Standardization for Agricultural Machinery in Bhutan

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Background on Farm Mechanization in Bhutan

AMTC

Private sectors

FM Corporation

1. Generate technologies

2. Certify machines for sale

3. Guideline, policy, monitoring

4. Trainings

Sales, Repair and Hiring

Farm Mechanization level 17.66% (11th Five Year Plan) to 24.34% (12th Five Year Plan) ...(plans 13th, 14th, 15th .......

Farmers

Linkages:

1) BSB, Bhutan, TC-08 members, Mechanical Engineering, calibration; Accreditation?

2) ANTAM, TWG members, National Focal Point, Facilities sharing?, Equipment specification?
1. Generate efficient farm mechanization technology through innovation, adoption, adaption (precision farming, farm power & post harvest technologies).
2. Ensure safe and efficient use of farm machinery

**Challenges faced in Agriculture**

1. Labour shortage
2. Drudgery
3. Poor Productivity (due to various reasons)
4. Expensive

**Benefits:**

1. Farmers will get efficient and affordable machines.
2. Pvt and SoE don’t have to spend time and resources to conduct research.
2. Generate and regulate farm mechanization services’ standards

Objective: Ensure safe, quality machines’ use for price paid

a. Standardization and Guidelines approval from National, BSB (TC-08) and Ministry Level, MoAL

b. Testing and Test Report/Result, Certificates

c. Awareness, advocacy on the test results
Farm Machinery Standardization Process

Survey → Prioritizing standard based on survey → Preliminary test (Inspection) → Draft test procedure based on test items

TC-08 (BSB) → AMC TC meeting → Meeting with sub-committee → Draft test code and standard

Board of Bhutan Standard → National Standard (BTS)
Certification Program

• Total of 10 standards at National Level from 20 standards (10 Ministry Level Standards)

• 63 different model of farm machines tested based on standards (6PT, 29MT, etc.....)

• Certificates issued to 53 models
National Level Standards and Test Codes {Bhutan Standards Bureau}:


Minimum Requirements, Basic Safety requirement, Performance requirement
Power Tiller: Test Items and Facilities

1. Verification of structure and specification
2. Safety Requirement
3. Sound Test
4. Vibration Test
5. Engine Test
6. Operation Field Test
7. Parking Test
8. Service Braking Test
9. Waterproof Test
Engine Test

Waterproof Test

Service Brake Test

SERVICE BRAKE TEST
Power tiller should be in maximum Gear at full throttle for the test

- Braking Point
- Stop Time
- Start Time
- Power tiller start point

Measure the slipping distance
To measure the travelling speed
To gain its initial momentum

900 kg

MINISTRY OF AGRICULTURE AND LIVESTOCK

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Facilities:-

- Dynamo
- Data Logger
- Sample Divider
Connection process

1. Vibration meter
2. Pre amplifier
3. Accelerometer meter

Accelerometer cable
Facilities and Example Mini tiller test result:-

Parking Test

Slope Test

Mini tiller (XPW1050 D (E))

<table>
<thead>
<tr>
<th>SL. No</th>
<th>Particular</th>
<th>Specification</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DimensionsLxBxH (mm)</td>
<td>1790x975x1120</td>
<td>Recommended and complied as per National Standard (BTS) Note: RH: Right Handle LH: Left Handle Day is expressed as 7 hs working</td>
</tr>
<tr>
<td>2</td>
<td>Engine</td>
<td>Air cooled, 4 stroke, diesel Engine, Single cylinder, 7kW, 3000 rpm</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Field Capacity @ Fuel Consumption</td>
<td>Mean Value: - Tines 1.36±0.14 acre/day @ 6.61±1.47 l/day</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mean Value: - Rotary 1.56±0.17 acre/day @ 4.85±0.35 l/day</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Vibration (m/sec2)</td>
<td>5.61±0.01 (RH) &amp; 5.77±0.59 (LH)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Sound (dB(A))</td>
<td>91.40±1.50 (L) &amp; 91.50±0.10 (R)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Suitability</td>
<td>Wet land (puddling operation suitable), dry land</td>
<td></td>
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</tbody>
</table>
Wayforward:

- Equipment Specification: Digital Fuel consumption measurement device (request for support)
- Exhaust fume devices (use for while engine testing)
- Waterpump testing device design (request for support)
- New development of standards means require different measuring equipments
- Potato collector or picker (Technologies) (if other countries has this technologies available)

- Expertise sharing mechanism
- BSB and AMTC need to work further with ANTAM/CSAM/ADB
- Calibration and accreditation (request for support)
THANK YOU