Dr. Arvind Kumar
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1. **Qualifications:**

Degree	**Subjects**	**Year**	**University**
B.Tech.	Agricultural Engineering	1989	Allahabad University
M.Sc. (Ag. Engg.)	Farm Machinery and Power	1991	Allahabad University
Ph.D.	Energy	2016	Tezpur University

2. **Current Research Area**
   Agricultural mechanization, Mechanization of fodder production, Animal feed pelleting, use of plastics on animal farm.

3. **Major Research Accomplishments**

- Designed and developed paddy thresher cum cleaner having wire loop type threshing drum, bower and sieving unit. The developed thresher cum cleaner is light weight machine hence easy to transport in hills as compared with existing heavy power threshers. The overall height of the thresher is 1310 mm to make it convenient for feeding. purpose. The speed of threshing drum and sieve was reduced to minimize the grain shattering losses. Grain output capacity of the thresher achieved was about 143 kg/h.
- A power tiller operated inclined plate planter was developed for sowing maize, soybean and other pulses. The developed planter was tested for field performance. The 3 row inclined plate planter is fitted with chain and sprocket mechanism for getting drive from ground wheel to seed plate. By changing the seed plates different crops can be sown. The average depth of sowing achieved was 46 mm with 0.135 ha/h field capacity. Light weight power paddy thresher cum cleaner having wireloop threshing cylinder, blower and shaking sieves was designed, fabricated and tested. V-shape attachment for covering seeds in paddy drum seeder was designed, fabricated and tested for field performance.
- Power tiller operated pneumatic planter was designed, developed and tested for field performance. The developed pneumatic planter showed significantly lower ($P<0.05$) Multiple Index and Quality of Feed Index (QFI) significantly higher for soybean seeds

at 0.11 m s^{-1} disc speed. Optimized results showed 0.11 m s^{-1} metering disc speed, 6kPa negative pressure and metering disc having 3.5 mm hole was found most suitable for soybean seeds and low speed, 6 kPa pressure and 3.5 mm size hole for corn seeds.

- Development of Complete Technology Package of Beehive Charcoal Briquette was done for its efficient use. The ergonomically modified design contains 21 holes which makes the burning of briquettes more efficient. The design of handle and grip have been modified which made it more suitable to use and increased the speed of making briquettes by 15%. Analysis was done on drying behaviour, normalised burn rate, temperature profile and emission of harmful gases of beehive briquettes prepared from 60:40; 50:50 and 40:60 ratios of charcoal and soil. Under natural drying conditions briquettes took 433 h to reach equilibrium moisture content of 5.56 – 10.29%. Normalised burn rate varied from 0.377 – 0.706 % of initial mass min-1.
- Prototype Feasibility Testing of power tiller operated seed drill, power tiller operated potato digger, power grass brush cutter for paddy harvesting, light weight power tiller with attachments for use on steep slope were conducted on the institute farm and farmer's field for adoption in the north eastern hilly region.

4. Awards

- "Best Poster Award" for the paper "Design and development of low–cost portable biomass fired dryer and its performance evaluation for drying of large cardamom" by S. Mandal, Amit Nath, R.K. Singh and Arvind Kumar. Presented during XII Agricultural Science Congress-2015 held at ICAR-NDRI, Karnal during 3-6 February, 2015.
- First Poster Prize on the paper entitled "Impact of soil and water conservation practices on productivity and livelihood security in hilly ecosystem of North East hill region" by R.K. Singh, Arvind Kumar, S. Mandal and S.V. Ngachan during Conference on "Farmers First for Conserving Soil and Water Resources in Southern Region" (FFCSWR-2013) held at UAS, Bangalore during March 14-16, 2013.
- Best Poster Award (2011) for research paper on "Characteristic and Economic Evaluation of Beehive Charcoal Briquettes" by S. Mandal, Arvind Kumar, R.K. Singh and S.V. Ngachan. 46th Annual Convention of "Indian Society of Agricultural Engineers" and International Symposium on Grain Storage held at GBPUA&T, Pantnagar during 27-29th Feb, 2012.

5. Trainings

Trainings attended

- Attended 21 days Winter School on "Manufacturing Technology of Agricultural Equipment" at ICAR-CIAE, Bhopal during 1-21 September, 2016.
- Attended a Training Programme on "Post Harvest Technology" at Central Institute of Post-Harvest Engineering and Technology, Ludhiana during 24 to 26 July, 2008.
- Attended training on "Data Analysis using SAS" held at ICAR RC for NEH Region, Umiam during 07-12 March, 2011.

Trainings organized

- Coordinated 30 days Industrial training of B.Tech. (Ag. Engg.) Students of North East Regional Institute of Science and Technology (NERIST), Itanagar, Arunachal Pradesh during 6th June to 5th July, 2016 at ICAR RC for NEH Region, Meghalaya.
- Coordinated 30 days Industrial training of B.Tech. (Ag. Engg.) Students of College of Agricultural Engineering and Post Harvest Technology, Central Agricultural University, Gangtok, Sikkim during June 1-30, 2016 at ICAR RC for NEH Region, Meghalaya.
- Organized "Sensitization Workshop-cum-Training on Agricultural Engineering Technologies for Extension Functionaries of NEH Region" held at ICAR RC, Umiam in collaboration with CIAE, Bhopal during 15-17 March, 2016.
- Course Coordinator of 8 days training programme on "Developing Agripreneurship through value-addition and processing of agricultural produce" held at ICAR RC, Umiam during 1-8 March, 2016.
- Organized Training on "Manufacturing of Farm Tools and Implements" for local manufacturers of the NEH region during October 30-31, 2012.
- Coordinated 7 days training programme on "Operation and Maintenance of Agricultural Machinery" organized by the Division of Agril. Engineering, ICAR RC for NEH Region, Umiam during May 07-13, 2009.

6. Patents, Technology. Methodology, Genetic Stock, Variety, etc.

- Patent filed on "Traction aid with split lugs for wetland locomotive machinery" dated 19.10.2015, application number 1099/KOL/2015 in the Patent Office, Intellectual Property Building, Salt Lake City, Kolkata.
- Technology of making beehive charcoal briquette with mould for household uses in the north eastern region was disseminated and popularized in the region.

- Technology of manually operated wire-loop paddy thresher, hand operated winnower for cleaning threshed paddy and self propelled vertical conveyor reaper for harvesting of paddy were demonstrated in the north eastern region.
- Making of furrow with manual Zero till furrow opener in post paddy harvested field for sowing of pulse and oil seed crops was demonstrated in the north eastern region.

7. Publications: (best 20 publications only)

Papers in research journals

1. Chakraborty D., Saha S., Singh R.K., Sethy B. K., Kumar A., Saikia U.S., et al. (2017). Spatio-temporal trends and change point detection in rainfall in different parts of North-eastern Indian states. Journal of Agrometeorology, 19(2):160-163.
2. Chakraborty D., Saha S., Singh R.K., Sethy B. K., Kumar A., Saikia U.S., et al. (2017). Trend Analysis and Change Point Detection of Mean Air Temperature: A Spatio-Temporal Perspective of North-Eastern India. Environmental Processes, 4: 937. https://doi.org/10. 1007/s40710-017-0263-6, Springer International Publishing AG 2017.
3. Mandal S., Kumar Arvind, Mehta C.R. and Singh R.K. (2018). Power Tiller operated Zero-till Planter for pea planting in rice fallow of North East India. Agricultural Mechanization in Asia, Africa and Latin America, Vol 49 No.1 2018, pp 79-84.
4. Kumar A, Baruah DC. (2016). Performance of lugged cage wheel for wetland cultivation. Agricultural Engineering International: CIGR Journal, 18(3): pp:113-118.
5. Kumar, A., Mandal, S., Singh, RK., Tamhankar, MB. 2015. Comparative Performance of Puddlers in Low Lands of Hilly Areas. Indian Journal of Hill Farming. 28 (1),pp 63-68.
6. Mandal, S., Kumar A., Singh, R.K., Ngachan, S. V., Kundu, K. 2014. Drying, Burning and Emission Characteristics of Beehive Charcoal Briquettes: An alternative household fuel of Eastern Himalayan Region, Journal of Environmental Biology, Vol 35(5), pp (543-548).
7. Mandal S, Kumar Arvind, Singh RK. (2014). Design of a Reciprocating Manual Weed Cutter for Hill Orchard. Journal of Agricultural Engineering, 51(1):1-6.
8. Mandal S, Kumar A, Singh RK, Ngachan SV. (2014). Road Map for Farm Mechanization in Assam. Indian Journal of Hill Farming, Vol. 27(1): 30-36.
9. S. Mandal, Arvind Kumar, and R.K. Singh. (2014). Design of a Reciprocating Manual Weed Cutter for Hill Orchard. Journal of Agricultural Engineering. Vol. 51 (1) 2014.

10. Kumar Arvind and Baruah D.C. (2013). Wetland traction research: Present status and future need. International Journal of Agricultural Engineering, 6(1), 216-220.
11. Mandal S., Singh R.K., Kumar Arvind., Verma B.C., Ngachan, S. V. (2013). Characteristics of Weed Biomass-derived Biochar and their Effect on Properties of Beehive Briquettes. Indian J of Hill Farming, 26(1), 8-12
12. Mandal S., Kumar Arvind, Singh R.K. and Ngachan S.V.. (2012). Evaluation of composition, burn rate and economy of beehive charcoal briquettes. International Journal of Agricultural Engineering, 5(2): 158-162.
13. Sahay, CS., Thomas, E. V., Satapathy, K. K. and Kumar, Arvind. (2011). Laboratory evaluation of selected Animal drawn Implements for the State of Meghalaya. Journal of Agricultural Engineering, Vol. 48(2) 2011.

Book

1. Inventory of Agricultural Mechanization Technologies for North East India by KK Satapathy, SV Ghadge, MB Tamhankar and Arvind Kumar, Published by The Zonal Project Director, Zone –III, ICAR-NEH, Umiam, Meghalaya.