

**Adopted by the 5th ANTAM Annual Meeting on November 28, 2018
Yogyakarta, Indonesia**

**2018 Work Report
Asian and Pacific Network for Testing of Agricultural Machinery (ANTAM)**

1. This annual report is prepared by the secretariat of the Asian and Pacific Network for Testing of Agricultural Machinery (ANTAM) hosted by the Centre for Sustainable Agricultural Mechanization of the United Nations Economic and Social Commission for Asian and the Pacific (CSAM-ESCAP).
2. The report describes major developments in the implementation of programme activities of ANTAM since its 4th Annual Meeting held on 22-24 November 2017 in Manila, Philippines. Based on the analysis carried out in 2016 regarding the network progress since its inception, 2018 was the second year of phase 2 of ANTAM implementation phases outlined below:
 - i. Development of region-wide agricultural standards that reflect the agricultural and technological needs of countries in Asia and the Pacific (2014-2016);
 - ii. Establishment of a network of testing stations able to perform the standardized ANTAM Codes and produce consistent test reports (2017-2020);
 - iii. Establishment of a mutual recognition agreement for test results produced under the ANTAM umbrella (2021-2023).
3. In support of the objectives of phase 2, substantive efforts have been devoted to support national testing stations capacity building, development of ANTAM procedure to establish roles and responsibilities of entities involved in the ANTAM certification system and procedure, as well as addressing member countries' comments on the ANTAM Codes 2017, conducting analytical work to contextualize the ANTAM work in the broader United Nations context and align the project with the 2030 Agenda for Sustainable Development.

I. Review of the Composition of the Technical Working Groups (TWGs) on Power Tillers, Knapsack Misters-Cum-Dusters and Paddy Transplanters

4. In February 2018, the ANTAM secretariat welcomed additional representatives from Cambodia, Japan, Malaysia, Sri Lanka and Thailand to the Technical Working Groups (TWGs).
5. The TWG on Power Tillers in 2018 is composed by the Chairman, Mr. Champat Raj Mehta, India; Mr. Israil Hossain, Bangladesh; Mr. Chhoeur Sothunn, Cambodia; Mr. Chang Xiongbo, China; Mr. Muhamad Iqbal, Indonesia; Mr. Hiroyuki Takahashi, Japan; Mr. Mohd Khusairy Khadzir, Malaysia; Mr. Liaqat Ali Shahid, Pakistan; Mr. Darwin Aranguren, Philippines; Mr. Vadim Pronin, Russian Federation; Mr. Janaka Hemachandra, Sri Lanka; Mr. Anuchit Chamsing, Thailand; and Mr. Le Huy Phuong, Viet Nam.
6. The TWG on Powered Knapsack Misters-Cum-Dusters in 2018 is composed by the Chair Mr. Hafiz Sultan Mahmood, Pakistan; Mr. Duc Sam On, Cambodia; Ms. Ma Lingjuan, China; Mr. Douzals Jean-Paul, France; Mr. Panna Lal Singh, India; Mr. Azmy Ulya, Indonesia; Mr. Yoshiyuki Kawase, Japan; Mr. Mohd Fazly Bin Mail, Malaysia; Mr. Pavel Ishkin, Russian Federation; Ms. Ayesha Herath, Sri Lanka; Ms. Khanit Wannaronk, Thailand; Mr. Baris Ozgur Kocturk, Turkey; and Mr. Nguyen Tuan Anh, Viet Nam.
7. The TWG on Paddy Transplanters in 2018 is composed by the Chairman Mr. Allimuthu Surendrakumar, India; Mr. Md. Anwar Hossen, Bangladesh; Mr. Zhang Xiaochen, China; Mr. Takashi Fujimori, Japan; Mr. Mohd Shahril Shah bin Mohamad Ghazali, Malaysia; Mr.

Shabbir Ahmad Kalwar, Pakistan; Mr. Romulo Esteban Eusebio, Philippines; Mr. Jeong Seong Lim, Republic of Korea; Mr. Anuradha Wijethunga, Sri Lanka; Mr. Yuttana Khaehanchanpong, Thailand; and Mr. Ngo Van Phuong, Viet Nam.

II. ANTAM Codes Development

8. The 4th Meeting of the Technical Working Groups (TWGs) of ANTAM was held on 25-28 June 2018 in Georgetown, Penang, Malaysia. The meeting was organized in collaboration with the Agricultural and Food Engineering Technical Division (AFETD) of the Institution of Engineers of Malaysia (IEM) and with the support of the Malaysian Agricultural Research and Development Institute (MARDI) of the Ministry of Agriculture and Agro-based Industry (MOA) of Malaysia (http://www.un-csam.org/news_detail.asp?id=503). A total number of 15 ESCAP member countries, i.e. Bangladesh, Cambodia, China, India, Indonesia, Japan, Malaysia, Pakistan, Philippines, Republic of Korea, Russian Federation, Sri Lanka, Thailand, Turkey and Viet Nam attended the meeting. Moreover, members of the Advisory Panel of ANTAM, i.e. ENAMA/ENTAM (Italian National Agency for Agricultural Mechanization/ European Network for Testing of Agricultural Machinery) and the Food and Agriculture Organization of the United Nations sent representatives. In addition, representatives from the CSAM led initiative Regional Council for Agricultural Machinery Associations (ReCAMA) attended the meeting as observers. Specifically, from All-India Agricultural Machinery Manufacturers Association (AMMA-India).
9. Negotiations at the meeting built on the constructive work carried out through online consultations held between March and June to address technical comments received by CSAM after the 4th ANTAM Annual Meeting held in November 2017. When relevant to the purpose of the Codes, comments and suggestions were integrated, otherwise a written technical reply can be found in the summaries of the teleconference meetings shared with the TWGs members.
10. The TWG on Power Tillers, based on the outcomes of the eight rounds of online technical negotiations, revised the text of the draft Code following suggestions received by ANTAM Focal Points and TWGs members. The group reviewed the Code to add International System of Unit (SI) measuring units, revise the overall technical content including minor revisions in the definition of power tiller and revision of measuring tolerances. Moreover, the protocol related to the water proof test was revised based on the OECD model where the machine is tested only in water. Additionally, the group suggested to revise the table of content and the structure of the Code. This proposal was also shared in the last plenary session and this solution was adopted across the three ANTAM Codes. Furthermore, the group reviewed and finalized the list of instruments for testing of power tillers, and specifications were added both to the list of instruments needed to test all three Codes and to the list of specific instruments needed to test power tillers only.
11. Based on the discussions during the eight online consultations held between March and May 2018, the TWG on Powered Knapsack Misters-Cum-Dusters reviewed the Code and worked on a number of modifications to reflect the changes requested by member countries. In particular, checks and requirements on nozzles were introduced to facilitate a more comprehensive assessment of the performance of the machine. Moreover, modifications were made in relation to the requirements concerning the use of chemicals for the corrosion test and the use of dust for the duster test. Substantive discussion took place and modifications were made to the requirements related to the blower test for air

velocity and volume, and the horizontal and vertical deposition. Given the lack of agreement on the methodology, the droplet size measurement is now optional. The group plans to reinstate the measurement in future editions by working on identifying an alternative testing methodology acceptable for all member countries. Moreover, while the noise acceptance level limits are no longer included in the Code, a specification on the actual limits observed by importing countries was added as a note to the manufacturer. Furthermore, modifications were made to the test report and the list of equipment needed for ANTAM accredited testing stations, a draft version of the list of equipment was circulated by email for written approval of the group prior to the ANTAM annual meeting. As a result of email consultation, the equipment list is considered as a working draft to be finalized by the TWG in 2019.

12. Negotiations of the TWG on Paddy Transplanters started by reviewing the general text section to discuss and finalize terminology. In particular, to facilitate custom clearance of the machine the term rice transplanter was added to the definition of paddy transplanter. Overall, the group reviewed the text and finalized the format in line with other ANTAM Codes by informing measurement units and adding acceptable tolerances. The water proof test methodology was finalized by adopting a testing methodology in which the machine is tested in water only without the mixture of dust and soil. The engine specification and verification methodology was modified to allow scope for the acceptance of manufacturer's specifications regarding the quality of the engine by the testing station. Data collection sheets were provided in the form of annexes. Furthermore, the group found agreement on the test report format which includes representation of specification, representation of safety requirements, and representation of calculated performance of the transplanter. The list of testing equipment and facilities needed to perform the Code for ANTAM accredited testing stations was finalized by the group.

III. ANTAM Codes 2018

13. The ANTAM Test Code on Power Tillers (ANTAM 001-2018)¹ is formulated by referring to existing standards from the International Electrotechnical Commission (IEC), International Organization for Standardization (ISO), and Organisation for Economic Co-operation and Development (OECD), and by merging relevant national standards from China and India to reflect unique regional conditions. It includes the following tests:

Compulsory tests:

- Checking of specifications
- Engine performance
- Rotary shaft performance
- Drawbar performance
- Turning ability
- Parking brake
- Noise measurement

¹ The Code can be downloaded from CSAM website: <http://www.un-csam.org/pub.asp>

- Vibration measurement
- Waterproofing
- Safety check

Optional test:

- Engine test at high ambient temperature

14. The ANTAM Test Code on Powered Knapsack Misters-Cum-Dusters (ANTAM 002-201)² was formulated by referring to standards developed by the International Electrotechnical Commission (IEC), International Organization for Standardization (ISO), and Organisation for Economic Co-operation and Development (OECD). It includes the following tests:

Compulsory tests:

- Checking of Specifications
- Engine Performance
- Joints, Tank, Straps, Hose and Controls
- Blower
- Discharge Rate
- Misting / Dusting Range and Width
- Noise
- Vibration
- Endurance

Optional test:

- Measurement of Droplet Size and Droplet Density

15. The ANTAM Test Code on Paddy Transplanters (ANTAM 003-2018)³ refers to previous ANTAM Standards, standards developed by the International Organization for Standardization (ISO), Regional Network for Agricultural Machinery (RNAM) and by merging relevant national standards from China, India, and Japan to reflect unique regional conditions. It includes the following tests:

- Checking of Specifications
- Safety Requirements
- Parking Brake
- Noise Measurement
- Water Proof test
- Field Performance

IV. Regional and National Trainings

16. According to the ANTAM Work Plan 2018, the network's strategic priorities for 2018 included: (i) Development of the ANTAM official rules and regulations concerning the certification process, including the official technical requirements for ANTAM accredited testing stations; (ii) Strengthened testing capabilities in the region; (iii) Revision of the

² The Code can be downloaded from CSAM website: <http://www.un-csam.org/pub.asp>

³ The Code can be downloaded from CSAM website: <http://www.un-csam.org/pub.asp>

current ANTAM Codes; and (iv) Resource mobilization. With regard to the first two objectives, the ANTAM training 2018 focused on training member countries on the necessary requirements for the establishment of a certification process including provision of assistance to guide member countries in the development of modern testing facilities. The training was held in Beijing and Wuhan, China on 22-27 October 2018 and co-organized by CSAM and the China Agricultural Machinery Testing Centre of the Ministry of Agriculture of China and Rural Affairs of China (CAMTC-MARA).

17. The training engaged a total of 26 engineers from 17 countries in the Asia-Pacific region, namely Bangladesh, Cambodia, China, India, Indonesia, Japan, Malaysia, Nepal, Pakistan, Philippines, Republic of Korea, Russian Federation, Sri Lanka, Thailand, Tajikistan, Turkey and Viet Nam. Participants benefited from the experience shared by one international trainer from India and two national trainers from China.
18. The training curriculum was designed to provide an overview of international certification systems including ANTAM, the International Organization for Standardization (ISO), and the Organisation for Economic Co-operation and Development (OECD). Moreover, the national consultants provided an in-depth explanation of China's testing and certification procedure including relevant national laws. In addition, participants from India, Japan, Russian Federation and Republic of Korea shared the rules and regulations in support of certification schemes in their respective countries. The programme included visits to testing stations and testing laboratories for power tillers, a demonstration on field performance of Paddy Transplanters as per ANTAM 003-2018, and lectures specific to testing of Powered Knapsack Misters-Cum-Dusters. The visit to the testing facilities on power tillers were guided by an explanatory booklet containing pictures and certifications of testing facilities to aid member countries in gaining knowledge to develop national testing facilities. Furthermore, trainees participated to the 6th Regional Forum on Sustainable Agricultural Mechanization organized by ESCAP- CSAM in Wuhan, China, to further engage with stakeholders in the agricultural machinery sector including representatives from member countries, academia, private sector and international organizations. The forum was held on the side of the China International Agricultural Machinery Exhibition which was an important occasion for participating trainees to observe the latest trends in agricultural mechanization and new technologies.
19. Furthermore, a national training was organized in Nepal to assist in human resource development of the newly built national testing station. The training was delivered to 10 agricultural engineers working with the Department of Agricultural Engineering of the Nepal Agricultural Research Council. The training saw presentations on the history of tractor testing, justification and objectives of testing, different types of tests, general permissible measuring tolerances, instruments generally used in testing of agricultural machinery, and testing of power tillers, powered knapsack misters-cum-dusters and paddy transplanters as per the corresponding ANTAM Standard Codes 2017.
20. A training on Testing of Agricultural Machinery was organized by the Indonesian Centre for Agricultural Engineering Research and Development (ICAERD) in collaboration with CSAM in Yogyakarta, Indonesia, on 27-28 November 2018. The training, attended by engineers from Indonesia, included an overview of ANTAM along with international testing practices and frameworks presented by resource persons invited by CSAM.

V. ANTAM Field Visit

21. In support of ANTAM implementation phase II, and in line with the objectives of the ANTAM work plan 2018, the ANTAM secretariat circulated in December 2017 an application form to gather preliminary information regarding ANTAM member countries' existing testing facilities and capabilities to perform the ANTAM Codes 2017. The application form provided information regarding availability of testing equipment used to conduct ANTAM compulsory tests, lists of testing staff, an overview of governmental support in the development of agricultural mechanization, and funding mechanism to upgrade testing facilities. Based on the information collected and other strategic programmatic priorities, the secretariat selected Nepal as the destination for an ANTAM field visit in 2018.
22. To guide the assessment process during the field visit, CSAM prepared a technical handbook. The ANTAM field visit technical handbook for Power Tillers and Powered Knapsack Misters-Cum-Dusters and Paddy Transplanters lists and displays all needed physical facilities, test rigs and test instrumentation needed to perform the ANTAM Codes. Existing facilities were examined according to a scoring process to allow easy identification of testing capabilities. Moreover, the handbook requires to present additional documents including recent test reports, specifications and calibration certificates of all machinery, and the curriculum vitae of personnel involved in testing. Furthermore, during the field visit CSAM experts analysed the testing centre's fabrication capacity, its funding mechanisms, and interviewed the personnel to understand the current process related to certification.
23. The field visit was conducted on 15-17 May 2018 at the newly-built Agricultural Machinery Testing and Research Center (AMTRC) under the Nepal Agricultural Research Council (NARC) at Nawalpur, Sarlahi. Based on the material collected during the tours, experts at CSAM developed one capacity building strategy report that details needed infrastructural and human resources updates to fill the gaps and apply for accreditation as ANTAM official testing station.

VI. Proposal on ANTAM Procedures and Mechanisms to Support the Development of a Mutual Recognition System

24. At the 4th ANTAM Annual Meeting held in Manila, Philippines, in November 2017, the key elements of a procedure to govern the operationalization of the network in its third phase (2021-2023) had been presented and endorsed by the participating countries. In accordance with ANTAM's work plan for 2018, CSAM has developed a document further expanding on these key elements and providing detailed rules and procedures to: (i) appoint National Designated Authorities; (ii) guide the accreditation of testing stations; (iii) appoint the Deliberative Committee; and (iv) outline the role and steps for appointment of the Technical Reference Unit. This new document was presented for adoption at the 5th ANTAM Annual Meeting held in Yogyakarta, Indonesia, on 28-30 November 2018 along with the 2018 edition of the ANTAM Codes.
25. Further to the discussion at the 4th ANTAM Annual Meeting held in Manila, Philippines, in November 2017, the ANTAM secretariat has presented to the ANTAM 5th Annual

meeting a proposal regarding the frequency of technical negotiations. Considering the mature stage of the Codes ANTAM 001 and ANTAM 002 and the substantive efforts required in the area of capacity building, the proposal seeks to hold technical negotiations once every two years, unless 5 or more participating countries request for the Codes to be updated earlier. The alternation of negotiation years aims to concentrate the secretariat's efforts toward the strategic objectives of the project, including practical application of Codes.

VII. Analytical Work

26. The ANTAM secretariat analysed the relation between standardization of agricultural machinery and the Sustainable Development Goals in the context of the wider United Nations work. The resulting paper also looks at the potential improvement in the environmental footprint of agriculture as a result of standardization of agricultural machinery.

VIII. Partnership Development

27. The ANTAM project benefited from ongoing collaboration with the Italian Agency for Agricultural Mechanization (ENAMA) which serves as the Technical Reference Unit of ANTAM, providing technical advice and sharing its experience on testing and certification. In addition, Moreover the secretariat worked at a renewed engagement with UNIDO as a member of the ANTAM Advisory Panel to enhance cooperation and collaboration.
28. Under the project “Assistance to Technical Implementation of the Asian and Pacific Network for Testing of Agricultural Machinery (ANTAM) Cooperation Project with Japan (Phase II)” initiated in 2017, two experts from the Institute of Agricultural Machinery (IAM- NARO) of Japan were deployed at CSAM for a total number of 88 working days. The experts contributed to the work of ANTAM including providing inputs to the technical negotiations on the ANTAM Codes. In addition, the experts were invited to deliver a lecture for around 50 testing engineers at the China Agricultural Machinery Testing Centre (CAMTC) in Beijing, providing an opportunity to share information on new trends in agricultural mechanization in Japan and key rules and provisions relating to testing and regulation in Japan. The Japanese experts revised the comments submitted by Japan on Power Tillers and Paddy Transplanters and worked on providing concrete proposals for updating the related Codes.
29. During the time of their deployment at CSAM, the Japanese experts participated in 5 online consultations, 3 on Power Tillers and 2 on Paddy Transplanters. During this time, the experts worked with the Technical Working Group to address member countries' comments and present Japan's position. Specifically, inputs were provided on terminology and safety matters for Power Tillers. Suggested amendments for the ANTAM test Codes for Paddy Transplanters were provided in the area of reliability through the suggestion of including a water proof test. Moreover, the experts at CSAM liaised with experts at IAM to consult on further inputs to be provided regarding the ongoing technical consultations.
30. On 6 and 7 March, 2018 a representative from the ANTAM secretariat attended the Annual Meeting of the OECD Tractor Codes in Brussels, Belgium. The meeting was an important occasion to share the work of CSAM on the development of agricultural

machinery testing standards in the Asia-Pacific region and to observe best practices and procedures carried out in the OECD certification scheme. In particular, given that several ESCAP member countries took part in the meeting- i.e. China, France, India, Japan, Republic of Korea, Malaysia, Russian Federation, and Turkey- CSAM could observe and identify areas of common interest and shared challenges as well as have a more comprehensive picture of the work on agricultural machinery standardization carried out by relevant stakeholders in the region.

IX. Monitoring and Evaluation

31. In order to target project activities towards member countries' needs and enhance the impact of activities promoted under the ANTAM umbrella, in 2018 the secretariat circulated Post Event Evaluation Surveys, by reaching out to participants 6-12 months after the completion of the activity surveyed, specifically the 3rd and 4th ANTAM annual meeting held in 2016 and 2017 and the 4th Training of Trainers held in September 2017. In addition, surveys were also circulated at the end of the major ANTAM events in 2018. The suggestions have been reviewed and reflected, to the extent possible, in the ANTAM work plan 2019.
32. The first survey circulated gathered feedbacks regarding the overall work of the ANTAM project in relation to the biennium 2017-2018. All respondents indicated that the ANTAM project provided increased opportunities for collaboration among member countries. In addition, over 70% of the participants mentioned that gaining access to agricultural machinery testing standards was the key benefit gained from the ANTAM project. Other benefits from the project mentioned by the respondents included increased awareness of the necessity of proper testing equipment and the importance of quality control of the test reports, enhanced motivation and inspiration to establish testing facilities in the respective countries. Due to participation in the various activities of ANTAM, Nepal, Pakistan and Thailand are in the process of establishing farm machinery testing centres in the future and are planning to adopt ANTAM standards for their testing stations. Suggestions for improvement included including enhancing the attendance of experts from the private sector. The secretariat will include whenever possible such suggestions in the work plan of the network.
33. The second survey regarded the evaluation of the 3rd Training of Trainers of ANTAM held on 11-16 September 2017 in Nanning, China on the theoretical and field application of the ANTAM Code for testing of Paddy Transplanters. All 27 respondents indicated the regional training successfully equipped them with the right knowledge and capacities to improve their work. The results suggested that more focus on regional needs could potentially increase the efficiency of the training as well as focusing on more than one machine. In addition, 73.7% of respondents suggested that enhanced intellectual exchange among participants would be beneficial, while 63.2% of the respondent suggested enhanced field work training. The secretariat will include these suggestions in the planning of future trainings.
34. A total of 38 participants responded to the survey for the 4th Meeting of the Technical Working Groups (TWGs) of the Asian and Pacific Network for Testing of Agricultural Machinery (ANTAM). The majority of the respondents agreed that the quality and usefulness of the meeting and the presentations was excellent. Nearly all respondents agreed that the group discussion was effective and helpful for understanding the position

of TWG members. Nonetheless, reveals that most of the respondents found the schedule too tight, and suggested that the meeting cover more days and sessions.

35. Activities conducted in 2018 were also evaluated. A total of 25 questionnaires were circulated for the 4th Training of Trainers of the Asian and Pacific Network for Testing of Agricultural Machinery (ANTAM). All 25 participants from 17 countries responded to the questionnaire. Out of all respondents, 100% agreed that the event achieved its objectives, specifically 64% agreed strongly. A total of 20 participants addressed the key benefits from the training which include: understanding the ANTAM codes, gaining knowledge about international standards, networking, and understanding the development of China's agricultural machinery. In addition to all the positive comments, key suggestions were offered by the respondents. These include visiting more testing centres and more field practice for the participants.

X. Resource Mobilization

36. In November 2018, the secretariat received US\$ 120,544 from the Ministry of Agriculture, Forestry and Fisheries of Japan under the ongoing project titled 'Asian and Pacific Network for Testing of Agricultural Machinery (ANTAM) Cooperation Project with Japan (Phase II)'. This represents the second round of funding under the project for the year 2018-2019 to support capacity building and network development activities in relation to testing of agricultural machinery and the work plan of the network adopted by the annual meeting.
37. The secretariat also received in-kind donations from the countries that hosted ANTAM meetings in 2018. China, Indonesia and Malaysia contributed an estimated US\$ 50,000 in cost sharing for hosting the 4th TWGs meeting, the 4th Training of Trainers and the Annual Meeting.