

# AGRICULTURAL MACHINE TESTING IN THE ASIA PACIFIC REGIONS

1. Overview of agric. mechanization in the Global & Asia Pacific Regions
  - A. Survey: **Global (2013), Asia Pacific (2010)**
  - B. Status and projection of agricultural mech. in surveyed regions
  - C. Cross regional comparison
2. Situational analysis of agricultural machine testing in the AP regions
  - Key success factors/drivers for ANTAM
3. Challenges
4. Recommendations

# Agriculture Mechanization Environment

<b>Crop Environment</b>	<b>Production Strategy</b>	<b>Operations</b>	<b>Machinery</b>	<b>Supporting</b>
<ul style="list-style-type: none"> <li>• Weather</li> <li>• Soil</li> <li>• Water</li> <li>• Plant pest &amp; disease</li> <li>• Nutrient</li> <li>• Type of crop</li> <li>• Crop structure</li> </ul>	<ul style="list-style-type: none"> <li>• Typical</li> <li>• Organic</li> <li>• Precision farming</li> <li>• Crop rotation</li> <li>• Type of seed</li> <li>• Intensity</li> <li>• Farm infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• Land preparation</li> <li>• Seeding / planting</li> <li>• Fertilizing</li> <li>• Crop care</li> <li>• Harvesting</li> <li>• Post harvest &amp; Transport</li> </ul>	<ul style="list-style-type: none"> <li>• Mounted</li> <li>• Trailed</li> <li>• Self-propelled</li> <li>• Soil engaging</li> <li>• Non-soil engaging</li> <li>• Level of mechanization</li> </ul>	<ul style="list-style-type: none"> <li>• Farm management</li> <li>• Education &amp; training</li> <li>• After sales service</li> <li>• Maintenance</li> <li>• Finance</li> <li>• Operators</li> <li>• Incentives</li> <li>• Policy</li> <li>• Certification</li> </ul>

# (1-A). Global Agricultural Mechanization Survey

- a) General dev. tendencies affecting the future demand of agri. Mech.
- b) Most imp. staple crops & major drivers for mech. of cropping systems
- c) Trade related to agric. machinery
- d) Impact of selected issues on the demand for agricultural mechanization
- e) Technological trends over the next 10-20 years.

Country	Association and/or Institution
Germany	VDMA – Verband Deutscher Maschinen- und Anlagenbaue
Italy	UNACOMA – Unione Nazionale Costruttori Macchine per l’Agricoltura
France	AXEMA – Union des Industriels de l’Agro-Equipment
Finland	Federation of Finnish Technology Industries
USA	AEM – Association of Equipment Manufacturers
Japan	<b>JFMMA – Japan Farm Machinery Manufacturer’s Association</b>
China	<b>CAAMM – China Association of Agricultural Machinery Manufacturers</b>
India	<b>FICCI – Federation of Indian Chambers of Commerce and Industry</b> <b>IARI – Indian Agricultural Research Institute</b> <b>CIAE - Central Institute of Agricultural Engineering</b>

(Source: S. Böttinger, R. Doluschitz, J. Klaus, C. Jenane and N. Samarakoon (2013). An UNIDO presentation to ANTAM, University of Hohenheim, Stuttgart, Germany)

## (d). Impact Factors on the Demand of Agri. Mechanization \*

<b>Natural conditions</b>	<b>Low (+/-)</b>
Climate change	Low (+/-)
Land (availability, condition)	Low (+/-)
<b>Water availability</b>	<b>Med. (+/-)</b>

<b>Political conditions</b>	<b>Medium (+)</b>
Food safety goals	Low (+)
<b>Education of farm operators</b>	<b>Med. (+)</b>
Research	Low (+)
<b>Subsidies</b>	<b>Med. (-)</b>
<b>Farm structure development</b>	<b>Med. (+)</b>
Biofuel production	Low/Med. (+)

<b>Economic conditions</b>	<b>Strong (+/-)</b>
<b>Technical progress</b>	<b>Med./Strong (+)</b>
<b>Economic growth and welfare</b>	<b>Med. (+)</b>
<b>Oil price</b>	<b>Med. (+/-)</b>
<b>Economic crises</b>	<b>Med. (-)</b>
<b>Energy supply</b>	<b>Med. (+/-)</b>

<b>Demographic conditions</b>	<b>Medium (+/-)</b>
<b>Population growth</b>	<b>Med. (+)</b>
<b>Population age in rural areas</b>	<b>Med. (+/-)</b>
Change in diets, consumer concerns	Low (+)
Urbanization and industrialization	Med. (+)

\* Values for all 8 surveyed countries

## (1 – A). Global Agricultural mechanization

- **India/China**

- Large shares to the GDP, > 1/3 population gains income from agriculture.
- Small scale (~ 0.5 to 1.5 ha) and towards larger farms
- Rapid increase machines for custom-hire services
- Fast growing tractor production

- **Japan**

- Agri. sector - diminishing (land, population working in agriculture, etc.).
- Highly mechanized, 461 tractors and 237 harvesters per 1,000 ha.
- Mostly small, sophisticated and specialized machines.
- Towards more automation.
- Strong industry with export to whole Asia and other regions of the world.

## **General and Developed Economies**

- Precision farming – std. in mid-term, control & automation systems will become common
- saturation of domestic markets, different agric. implements industry with potentials abroad.

## **Transition Economies**

- India and China - sig. technology transfer and progress
- promising markets with high demands
- towards high levels of mechanization, if:
  - ✓ current trends of technology transfer is pursued
  - ✓ property rights, taxation practices across countries, market access, etc. are further dealt with.

## **Developing Economies**

- Limited increased no. of machines and market expansion, next 10 years are positive.
- Need increased investments - governments and private sector

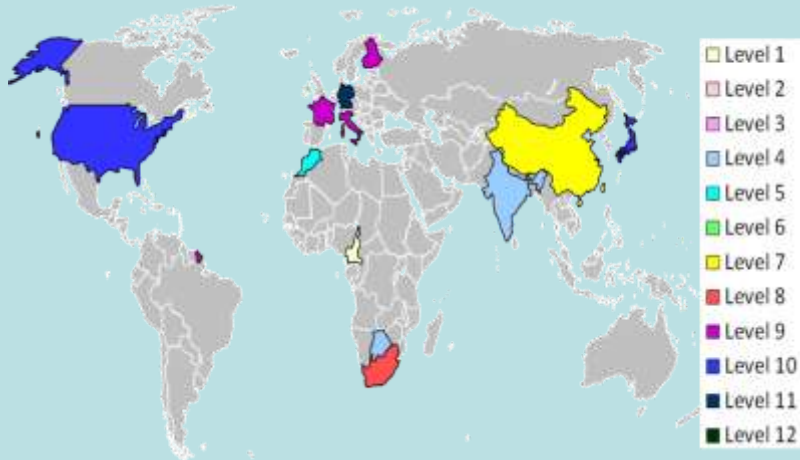
# (1 – B). Status And Projection Of Agric. Mechanization: 12 Levels

<b>Level</b>	<b>Farm power characteristics</b>	<b>hand</b>	<b>Draught animal</b>	<b>tractors</b>	<b>Nomin. speeds (km/h)</b>		<b>No. of speeds</b>	<b>Shift</b>	<b>PTO speeds rpm</b>
					<i>forw.</i>	<i>rev.</i>	<i>forw./rew.</i>		
<b>1</b>	Predominantly hand power	> 80	<= 20	<= 5					
<b>2</b>	Sig. use of draught animal power	46 – 80	21 – 39	<= 10					
<b>3</b>	Sig. use of tractors	15 – 45	>= 40	<= 19					
<b>4</b>	Mainly Tractors	20 – 50	15 – 30	20 - 49					
<b>5</b>	Fully motorized technology level I	<= 25	<= 25	50 - 75					
<b>6</b>	Fully motorized technology level II	<= 10	<= 10	> 75	2 – 20 (25)	3 - 8	6/2 – 8/2	SG, CS	540
<b>7</b>	Fully motorized technology level III	“	“	“	2 - 30	3 - 10	8/4 – 12/4	CS, SS	540/(10 00)
<b>8</b>	Fully motorized technology level IV	“	“	“	(0,5) 2 – 30 (40)	3 - 15	12/4 – 16/8	SS, HL	540/100 0
<b>9</b>	Fully motorized technology level V	“	“	“	(0,3) 2 – 40 (50)	2 - 20	16/12 – 36/36	SS, PPS, FPS	540/100 0
<b>10</b>	Fully motorized technology level VI	“	“	“	0 – 50 (60)	0 - 25	∞	autom.	(750/12 50)
<b>11</b>	Moderate share of autonomous vehicles								
<b>12</b>	Significant share of autonomous vehicles								

(Source: S. Böttinger, R. Doluschitz, J. Klaus, C. Jenane and N. Samarakoon (2013). An UNIDO presentation to ANTAM, University of Hohenheim, Stuttgart, Germany)

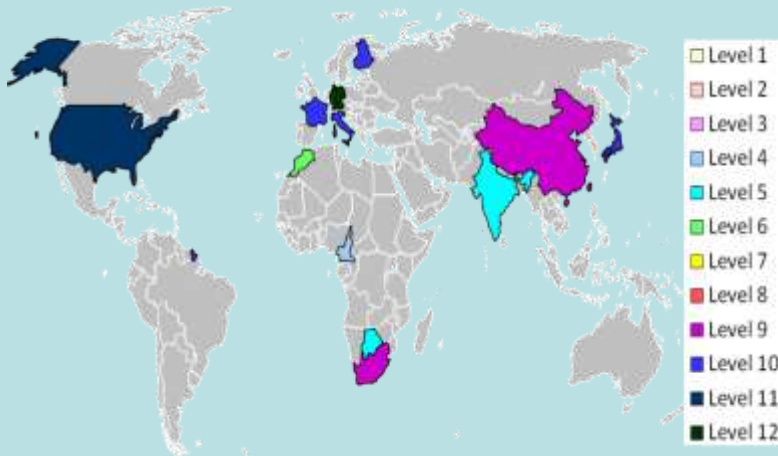
Source: Clarke et al. (2002) / Renius (2005), modified.

Agricultural mechanization: Status

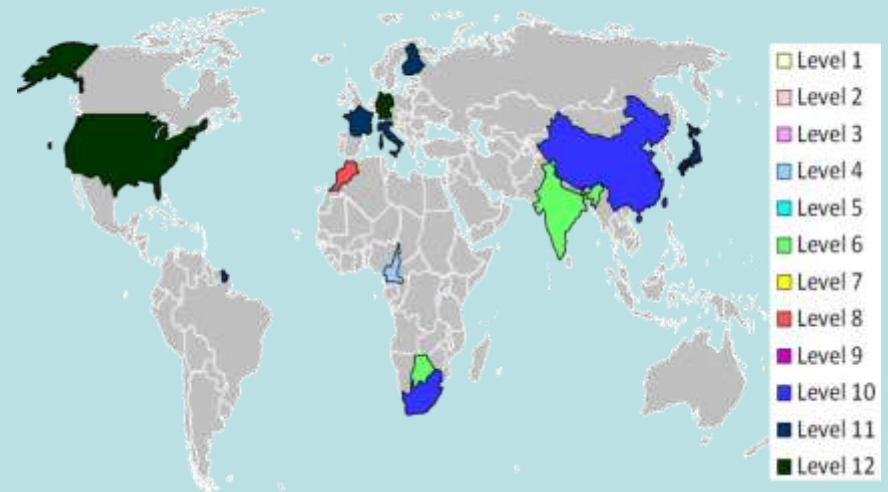


## (1 – B). Status and projection of agr. mechanization

Agricultural mechanization: 10 years prediction



Agricultural mechanization: 20 years prediction



(Source: S. Böttinger, R. Doluschitz, J. Klaus, C. Jenane and N. Samarakoon (2013). An UNIDO presentation to ANTAM, University of Hohenheim, Stuttgart, Germany)



# 1- C. Annual Domestic Growth ( next 10 years )

	Germany	USA	Japan	China	India
Small size tractors (= < 40 hp)	→	↗	↘	↗	↗
Medium size tractors (= < 100 hp)	→	↗	↗	→	↗
Big size tractors (> 100 hp)	↗	↗	↗	↑	/
Self propelling combines	→	↗	↗	→	↗
Forage harvesters	→	↗	→	↑	↗
Reapers	→	/	/	→	↗
Threshers	/	/	↘	↘	↗
Irrigation systems	→	↑	↘	↗	↗
Diesel engines	→	↗	↘	↗	↗
Power tillers	→	→	↘	→	↗
Food processing technique	→	↗	/	↗	↑
Hand implements	/	↘	/	→	↗
Draught animal implements	/	/	/	/	→
Soil preparation	→	↗	→	→	↗
Seeding	→	↗	→	→	↗
Plant protection	→	↗	→	↗	↗

## Legend

[↑] >= 10% annual growth rate

[↘] -10% to 0 % annual growth rate

[-] not specified

[↗] 0% to 10% annual growth rate

[↘] <= -10% annual growth rate

[→] -/+ 0% annual growth rate

[/] not relevant

## (1 – C). Annual Import Growth ( next 10 years)

	Germany	USA	Japan	China	India
Small size tractors (=< 40 hp)	↗	↗	↗	↓	→
Medium size tractors (=< 100 hp)	↗	↗	↗	↓	→
Big size tractors (> 100 hp)	↗	→	↗	→	/
Self propelling combines	→	→	→	→	→
Forage harvesters	→	→	→	↗	-
Reapers	→	/	/	→	-
Threshers	/	/	/	→	-
Irrigation systems	→	→	→	↗	-
Diesel engines	→	→	→	→	-
Power tillers	→	→	↘	→	↑
Food processing technique	→	↗	/	→	↗
Hand implements	/	↗	/	/	→
Draught animal implements	/	-	/	/	→
Soil preparation	→	↗	/	→	→
Seeding	→	↗	→	→	→
Plant protection	→	↗	→	↗	→

[↑] >= 10% annual growth rate

[↘] -10% to 0 % annual growth rate

[-] not specified

[↗] 0% to 10% annual growth rate

[↓] <= -10% annual growth rate

[→] -/+ 0% annual growth rate

[/] not relevant

## (1 – C). Annual Export Growth ( next 10 years)

	Germany	USA	Japan	China	India
Small size tractors (= < 40 hp)	→	↑	↗	↑	↗
Medium size tractors (= < 100 hp)	→	↑	→	↑	↗
Big size tractors (> 100 hp)	↗	↑	→	↗	/
Self propelling combines	↑	↑	↘	↗	↗
Forage harvesters	↑	↗	→	→	↗
Reapers	→	/	/	→	-
Threshers	/	/	→	→	-
Irrigation systems	→	↗	→	→	↗
Diesel engines	→	↗	↗	→	↗
Power tillers	→	↗	↗	→	-
Food processing technique	↗	↗	/	→	↗
Spare parts in general	↗	↗	↗	→	↗
Draught animal implements	/	/	/	/	↗
Soil preparation	↗	↗	/	→	↗
Seeding	↗	↗	→	→	↗
Plant protection	↗	↗	→	↗	↗

### Legend

[↑] ≥ 10% annual growth rate

[↘] -10% to 0 % annual growth rate

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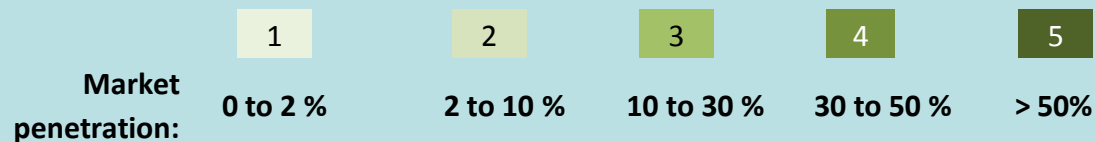
[→] -/+ 0% annual growth rate

[/] not relevant

# (1 – C). Cross regional comparison: Market penetration technologies

		Precision farming							Driverless tractors	Fleet management	Smart implements	ISOBUS	Remote diagnostics	Use of sensor technology	Robotics
		Overall	Tillage	N-fertilizer Application	Other fertilizer application	Plant protection	Guidance systems	Yield mapping							
Germany	status	4	5	5	5	5	4	4	1	2	1	3	3	4	3
	10 years	5	5	5	5	5	5	5	1	5	2	4	4	5	4
Italy	status	2	2	-	-	4	2	2	1	2	1	1	1	1	1
	10 years	3	3	-	-	5	3	3	2	2	2	3	3	2	2
France	status	2	1	2	1	2	1	2	1	2	2	2	1	2	1
	10 years	3	2	4	3	4	3	4	2	3	4	4	3	4	2
Finland	status	2	1	2	2	1	2	2	1	1	2	2	1	2	1
	10 years	3	2	3	3	4	5	3	1	2	4	4	4	4	2
USA	status	5	5	5	5	5	5	4	1	3	2	2	3	3	2
	10 years	5	5	5	5	5	5	5	3	4	4	4	5	5	4
Japan	status	1	5	1	5	5	2	1	1	-	-	1	1	1	2
	10 years	3	5	1	5	5	3	1	1	-	-	4	2	3	3
China	status	1	1	4	4	3	1	1	1	1	1	1	1	1	1
	10 years	3	2	5	5	5	2	2	2	3	3	3	2	3	2
India	status	1	3	4	2	3	1	1	1	1	1	1	1	1	1
	10 years	2	4	5	3	4	1	1	1	1	2	1	1	1	1

Legend:



## ( 2) Situational Analysis of Agric. Machine Testing in The AP Regions

### ANTAM :

- ✓ Factors : economic , labour, land utilization, agric. production, food demand, agric machinery industry, testing.
- ✓ **Need uniform testing procedures, safety standards, intra-regional trade**
- a) **Level of mechanization (> 20%, 10% -20%, < 10%), imbalances – may impede ANTAM**
- b) Huge gaps in *economic dev.*, underdeveloped ag. infrastructure, insufficient purchasing power, & sig. **different level of ag machinery industry.**
- c) Constraints: fragmented lands, diverse machinery types & facilities, poor utilization & high fuel consumption, lack of knowledge and skill of users, artisans and traders.
- d) **ENTAM – a model to ANTAM**
- e) **Constraints ANTAM: financial, admin.**

Source: P. Soni and Y. Ou (2010). Agricultural Mechanization – 6 AP Countries in Asia pacific

# Farm Mechanization In Selected Asian Countries

Country	Land preparation (%)	Planting (%)	Threshing (%)	Harvesting (%)	Overall (%)	Machinery produce	Mechanization level (%)
China	60	35		30	42	extensively	>20%
India	30	10	60	20	25-30	extensively	>20%
Republic of Korea	High	High	High	High	>70	extensively	>20%
Philippines	13	0.2	69	low		Few	10 - 20
Thailand	high	medium			medium	medium	10 - 20
Vietnam	72 (rice)	20	100			Medium	10 - 20
Bangladesh	80	low	>80	low	low		< 10 %
Cambodian	low	low	low	low	<10		< 10 %
Indonesia	low	low	low	Low			< 10 %
Nepal		low	low	9 combines	low		< 10 %
Sri Lanka	low	low	low	low	low		< 10 %

Source: P. Soni and Y. Ou (2010). Agricultural Mechanization – 6 AP Countries in Asia pacific

# Agriculture Machinery Industry

- Japan – Tractors, 1/3 total agric. machinery production, 80% ag. machinery exports, suffered in recent years due to the appreciation of the yen (VDMA, 2014)
- Korea – Tractors, growing demand, production & export are approx. 1/3 Japan (VDMA, 2014)
- AP – produce 30.48 % tractors sold worldwide (FAO, 2004), India topping the list (>680K units in 2013, VDMA, 2014). 13 tractor manufacturers, other - diesel engines & agric. tools
- Other countries: “cut and weld” manufacturing, manual weeders, threshers, winnowers, SME workshops. Low quality prototype from the designers / researchers
- Voluntary implementation of farm machinery testing standards.
- Issues:
  - Machines are not suitable to the farming conditions
  - Expensive, for most farmers, high acquisition and maintenance costs.

# Agriculture Machinery Safety

- In several AP countries - fatal accident rate in agric. is double the average for all other industries.
- Need a **region-wide safety standards and guidelines** on the operation of agric. machines

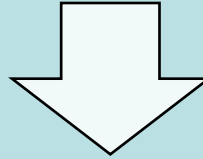


# Agricultural Machinery and Environmental Sustainability

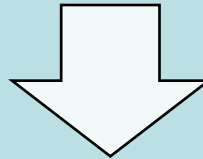
- Most of the agric. machinery in the region - **energy-intensive**.
- Need to promote the application of energy - **efficient and safe** agricultural machinery
- Concerted and holistic approach - capacity building, technology transfer, training of operators and mechanics, experience-sharing and needs assessment study
- **Development of common testing procedures and safety standards**

# ANTAM

( use Organization for Economic and Development (OECD) and the European Network for Testing of Agricultural Machines (ENTAM) )



- ✓ **ANTAM** - UN-CSAM of ESCAP
- ✓ **ANTAM Steering Committee (SC)** - OECD, ENAMA, FAO and UN-CSAM
- ✓ **ANTAM Technical Working Group (TWG) – To be formed.** More than 10 countries: Bangladesh, China, India, Malaysia, Myanmar, Nepal, PNG, the Philippines, the Russian Federation, Viet Nam and Thailand



- **Common Basis For Standards And Guidelines**
- **Step By Step Policy/Deadlines until ANTAM = ENTAM**

# Key Factors - ANTAM

- A. Adoption of a Common Standard
  - International (ISO) /Regional
- B. Harmonised Test Codes
  - National → Regional → International
- C. Endorsement / Empowerment of Test Centres
- D. Recognition of Certified Test Report
- E. Mutually agreeable Regulation Procedures – Test Report
- F. Functioning and effective TWG and Test Centres
  - voluntarily

# **STANDARD ORGANISATIONS**

## **International**

- **ISO – International Standards Organization**

## **Europe**

- **CEN - European Committee for Standardisation**

## **Asia Pacific**

- **PASC — Pacific Area Standards Congress**
- **ACCSQ — ASIAN Consultative Committee for Standards and Quality**

# **OECD Codes**

**A GOOD EXAMPLE OF**

**STANDARDISATION**

**+**

**TESTING**

**+**

**CERTIFICATION**

**UNDER THE UMBRELLA OF AN  
INTER GOVERNMENTAL ORGANISATION**

# OECD Codes

[Code 2](#) - tractor performance.

[Code 3](#) - strength of **protective structures** for tractors (**dynamic test**).

[Code 4](#) - strength of **protective structures** for tractors (**static test**).

[Code 5](#) - **Noise measurement** at the driver's position(s).

[Code 6](#) - **front-mounted protective structures on narrow-track wheeled**

[Code 7](#) - **rear-mounted protective structures on narrow-track wheeled**

[Code 8](#) - **protective structures on track laying tractors.**

[Code 9](#) - **Protective structures for tele-handlers** (testing of falling-object and roll-over protective structures fitted to self-propelled variable reach all-terrain trucks for agricultural use).

[Code 10](#) - **Falling object protective structures**

# OECD Tractor Codes

- **Brief history of the OECD Tractor Codes**
  - established in 1959
  - 26 participating countries
  - 30 Testing Stations worldwide
  - Participation is voluntary
  - National Designated Authorities (NDA)
  - 9 Codes – Performance (1), Noise (1), ROPS (6) and FOPS (1)
  - Over 3000 tractors models tested for performance and more than 10800 tested for noise levels and driver's protection in case of a roll-over or a falling object hitting the protective structure

# Uniqueness of OECD Tractor Codes

- Quantifiable tests for reliable comparison between countries
- Global Network of Testing Stations
- Intergovernmental Organisation
- Third Party Certification
- Transparency
- Changes agreed by Consensus



# ISO Standards on Agriculture Machinery/Equipment

Sub-committee	Title	No.
ISO/TC 23/SC2	Common tests	35
ISO/TC 23/SC3	Safety and Comfort	11
ISO/TC 23/SC4	<b>Tractors</b>	49
ISO/TC 23/SC6	<b>Equipment for crop protection</b>	42
ISO/TC 23/SC7	Equipment for harvesting & conservation	21
ISO/TC 23/SC13	Powered lawn and garden Equipment	13
ISO/TC 23/SC14	Operator controls, operator symbols and other display, operator manuals	9
ISO/TC 23/SC15	Machinery for forestry	15
ISO/TC 23/SC17	Manually portable forest machinery	25
ISO/TC 23/SC18	Irrigation and drainage and systems	34
ISO/TC 23/SC19	Agricultural electronics	39
ISO/TC 23/	Others	36

## ISO/TC 23/SC2 Common Tests

### Agricultural tractors - Test procedures

- PTO, Rear 3-pt. link lifting capacity, Partial power PTO, Guards for PTO drive-shafts,
- Turning and clearance dia., Steering capability,
- Exhaust smoke, Engine air cleaner, Low temp. starting,
- Centre of gravity, Roll-over protective structures (ROPS) - Dynamic test and acceptance conditions Seat belts, anchorage strength requirements, Operator's seat, noise at the operator's position,
- Axle power, drawbar power, Hydraulic power at tractor/implement interface,
- Max speeds, Brakes and braking devices
- Electromagnetic compatibility

# ISO/TC 23/SC3 Safety and Comfort

- Tractors & ag. Machinery - Seat belts anchorage location requirements
- General requirements - agricultural machinery Safety
- Power-driven soil-working machines – Safety
- Solid fertilizer distributors machinery – Safety
- Seed drills - safety
- Auto-guidance systems for operator-controlled tractors and self-propelled machines -- Safety requirements
- Agricultural trailers and trailed equipment -- Drawbar jacks
- Tractors and self-propelled machinery - Operator controls - Actuating forces, displacement, location and method of operation
- Self-propelled machinery -- Assessment of stability
- Guards for moving parts of power transmission

# ISO/TC 23/SC6 - Equipment for crop protection

- Sprayers - Connection threading
- Safety - Sprayers and liquid fertilizer distributors
- Test methods for: sprayer nozzles, hydraulic sprayers
- Anti-drip devices performance, nozzles and manometers
- Distributing granulated pesticides or herbicides
- Agricultural sprayers -- Tank nominal vol. and filling hole dia.
- Air-assisted sprayers for bush and tree crops
- **Knapsack motorized air-assisted sprayers - Test methods and performance limits**
- OTHERS: Traceability - Spray parameter recording, reciprocating positive displacement pumps and centrifugal pumps, volume of total residual Air-assisted agricultural sprayers, Boom steadiness, environmental requirements for sprayers, evaluation of cleaning systems (External & Internal cleaning) of tank, Drift classification, Classification of field crop sprayers by field measurements, Field measurement of spray distribution in tree and bush crops, lab. measurement of spray drift -- Wind tunnels, field measurement of spray drift, engine-driven mistblowers -- Safety requirements

# ISO/TC 23/SC18 - Irrigation and drainage and systems

- Volumetric valves -- General requirements and test methods
- Rotating sprinklers, Sprayers, Automatic irrigation systems -- Hydraulic control, Traveller irrigation machines laboratory and field test methods, Emitters and emitting pipe, Irrigation valves, Pressure losses in irrigation valves, Filters for micro-irrigation, Direct-acting pressure-regulating valves, Centre-pivot and moving lateral irrigation machines with sprayer or sprinkler nozzles, Wiring and equipment for electrically driven or controlled irrigation machines, Safety devices for chemigation, Test facilities for agricultural irrigation equipment,

# B. Harmonised Test Codes

National → Regional → International

MANUFACTURER



Type Approval for road  
circulation

ENAMA



ITALIAN MINISTRY OF TRANSPORT

# Tractor Tests

- OECD tractor test does not covers small field plots and wet field operation in many of the AP countries.
- There is a role for ANTAM in helping the development of adapted test methods for the AP countries

## C. Endorsement / Empowerment of Test Centres

### A regional approach...Economy of scale

- Implemented within the existing institutional framework of the participating country(ies):
  - Respond to the needs of existing Asian regional economic entities
- Leading to inter-regional cooperation:
  - Harmonization of existing (or new) standards, limit overlap and facilitate future trade related to agricultural machines.

Source: N. Samarakoon (2012) UNIDO, UN



## Phase 1:

National or  
Regional  
Assessment  
of agric.  
machines  
Testing and  
evaluation  
needs)

- Reviewing existing national testing standards and recommending appropriate adjustments to meet international standards.
- Evaluating existing national institutions to identify testing equipment needs and related training for future operation of the station.

## **I. Phase 2:**

- (I).** Human resource development for the operation of the center
- (II).** Equipment acquisition, installation and operation.
- (III).** Guidance on the management methods required for an efficient operation of the testing station

# Phase 3:

Standards  
selection and  
adaptation to  
local needs

a. Review testing policies and procedures for the operation of installed testing equipment

b. Formalizing methods for collecting, analyzing and evaluating the test results

# Phase 4:

**Communication policies of the testing station and publication of testing reports**

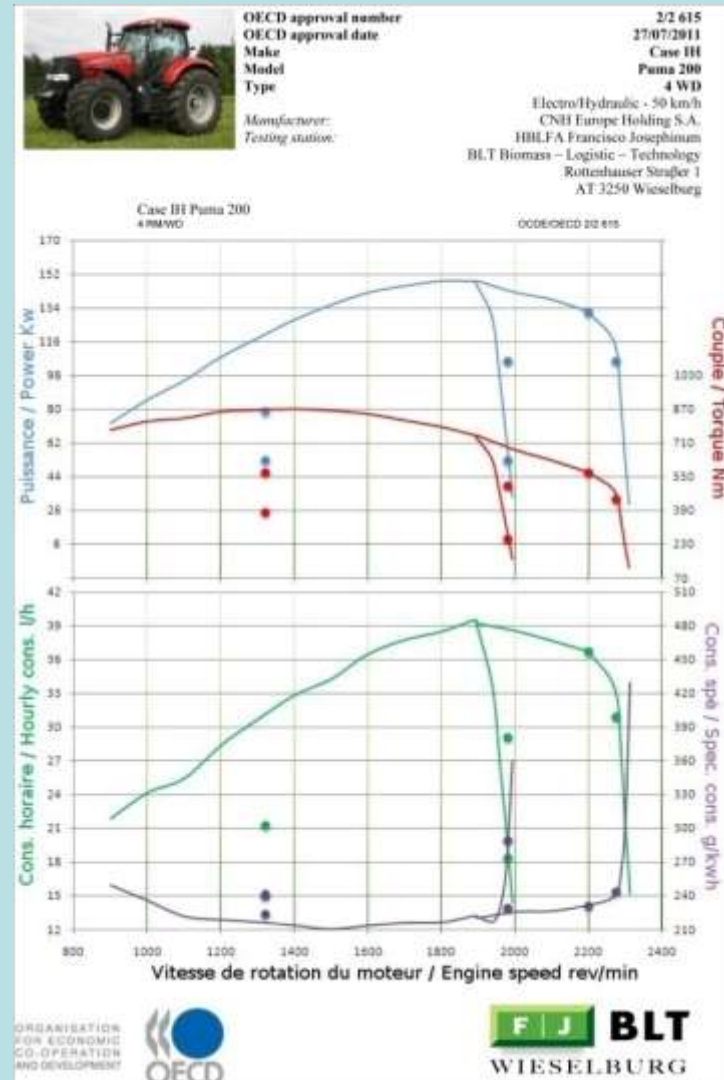
- A systematic procedure in transferring machines test report
- Publication of test report within the agricultural community and equipment industry.

# OECD Test Report

- Results of each tractor test approved according to the OECD Codes are included in a full report issued by the national stations having performed the tests.

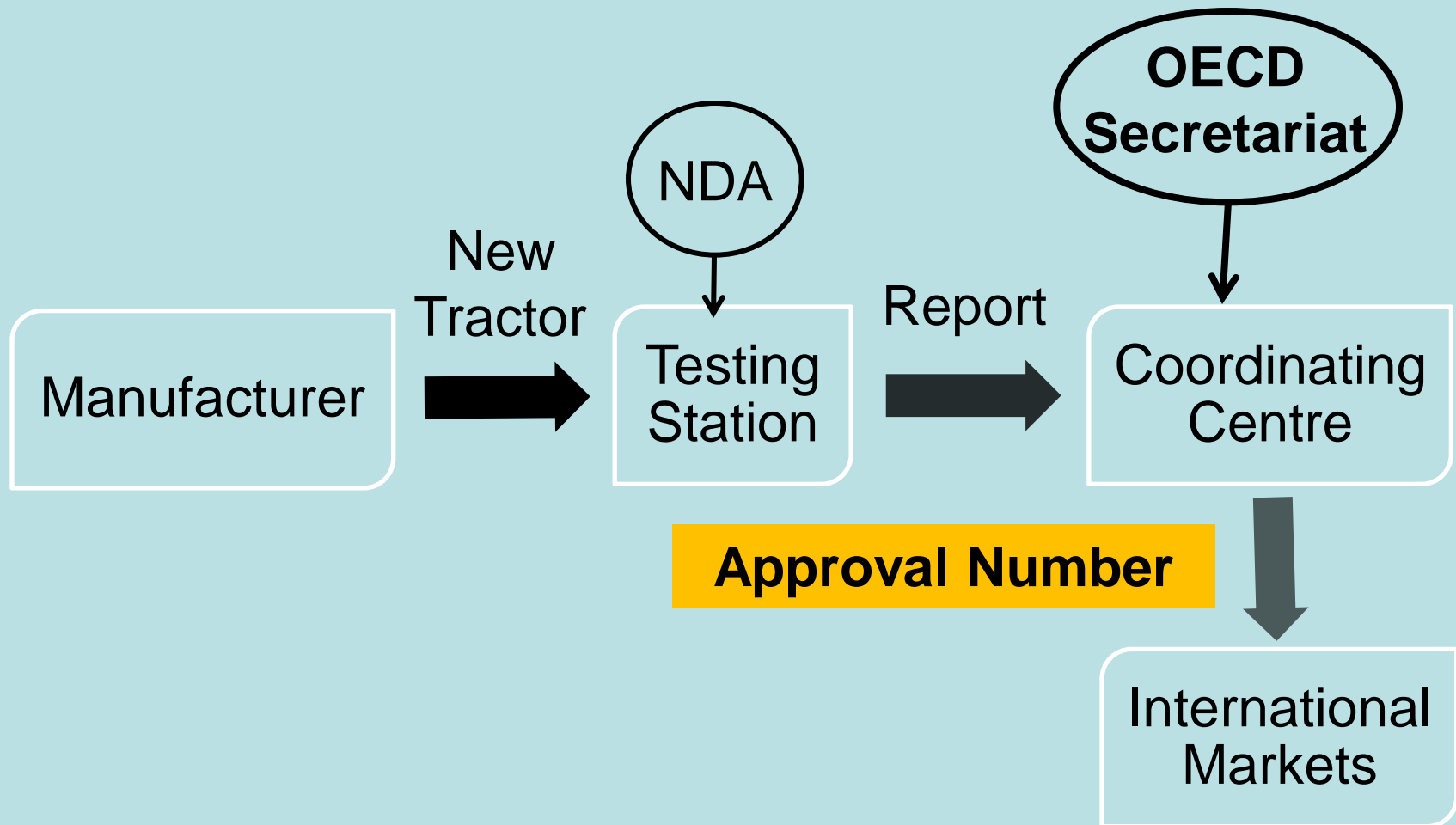
- Access to these reports and their possible distribution remain the testing stations responsibility.

*(On the right, copy of a test report received at the end of 2011)*

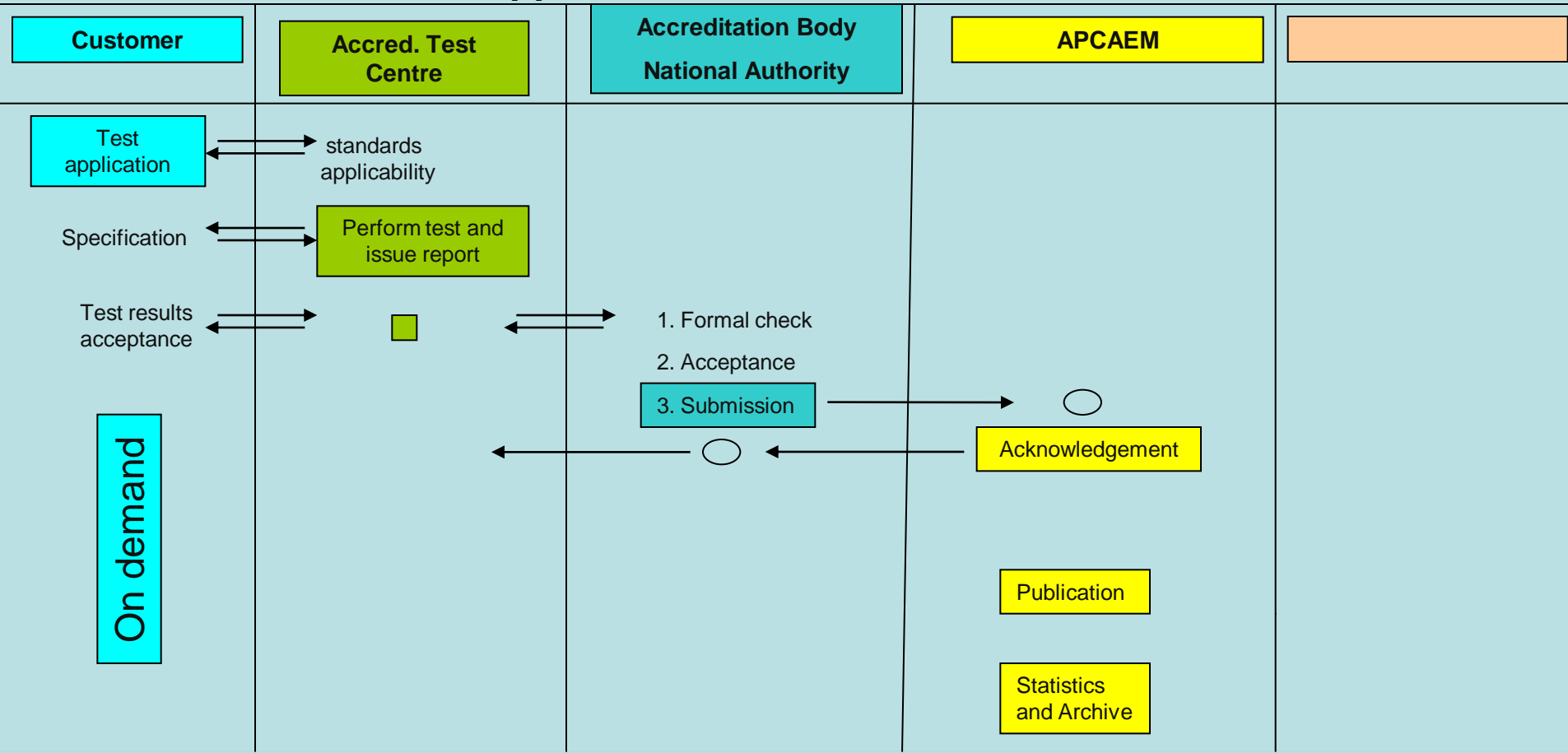


- Many existing international test standards including many developed by and for developing countries.
- Adaptation of existing testing standards should be developed at the initial stage that address the needs of national conditions
- Leveraging the expertise of existing established testing stations among member countries and outside the AP countries can play an important role in supporting setting-up such stations, human resources,

# D. Recognition of Certified Test Report



# Approval Procedure Flow Chart



Development & adoption of procedures for checking and controlling the system

The manufacturers should pay for the tests

Governments should give subsidies to tested machines = cost benefit optimization



# E. Enforceable Regulation and Procedures – Test Report

By the National Standards  
Agencies of Each Member  
Countries

# F. Functioning and effective TWG and Test Centres

- Funding, Professionals and Voluntary
- Regular Meeting
- Coordinated
- Capacity Building
- Clearly Defined Responsibility

# 3. CHALLENGES AND CONSTRAINTS TO ANTAM

- **Financial : Sources of funding**
- **Administrative : governance and coordination**
- **Stakeholders' : Acceptability by end users, manufacturers, traders, etc.**
- **Miscellaneous constraints:**
  - **Significant variations in standards and test codes/procedures among member countries**
  - heterogeneous needs of farmers
  - heterogeneous needs manufacturers and traders of agricultural machinery and
  - bureaucratic delays in taking timely decisions.

# 4. Recommendations - ANTAM

- Comprehensive document of various national standards and agricultural machinery test codes – currently existing and practiced. Recognizing differences among member countries and establishing harmonised factors – inter-regional trade
- Identification of focal points
- Guide & promote - cooperative testing & standardization procedure. Comparison of test centres, test facilities & capabilities - detailed survey
- Promote business communications - identify similarities and differences among country standards, harmonizing different standards
- Strengthen – R&D on testing technology, organize test training courses for the regional testing staff.
- Empowerment and support Test Centres – with region-wide acceptability.
- Capacity building and expert exchange to help building / updating / upgrading test facilities
- Implement mutually agreed standards into agricultural machinery trade and cooperate with other regional/international testing networks.
- Financial support of regional test centres