



CAPITALS
COALITION



TEEBAgriFood Implementation in India:

Consultation between National Project Steering Committee
and Uttar Pradesh and Uttarakhand authorities

Background Document

Summary

The Project Steering Committee for TEEBAgriFood Implementation in India convened for the first time on 9th October. The steering committee agreed to undertake the TEEBAgriFood study in Uttar Pradesh and Uttarakhand states of India, with a focus on organic farming and agroforestry. The precise scoping of the districts to be selected will be done in consultation with the officials from these two states on 23rd October.

This document is prepared to serve as a background document for the discussions during the meeting. It first presents a brief context for each state, the agricultural profile, agroclimatic zone and principal crops grown. That description is followed by a brief introduction to districts within the state which show potential for selection as project sites in view of the state policies and programmes already in place which can be further strengthened using the TEEB AgriFood project. The districts discussed in this document are only for discussion purposes.

Note that this background note has been drafted based on a desk review which was carried out over a very short time frame. It is intended only as a very preliminary input to the discussions. The final decision on district/ village selection rests with the steering committee and officials from the state government.

In general, it will be useful to select districts/villages that have an existing track record of organic farming practices and not those that are starting afresh or are in the pilot phase. This is important vis-a-vis gathering data to study the impacts of organic farming on social, human and natural capital over time as compared to the counterfactual of conventional production. It will also be useful to have diversity in selection, villages/ districts across different agroclimatic zones of Uttar Pradesh (UP) and Uttarakhand; the intention would be to upscale activities based on the evidence provided by the TEEBAgriFood study and this would only be possible if the suite of studies was representative with regards to the heterogeneity in ecological, social and economic conditions in the States.

In UP, options include the following: select villages in central or western UP (with a track record of organic farming) that are among the 25 districts shortlisted under scaling up of organic farming, as part of the National Mission for Clean Ganga; in eastern UP, villages in the Hamirpur district which lie along the Yamuna tributary of Ganga river- the Bundelkhand region in Agroclimatic Zone 7 (Central plateau region) and villages in the Purvanchal region of Agroclimatic Zone 4 (Middle Gangetic Plains region).

In Uttarakhand, which lies in Agroclimatic Zone 1-Western Himalayan region, there is scope to select villages in the districts of Chamoli, Uttarkashi, Pauri, Rudrapur and

Tehri, along river Ganga. The five districts have been selected under the organic farming promotion programme of Namami Gange Scheme and organic farming practices are proceeding successfully across over 1300 hectares of land under the program Swachhta Action Plan (SAP). In addition, the central government is providing an impetus to organic farming clusters in these villages: 20 hectare clusters are to be created in 42 villages in the above-mentioned 5 districts over a period of 3 years, under the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) of the Central Government. Other districts such as Udham Singh Nagar where organic farming has been widely practised over the years, can also be selected.

Both UP and Uttarakhand have promoted organic farming clusters under the PMKY scheme; there are over 800 clusters of organic farming in UP and over 400 in Uttarakhand. Select villages from these clusters across different agroclimatic zones can also be selected. Final selection of districts in the two states rests with the steering committee.

In the meeting on 23rd October, the TEEBAgriFood Steering Committee seeks guidance from the State Government officials on which district/ village to select for implementation of the study on organic farming and agroforestry.

This choice will need to be made with reference to the funding available for research activities, viz. around 200,000 USD in total for the project.

UTTAR PRADESH

UP State Agriculture Profile	
Total geographical area	29.44 million hectare.
Net area sown	16.5 million hectare.
Gross cropped area	25.41
Area sown more than once	8.841 million hectare
Cropping Intensity	153.54 %.
Net irrigated area	13.31 million hectare

- **Water use for irrigation use has been exerting pressure on the limited water resources in the state.** Tubewells are a major means of irrigation, amounting to 66.94% of the total irrigated area of 13.31 million hectare. The low water use efficiency of most tube wells combined with limited water conservation measures have resulted in over-exploitation of ground water resources over the years. As per data from the Uttar Pradesh Ground Water Departments, as provided in the Groundwater Assessment Report, in terms of ground water development in the state 200 out of 820 blocks have been classified as over-exploited, critical, or semi critical. Large-scale exploitation of groundwater is being done through 48 million shallow tube wells, 49,480 medium tube wells and 33,510 deep tube wells and 30,917 government tube wells¹.
- **The majority of landholdings are marginal** i.e. size one hectare or less. Of the total number of land holdings- 224.57 lakhs, 78.0% are marginal farmers, 13.8% small farmers with land size between 1 to 2 hectares and 8.22% are farmers that hold land above 2 hectare. Policy implementation has its own challenges when it is being implemented in marginal landholdings.
- Rice, maize, pigeon pea, moong bean crops are common in kharif season. In post-rainy (rabi) season wheat, lentil, Bengal gram, pea, and sesame and at some places groundnut is grown. The important cash crops of the region are sugarcane, potato, tobacco, chillies, turmeric and coriander with supplemental irrigation. Rice–wheat cropping system is more predominant.
- **Stubble burning of crops** at sow-in time for the Kharif season crop has intensified the problem of air pollution in the state as the well in the adjoining areas including the national capital region during the months of November each year.
- The state accounts for a significant share of the rice and wheat production of the country and also popularly known as **the food bowl of the country**. See Annex 1. As

¹ The numbers based on 2013 report as published on UP Water Resources website.

a result of the significant importance given to food crop production, fertilizer use in the state is the highest in the country.

- Uttar Pradesh falls under three agro-climatic zones. Agro Climatic Zone–I: Middle Gangetic Plains region, Agro Climatic Zone–V: Upper Gangetic Plains region and Agro Climatic Zone–VIII: Central Plateau and Hills region². Zone IV and Zone–V are further divided into subzones (see Annex 2 for details on subzones). Of all these zones, Zone- V is among the larger and thickly populated and well irrigated, covering 32 districts out of the 75 districts of Uttar Pradesh (see Annex 3 for map of UP). Agroclimatic Zone VII includes the Bundelkhand subregion. **Bundelkhand region is the least irrigated**. Only about 25% of the cultivated area is irrigated as against a State average of nearly 60%. Irrigation facilities are also less developed. Soil erosion is high and land productivity is low.
- Organic farming is popularly known as ‘**Jaivik kheti**’ in Hindi in Uttar Pradesh. Select regions of the state are actively being promoted for this purpose. Under the Namami Gange program there are plans to scale up organic farming in the villages along the Ganga river. It is expected that this will result in co-benefits for Ganga by reducing water pollution of river from chemical fertilizers³. Under the plan, 25 districts along Ganga are included. The project was launched during the lockdown month of May. For the purposes of selection for this project, some villages might be selected in central and western UP, among these shortlisted districts.
- It is important to note in particular that the Uttar Pradesh Government has expressed interest in making **Bundelkhand a role model for organic farming**^{4,5}.

“बुंदेलखंड एक्सप्रेसवे, डिफेंस कॉरिडोर और पर्यटन विकास के विभिन्न कार्यों के साथ हम बुंदेलखंड को जैविक खेती का केंद्र बनाना चाहते हैं। इससे जहरीली रासायनिक खादों से मुक्ति तो मिलेगी ही, उत्पाद की कीमत अधिक मिलने से किसान भी खुशहाल होंगे। कृषि विभाग के अधिकारियों को उन्होंने यहां के किसानों को जैविक और जीरो बजट कृषि के प्रति जागरूक करने के लिए कहा। इससे बुंदेलखंड को अन्ना प्रथा से निजात मिलेगी और किसान अच्छे नस्ल के गोवंश पालने के लिए प्रेरित होंगे। इससे देश में बुंदेलखंड की नई पहचान भी बनेगी।

“ In addition to the Bundelkhand Expressway, corridor and the various works of tourism development, we have interest in making bundlekhand role model for agriculture. This will not only get rid of poisonous chemical fertilizers, farmers will also be happy. He asked the officials of the Agriculture Department to make the farmers aware of the organic and zero budget agriculture. With this, Bundelkhand will get rid of Anna system (Abandoning the cattle due to inability to feed them in drought or difficult times — Anna Pratha. This will also create new

² <https://farmech.dac.gov.in/FarmerGuide/UP/index1.html>

³ अब गंगा किनारे वाले गांवों में होगी जैविक खेती

https://www.amarujala.com/channels/downloads?tm_source=text_share

⁴ बुंदेलखंड को जैविक खेती का रोल मॉडल बनाया जाए, किसान होंगे खुशहाल: मुख्यमंत्री योगी आदित्यनाथ, <https://www.jagran.com/uttar-pradesh/lucknow-city-chief-minister-yogi-adityanath-said-bundelkhand-will-be-make-center-of-organic-farming-farmers-will-be-happy-20709791.html>

⁵ [jagran.com/uttar-pradesh/lucknow-city-chief-minister-yogi-adityanath-said-bundelkhand-will-be-make-center-of-organic-farming-farmers-will-be-happy-20709791.html](https://www.jagran.com/uttar-pradesh/lucknow-city-chief-minister-yogi-adityanath-said-bundelkhand-will-be-make-center-of-organic-farming-farmers-will-be-happy-20709791.html)

identity of Bundelkhand in the country. Bundelkhand region includes five districts in south central UP.”

- Among the districts of Bundelkhand, Hamirpur district was specifically identified to promote organic farming in 2016⁶. For details on location of Hamirpur within this agroclimatic zone, see Annex 3.
- The state government launched some schemes for Hamirpur to promote organic farming, horticulture, watershed programmes and agroforestry. Key schemes relevant for the TEEBAgriFood project are listed in the table below

Schemes for Organic Farming and Conservation of Ecosystem Services Hamirpur District of UP	
Strengthening of Organic Fertilizer Production Laboratories / Program to Encourage the Use of Organic Fertilizer	State Sponsored
Scheme for Development of Organic Farming in District Hamirpur	State Sponsored
Water storage and Distribution of Sprinkler in Bundelkhand Area	State Sponsored
Bundelkhand Organic Farming Corridor	State Sponsored
NABARD Funded Integrated Rain Water Management(Water Shed Development)Project	State Sponsored

Source: Uttar Pradesh Agriculture Department and Hamir Pur, Kendra Vigyan Centre

- **Krishi Vigyan Kendra (KVK)** ⁷ of Hamirpur on 28 December 2018 conducted a Training Program (Rural Youth and Girls)- on Organic Farming for promotion of organic farming.
- **Hamirpur KVK has several collaborations with technical institutes.** This network can be leveraged for implementing the TEEBAgriFood study of Krishi Vigyan Kendra Hamir pur relevant for TEEB Implementation. These include- ICAR-IIPR, Kanpur; ICAR-IIVR, Varanasi; ICAR-IGFRI, Jhansi; ICAR-IVRI, Bareilly; ICAR-NHRDF, New Delhi; ASCI, Gurugram; ICAR-NDRI, Karnal, Haryana; ICAR-CISH, Lucknow.
- Another region of UP where the government has expressed interest to promote organic farming is in **Purvanchal region**. This lies in Agroclimatic zone IV (See Annex 2.).
- A pilot project is envisaged on 100-200 acres in 15 identified districts in the Purvanchal region of Uttar Pradesh. The districts set to benefit from the initiative include Balrampur, Shravasti, Siddharthnagar and Kushinagar⁸. In these districts, suitable locations are to be identified for installations of almost 3000 solar borewells

⁶ जैविक खेती के लिए जिले को चुना https://www.amarujala.com/channels/downloads?tm_source=text_sharehttps://www.amarujala.com/uttar-pradesh/hamirpur/the-district-opted-for-organic-farming

⁷ Agriculture Science Centre

⁸ <https://energy.economictimes.indiatimes.com/news/renewable/up-govt-to-install-8000-solar-borewells-35-per-cent-in-purvanchal-districts/78179114>

in addition to promoting organic farming. Almost 2800 solar powered borewells are expected to come up in this region to reduce the burden on electricity subsidy⁹.

- There are also plans to expand drip irrigation in the region to address water scarcity. Examining the water- energy nexus of agriculture in the context of provisioning of ecosystems services for organic farming can be an interesting area of study.
- In addition to the above, select villages from the 800 clusters of organic farming in UP under the PMKY scheme of Central government can also be selected.

⁹ <https://energy.economictimes.indiatimes.com/news/renewable/up-govt-to-install-8000-solar-borewells-35-per-cent-in-purvanchal-districts/78179114>

UTTARAKHAND

State Agriculture Profile	
Total geographical area	5.67 million hectare
Net area sown	0.7 million hectare
Gross cropped area	1.2 million hectare
Area sown more than once	8.841 million hectare
Cropping Intensity	161%.
Net irrigated area	0.3 million hectare

- Like UP, in Uttarakhand **tube wells are a major means of irrigation - 63.1%** of the total. The state faces a severe water crisis, as per a UNDP report¹⁰. Almost 10 out of 13 districts experienced severe drought in the past few years. Land use changes such as increase in construction and deforestation have depleted the water discharge potential of springs which are common in the region.
- The total number of land holdings are **9 million out of which 6 million (71.4%) are marginal farmers** i.e. land holdings less than 1 hectare, 1.6 million (17.7%) small farmers with land holding size in the range of 1 to 2 hectares and 1 million (10.9%) farmers with land holding size above 2 hectare. The average size of land holding in the state is 0.95 ha as against the National Average of 1.57 ha. The share of small and marginal holdings is also higher in Uttarakhand State as compared to the national average.
- The entire state of Uttarakhand falls under **the agro-climatic zone- I i.e. Western Himalayan Region**. The region is divided into following four sub agro-climatic zones: (i) the outer Himalayas Zone or Shivalik hills which is located at 500 to 1250 m above mean sea level; (ii) the lesser Himalayas Zone located at 1250 to 2750 m above mean sea level; (iii) the Great Himalayas Zone located at 2750 to 4500 m above mean sea level; and (iv) the Trans Himalayas Zone located at 4500 m above mean sea level¹¹.
- On the whole, **86 per cent of agriculture practiced in the state is rain fed**. Nearly 90% of the total cropped area is devoted to subsistence food crops mainly grown for domestic consumption and local market. The influence of the monsoon on the cropping pattern is very dominant, with the result that of the total cropped area about **70 to 75 per cent is under 'Kharif' or rainy season crops**. Irrigated agriculture is confined to the fertile valleys in the hills, where High Yielding Varieties and chemical fertilizers are used.
- The main crops are wheat, paddy, maize, manduwa and sanwa in food grains, urad, gram, pea, masoor & rajma in pulses and mustard, soybean, groundnut in oil seeds.

¹⁰ <https://timesofindia.indiatimes.com/city/dehradun/uttarakhand-facing-acute-water-crisis-undp-report/articleshow/63187711.cms>

¹¹ <https://farrech.dac.gov.in/FarmerGuide/UK/Introduction.htm>

Rice and wheat dominate. Commercial crops occupy a very negligible portion of the cropped area.

- Farmers often grow three crops in two years. The highest sown area is under wheat crop (34.79%) followed by rice with 24.3%. Mandua, a traditional millet crop has 15.1% sown area, while the area under pulses is 4.6%. The rest of the area is under other millets including koni, jhangora, jowar, bajara, maize and oilseeds.
- Uttarakhand became the first state in the country to develop an **Organic Agriculture Act in 2019**¹². Under the new Act, NGOs, private entities, and traders engaged in the export market and processing of organic products are to be regulated. The sale of chemical fertilizers is also to be regulated. The Act also allows for penalties for banned substances. Moreover, **the state 'organic Uttarakhand brand' will be promoted.**
- The total length of Ganga in the Himalayan state including the tributaries is about 250 km¹³. Just as in UP, under the Namami Gange project in Uttarakhand, there are plans to upscale organic farming in villages located alongside Ganga, from Devprayag in Tehri Garhwal district where the two main tributaries Alaknanda and Bhagirathi of Ganga merge in Uttarakhand. Under the project duration of three years starting from 2020, the government aims to promote organic farming by training the farmers there for its implementation so as to gradually stop the use of chemical fertilizers. It targets to **scale up organic farming by another 50,000 hectares** in the state.
- To this end, 42 villages (in the catchment of the Ganga) have been selected for promoting organic farming. These villages fall in five districts, to **Chamoli, Uttarkashi, Pauri, Rudraprayag and Tehri**. For a map of the state see Annex. the state government has asked officials in the agriculture department to prepare a roadmap to transform five Uttarakhand districts¹⁴.
- In the **Chamoli, Uttarkashi, Pauri, Rudraprayag and Tehri districts** of Uttarkhand, organic farming practices are going on successfully in over 1300 hectares of land under the program head Swachhta Action Plan (SAP), Namami Gange Clean Abhiyan¹⁵.
- Under the plan, farmers will be encouraged to create clusters of different organic crops like millets, pulses, kidney beans apart from vegetables like Amaranthus etc. The emphasis is on cluster-based farming because if a crop is grown in clusters its volume goes up, which achieves good financial returns to the farmers. In each cluster, a 20-hectare area is to be created in all the 42 villages under **PKVY (Pradhan Mantri Krishi Sinchai Yojana)**.

¹² <https://www.hortidaily.com/article/9184710/indian-state-of-uttarakhand-introduces-country-s-first-organic-agriculture-act/>

¹³ <https://www.hindustantimes.com/india-news/organic-farming-to-be-promoted-in-villages-along-ganga-to-curb-pollution-under-namami-gange/story-Del4rC9zxargjMHR3O124I.html>

¹⁴ <https://timesofindia.indiatimes.com/city/dehradun/State-govt-plans-5-organic-farming-districts-in-state/articleshow/50223693.cms>

¹⁵ https://www.nmcg.nic.in/writereaddata/fileupload/27_Namami%20Gange%20Patrika-Volume-VII.pdf

- In addition to these recent efforts, in 2015, the government planned to declare six regions as exclusive organic farming blocks. Four such blocks already existed at the time, in Rudraprayag, Almora and Chamoli, where over 1,500 farmers had registered with the Uttarakhand Organic Commodity Board (UOCB).
- There is already some research on some of these districts in the context of organic farming which could be a useful baseline for TEEBAgriFood. Several of these studies are for Rudraprayag district where organic farming appears to be relatively more mature.
- **A social impact study on awareness and perception of 100 farmers in Rudraprayag district**¹⁶ showed that majority of the farmers (38%) strongly agreed that organic produce provides health security for the family followed by 30 per cent who agreed with the benefits of organic for the health of fields.
- Another study for Rudraprayag, analyzed the constraints faced by of organic farming¹⁷. The mean score of economic constraints in the order of severity were ranked. These were initial low price for the organic produce (2.89), initial yield loss (2.76), inadequate availability of credit (2.33), higher cost involved in the certification charges (1.97) and inadequate subsidies for organic cultivation of crops (1.88), infrastructural constraints in the order of severity were lack of training institutions (1.93), lack of indigenous certification agencies (1.81) and lack of specialized institutes for doing research on organic farming (1.70).
- **Udham Singh Nagar** where organic farming has been widely practised over the years, can also be selected. Here, TEEB can build on existing studies¹⁸.
- In addition to the above, select villages from the over400 clusters of organic farming in under the PMKY scheme of Central government can also be selected.

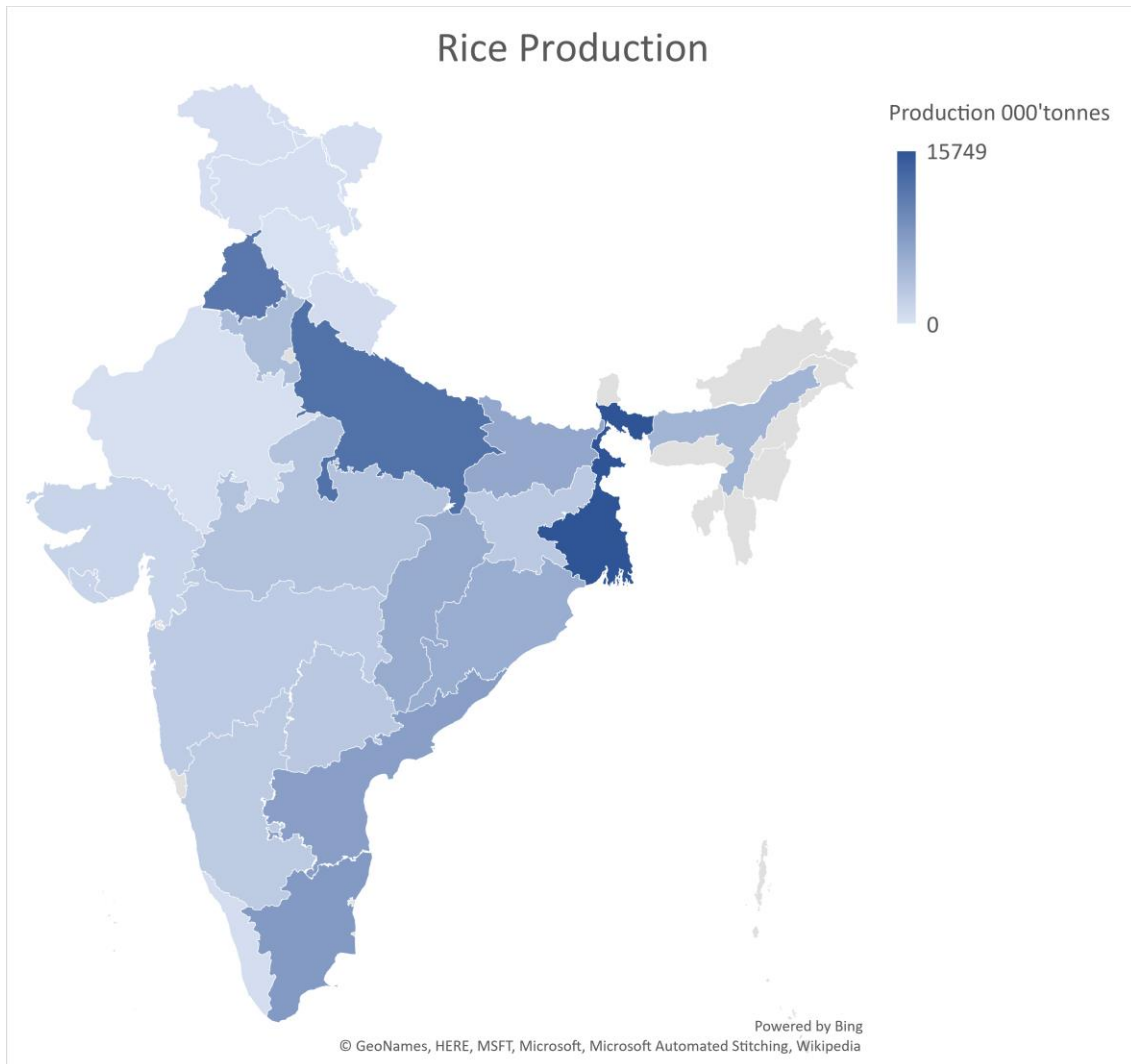


¹⁶ https://www.researchgate.net/publication/328118349_Organic_agriculture_awareness_and_perception_of_farmers_in_Rudraprayag_district_Uttarakhand

¹⁷ https://www.researchgate.net/publication/333615993_Constraints_Faced_by_Farmers_Practicing_Organic_Farming_in_Hill_Region_of_Uttarakhand_India

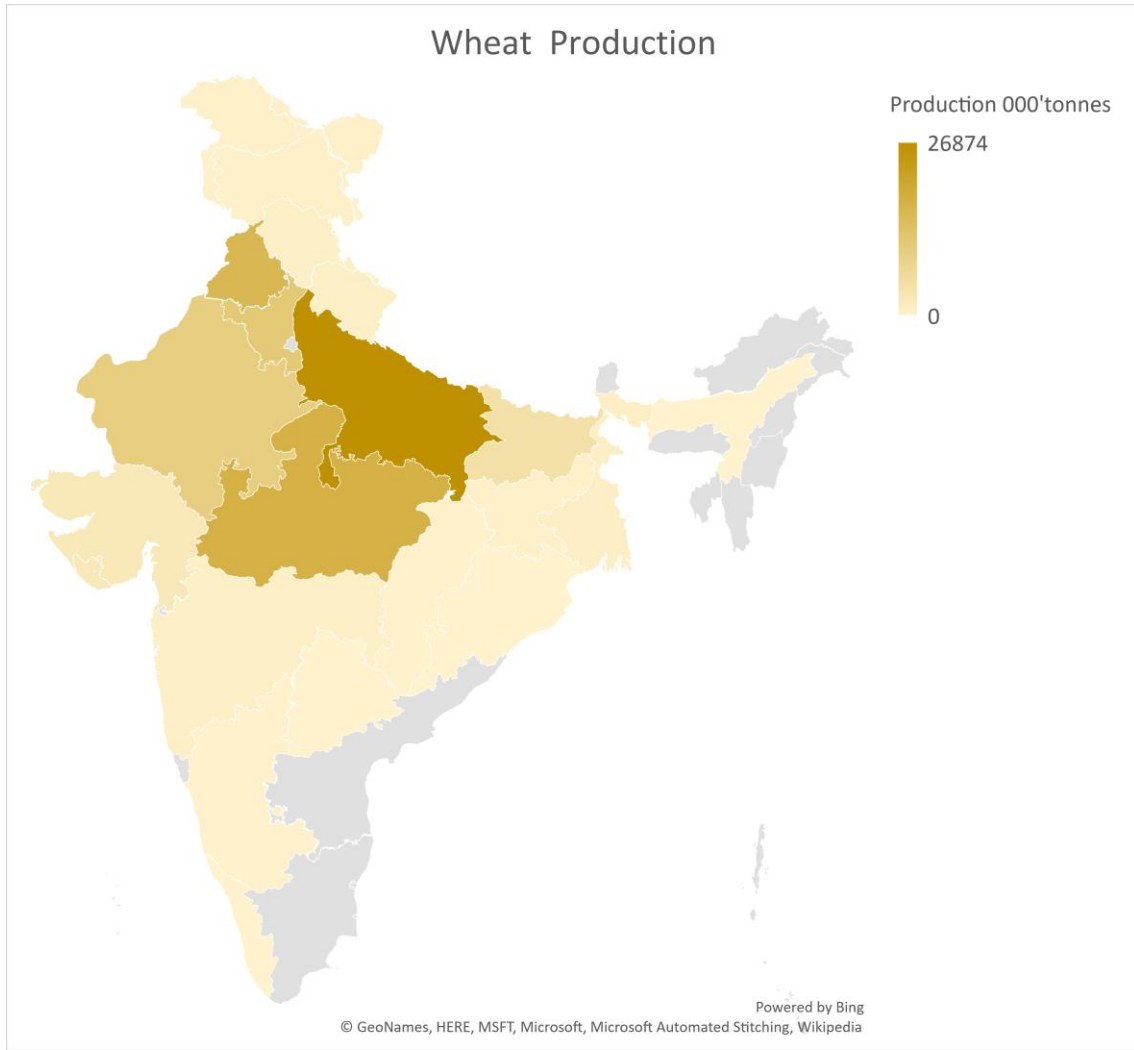
¹⁸ https://www.researchgate.net/publication/46535083_Present_Status_and_Economics_of_Organic_Farming_in_the_District_of_Udham_Singh_Nagar_in_Uttaranchal

Annex 1: Rice and Wheat Production in Uttar Pradesh



Source:

Maps made using data from Directorate of Economics And Statistics, Ministry Of Agriculture and Farmers Welfare



Source: Maps made using data from Directorate of Economics And Statistics, Ministry Of Agriculture and Farmers Welfare

Annex 2- AgroClimatic Zones

The Agro-climatic zone IV- Middle Gangetic Plains region has three sub-zones:

- (i) North Eastern Plains Zone of Uttar Pradesh- This sub-zone covers the districts of Baharaich, Gonda, Balrampur, Basti, Gorakhpur, Sidharth Nagar, Maharajgunj, Kushinagar and Deoria. Rainfall is quite high at about 1,210 mm, the climate is moist sub-humid to dry sub-humid. 73% of the land area is cultivated and about half of the cultivated land is irrigated. Tube wells are the major source of irrigation.
- (ii) Eastern Plain Zone of Uttar Pradesh- Azamgarh, Mau, Balia, Faizabad, Ghazipur, Jaunpur, Sant Ravidas Nagar and Varanasi districts fall under this sub zone. Rainfall is adequate with a normal level of 1,025 mm. The climate is dry sub-humid to moist sub-humid. Over 70% of the land is cultivated and more than 80% of the cultivated area is irrigated.
- (iii) Vindhyan Zone of Uttar Pradesh - Mirzapur and Sonbhadra districts of Uttar Pradesh are the Vindhyan sub-zone of the Middle Gangetic Plain zone. Rainfall is adequate at about 1,134 mm; the climate is similar to the other parts of the eastern plains of Uttar Pradesh. However, the region has a very high forest cover of about 40% of the land. Less than a third of this land is cultivated and only a third of this is irrigated.

The Agro-climatic zone- V, Upper Gangetic Plains region has three sub-zones under this agro-climatic zone.

- (i) Central Plains - Allahabad, Fatehpur, Pratapgarh, Sultanpur, Rae- Bareilly, Unnao, Lucknow, Bara Banki, Sitapur, Hardoi, Kheri and Pilibhit districts fall under this sub-zone. The region receives on an average 979 mm of rainfall; the climate ranges from dry sub-humid to semi-arid and the soil is alluvium calcareous sandy loam. About 62% of the land is cultivated of which 56% is irrigated.
- (ii) North-Western Plains -This sub-zone covers the districts of Shahjahanpur, Bareilly, Rampur, Moradabad, Bijnor, Saharanpur, Muzaffarnagar, Meerut, Baghpat, Ghaziabad and Bulandshar of Uttar Pradesh. This region has the highest land productivity in the State. About 70% land is under agriculture and another 5% land is under forest cover. 76% of the net sown area is irrigated. Tube wells are the predominant source of irrigation. The zone receives on average 907 mm of rainfall, the climate is dry sub-humid to semi-arid and the soil is loam to sandy loam.
- (iii) South-Western Plains- In spite of a relatively high proportion of arable and irrigated cropped area, land productivity in the southwestern plains of Uttar Pradesh is low. This is largely on account of cultivation of low value crops principally wheat and bajra. The region covers the districts of Badaun, Aligarh, Mathura, Agra, Etah, Farrukhabad, Kannauj, Mainpuri, Firozabad, Etawah, Kanpur Dehat and Kanpur. The climate is semi-arid and the soil type is alluvium calcareous clay. The region receives about 721 mm of rainfall. More than 74% of the net sown area is irrigated and over 69% land is cultivated.

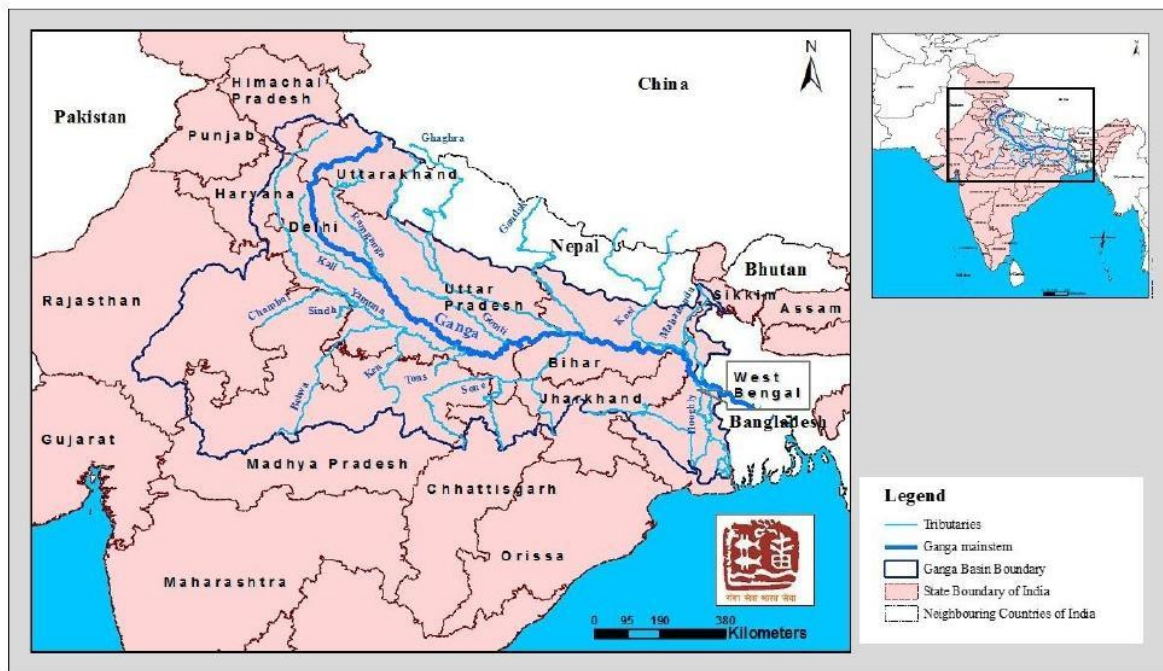
Under the Zone-VIII- Central Plateau and Hills region, the sub-zone Bundelkhand (Uttar Pradesh) includes five districts from South-central Uttar Pradesh, viz. Jalaun, hansi, Lalitpur, Hamirpur and Banda. It receives about 900 mm of rainfall.

Annex 3: Map of UP



Source: Map of UP, as found on <http://uphome.gov.in/maps-of-up.htm>

Annex 4: Map of Uttarakhand



Source : Uttarakhand Government, Namami Gange Site
<https://spmgttarakhand.uk.gov.in/pages/display/86-location>

Annex 5: District wise Map of Uttarakhand

