Government of Odisha

STANDARD OPERATING PROCEDURE (SOP)
FOR

WOMEN-CENTRIC ERGONOMIC TESTING OF AGRICULTURAL MACHINERY

Department of Agriculture & Farmers' Empowerment
Government of Odisha

Government of Odisha

STANDARD OPERATING PROCEDURE (SOP)
FOR

WOMEN-CENTRIC ERGONOMIC TESTING OF AGRICULTURAL MACHINERY

Issued By:
Department of Agriculture & Farmers' Empowerment
Government of Odisha

Suggested Citation:
Govt of Odisha (2025) *Standard Operational Procedure (SOP) for Women-Centric Ergonomic Testing of Agricultural Machinery*, Department of Agriculture and Farmers' Empowerment, Bhubaneswar, Odisha, India.

CONTENTS

ABBREVIATIONS

Abbreviations	Full Description
AICRP	All India Coordinated Research Projects
AWL	Acceptable Work Load
CSO	Civil Society Organization
DA & FP Govt. of Odisha	Directorate of Agriculture & Food Production, Odisha
DA & FE Govt. of Odisha	Department of Agriculture & Farmers' Empowerment, Govt. of Odisha
FAO	Food and Agriculture Organization
FMTC	Farm Machinery Testing Center
FPO	Farmer Producer Organization
HOD	Head of Department
HP	Horsepower
HR	Heart Rate
ICAR	Indian Council of Agricultural Research
ICAR-CIAE	Indian Council of Agricultural Research – Central Institute of Agricultural Engineering
ICAR-CIWA	Indian Council of Agricultural Research – Central Institute for Women in Agriculture
NGO	Non-Governmental Organization
NIOH	National Institute of Occupational Health
OCR	Oxygen Consumption Rate
OFMRDC	Odisha Farm Machinery Research and Development Centre
OUAT	Odisha University of Agriculture & Technology
PLFS	Periodic Labor Force Survey
PRA	Participatory Rural Appraisal
RAWE	Rural Agricultural Work Experience
REBA	Rapid Entire Body Assessment
RULA	Rapid Upper Limb Assessment
SE	Structural Engineering
SLFMTTC	State Level Farm Machinery Training and Testing Centre
SLTC	State Level Technical Committee
SOP	Standard Operating Procedure
SSI	Small Scale Industries
TWETM	Technical Committee on Women-Centric Ergonomic Testing

1. Background

Agrifood systems are the primary source of livelihood for women rather than for men in many countries. In sub-Saharan Africa, 66 % of women's employment is in agrifood systems, compared with 60 % of men's. In southern Asia, women overwhelmingly work in agrifood systems (71 % of women, versus 47 % of men). Agrifood systems are a key source of employment for young women, especially those aged 15–24. The gender gap in land productivity between female and male-managed farms of the same size is 24 %. On average, women earn 18.4 % less than men in wage employment in agriculture. This means that women receive 82 cents for every dollar earned by men[1].

The Economic Survey of India (2024-25) analysis shows that in the Periodic Labor Force Survey (PLFS) 2023-24, the agriculture sector remains dominant in employment, with its share rising from 44.1 percent in 2017-18 to 46.1 percent in 2023-24. The share of female workers in agriculture has increased significantly, from 57.0 % in 2017-18 to 64.4 % in 2023-24, whereas male participation in agriculture decreased from 40.2% to 36.3%. The feminization of agriculture is now a reality across the world, especially in India. Despite the central and dominant role of women in agriculture, the productivity of women farmers is less than that of men. Mechanization has transformed agricultural practices across India, but its impact on women has been uneven. Women often have limited access to appropriate technologies and mechanized equipment that match their ergonomic and operational needs.

Studies by ICAR-CIWA show that numerous types of work-related musculoskeletal issues need to be considered for the adoption of farm mechanization. Women, on average have a smaller stature and have less physical strength; their vital capacity is 11% less; their hemoglobin is approximately 20% less compared to men. The skin area of women farmers is larger compared to the circulating volume and has larger body fat content. They have lower heat tolerance and greater cold tolerance compared to men. Accordingly, they are more prone to mechanical hazards like back pain, neck pain, tendon, shoulder disorders, cumulative trauma disorder, repetitive motion disorder, and carpal tunnel syndrome. Mechanical hazards, unshielded machinery, unsafe structures in the workplace, and dangerous tools are among the most prevalent workplace hazards in developed and developing countries. Occupational health and ergonomics research from institutions such as ICAR-CIAE and NIOH has demonstrated that women farmers experience high levels of drudgery and musculoskeletal strain due to repetitive and manual farming activities.

[1]FAO. 2023. The status of women in agrifood systems – Overview. Rome . https://doi.org/10.4060/cc5060en

Studies by the Indian Council of Agricultural Research (ICAR) on the involvement of women farmers in different key categories of farm activities showed that 65.8% involved in weeding, 89.2 % involved in harvesting, 67.3% involved in winnowing, 91.3% involved in cleaning, and 86.9% involved in storage of grain. The same study also showed that 56.7% of the women farmers experienced back pain due to load, 59.4% experienced shoulder pain, 69.4% experienced leg/foot pain, 51.3% experienced headache, 50.8% experienced heat stress, and 53.5% experienced dehydration involved in farm activities. In addition to farm activities, women were also involved in 100% of house cleaning, water collection, and washing clothes. Among other activities, more than 99% are involved in activities such as spice making, cooking, vegetable peeling and cutting, utensil cleaning, and others. In many instances, the head load for carrying green fodder is between 17-30 kg, which is much higher than the proposed head load of 15kg[2].

FAO's Unjust Climate Report shows that climate change is increasing working hours for women. As this adds to the already existing higher burden of care, it is having a disproportionate effect. On average, women spend 4 hours a day on unpaid domestic and care work, while men spend less than two[3].

This differentiated impact on women farmers is also because most machines are designed for male body dimensions, strength, and working postures. The lack of women-friendly ergonomic testing and feedback mechanisms has led to a situation where women's labor-saving needs are rarely considered during the design and procurement of agricultural machinery. Addressing these gaps requires a structured assessment process that integrates ergonomics, usability testing, and participatory feedback from women users.

While considerable research has been conducted through the All India Coordinated Research Projects (AICRP) on Ergonomics and Safety, most testing and empanelment procedures for agricultural machinery in India focus primarily on performance parameters such as efficiency, output, and fuel consumption. Ergonomic aspects, such as comfort, reach, control, access, vibration, and health impacts are not part of the standard testing and certification process. To promote inclusive mechanization, there is a need for the generation of ergonomic test code with a focus on women, to be included in the testing process. This will ensure that agricultural implements/machines supplied under Government programs/schemes are women-friendly.

2. Introduction

In this context, Participatory Machinery Development, with a focus on women-friendly ergonomics, was piloted under the Shree Anna Abhiyan (formerly Odisha Millets Mission) in five districts, namely Sundargarh, Keonjhar, Koraput, Nuapada, and Gajapati, with an emphasis on machinery and implements related to the millet-based cropping system. Through field trials and iterative feedback sessions with women farmers, several prototype machines were developed, refined, and recommended for mass production and distribution by local manufacturers. This Standard Operating Procedure (SOP) has been developed through the integration of field experiences from the pilot and research conducted under the AICRP on Ergonomics and Safety, in consultation with OUAT, ICAR, testing institutions, and social scientists.

[2]Occupational Health Hazard Faced By Farm Women at their Workplaces. CIWA(ICAR), Bhubaneswar, pp. 1-32.

[3]FAO. 2024. The unjust climate – Measuring the impacts of climate change on rural poor, women and youth. Rome. https://doi.org/10.4060/cc9680en

3. Objective

The objective of this Standard Operating Procedure (SOP) is to test, certify, and improve relevant agricultural implements/machinery with a focus on women-centric ergonomic parameters and occupational hazards. This SOP aims to streamline the supply of women-friendly implements/machines in subsidy mode in different schemes/programs.

4. Scope

This SOP will be applicable to the identified agricultural implements/machinery mostly operated/used by women in different farm activities in various government schemes/programs.

5. Roles and Responsibilities

5.1 Department of Agriculture & Farmers' Empowerment, Government of Odisha

The Department of Agriculture & Farmers' Empowerment, Government of Odisha, shall be the nodal department for implementation and to ensure women-centric ergonomic testing of agricultural implements/machinery. The DA&FE shall be responsible for:

- Approval of the annual action plan and budgetary allocation.
- Issuing official notifications and empanelment guidelines.
- Ensuring popularisation across schemes and programs.
- Reviewing the progress periodically.

5.2 Directorate of Agriculture & Food Production, Odisha

Directorate of Agriculture & Food Production, Odisha, shall be the nodal Directorate for implementation of the initiative. It shall be responsible for:

- Approval of the machines through SLTC. and inclusion in different schemes.
- Approval of the annual action plan and budgetary provision and submission to DA&FE for approval.
- Reviewing the progress periodically.

5.3 Technical Committee on Women-centric Ergonomic Testing of Farm Machinery (TWETM)

Designation	Role
Chief Engineer, Directorate of Agriculture and Food Production	Chairperson
Director, SLFMTTC Bhubaneswar	Member
HOD/Representative, Deptt. Of Farm Machinery & Power Engineering	Member
Officer in charge, AICRP on" Ergonomics and safety in Agriculture and Allied sector"	Member
Scientist, ICAR-CIWA/Ergonomics Expert	Member
Development Engineer, OFMRDC	Member
Superintending Engineer (Agriculture), Central Zone	Member
Representative, CSO with experience in testing of machines	As Invitee
Other technical experts/developers/manufacturers/etc as needed	As invitee
Executive Engineer(SLFMTTC)	Member Convener

- The committee will shortlist the machines from the existing empanelled machinery /newly proposed list for women-centric ergonomic testing.
- It will propose an annual action plan with budgetary provision for undertaking women-centric ergonomic testing and submit it to the Directorate of Agriculture & Food Production, Odisha, for approval.
- Budgetary provision for the initiative shall be met from administrative expenses from the State plan scheme of **"2078-Popularization of Agricultural Implements, Equipment and Diesel pump sets"**. Any additional budgetary requirement shall be included in the annual action plan. Any innovative pilots with communities related to this initiative can also be taken up with schemes under innovative components such as Shree Anna Abhiyan, Revival and intensification of neglected crops and forgotten foods, innovative projects among others. Proposals may be developed by OFMRDC under the guidance of the Chief Engineer and submitted accordingly.
- It will review and approve the suggested test code, checklist with focus on ergonomics and safety, and parameters submitted by OUAT. Further, the committee may submit the test code for inclusion in the Bureau of Indian Standards.
- It will analyze the test reports and suggest improvements in the design of the machines.
- It may recommend suitable implements/machines for inclusion in government programs.
- It will approve the design of the prototype developed by the OFMRDC.
- It will revise the testing protocols and guidelines periodically to adapt to changing field scenarios.
- It will submit relevant matters to DA&FP(O) and DA&FE for necessary approval.
- It will review the progress of the initiative at least once every six months. The committee meeting may be convened as needed with the approval of the chair.
- Any further changes in SOP can be proposed by the committee and submitted to DA&FP(O) and DA&FE for approval.

5.4 The Odisha University of Agriculture and Technology (OUAT)

- OUAT will develop test code for women-centric ergonomic testing of agricultural implements/machinery along with SLFMTTC. The test code will ensure that all relevant matters of ergonomics, musculoskeletal disorders, and relevant occupational hazards associated with farm activities are included in the testing code.
- It will provide technical support to SLFMTTC/OFMDRC for different activities.
- It will test the shortlisted machines, including ergonomic parameters, from the existing machines under Farm Mechanization. For the existing machines under Farm Mechanization and empaneled under SLTC, concerned vendors/ manufacturers/ SSI units will also be involved in the testing process.
- It will submit the test reports to SLFMTTC for further action.
- After the development of prototypes by OFMRDC, it will again undertake testing, including ergonomics, of the different implements/machines.
- It will engage young fellows/students for field-level testing/research on participatory machinery development through RAWE/other academic internship programs.
- It may also coordinate with NGOs/FPOs for field-level testing and gather feedback from the community on participatory machine development.

5.5 State Level Farm Machinery Training and Testing Center (SLFMTTC), Bhubaneswar

- It will establish and operationalize an ergonomics lab at SLFMTTC for ergonomic testing. Till operationalization of the ergonomics lab at SLFMTTC, OUAT will support SLFMTTC for ergonomic testing.
- It will also undertake testing, including ergonomics, of different implements/ machines identified by OFMRDC and approved by the committee.
- It will also undertake testing, including ergonomics, of the different implements /machines after the prototype is submitted by OFMRDC.
- It will release test reports after testing of the implements /machines.
- It will provide training and capacity building to department officials and other stakeholders.

5.6 Odisha Farm Machinery Research and Development Center (OFMRDC)

- OFMRDC will lead the development of new equipment/tools/machinery for women in association with OUAT/CIWA/SLFMTTC/AICRP on Ergonomics & Safety and other related entities.
- OFMRDC will conduct necessary field surveys and research on Farm Mechanization in general and women-friendly equipment/tools/machinery in particular.
- As per the approved ergonomic parameters and field feedback, OFMRDC will shortlist implements/machinery in consultation with OUAT/CIWA/SLFMTTC/SE, Central Zone, for women-centric ergonomic testing.
- Priority will be given to the implements/machineries already existing under the Farm Mechanization fold (manual, bullock-drawn implements, and power-driven implements less than 2 HP) during selection. This will be submitted to the Technical committee for review and approval for prototype development/designing/modification, etc..
- After the committee's approval, it will develop a prototype of the selected machines involving SSI units of the state, based on the feedback and suggestions from women-centric ergonomic testing by either OUAT or CIWA, and SLFMTTC.
- OFMRDC shall enter into an agreement for prototype design, development, and modification of implements/machinery with SSI units of the state.
- OFMRDC will develop a business module to involve SSI units of the state in the design and development of women-friendly implements/machines and obtain approval from TWETM.
- After the approval of the prototype by the committee, the implements/machines will be submitted to either FMTC, OUAT, or SLFMTTC for testing, including ergonomics.
- Any innovative pilots with communities related to this initiative can also be taken up with schemes under innovative components, such as Shree Anna Abhiyan, the Revival and intensification of neglected crops and forgotten foods, and innovative projects among others. Proposals may be developed by OFMRDC under the guidance of the Chief Engineer and submitted accordingly.

6. Process flow

- After receiving the necessary instructions from the Government, OUAT shall develop the test code for women-centric ergonomic testing for different implements/machinery. Priority during selection will be given to implements/machineries already existing under the Farm mechanization fold (manual, bullock-drawn implements, and power-driven implements less than 2 HP).
- This ergonomic test code will include all aspects of drudgery, ease of operation, body pain measurement, operational hazard, etc.
- The test code will be submitted to SLFMTTC with a request to convene the Technical Committee on women-centric Ergonomic Testing of Farm Machinery.
- The Technical Committee on Women-Centric Ergonomic Testing of Farm Machinery (TWETM) will review the test code and approve it with any suggested changes.
- As per the approved ergonomic parameters and field feedback, OFMRDC will shortlist implements/machineries in consultation with OUAT/CIWA/SLFMTTC/SE, Central Zone, for women-centric ergonomic testing.
- OFMRDC will submit the shortlisted implements/machines to TWETM for approval.
- OFMRDC and OUAT may also suggest the development of a list of new implements/machinery based on emerging needs of the community. They may engage with experts, field officials, farmers, NGOs, and FPOs to understand the emerging needs of the communities.
- TWETM will review the list and recommend the implements/machines that may be tested in the financial year. The annual plan and budget for the financial year will be approved accordingly and submitted to DA&FP(O) for perusal.

- As per the list finalized by TWETM, implements/machines will be divided between OUAT and SLFMTTC for testing, including ergonomics. Until the ergonomics lab /equipment is established at SLFMTTC, OUAT will support ergonomic testing during the testing process at SLFMTTC.
- OUAT and SLFMTTC shall submit the test reports and feedback, including women-centric ergonomic testing, to the TWETM.
- If the test report shows that any implements/machines are already women-friendly, the committee will issue instructions to certify the machines accordingly.
- If any implements/machines are deemed unsuitable, based on test reports and feedback, the committee will issue instructions to OFMRDC to develop prototypes incorporating the feedback.
- OFMRDC shall undertake the prototype development in collaboration with the vendor/manufacturer/SSI units of the state. If any vendor/manufacturer/SSI unit is not interested, then OFMRDC will develop the prototype on its own.
- After development of the prototype, it will be submitted for testing, including ergonomics, once again at OUAT/SLFMTTC.
- After testing of the prototype, iterations may be suggested to OFMRDC to make it more women-friendly. OFMRDC may also conduct tests with women farmers from different age groups in central locations in Bhubaneswar.
- Once the final round of iterations at OFMRDC and testing at OUAT/SLFMTTC are completed, the final test report shall be submitted to TWETM. TWETM shall review and recommend manufacturers for SLTC empanelment and supply in the Government programs and schemes.
- OFMRDC will engage with different vendors/manufacturers/SSI units for production and supply of women-friendly implements and machinery, following the laid out process.

7. Feedback and Revision Mechanism

- After implements/machines are supplied to farmers according to the laid-out process, feedback may be collected by OFMRDC on implements/machines after 9-12 months from different field locations for further improvement.
- This feedback may be submitted to TWETM for their perusal.
- A PRA/Group discussion shall also be conducted with women farmers after the operation of the machinery. Postural analysis may be undertaken.
- As current ergonomic software and technologies are able to simulate the different conditions accurately, field testing with women farmers will be carried out only for those implements/machinery where it is needed. Manufacturers may also submit suggestions for changes through a formal online form hosted by the Directorate.

8. Expected Outcomes:

- Increased adoption of women-friendly implements/machinery leading to higher farm productivity and higher incomes.
- Improved well-being outcomes for women farmers with reduction in musculoskeletal disorders and occupational hazards and better safety.

Parameters under consideration for Ergonomic & Safety Testing

Annexure- 1:

Physiological Evaluation Parameters

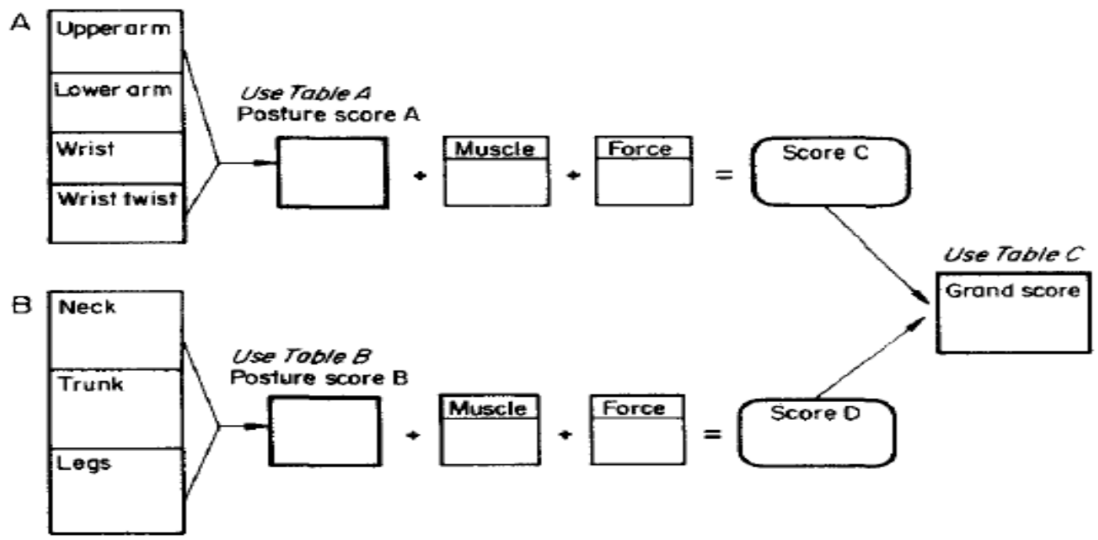
Activity	Score
Heart Rate	
Resting Heart Rate	
Work Pulse	
Oxygen Consumption Rate	
Energy Expenditure Rate	
Acceptable Work Load (AWL)	
Physiological Cost of Work	

Annexure- 2:

RULA (Rapid Upper Limb Assessment)

Body Part	Position	Score
Arm and wrist analysis		
Upper arm position		
Lower arm position		
Wrist position		
Wrist Twist		
Neck		
Trunk		
Legs		

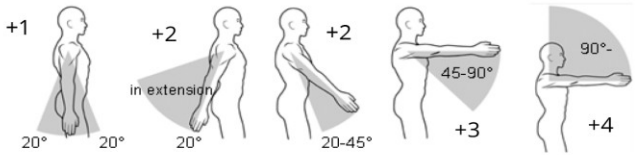
RULA Final Score: ___, Action:



Rapid Upper Limb Assessment Worksheet

A. Arm and Wrist Analysis

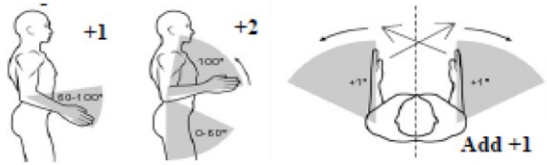
Step 1: Locate Upper Arm Position:



Step 1a: Adjust...
If shoulder is raised: +1
If upper arm is abducted: +1
If arm is supported or person is leaning: -1

Upper Arm Score

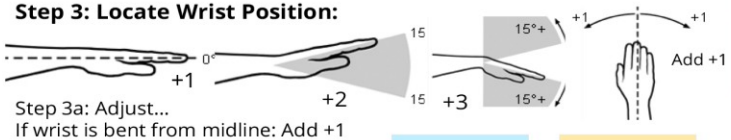
Step 2: Locate Lower Arm Position:



Lower Arm Score

Step 2a: Adjust...
If either arm is working across midline or out to side of body: Add +1

Step 3: Locate Wrist Position:



Step 3a: Adjust...
If wrist is bent from midline: Add +1

Step 4: Wrist Twist:

If wrist is twisted in mid-range: +1
If wrist is at or near end of range: +2

Wrist Twist Score

Wrist Score

Step 5: Look-up Posture Score in Table A:

Using values from steps 1-4 above, locate score in Table A

Posture Score A

\+

Step 6: Add Muscle Use Score

If posture mainly static (i.e. held>10 minutes),
Or if action repeated occurs 4X per minute: +1

Muscle Use Score

\+

Step 7: Add Force/Load Score

If load < .4.4 lbs. (intermittent): +0
If load 4.4 to 22 lbs. (intermittent): +1
If load 4.4 to 22 lbs. (static or repeated): +2
If more than 22 lbs. or repeated or shocks: +3

Force / Load Score

=

Step 8: Find Row in Table C

Add values from steps 5-7 to obtain Wrist and Arm Score. Find row in **Table C**.

Wrist & Arm Score

Scores

Table A		Wrist Score							
		1		2		3		4	
Upper Arm	Lower Arm	Wrist Twist		Wrist Twist		Wrist Twist		Wrist Twist	
		1	2	1	2	1	2	1	2
1	1	1	2	2	2	2	3	3	3
	2	2	2	2	2	3	3	3	3
	3	2	3	3	3	3	3	4	4
2	1	2	3	3	3	3	4	4	4
	2	3	3	3	3	3	4	4	4
	3	3	4	4	4	4	4	5	5
3	1	3	3	4	4	4	4	5	5
	2	3	4	4	4	4	4	5	5
	3	4	4	4	4	4	5	5	5
4	1	4	4	4	4	4	5	5	5
	2	4	4	4	4	4	5	5	5
	3	4	4	4	5	5	5	6	6
5	1	5	5	5	5	5	6	6	7
	2	5	6	6	6	6	7	7	7
	3	6	6	6	7	7	7	7	8
6	1	7	7	7	7	7	8	8	9
	2	8	8	8	8	8	9	9	9
	3	9	9	9	9	9	9	9	9

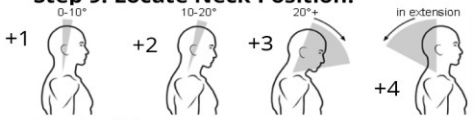
Table C		Neck, Trunk, Leg Score						
		1	2	3	4	5	6	7+
Wrist / Arm Score	1	1	2	3	3	4	5	5
	2	2	2	3	4	4	5	5
	3	3	3	3	4	4	5	6
	4	3	3	3	4	5	6	6
	5	4	4	4	5	6	7	7
	6	4	4	5	6	6	7	7
	7	5	5	6	6	7	7	7
	8+	5	5	6	7	7	7	7

Scoring: (final score from Table C)
1-2 = acceptable posture
3-4 = further investigation, change may be needed
5-6 = further investigation, change soon
7 = investigate and implement change

RULA Score

B. Neck, Trunk and Leg Analysis

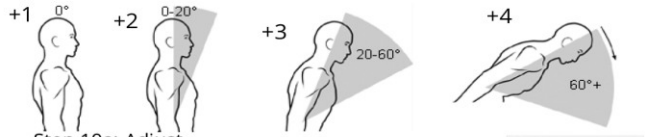
Step 9: Locate Neck Position:



Neck Score

Step 9a: Adjust...
If neck is twisted: +1
If neck is side bending: +1

Step 10: Locate Trunk Position:



Step 10a: Adjust...
If trunk is twisted: +1
If trunk is side bending: +1

Trunk Score

Step 11: Legs:

If legs and feet are supported: +1
If not: +2

Leg Score

Neck Posture Score	Table B: Trunk Posture Score											
	1		2		3		4		5		6	
	Legs		Legs		Legs		Legs		Legs		Legs	
	1	2	1	2	1	2	1	2	1	2	1	2
1	1	3	2	3	3	4	5	5	6	6	7	7
2	2	3	2	3	4	5	5	5	6	7	7	7
3	3	3	3	4	4	5	5	6	6	7	7	7
4	5	5	5	6	6	7	7	7	7	7	8	8
5	7	7	7	7	7	8	8	8	8	8	8	8
6	8	8	8	8	8	8	8	9	9	9	9	9

Step 12: Look-up Posture Score in Table B:

Using values from steps 9-11 above, locate score in Table B

Posture B Score

\+

Step 13: Add Muscle Use Score

If posture mainly static (i.e. held>10 minutes),
Or if action repeated occurs 4X per minute: +1

Muscle Use Score

\+

Step 14: Add Force/Load Score

If load < .4.4 lbs. (intermittent): +0
If load 4.4 to 22 lbs. (intermittent): +1
If load 4.4 to 22 lbs. (static or repeated): +2
If more than 22 lbs. or repeated or shocks: +3

Force / Load Score

=

Step 15: Find Column in Table C

Add values from steps 12-14 to obtain Neck, Trunk and Leg Score. Find Column in **Table C**.

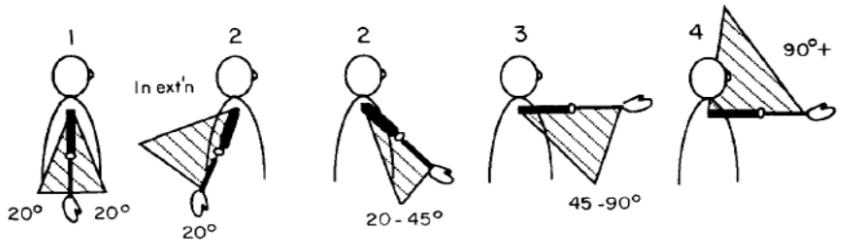
Neck, Trunk, Leg Score

Upper arms

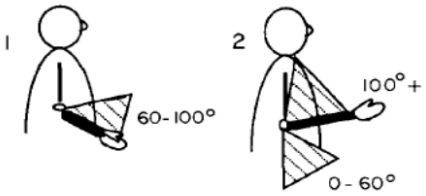
Add 1 if shoulder is raised

Add 1 if upper arm is abducted

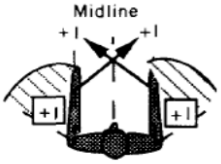
Subtract 1 if leaning or supporting the weight of the arm



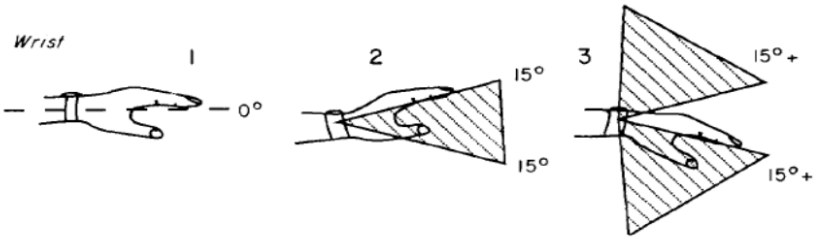
Lower arms

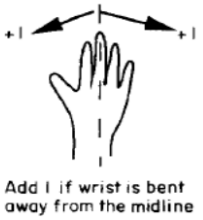


Add 1 if working across the midline of the body or out to the side



Wrist





Add 1 if wrist is bent away from the midline

Wrist twist

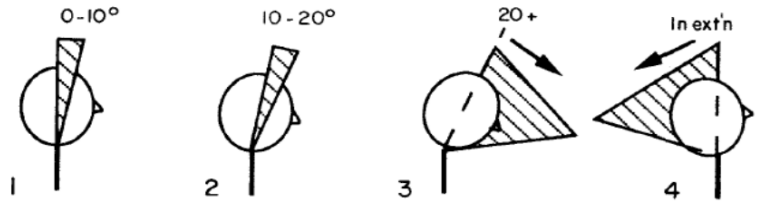
1 Mainly in mid-range of twist

2 At or near the end of twisting range

Neck

Add 1 if the neck is twisting

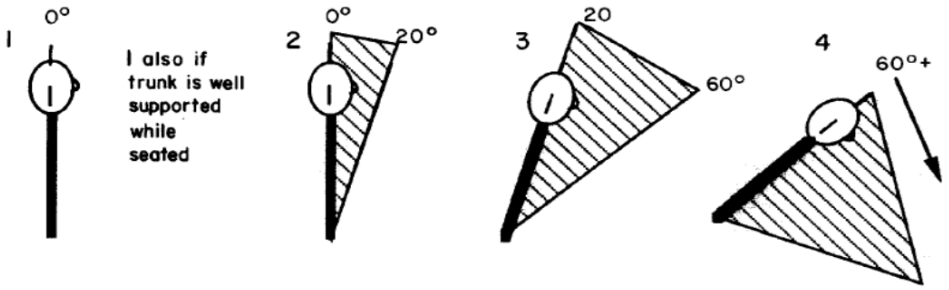
Add 1 if neck is side-bending



Trunk

Add 1 if trunk is twisting

Add 1 if trunk is side-bending



1 also if trunk is well supported while seated

Legs

1 if legs and feet are well supported and in an evenly balanced posture

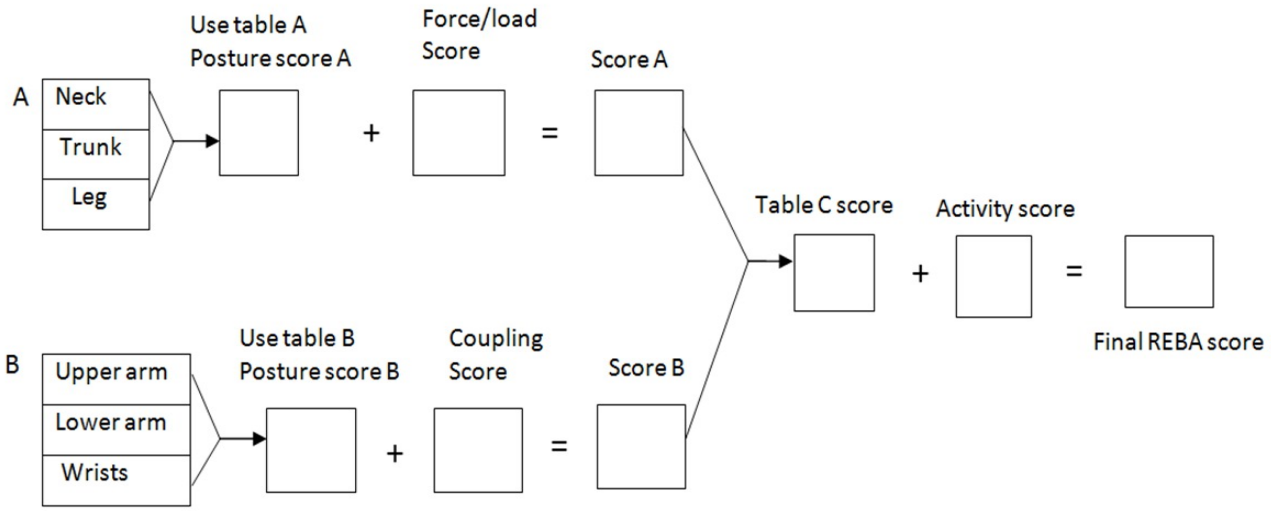
2 if not

Annexure- 3:

REBA (Rapid Entire Body Assessment)

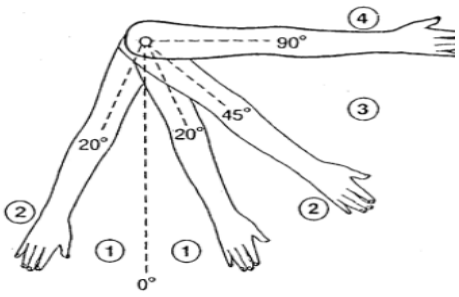
Body Part	Position	Score
Neck		
Trunk		
Legs		
Upper Arm		
Lower Arm		
Wrist		
Coupling/Load Handling		

REBA Final Score: ___, Action:



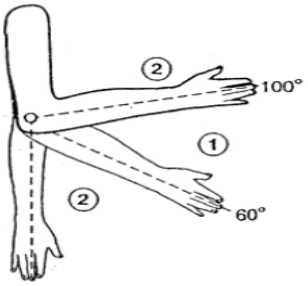
Upper arms

Position	Score	Change score:
20° extension to 20° flexion	1	+1 if arm is: • abducted • rotated
>20° extension 20°–45° flexion	2	+1 if shoulder is raised
45°–90° flexion	3	–1 if leaning, supporting weight of arm or if posture is gravity assisted
>90° flexion	4	



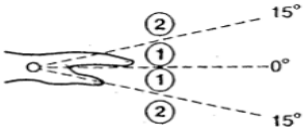
Lower arms

Movement	Score
60°–100° flexion	1
<60° flexion or >100° flexion	2



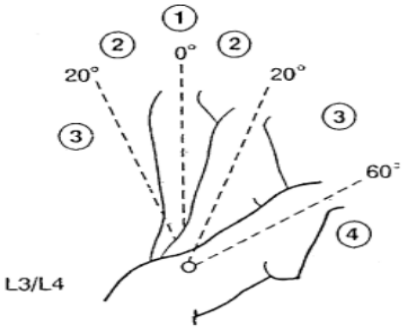
Wrists

Movement	Score	Change score:
0°–15° flexion/ extension	1	+1 if wrist is deviated or twisted
>15° flexion/ extension	2	



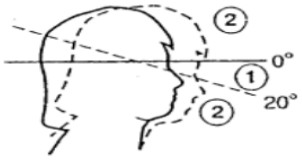
Trunk

Movement	Score	Change score:
Upright	1	+1 if twisting or side flexed
0°–20° flexion 0°–20° extension	2	
20°–60° flexion >20° extension	3	
>60° flexion	4	



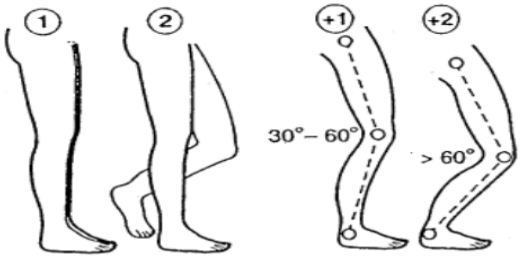
Neck

Movement	Score	Change score:
0°–20° flexion	1	+1 if twisting or side flexed
>20° flexion or in extension	2	



Legs

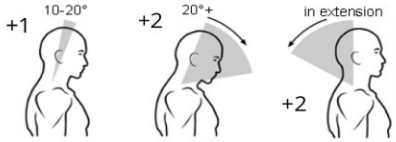
Position	Score	Change score:
Bilateral weight bearing, walking or sitting	1	+1 if knee(s) between 30° and 60° flexion
Unilateral weight bearing Feather weight bearing or an unstable posture	2	+2 if knee(s) are >60° flexion (n.b. Not for sitting)



Rapid Entire Body Assessment Worksheet

A. Neck, Trunk and Leg Analysis

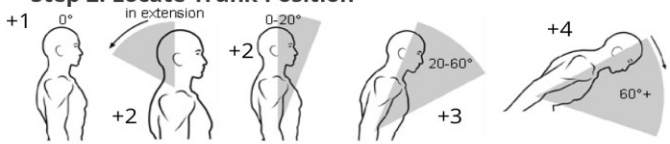
Step 1: Locate Neck Position



Neck Score

Step 1a: Adjust...
If neck is twisted: +1
If neck is side bending: +1

Step 2: Locate Trunk Position



Step 2a: Adjust...
If trunk is twisted: +1
If trunk is side bending: +1

Trunk Score

Step 3: Legs

Leg Score

Step 4: Look-up Posture Score in Table A

Using values from steps 1-3 above,
Locate score in Table A

Posture Score A

+

Step 5: Add Force/Load Score

If load < 11 lbs. : +0
If load 11 to 22 lbs. : +1
If load > 22 lbs.: +2
Adjust: If shock or rapid build up of force: add +1

Force / Load Score

=

Step 6: Score A, Find Row in Table C

Add values from steps 4 & 5 to obtain Score A.
Find Row in **Table C**.

Score A

Scoring
1 = Negligible Risk
2-3 = Low Risk. Change may be needed.
4-7 = Medium Risk. Further Investigate. Change Soon.
8-10 = High Risk. Investigate and Implement Change
11+ = Very High Risk. Implement Change

Scores

Table A		Neck											
		1				2				3			
	Legs	1	2	3	4	1	2	3	4	1	2	3	4
Trunk Posture Score	1	1	2	3	4	1	2	3	4	3	3	5	6
	2	2	3	4	5	3	4	5	6	4	5	6	7
	3	2	4	5	6	4	5	6	7	5	6	7	8
	4	3	5	6	7	5	6	7	8	6	7	8	9
	5	4	6	7	8	6	7	8	9	7	8	9	9

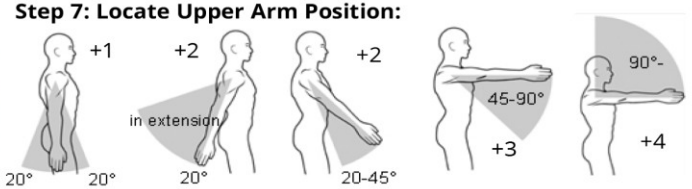
Table B		Lower Arm					
		1			2		
	Wrist	1	2	3	1	2	3
Upper Arm Score	1	1	2	2	1	2	3
	2	1	2	3	2	3	4
	3	3	4	5	4	5	5
	4	4	5	5	5	6	7
	5	6	7	8	7	8	8
	6	7	8	8	8	9	9

Score A	Table C											
	Score B											
	1	2	3	4	5	6	7	8	9	10	11	12
1	1	1	1	2	3	3	4	5	6	7	7	7
2	1	2	2	3	4	4	5	6	6	7	7	8
3	2	3	3	3	4	5	6	7	7	8	8	8
4	3	4	4	4	5	6	7	8	8	9	9	9
5	4	4	4	5	6	7	8	8	9	9	9	9
6	6	6	6	7	8	8	9	9	10	10	10	10
7	7	7	7	8	9	9	9	10	10	11	11	11
8	8	8	8	9	10	10	10	10	10	11	11	11
9	9	9	9	10	10	10	11	11	11	12	12	12
10	10	10	10	11	11	11	11	12	12	12	12	12
11	11	11	11	11	12	12	12	12	12	12	12	12
12	12	12	12	12	12	12	12	12	12	12	12	12

Table C Score + Activity Score = REBA Score

B. Arm and Wrist Analysis

Step 7: Locate Upper Arm Position:



Step 7a: Adjust...
If shoulder is raised: +1
If upper arm is abducted: +1
If arm is supported or person is leaning: -1

Upper Arm Score

Step 8: Locate Lower Arm Position:

Lower Arm Score

Step 9: Locate Wrist Position:

Wrist Score

Step 9a: Adjust...
If wrist is bent from midline or twisted : Add +1

Step 10: Look-up Posture Score in Table B

Using values from steps 7-9 above, locate score in Table B

Posture Score B

+

Step 11: Add Coupling Score

Well fitting Handle and mid rang power grip, ***good: +0***
Acceptable but not ideal hand hold or coupling acceptable with another body part, ***fair: +1***
Hand hold not acceptable but possible, ***poor: +2***
No handles, awkward, unsafe with any body part, ***Unacceptable: +3***

Coupling Score

=

Step 12: Score B,

Find Column in Table C
Add values from steps 10 &11 to obtain Score B. Find column in **Table C** and match with Score A in row from step 6 to obtain Table C Score.

Score B

Step 13: Activity Score

+1 1 or more body parts are held for longer than 1 minute (static)
+1 Repeated small range actions (more than 4x per minute)
+1 Action causes rapid large range changes in postures or unstable base

Annexure- 4:

Combined Ergonomic and Physiological Summary Sheet

Machine / Equipment Name	
Operator Category	☐ **Female** ☐ **Male**
Trial Location	
Date / Duration	

Parameter	**Observed Value**	**Acceptable Range / Standard**	**Compliance (✔/✖)**
Average Heart Rate			
OCR ($L \cdot min^{-1}$)			
Work Pulse			
Energy Expenditure Rate ($kJ \cdot min^{-1}$)			
Acceptable Workload (%VO_2max)			
Computerized ambulatory			
metabolic measurement system (K4b2)			
RULA Score			
REBA Score			
Physiological Cost of Work			

Certified by:

Name:_____

Designation: _____

Institution:_____

Signature & Date: _____

DEPARTMENT OF AGRICULTURE & FARMERS' EMPOWERMENT

https://www.facebook.com/agriculture.odisha @krushibibhag krushibibhag