

Wasteland attributes to various factors, including water logging, ravine and gully erosion, riverine lands, salinity and alkalinity, shifting and sand dunes, wind erosion, extreme moisture deficiency, overexploitation of natural resources, accumulation of industrial and sewage wastes, soil erosion, and deforestation. The area of our country encompasses approximately 329 million hectares, of which 167 million hectares are affected by various forms of degradation, including water erosion, wind erosion, salinity and alkalinity, and flooding. Moreover, in Uttar Pradesh, about 1.8 million ha (6%) of the area is under fallow, which is either due to the lack of irrigation facilities or related problems of water logging, salinity/sodicity.

University is distinguished for wasteland management under sodic and submerged conditions. Prior to establishing the university, vast area of sodic soil, had a pH, EC (ds/m), ESP, and Organic carbon percentage ranged from 10.4 to 10.6, 18.3 to 24.5, 76 to 84, and 0.08 to 0.16, respectively make agronomical practices impossible. University has developed technology to counter salinity and submerged conditions by developing wasteland-suitable planting materials/varieties.

Aonla (*Phyllanthus emblica*), Ber (*Ziziphus mauritiana*), Bael (*Aegle marmelos*) and Guava (*Psidium guajava*) orchards were established with intercropping system on 720 acres of sodic land in main campus and neighboring areas. Aonla, bael, ber, mahua orchards, rice, wheat, barley, bajra and oat varieties suitable for sodic soil has been developed and are popular among farmers.

#### Salt tolerant varieties of fruits and crops

S. No.	Fruit crop	Cultivars
1	Aonla	Krishna (NA-4), Kanchan (NA-5), NA-6, NA-7, NA-10, NA-25 and NA-26
2	Bael	NB-1, NB-5, NB-7, NB-8, NB-9, NB-10, NB-11, and NB-17
3	Ber	Narendra Ber selection-1, and Narendra Ber selection-2
4	Rice	Narendra UsarDhan-2, Narendra UsarDhan-3, Narendra UsarSankar-3, Narendra UsarDhan-2008 and Narendra UsarDhan-2008
5.	Wheat	Narendra Wheat-1076, Narendra Wheat-1067, Narendra Wheat-4018 and Narendra Wheat-5056
6.	Barley	Narendra Jau-1, Narendra Jau -2, Narendra Jau-3, Narendra Jau-4, Narendra Jau-5, Narendra Jau-6, Narendra Jau-7, and NDB-1465
7.	Bajara	Narendra Chara Bajara-2, Narendra Chara Bajara-3, NDFB-5 and NDFB-11
8.	Oat	Narendra Jayee-1, Narendra Jayee-2, NDO-10, NDO-711 and NDO-1101



Eighty five percent Aonla cultivation area (nearly 98000 hectares) is covered through the popular varieties (Narendra Aonla-4, 5, 6 and 7) developed by university. Narendra Bael -5 and Narendra Bael -9 covers more than 40% Bael cultivated area of our country.

University is working on rice improvement since its establishment and has released 43 rice varieties, better farm practices and technologies for enhanced rice productivity and accelerated climate change research and environmental sustainability, soil and water management also and improved commercial production of hybrid rice in India. The university has developed several varieties of rice adapted for different ecosystems. These include rainfed upland rice varieties (Narendra-1, Narendra-2, Narendra-97, Barani Deep and Shushka Samrat) of 90-110 days, irrigated mid early (Saket-4, Narendra-118 and Narendra Lalmati) of 110-120 days, irrigated ecosystem (Narendra-80, Sarjoo-52, Narendra-359, NDR- 2064, NDR-2065, Narendra Dhan- 8002, Narendra Mayank, and Narendra Narayani) of 125-135 days, rainfed lowland ecosystem (Jalmagna, Jalnidhi, Jal Bhawani, NDGR 201, Chakia 59, Jalpriya, Madhukar, Barah Avarodhi and Jal Lahri), submerged ecosystem (Swama Sub-1, Sambha Sub-1, IR 64 Sub-1, NDR-9930077, NDR-9930017, NDGR-201, NDR-84183, NDR-9930111, NDGR-702 and NDR-9730018), problematic soil (NDR-9930077, Narendra Usar Dhan-2, Narendra Usar Dhan- 3, Narendra-359 and Narendra Sankar Usar Dhan-3). The university's rice varieties viz.; Sarju-52, NDR-2065, NDR-2064, NDR-97 and NDR-359 are being cultivated on more than 40% area of Eastern Uttar Pradesh and Bihar and Sarju-52 is most popular among rice varieties.

University is working on improvement of Kalanamak for high yielding, short stature, and tolerance to biotic and abiotic stresses with strong aroma and nutritional quality. Recently, the university has released two improved Kalanamak varieties, Viz., "Pusa Narendra Kalanamak -1" and "Pusa Narendra Kalanamak CRD-2" which can be helpful for Indian government in achieving the target of rice exports of 400 million US Dollar. The university is working to supplement the poor people diet by rice fortification with micronutrients like iron, zinc and pro-vitamin-A.

University has utilized a large area of wasteland especially low land for establishing the integrated farming system. Demonstration of integrated Paddy-Fish and Paddy-Vegetable-Fish farming has been successfully established at Instructional Fish Farm to utilize water logged wasteland characterized by sodic soil. Under integrated farming, the vegetable crops (snake gourd, smooth gourd, ridge gourd and asparagus bean), rice crop (Sarjoo-52) and fish has been



grown. Multi-layer farming has been established to utilize maximum area by using vertical space above the land.

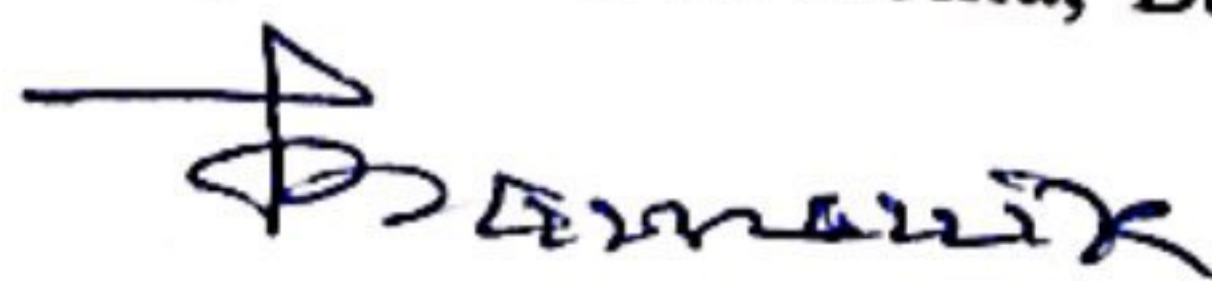
The university has established a model of inorganic fertilizer and chemical-free "Natural/Organic" farming system. It is considered as agro-ecology based diversified farming system which integrates crops, trees and livestock with functional biodiversity.

Development of salt tolerant wheat varieties is the permanent solution to utilize the wasteland for crop production which is sustainable and eco-friendly as compare to management practices. The university has developed high yielding salt tolerant wheat varieties namely, NW-1076, NW 1067, NW-4018 and NW-5054 performing well in salt affected soils.

The university has developed barely varieties suitable for salinity conditions viz., Narendra Barley-1, Narendra Barley -2, Narendra Barley-3, Narendra Barley-4, Narendra Barley-1173, NDB-943, NDB-1445, NDB-1465 and NDB-1464. These varieties also have industrial importance.

The university has also developed forage Bajra and Oat varieties for salt affected areas. Bajra varieties are NDFB-2, NDFB-4, NDFB-5 and NDFB-11. Oat forage varieties are NDO-1, NDO-2, NDO-11 and NDO-1101.

NSP-6 Farm was developed on 12.10 hectare undulated sodic wasteland with four rain water harvesting-cum-fish ponds and the remaining developed areas are being used for crop production since 2020. In 2021, a total of 3.20 hectare area of wasteland was also developed for wheat and barley research farms. In 2022, a total of 2.80 hectare area of wasteland was reclaimed and utilized for the plantation (horticultural crops). Beside this 3.5 hectare wasteland has also been reclaimed for establishment of Technology Park. The university has provided consultancy on wasteland management to Uttar Pradesh Bhumi Sudhar Nigam (UPBSN) and State Horticulture Department which resulted into plantation of Aonla, Bael, Guava, and Ber on an area of 25000 acre of sodic land.



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