protective Harvesting Gloves | Cotton/rubber material, grip design | Prevents cuts, reduces skin irritation and infection | 150 – 400 |
| 13 | Solar Dryer (Small Scale) | Enclosed drying chamber, solar-powered | Hygienic drying of grains/vegetables, reduces post-harvest losses | 8,000 – 25,000 |
| 14 | Mini Millet Thresher | Compact size, low power requirement | Reduces manual beating, increases grain recovery rate | 15,000 – 30,000 |
| 15 | Power Weeder (Lightweight Model) | Small petrol/electric engine, adjustable handle | Suitable for small farms, reduces manual labor by 60–70% | 25,000 – 40,000 |

*Note: Prices are approximate and may vary by brand, region, and subsidy availability.*

## Government Schemes, Subsidies, and Access to Women-Friendly Tools

To support rural women farmers, the Indian government has introduced several schemes that provide affordable access to agricultural machinery and promote women empowerment in farming. The Sub-Mission on Agricultural Mechanization (SMAM) prioritizes women farmers and Self-Help Groups (SHGs), offering 50–80% subsidy on selected farm tools. These subsidies make high-quality equipment like pedal-operated threshers, battery-operated sprayers, and seed drills financially accessible to women. In addition, Custom Hiring Centers (CHCs) have been established in many villages, allowing women to rent machinery at minimal daily rates (₹10–50). This ensures that even women with limited resources can use advanced tools without heavy upfront costs. Local Krishi Vigyan Kendras (KVKs) and block agriculture offices provide technical guidance, training, and assistance for registration in subsidy programs (Table 5).

Collective approaches are encouraged: 10 or more women can form an SHG and set up a Farm Machinery Bank, enabling shared use of equipment and reducing individual costs. Registration through the agrimachinery.nic.in portal streamlines access to government benefits.

By combining subsidies, rental facilities, and group initiatives, rural women can overcome barriers of cost, maintenance, and accessibility, ensuring greater participation in modern agriculture.

**Table 5: Government Support Programs for Women Farmers**

| Program | Benefits | Access Mechanism |
|---|---|---|
| SMAM (Sub-Mission on Agricultural Mechanization) | 50–80% subsidy on machinery | Agrimachinery.nic.in portal, local KVK |
| Custom Hiring Centers (CHC) | Rent machinery at ₹10–50/day | Local village CHC |
| Self-Help Group (SHG) Farm Machinery Bank | Shared use of machines, reduced cost | Form SHG, register with KVK |
| Training & Technical Support | Guidance on tool use and maintenance | Krishi Vigyan Kendra (KVK), block office |

## Conclusion and Key Recommendations

Ease of agricultural work for rural women is more than a technological intervention—it is a step toward health, dignity, and empowerment. Women constitute the backbone of India's agriculture, contributing over 60–75% of farm labor, yet they face extreme physical strain, health risks, and economic challenges due to outdated tools and methods. The adoption of women-friendly, ergonomic tools—such as improved serrated sickles, long-handle weeders, maize shellers, and pedal-operated threshers—directly reduces drudgery, improves productivity, and preserves health.

Beyond tools, ergonomic practices like correct posture, micro-breaks, and the use of protective equipment are critical in preventing musculoskeletal injuries and long-term health issues. The integration of these practices with mechanized tools ensures women can work efficiently, safely, and sustainably. The economic and social benefits are equally significant. Time savings, reduced labor costs, and higher crop yields increase household income. Women gain confidence, social recognition, and decision-making power, strengthening their role in both the family and community.

Government support through SMAM subsidies, Custom Hiring Centers (CHCs), and SHG machinery banks further enhances access to modern tools, allowing even resource-limited women to participate fully in modern agriculture.

## Key Recommendations for Maximizing Impact:

1. Prioritize lightweight, adjustable, and low-maintenance tools suitable for women.
2. Promote training programs at KVKs to teach safe and efficient tool use.
3. Encourage SHG formation to enable shared access to machinery.
4. Integrate ergonomic practices into daily farming routines.
5. Ensure continuous government support through subsidies and rental programs.
6. By embracing technology, ergonomics, and supportive policies, rural women can transform agriculture into a healthier, productive, and empowering profession, laying the foundation for a prosperous and equitable India.