PROFORMA FOR SUBMISSION OF PROJECT PROPOSAL

- Name of the Institute/University/Organization submitting the Project Proposal: Swami Rama Himalayan University
- State: Uttarakhand
- District and block: Block Jaihari Khal District Pauri & Block Bhilangana Block District Tehri.
- Principal Investigator/ Network Coordinator Name and Institute: -

1. Dr Pradeep K Varshney/ Swami Rama Himalayan University
2. Dr Rajeev Bijalwan/ Rural Development Institute

- Age (in years) as of the closing date of application submission:
- Category (SC/ ST/ OBC/ Gen/ Others): - General
- Designation: Director
- Division of DST: SUNIL
- Programme Or Scheme of SEED division (SYST/ TIDE/ SCSP/ TSP/ SUNIL/ STW/ Network/ special call): - SUNIL
- **Proposed Subject Area -**

1. Innovative Machines and Tools in agriculture and allied sectors (Horticulture, Sericulture,

- **Thematic areas for proposal submission: Precision Agriculture and farm automation**

1. **Project Title: S & T Enabled Pathway for Sustainable Livelihoods and Integrated Rural Development in Uttarakhand using Hitech farming: कृषि नवाचार**
2. **Project Duration: 5 years**
3. **Project Summary (in 250 words only, including the livelihood of the proposed area, S&T component, source of technology, problem statement, proposed solution, target beneficiaries, and expected outcomes, community-identified, etc.):**

S & T Enabled Pathway for Sustainable Livelihoods and Integrated Rural Development in Uttarakhand using Hitech farming: कृषि नवाचार

Krishi Navachar/ is a holistic, science and technology-driven initiative aimed at transforming the socio-economic and environmental fabric of rural Uttarakhand. Focused on the blocks of Jaiharikhal (Pauri) and Bhilangana (Tehri Garhwal), the project targets some of the most underserved and migration-prone hill regions of the state. These areas suffer from deep-rooted challenges such as lack of irrigation facilities in rainfed agriculture, frequent crop damage by wild animals, low productivity due to outdated agricultural practices, and minimal value addition or market linkage for farm produce. Coupled with poor health infrastructure, weak educational systems (especially digital learning), inadequate youth skilling, natural disasters, and weak rural connectivity, these factors contribute to sustained outmigration and rural decline. Over the last five years, the implementing team has laid a solid foundation by promoting climate-resilient and traditional crops turmeric, garlic, ginger, cardamom, and millets. This phase of the project builds on those learnings by integrating Science, Technology, and Innovation (STI) to enable high-value, high-impact agricultural practices and sustainable rural livelihoods.

Key agricultural interventions include the cultivation of high-value crops- Cymbidium orchids, Lilium spp., Amomum (black cardamom), Ferula (Hing), Rubus ellipticus (Hisalu), blueberries, and Turmeric, Ginger, Garlic, Lemon grass and millets. Hydroponic techniques will be introduced for the conservation and commercial production of rare and wild endangered Himalayan plants (Hisalu, blueberries), allowing landless farmers and youth to participate in high-return cultivation using minimal resources.

Swami Rama Himalayan University Director Research

The project will also establish processing and marketing units, helping farmers to move beyond cultivation and into value addition, branding, and direct-to-market models. These units will boost income generation, reduce post-harvest losses, and strengthen rural entrepreneurship.

Parallel interventions will focus on community well-being—including mobile healthcare services, water purification technologies, nutrition and hygiene education, and the promotion of women's health through awareness and access to services. Digital learning tools and skilling modules will also be introduced to enhance employability, especially among youth and school children.

A major strength of this project lies in the innovation ecosystem offered by Swami Rama Himalayan University (SRHU). The Department of Biotechnology leads R&D in plant sciences, hydroponics, and conservation technologies. The Rural Development Institute (RDI) ensures deep community engagement and field-level execution. And the Innovation and Entrepreneurship Development Centre (IEDC) incubates rural start-ups, supports enterprise development, and enables technology transfer, ensuring that innovation reaches the grassroots.

Through this integrated model, Krishi Navachar envisions a self-reliant, climate-resilient, and digitally empowered rural Uttarakhand, where tradition meets technology, and villages evolve into hubs of productivity, health, learning, and dignity.

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4. **Summary of work accomplished by PI/ Lead Institute in the proposed area during the last 5 years (100 words):**

Over the past five years, Swami Rama Himalayan University has implemented the Comprehensive Community Development Programme (CCDP) in the Toli area of Pauri Garhwal, focusing on sustainable agriculture, skill development, and women's empowerment. The program supported lemongrass cultivation and distillation, and promoted crops like turmeric, ginger, black cardamom, chilies, and millets. Infrastructure such as processing units and playhouses was established to boost productivity. Over 1,000 beneficiaries across 20 villages in the Jaiharikhal block have engaged in farm and off-farm activities. CCDP has enhanced livelihoods and economic stability, serving as a scalable and sustainable model for rural development in mountainous regions.

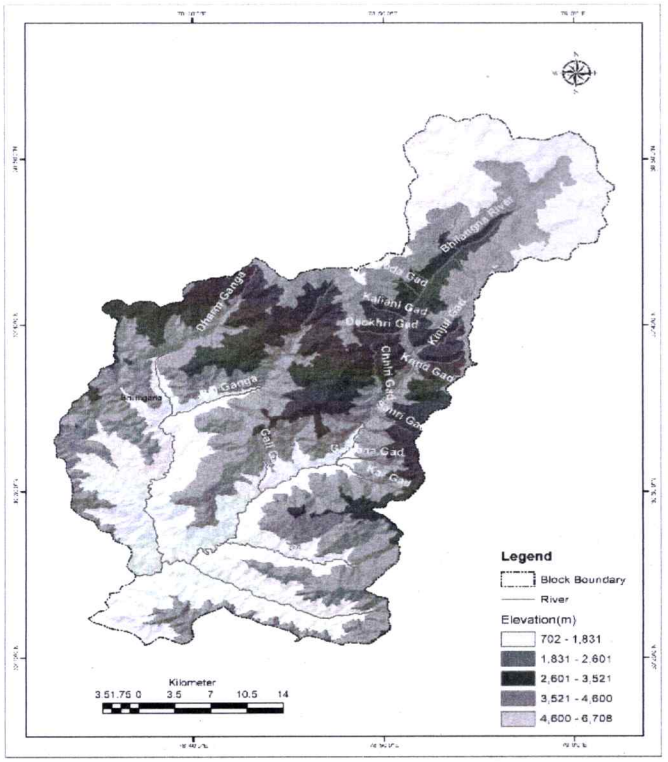
5. **Proposed Geographical coverage** JaiHari Khal **Area (to be identified based on a preliminary assessment of the areas as well as the people, availability of minimum infrastructural facilities particularly roads, water & sanitation, health centers, communication, marketing facilities, electricity, and potential for irrigation; climate, land use pattern, crops & cropping patterns, natural resources & raw materials, availability of special skills/ trades; and presence of local organizations like Panchayats or cooperative or voluntary groups, etc.):**

The project will be implemented in selected villages from Jaiharikhal block in Pauri Garhwal district and five villages from Bhilangana block in Tehri Garhwal district (Ghansali region), Uttarakhand. The selection of these areas is based on a preliminary assessment of demographic profiles, infrastructural availability, agricultural potential, and community readiness for participatory development.

Jaiharikhal block comprises 236 villages, with a total population of 26,493 (12,338 males and 14,155 females) across 6,640 households. The region has moderate infrastructure, including access to roads, electricity, water and sanitation, basic healthcare, and communication networks. The area exhibits significant potential for integrated rural development due to its diverse natural resources, existing traditional agricultural practices, and availability of human skills that can be upgraded through targeted interventions.

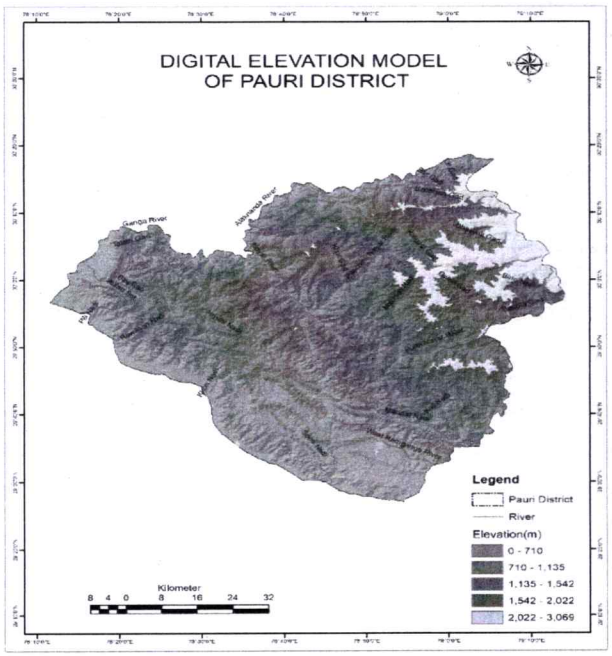
Bhilangana block, particularly villages in the Ghansali region, is characterized by hilly terrain, an agrarian economy, and close-knit community structures. The block has a total population of approximately 1,09,756 and comprises 273 villages. Five representative villages will be selected based on criteria such as existing infrastructure (road connectivity, electricity, water supply, sanitation), cropping patterns, irrigation potential, availability of raw materials, and institutional presence such as Panchayats and local organizations.

Study Area: 1. Bhilangna Block, Dist Tehri Garhwal



Digital Elevation Model of Bhilangna Block, Dist Tehri

Study Area: 2. Jharikhal Block, Dist Pauri Garhwal



Digital Elevation Model of Pauri Distric Block

s.N.	Village Name	Block	District	House hold	Total Population	Male	Female	SC	SC Male	SC Female	ST	ST male	ST female
1	Toli	Jhairikhal	Pauri Garhwal	39	158	71	87	65	30	35	0	0	0
2	Moli			23	102	44	58	25	10	15	0	0	0
3	Pasta			18	84	35	49	22	9	13	0	0	0
4	Kota Malla			38	144	60	84	49	23	26	0	0	0
5	Khera			61	222	85	137	9	4	5	0	0	0
6	Kandai			91	396	188	208	13	6	7	0	0	0
7	Gawana			31	102	48	54	16	8	8	0	0	0
8	Chinwari			17	51	19	32	0	0	0	0	0	0
9	Chaud			34	120	40	80	0	0	0	0	0	0
10	Kandiya			50	225	108	117	9	6	3	0	0	0
11	Malethi			65	263	120	143	102	71	31	0	0	0
12	Handul			55	225	107	118	51	23	28	0	0	0
13	Kharkholi			52	223	101	122	28	12	16	0	0	0
14	Gwelani			66	243	106	137	0	0	0	0	0	0
15	Bayali			45	169	79	90	45	22	23	0	0	0
16	Bandun			148	642	293	349	102	47	55	0	0	0
	Total			**833**	**3369**	**1504**	**1865**	**536**	**271**	**265**	**0**	**0**	**0**
16	Anthawal Gaon	Bhilangna (Ghansali)	Tehri	200	1050	528	522	390	201	189	1	0	1
17	Akhori			267	1136	502	634	132	65	67	0	0	0
18	Badiyar			292	1439	612	827	484	236	248	0	0	0
19	Vanchuri			219	1169	518	651	533	255	278	1	1	0
20	Chaji Malli			146	638	270	368	104	46	58	0	0	0
21	Chaji Talli			115	538	232	306	299	134	165	0	0	0
22	Chakarera			231	1133	478	655	535	242	293	0	0	0
23	Hadiyana Malla			220	925	391	534	212	93	119	0	0	0
24	Gagwari			105	503	233	270	166	78	88	0	0	0
25	Pakha			173	750	331	419	336	164	172	0	0	0
26	Kothar			84	384	177	207	129	66	63	0	0	0
27	Pangariyana			343	1571	615	956	281	140	141	0	0	0
28	Padagali			239	1202	554	648	284	136	148	0	0	0
29	Jakhanyali			200	892	379	513	160	75	85	0	0	0
30	Tharti			215	1085	493	592	192	101	91	0	0	0
	Total			**3049**	**14415**	**6313**	**8102**	**4237**	**2032**	**2205**	**2**	**1**	**1**
	Grand total			**3882**	**17784**	**7817**	**9967**	**4773**	**2303**	**2470**	**2**	**1**	**1**
Source: https://www.census2011.co.in/data/subdistrict/293-ghansali-tehri-garhwal-uttarakhand.html													

***PMGAY & Aspirational District Status (not Applicable): Not applicable (Pauri Garhwal is not currently listed as an Aspirational District under NITI Aayog).**

6. **Background of target community (considering Indigenous Knowledge (IK)/ Traditional Knowledge (TK), skills & practices, socioeconomic status, and demographic details of the target**

The target communities in Pauri Garhwal and Tehri Garhwal districts of Uttarakhand are predominantly rural and comprise indigenous populations with deep-rooted traditional knowledge (TK) and skills. Their livelihoods are primarily based on subsistence agriculture, animal husbandry, and traditional crafts such as weaving Bhimal (Grewia optiva) ropes. Local farming practices reflect a rich legacy of Indigenous Knowledge (IK), including organic cultivation, seed preservation, and water conservation techniques adapted to the hilly terrain. Staple crops include millets, maize, pulses, and vegetables, often cultivated without the use of chemical inputs.

Despite this wealth of traditional knowledge, the communities face several socio-economic challenges. A lack of access to modern agricultural tools, advanced farming techniques, and reliable market linkages has led to low productivity and economic insecurity. Most households belong to low-income groups, relying on seasonal agricultural labor and limited crop yields for sustenance. This economic vulnerability has accelerated youth migration and the gradual depopulation of villages.

Women play a vital role in agriculture, household management, and local enterprises. However, they have limited access to training, credit, and formal employment opportunities. Recent grassroots efforts—such as training in tailoring, organic farming, beekeeping, and handicrafts—have demonstrated positive outcomes in improving livelihoods and empowering women.

These communities possess significant potential for inclusive, integrated development. By combining traditional knowledge systems with science and technology-based interventions, the project aims to enhance productivity, ensure environmental sustainability, and build resilient rural economies that reduce migration and promote dignified livelihoods.

7. **registration number & year, if registered as Society/ Trust (applicable for NGO/ private institute only): RENEW0524008968 & 29th May 2029**

8. **NGO Darpan ID of NGO/ private institute: UA/2009/0013891**

9. **Scientific Manpower in position in the organization as of the date (for NGO only)**

S. N.	Name	Designation	Education	Specialization	Date of Joining	Full Time/ Part Time
1	Dr. Rajeev Bijalwan	Deputy Director- Health	BAMS, Master's in Health Management & Development	Health	16-Nov-08	Full Time
2	Mr. Nitesh Kaushik	Dy. Director	M. Tech (Atmospheric Science), Master's in Ecology & Environment	Water & Sanitation	31-Jan-04	Full Time
3	Dr. Naincy Barthwal	Medical Officer	BAMS	Health	04-Oct-21	Full Time
4	Mrs. Usha Singh	Incharge	BA, IGD	Livelihood	16-May-24	Full Time
5	Ms. Neelam Pandey	Manager	MA (English), NTT, MSW	Livelihood	15-Nov-02	Full Time
6	Mr. Ravindra Verma	Deputy Manager	MA (Sociology)	Health	15-Dec-94	Full Time
7	Mr. Vivek Anand	Dy. Project Manager	MSW	Water & Sanitation	01-Nov-06	Full Time

8	Mr. Rajkumar Verma	Assistant Manager	MSW, MA (Sociology)	Water & Sanitation	01-Mar-96	Full Time
9	Mr. Sunil Khanduri	Senior Coordinator	BA, Mass comm.	Health	15-Dec-94	Full Time
10	Mr. Satendra Chauhan	Field Supervisor	MSW	Water & Sanitation	01-Jan-95	Full Time
11	Mr. Digvijay Singh Bisht	Field Supervisor	MA (Sociology), MSW	Education	02-May-05	Full Time
12	Mr. Kamal N. Joshi	Field Supervisor	B.A.	Livelihood	01-Sep-07	Full Time
13	Ms. Leela Uniyal	Field Supervisor	MA (Sociology)	Health	03-Sep-07	Full Time
14	Ms. Maya Sharma	Senior ANM	Intermediate, BHW	Health	01-Aug-92	Full Time
15	Ms. Nirmala Bijalwan	Field Supervisor	MA (Hindi)	Health	04-Jan-07	Full Time
16	Ms. Jyoti Sharma	Sr.Teacher	MA, NTT	Teacher	02-May-05	Full Time
17	Mr. Lakhpat Bisht	Coordinator	MA (Sociology)	Water & Sanitation	15-Dec-94	Full Time
18	Ms. Pawandeep Kaur	Coordinator	BA, NTT, MSW	Health	02-May-05	Full Time
19	Mr. Naresh Thapliyal	Assistant Office Superintendent	PGDCA, B.Sc.	Admin	01-Apr-98	Full Time
20	Mr. Vikesh Prasad	Assistant Office Superintendent	B.Sc.	Admin	04-Sep-14	Full Time
21	Mr. Shakti Prasad Bhatt	Sr. Office Assistant	B.A.	Admin	29-Dec-10	Full Time
22	Mr. Gajendra Singh Rawat	Senior Office Assistant	MA (Sociology)	Admin	01-May-01	Full Time
23	Mr. Naval Kishor	Assistant	Intermediate	Admin	01-May-00	Full Time
24	Ms. Richa Bijalwan	Media & Publicity-Executive	MA	Media	01-Dec-14	Full Time
25	Ms. Meena Pandey	Media & Publicity-Executive	MA Mass comm.	Media	01-Dec-14	Full Time
26	Ms. Sunita Badoni	Media & Publicity-Executive	B.A.	Media	01-Dec-14	Full Time
27	Mr. Satya Prakash	Tailor	Intermediate	Livelihood	03-Jul-12	Full Time
28	Mr. Pankaj Sharma	Attendant	Intermediate	Admin	06-Sep-13	Full Time
29	Ms. Sandhya	Coordinator- Tailoring	MA	Livelihood	05-Oct-17	Full Time
30	Mr. Ramesh Kumar	Tailor	9th	Livelihood	16-Mar-18	Full Time
1	Dr. Vivek Singh	Project Coordinator	BDS, MDS, MPH, PhD. Pursuing	Health	09-May-24	Part Time
2	Ms. Shikha Bisht	Jr. Teacher	PG (Drawing and Painting) Dip. in Art therapy-self heeling	Teacher	01-Nov-13	Part Time
3	Ms. Neelam Kukshal	Supervisor	Graduation	Health	05-Jan-23	Part Time

4	Ms. Sheetal	Supervisor	B.ed and Asha Certificate Course	Health	14-Mar-24	Part Time
5	Dr. Amandeep Kaur	Project Coordinator		Health	21-Mar-24	Part Time
6	Mr. Vikash kumar	Pharmacist	D.Pharm	Health	01-Aug-23	Part Time
7	Ms. Saloni	Teacher (FB School)		Teacher	26-Jul-24	Part Time
8	Ms. Bhawna	Office Assistant	Graduation	Admin	05-Aug-24	Part Time
9	Mr. Abhishek Uniyal	Project Engineer	B.Tech (Civil)	Water & Sanitation	01-Apr-21	Part Time
10	Mr. Atul Uniyal	Scientist	B. Tech	Water & Sanitation	20-Jul-22	Part Time
11	Mr. Karan Singh Negi	Civil Engineer	M.Tech.	Water & Sanitation	08-Aug-23	Part Time
12	Mr. Sujeet Kumar Thapliyal	Coordinator	MSW	Water & Sanitation	02-Aug-23	Part Time
13	Mr. Deepak Joshi	Jr. Office Assistant	BSc	Admin	21-Jun-23	Part Time
14	Ms. Nidhi Singhal	Jr. Office Assistant	B. com	Admin	21-Jul-22	Part Time
15	Mr. Suraj Singh	Attendent	Intermediate	Admin	01-Mar-23	Part Time
16	Mr. Ankush Negi	Field Staff (CCDP Toli-SRHU)		Livelihood	27-Nov-19	Part Time
17	Mr. Kushagra	Trainer Recycle Unit		Livelihood	12-Feb-24	Part Time
18	Mr. Kishan Singh	Trainer Handloom Unit		Livelihood	01-Jun-24	Part Time
19	Ms. Vandana Kukreti	Jr. Tec. Recycle Unit		Livelihood	02-Dec-24	Part Time
20	Dr. Divya Verma	Project Research Scientific-II (Non-Medical)	BDS, MPH	Health	04-Nov-24	Part Time
21	Ms. Prasangeeka Basnet	Project Research Scientific-I (Non-Medical)	Master in Public Health & BSC Nursing	Health	06-May-24	Part Time
22	Mr. Ayush Bhatt	Project Technical Support	B.com	Health	01-May-24	Part Time
23	Mr. Manjeet Kumar	Project Technical Support	Bachelor of Computer Application	Health	01-May-24	Part Time
24	Ms. Payal Bhatt	Project Technical Support	Master of Science in Clinical research	Health	01-May-24	Part Time
25	Ms. Nagma Mirza	Project Technical Support	M.Sc Epidemiology	Health	01-May-24	Part Time
26	Dr. Simran Sanoria	Project Technical Support	BDS, MPH	Health	23-Sep-24	Part Time
27	Ms. Aayushi Thapa	Project Technical Support (Office Support)	Intermediate, Diploma Computer Science & Engineering	Health	18-Oct-24	Part Time
28	Mr. Ankit Negi	Project Technical Support	Bachelor of Science	Health	18-Oct-24	Part Time
29	Dr. Aakriti Jasrotia	Study Coordinator	BDS, MPH	Health	11-Nov-24	Part Time

30	Dr. Harsimran Kaur	Project Technical- III Nonclinical	BDS, MPH	Health	03-Mar -25	Part Time
31	Ms. Tannu	Project Technical Support- III	MSc. Microbiology	Health	03-Mar -25	Part Time
32	Ms. Diya Rawat	Telly caller	BCom.	Health	03-Mar -25	Part Time
33	Mr. Aaditya Kohli	Project Technical Support- III Central care Coordinator	Bachelor in Hospital Administration	Health	03-Mar -25	Part Time
34	Mr. Suraj	Project Technical Support- III	MPH	Health	10-Mar -25	Part Time

10. Details of ongoing /completed projects of Lead Institute during last 5 years (relevant to current proposal only):

SN	Funding Agency	Type of Funding (National/ International)	Amount (Rs.)	Year	Purpose	Present status (Ongoing/Completed)
1	Rural India Supporting Trust (RIST) USA & The Hans Foundation (THF), Delhi	National	5,26,33,562.00	2021-22	Implementation of Water Supply, Spring shed and Sanitation Schemes	Completed
2	The Hans Foundation (THF)	National	4,86,000.00	2021-22	Training & Capacity Building on Water Supply Scheme Implementation and Hygiene and Sanitation Awareness	Completed
3	Ministry of Jal Shakti, Govt. of India	National	33,00,000.00	2021-22	Training program on Jal Jeevan Mission for Level- 2	Completed
4	Ministry of Jal Shakti, Govt. of India	National	12,78,000.00	2021-22	Orientation/training program on key components of Jal Jeevan Mission for Level- 3	Completed
5	Ministry of Jal Shakti, Govt. of India	National	29,52,000.00	2021-22	Training program on Jal Jeevan Mission for Level- 3	Completed
6	Ministry of Jal Shakti, Govt. of India	National	32,76,000.00	2022-23	Training program on Jal Jeevan Mission for Level- 2	Completed
7	Ministry of Jal Shakti, Govt. of India	National	28,80,000.00	2022-23	Training program on Jal Jeevan Mission for Level- 3	Completed
8	State Water Sanitation Mission, GoUK	National	11,04,000.00	2022-23	Training program on Jal Jeevan Mission for Level- 2	Completed

9	State Water Sanitation Mission, GoUK	National	8,96,000.00	2022-23	Training program on Jal Jeevan Mission for Level- 2	Completed
10	State Water Sanitation Mission, GoUK	National	48,00,000.00	2022-23	Training program on Jal Jeevan Mission for Level- 3	Completed
11	State Water Sanitation Mission, GoUK	National	4,20,000.00	2022-23	Training program on Jal Jeevan Mission for Level- 3	Completed
12	State Water Sanitation Mission, GoUK	National	1,92,22,000.00	2022-23	Training program on Jal Jeevan Mission for Level- 3	Completed
13	Ministry of Jal Shakti, Govt. of India	National	1,13,40,000.00	2023-24	Training program on Jal Jeevan Mission for Level- 2	Completed
14	State Water Sanitation Mission, GoUK	National	39,82,000.00	2024-25	Training program on Jal Jeevan Mission for Level- 2 (Change Management- Role (as Public Health Engineer) and activities for Har Ghar Jal)	Completed
15	Rural Development Department, Gangtok, Govt of Sikkim	National	20,01,265.00	2024-25	Operation & Maintenance of rural water supply schemes and Source sustainability and recharge of spring water sources	Completed
16	ICIMOD-International Centre for Integrated Mountain Development	International	22,50,970.00	2024-25	Workshop on Gender Equity, Socially Inclusive Springshed Management	Completed
17	State Mission for Clean Ganga (SMCG), Namami Gange, Govt. of Utttarakhand	National	21,68,870.00	2024-25	Work Order for Conducting Social Audit & Environmental Audit	Ongoing
18	NMHS-National Mission On Himalayan Studies	National	1,01,00,000.00	2024-25	Affordable Climate-Resilient Water Infrastructure Prototype for the Indian Himalayan Region	Ongoing
19	DMT/AHYMSIN	National	Rs. 65,50,000	2020-25	Community-based rehabilitation services for people with disabilities in Dehradun, Haridwar, and Pauri district	On going
20	Panchayat Raj Department Dehradun	National	Rs. 31,21,020	2022-24	PRI training on SDGs (9 theme) for Panchyat members	Completed

					and line departments in Pithoragarh and Pauri.	
21	Wipro Cares Bangalore	National	Rs. 1,54,69,609	2021-25	Enable maternal, child, and adolescent health in 12 villages of the Bahadrabad block of Haridwar district	On going
22	New Space India Limited, Bangalore	National	34,74,600	2022-25	Providing primary health care services in selected villages of Kalsi block of Dehradun.	
23	(Telemedicine services, Outreach health camps, Nutrition kits distribution to HRP, School and Adolescent health camps, Capacity building of front-line workers, etc.)	On going				
24	SRHU	National	Rs. 46,56,000	2021-25	Comprehensive Community Development Program Toli	On going
25	Sankalp project ICMR, Delhi	National	Rs. 1,84,06,242	2024	Strengthening Program Implementation and Monitoring to Achieve Single-digit Neonatal Mortality)	On going
26	SRHU	National		2024	Integrated Skill Development of Rural Youth (Office Assistant cum Computer Operator and Plumbing cum Electrician)	On going
	Stichting Pooja kajal Foundation, Netherlands	International	Rs. 20,26,830	2021-25	To enable underprivileged children with healthy nutrition, health and general education.	On going
	Caring Hand Scholarship- USA	International	Rs. 10,30,149	2021-24	To support education of the children from disadvantaged communities.	
	SRHU	National	Rs. 5720000	2023-25	Comprehensive Package of Services-TB Cases, (Poshan	On going

11.

Infrastructure available with the institution for implementing the project (land/ building, equipment, etc.)

- SRHU Area
- Building
- Equipment

12. **Collaboration partner, if any:** - RDI-SRHU

13. **State the target population-related problem you seek to address and brief of their Socio-Economic status, in 200 words only (should be based on the identification of weakest links/gaps/problems in the predominant livelihood, health, quality of life, and socio-economic status of people in the select area – the problem identification should be supported with evidence-based data – may be based on livelihood system analysis, investigators fieldwork in the target area, district (industrial) reports, data from various others reports, NRLM, SRLM data etc) :**

The rural communities in Jaiharikhal block (Pauri Garhwal) and Bhilangana block (Tehri Garhwal) face deep-rooted socio-economic challenges linked to fragile livelihoods, poor health infrastructure, and limited access to basic services. According to NRLM (2022), over 60% of households rely on marginal, rainfed agriculture with minimal productivity, driven by fragmented landholdings, deteriorating soil health, lack of irrigation (more than 75% rainfed—SRLM, 2022), and recurring crop losses from wild animal attacks. Traditional crops like Mandua, Jhangora, and seasonal vegetables generate low economic returns due to poor market linkages, lack of value addition, and absence of post-harvest infrastructure.

High rates of male outmigration have left women as primary cultivators, yet with little access to training, mechanization, or formal credit. Over 60% of families live below the poverty line (NRLM, 2022), with limited avenues in allied sectors like horticulture, livestock, or rural enterprise. Health services are inadequate—PHC coverage is sparse and female literacy stands at just 59% (Census 2011; DHDR 2019). Investigator fieldwork and district-level reports highlight the need for integrated, science and technology-based interventions to address these systemic gaps. The proposed project seeks to build resilient, inclusive livelihoods through skill development, agri-innovation, and infrastructure support tailored to the Himalayan context.

14. Brief Industrial Scenario of the target area (100 words max)(may refer to Industrial Profile of Districts by State Govt. and MSME schemes such as SFURTI/ ASPIRE/ Cluster/ innovation etc.)

Jaiharikhal (Pauri) and Bhilangana (Tehri Garhwal) lie in ecologically sensitive, migration-prone zones of Uttarakhand with limited industrial presence. The primary livelihood remains subsistence farming, hindered by poor irrigation, outdated practices, and weak market linkages. MSME-driven cluster initiatives and schemes like SFURTI and ASPIRE have limited reach here. However, there is growing potential for agro-based micro-enterprises, floriculture, and herbal industries. The region is ideal for innovation-led interventions in climate-resilient agriculture, processing, and rural entrepreneurship. The project leverages this potential to develop sustainable, tech-enabled agri-industrial ecosystems fostering local employment and reducing outmigration.

15. **Existing Regional/National/International Solutions (within 200 words):**

Regionally, initiatives like *Vocal for Local, Mission Organic Uttarakhand,* and *Uttarakhand Millet Mission* promote traditional, climate-resilient crops, yet face scale and market challenges in remote hill areas. Nationally, schemes like *Rashtriya Krishi Vikas Yojana (RKVY), Paramparagat Krishi Vikas Yojana (PKVY), National Horticulture Mission,* and *National Rural Livelihoods Mission (NRLM)* support sustainable agriculture, FPO formation, and agri-enterprises, though integration of STI (Science, Technology, Innovation) remains limited in hill ecosystems. Platforms like *SFURTI* and *ASPIRE* promote cluster-based rural entrepreneurship and agro-processing.

Internationally, models such as Israel's hi-tech farming (drip irrigation, hydroponics), Nepal's community-based agroforestry, and UN-FAO's Climate-Smart Agriculture Framework offer scalable templates for climate resilience, water efficiency, and agri-enterprise development. However, these often lack localization to Himalayan geographies and socio-cultural contexts.

What sets **Krishi Navachar** apart is its place-based approach—integrating global best practices with local traditional knowledge, leveraging institutional R&D (SRHU), community trust (RDI), and grassroots enterprise incubation (IEDC). It fills a critical gap by embedding STI directly into rural livelihoods, health, and education, ensuring holistic rural transformation tailored to Uttarakhand's unique terrain, ecology, and demographic needs.

16. **Any other Government National Initiatives related to proposed activities to solve this problem (mention outcomes of the initiatives (100 words max).**

In Uttarakhand, initiatives like Mission Organic Value Chain Development (MOVCDNER), Biotech-KISAN Hub (Pantnagar), and National Horticulture Mission promote sustainable agriculture and value addition in hill regions. Rural Business Incubators under ASPIRE and Start-Up India have supported local agro-enterprises. MGNREGA and Jal Shakti Abhiyan aid in water conservation and farm infrastructure. Outcomes include promotion of organic farming, initial FPO formation, and increased cultivation of niche crops like millets and herbs. However, remote regions like Jaiharikhal and Bhilangana still face challenges in market access, tech adoption, and sustainability—gaps that Krishi Navachar addresses through STI-led grassroots interventions.

17. Technology gaps and new innovative S&T component/ adaptive R&D solution proposed as per need identification (mention the importance of the project in the context of the current status, and demonstrate how the project will progress beyond the "state-of-art" or the best initiative tried by others in providing new innovative technological solution such as design modification, improvement in existing solutions, etc. to the identified problem and user needs):

Technology Gaps and Proposed S&T Solutions

Sl. No.	Technology Gap in the Identified Problem	Proposed S&T Interventions / Innovative Components / Adaptive R&D Solutions	Justification (Development, Upscaling, Adaptation, etc.)
1	Low agricultural productivity due to fragmented landholdings, poor soil fertility, and erratic rainfall. Traditional farming is labor-intensive and water-inefficient, resulting in low income and food insecurity.	Introduce community-level hydroponic systems for soilless cultivation using nutrient-rich water. Hydroponics enables year-round production of high-value crops (e.g., leafy greens, herbs, tomatoes), reduces water use by up to 90%, and requires minimal land—making it ideal for hilly terrains.	Adaptation of hydroponic technology to increase productivity in resource-constrained areas, with year-round cultivation and minimal land and water requirements.
2	Lack of awareness, accessibility, and adoption of modern cultivation technologies like hydroponics in remote and resource-constrained regions.	Set up demonstration units, conduct training workshops, and integrate hydroponics into village-level entrepreneurship models to build capacity among women, youth, and SHGs.	Promotes sustainable agricultural enterprise by empowering local communities with modern, water-efficient farming methods and creating opportunities for self-reliance.
3	Lack of irrigation and water management in rainfed agriculture.	Introduction of low-cost, gravity-fed micro-irrigation systems using rainwater harvesting structures and solar-powered pumps.	Adaptation of water-efficient systems suited for hilly terrain; demonstrated to increase water-use efficiency and crop productivity.
4	Crop damage by wild animals.	Deployment of solar-powered electric/bio-fencing and sensor-based	Technology deployment to mitigate crop loss; builds farmer confidence and

		animal alert systems integrated with community surveillance.	promotes reinvestment in agriculture.
5	Low agricultural productivity and outdated practices.	Promotion of climate-resilient, high-yielding indigenous crop varieties; use of soil health cards and organic nutrient kits.	Upscaling of sustainable, eco-friendly practices; aligns with traditional knowledge and enhances productivity.
6	Poor value addition and market linkage.	Establishment of solar-powered mobile processing units for millets, spices, and fruits; support for branding and eco-packaging.	Encourages local value chains, entrepreneurship, and income generation through rural enterprise development.
7	Limited livelihood diversification and skill development.	Deployment of ICT-based agro-advisory platforms, crop-weather alert mobile apps, and entrepreneurship training modules.	Builds digital capacity and practical skills; empowers youth and women in diversified livelihood streams.
8	Lack of accessible health services.	Use of kits, portable diagnostics (BP, sugar, Hb), and solar-powered Health ATMs for remote outreach.	Innovation in rural healthcare delivery; enables early screening, improves health access, and reduces referral burden.
9	Weak education infrastructure, especially for digital learning.	Establishment of solar-powered smart classrooms, mobile e-learning vans, and offline digital libraries with localized content.	Adaptation of EdTech for remote learning; improves digital literacy and educational inclusion, especially among girls.
10	Limited youth skilling and employment.	Creation of ICT-enabled vocational hubs focusing on agri-tourism, herbal wellness, and food processing.	Integrates local resources with skill development; promotes entrepreneurship and curbs migration.
11	Poor digital and physical connectivity.	Installation of solar-powered community Wi-Fi hubs, and drone-assisted delivery systems.	Innovative last-mile solutions to enhance service delivery, communication, and access to markets and services.
12	Risk from natural disasters (landslides, cloudbursts, etc.).	Community-based early warning systems, GIS-based vulnerability mapping, training in disaster-resilient infrastructure and crop planning.	

18. Proposed Objectives (aligned with title of project and 4-5 only): (5 lines only in drop-down)

- **To introduce and demonstrate hydroponic farming systems in rural Uttarakhand**, focusing on community-level adoption of water-efficient, soilless cultivation technologies for high-value crops, aimed at improving agricultural productivity and resource conservation.
- **To build local capacity through training workshops, skill development programs, and entrepreneurial initiatives**, empowering rural youth, women, and self-help groups (SHGs) in adopting modern agricultural practices and creating sustainable livelihoods.
- **To improve water management and irrigation systems** in rainfed agriculture by implementing low-cost, gravity-fed micro-irrigation systems, rainwater harvesting structures, and solar-powered pumps, thereby enhancing water-use efficiency and crop yields.
- **To strengthen agricultural value chains** by establishing mobile processing units, improving market linkages, and promoting local entrepreneurship for high-value crops, thereby increasing incomes and reducing post-harvest losses.
- **To enhance rural health and education infrastructure t**hrough digital learning platforms, improving access to quality healthcare and education in remote communities.

19. **Methodology** (defined steps/relevant process details e.g., PERT chart, model, diagram including methods such as Survey; Protocols, Mobilization; Technology Identification, Assessment, Transfer, Adaptation &

Adoption; Demonstration & Training, Result & Impact analysis, Stakeholder's engagement, Marketing, Linkages, Feedback and Follow-up from stakeholders/ben, etc.):

1. Survey & Protocols: Gather baseline data on community needs and resources.
2. Mobilization & Stakeholder Engagement: Involve local stakeholders early and throughout.
3. Technology Identification & Adaptation: Select and adapt appropriate technologies for the community.
4. Demonstration & Training: Ensure effective use of technologies.
5. Marketing & Linkages: Raise awareness and create sustainability links.
6. Result & Impact Analysis: Measure the project's success and long-term impact.
7. Feedback & Follow-up: Ensure long-term project sustainability and improvement.
8. PERT (Program Evaluation and Review Technique) Chart: Visualize project tasks and timelines.

1. **Objective 1**: **Introduce and demonstrate hydroponic farming systems in rural Uttarakhand, focusing on community-level adoption of water-efficient, soilless cultivation technologies for high-value crops, aimed at improving agricultural productivity and resource conservation.**

   Methodology:

   - **Survey & Protocols**: Conduct a baseline survey to assess the current agricultural practices, water usage, and resource constraints in rural Uttarakhand.
   - **Technology Identification & Adaptation**: Identify and adapt hydroponic farming systems for local conditions, ensuring that they are resource-efficient and suitable for year-round crop production.
   - **Demonstration & Training**: Set up community-level hydroponic systems and organize hands-on training workshops for local farmers, SHGs, and youth on hydroponic farming techniques.

2. **Objective 2**: **Build local capacity through training workshops, skill development programs, and entrepreneurial initiatives, empowering rural youth, women, and self-help groups (SHGs) in adopting modern agricultural practices and creating sustainable livelihoods.**

   Methodology:

   - **Mobilization & Stakeholder Engagement**: Involve local stakeholders, including youth, women, and SHGs, early in the project to ensure community buy-in and active participation.
   - **Training & Demonstration**: Conduct skill development programs on hydroponic farming, sustainable agriculture practices, and entrepreneurial training to help participants manage agricultural businesses.
   - **Entrepreneurship Support**: Provide ongoing support for the creation of agri-enterprises, including business planning, access to credit, and marketing strategies.

3. **Objective 3**: **Improve water management and irrigation systems in rainfed agriculture by implementing low-cost, gravity-fed micro-irrigation systems, rainwater harvesting structures, and solar-powered pumps, thereby enhancing water-use efficiency and crop yields.**

   Methodology:

   - **Technology Identification & Adaptation**: Select appropriate low-cost, gravity-fed micro-irrigation systems and solar-powered pumps, customized for rainfed agriculture in hilly terrains.
   - **Installation & Training**: Deploy the micro-irrigation systems and rainwater harvesting structures, and provide training for local farmers on their maintenance and use.
   - **Monitoring & Evaluation**: Regularly assess water-use efficiency, crop yield improvements, and overall system sustainability.

4. **Objective 4**: **Strengthen agricultural value chains by establishing mobile processing units, improving market linkages, and promoting local entrepreneurship for high-value crops, thereby increasing incomes and reducing post-harvest losses.**

   Methodology:

- **Survey & Protocols**: Identify local high-value crops with strong market demand and potential for value addition through processing.
- **Mobile Processing Units**: Set up solar-powered mobile processing units for crops like millets, fruits, and spices, enabling local processing and reducing post-harvest losses.
- **Marketing & Linkages**: Establish connections between farmers and local/urban markets, ensuring a stable market for processed products and improving income opportunities for rural farmers.

5. **Objective 5**: **Enhance rural health and education infrastructure through digital learning platforms, improving access to quality healthcare and education in remote communities.**

Methodology:

- **Survey & Protocols**: Assess the current state of healthcare and educational infrastructure in remote villages of Uttarakhand.
- **Solar-Powered Smart Classrooms & E-learning**: Set up solar-powered classrooms, digital learning platforms, and e-learning vans to provide education to children and adults, especially in areas with limited connectivity.
- **Health & Education Awareness**: Conduct community health awareness programs and e-learning sessions on nutrition, hygiene, and essential health monitoring.

S. no	Objectives	Milestones/ Work flow
1	To Introduce and demonstrate hydroponic farming systems in rural Uttarakhand, focusing on community-level adoption of water-efficient, soilless cultivation technologies for high-value crops, aimed at improving agricultural productivity and resource conservation.	1. Baseline Survey & Development • The baseline survey will be conducted in 30 villages across Jaiharikhal and Bhilangana blocks, covering around 10,000+ beneficiaries. This survey will assess current agricultural practices, cropping patterns, water usage, input costs, and knowledge of soilless or climate-resilient agriculture. • Agro-climatic mapping and resource assessment will help identify suitable areas for hydroponics based on factors like water access, sunlight exposure, availability of skilled youth, and climate conditions. • Selection of 3–5 high-value crops (such as lettuce, spinach, basil, strawberry, and local herbs) based on market demand and local preferences, with development of crop-specific cultivation protocols (nutrient solution composition, pH/EC range, light requirements, crop cycles). 2. Technology Identification, Adaptation & Field Testing • Different hydroponic systems (e.g., NFT, DWC, Kratky, vertical systems, and wick-based systems) will be reviewed to find the most suitable options for the hilly terrain and resource constraints in Uttarakhand. • Custom hydroponic systems will be designed and adapted using local materials for solar-powered pumps, polyhouses for colder climates, and water-recycling systems for sustainable cultivation. • Two to three prototype hydroponic systems will be set up at SRHU and selected villages for field testing. Performance parameters (yield, water usage, maintenance) will be continuously monitored and assessed. • The best models will be finalized for widespread field deployment. 3. Demonstration & Community-Level Training • 5 hydroponic demonstration units will be set up across the 30 villages (10 in first phase & 20 in second phase, spread across both blocks), managed by SHGs, youth groups, and progressive farmers. • A training curriculum in Hindi will be created, including easy-to-understand manuals, videos, and visual guides for farmers. • Training sessions will be organized in 10 villages with the goal of reaching at least 10,000 beneficiaries (including farmers, SHG members, and youth). At least 40% of participants will be women/youth. The sessions will cover topics such as hydroponic system setup, nutrient management, pest control, and resource-efficient farming techniques. • Farmer Field Schools (FFS) will be initiated in each village to continue peer learning and troubleshooting, aiming for 4–6 active groups by Year 2. 4. Key Indicators Indicator Target Technologies Adapted/Tested 2 hydroponic models customized for hill conditions Technologies Deployed 3 hydroponic demo units in 30 villages High-Value Crops Standardized 3–5 high-value crop protocols Training Materials Developed 1 complete toolkit (manuals, posters, videos) People Trained 10,000+ beneficiaries (=40% women/youth) in multiple phases, Training Events 30+ hands-on workshops Villages Covered 30 villages (all SHGs/youth) Farmer Field Schools Initiated 4–6 active peer-learning groups
2	To build local capacity through training workshops, skill development programs, and entrepreneurial initiatives, empowering rural youth, women, and self-help groups (SHGs) in adopting modern agricultural practices and creating sustainable livelihoods.	1. Needs Assessment & Stakeholder Mapping Activity: Conduct a baseline survey to identify the specific training needs and skills gaps among rural youth, women, and SHGs in the target areas. Outcome: Understanding of local needs, current skill levels, and specific areas where training is required (e.g., crop production, post-harvest handling, business skills). Timeline: 1st Month (Preparation and Data Collection) 2. Designing Training Modules & Curriculum Development Activity: Develop comprehensive training modules or utilize existing training material. If found approprite on modern agricultural practices (including hydroponics, organic farming, pest management), entrepreneurship, business planning, financial literacy, and digital tools for agriculture. Outcome: Tailored, gender-sensitive training materials (manuals, videos, PowerPoint presentations) in Hindi for diverse groups (farmers, SHGs, youth). Timeline: 2nd Month (Content Development) 3. Establishment of Training Centers & Infrastructure Activity: Set up training hubs in strategic locations (e.g., community halls, local schools) in each of the 30 target villages, equipped with necessary infrastructure at both locations (computers, projectors, etc.). Outcome: Functional training centers in each village, accessible to farmers, SHGs, and youth. Timeline: 3rd Month (Infrastructure Setup) 4. Skill Development Workshops Activity: Conduct 40+ workshops over 12 months for rural youth, women, and SHGs, focusing on topics such as modern agricultural techniques, organic farming, digital literacy for agriculture, and basic entrepreneurial skills. Outcome: At least 500 participants trained in various aspects of modern agriculture, with a target of 40% women/youth. Timeline: 4th–15th Month (Workshops) 5. Entrepreneurial Initiatives & Business Incubation Activity: Organize entrepreneurship development programs to encourage participants to

		start their own ventures in agriculture-related businesses (e.g., small-scale agro-processing, produce marketing, rural agri-tech solutions). Provide mentorship, seed funding, and business planning support to at least 30 rural startups. Outcome: Empowerment of at least 30 rural entrepreneurs (with a focus on women/youth), helping them start businesses related to modern agriculture, marketing, or processing. Timeline: 6th–18th Month (Entrepreneurship Support) 6. Digital Literacy & Technology Adoption Training Activity: Provide training in digital tools (e.g., mobile apps for weather forecasting, market pricing, pest management) to help farmers and SHG members make data-driven decisions. Outcome: At least 200 rural youth and women trained in using mobile technology and digital platforms for farming, marketing, and business. Timeline: 4th–12th Month (Digital Literacy Programs) 7. Monitoring & Impact Assessment Activity: Implement a feedback mechanism to evaluate the effectiveness of training and skill development programs through surveys, interviews, and regular check-ins with participants. Monitor the progress of trained individuals and their transition into sustainable livelihoods. Outcome: Regular monitoring and mid-term assessments to measure the effectiveness of the programs and track the number of successful livelihoods created. Timeline: Ongoing (Assessment at 6 and 12 Months) 8. Creation of Women-Focused Initiatives Activity: Focus on women-led agribusinesses such as organic produce selling, food processing, and local handicrafts. Provide targeted training, funding, and market linkages for at least 15 women-led ventures. Outcome: Empowerment of women in rural areas with practical skills, enabling them to lead their own agricultural enterprises. Timeline: 5th–18th Month (Women's Empowerment) Key Deliverables Needs Assessment Report detailing the skills gap and training needs. Training Materials: Developed and localized manuals, videos, and digital resources in Hindi. Training Workshops: 40+ workshops conducted, reaching 500 participants, with at least 40% women/youth. Entrepreneurial Ventures: 30 rural entrepreneurs supported with mentorship, seed funding, and market access. Digital Literacy Training: 200 youth and women trained on digital tools for agriculture. Impact Reports: Regular assessments to track skills gained, employment generation, and entrepreneurial success.
3	To improve water management and irrigation systems in rainfed agriculture by implementing low-cost, gravity-fed micro-irrigation systems, rainwater harvesting structures, and solar-powered pumps, thereby enhancing water-use efficiency and crop yields.	1. Baseline Survey & Water Resource Mapping Activity: Conduct a baseline survey to assess existing water sources, irrigation practices, and water use inefficiencies across the 30 target villages. Map available water resources (e.g., rivers, springs, ponds) and identify areas most in need of water management interventions. Outcome: A detailed water resource mapping report and baseline data on current irrigation practices and water usage patterns. Timeline: Month 1–2 2. Technology Selection & Adaptation Activity: Research and select the most suitable gravity-fed micro-irrigation systems (e.g., drip or sprinkler systems), rainwater harvesting designs, and solar-powered pump models that are cost-effective, easy to maintain, and adaptable to local conditions. Work with technical experts to customize these systems for the mountainous terrain. Outcome: Technology adaptation report and finalized irrigation system designs tailored for the local context (low-cost, easy to maintain). Timeline: Month 3–4 3. Construction of Rainwater Harvesting Structures Activity: Design and construct rainwater harvesting structures (e.g., check dams, water tanks, rooftop systems) in areas where water scarcity is most critical. Ensure that these structures can collect and store water efficiently during the rainy season. Outcome: 10–12 rainwater harvesting structures constructed across the 30 villages, designed to capture and store rainwater for irrigation purposes. Timeline: Month 5–6 4. Installation of Gravity-Fed Micro-Irrigation Systems Activity: Implement gravity-fed micro-irrigation systems (drip and sprinkler) in selected farms and fields. Use low-cost, locally available materials for the system setup, ensuring ease of use and sustainability. Focus on high-value crops, fruit orchards, and medicinal plants. Ensure that systems use minimal external power (gravity-fed design) to maximize cost-efficiency. Outcome: 15–20 micro-irrigation systems installed across demonstration plots, showcasing water-saving irrigation techniques. Timeline: Month 7–10 5. Installation of Solar-Powered Pumps Activity: Install solar-powered pumps for water lifting in areas with low or inconsistent electricity access, particularly in farms and fields that are located farther from natural water sources. Outcome: Solar-powered pumps installed in 5–7 water-scarce sites across the project villages. Timeline: Month 8–12 6. Capacity Building & Training Workshops Activity: Organize training workshops for farmers and community members on the installation, operation, and maintenance of micro-irrigation systems, rainwater

		harvesting structures, and solar-powered pumps. Focus on sustainable water management practices and the role of these systems in enhancing crop productivity and reducing water wastage. Outcome: 50–100 participants (farmers, SHG members, youth) trained in water management and system maintenance. Timeline: Month 7–12 (Ongoing) 7. Monitoring & Evaluation Activity: Set up a monitoring system to track the effectiveness of the interventions. Measure water savings, crop yield improvements, and system usage. Conduct periodic visits to assess the performance of micro-irrigation systems and rainwater harvesting structures. Outcome: Mid-term and end-term evaluation reports detailing the water savings, crop yield improvements, and efficiency of installed systems. Timeline: Month 12 and ongoing 8. Community Engagement & Awareness Campaign Activity: Launch an awareness campaign to promote water conservation and efficient irrigation practices in the community. This will include information dissemination through community meetings, posters, and local media. Outcome: Increased community awareness and buy-in, ensuring sustainability and long-term adoption of water-efficient practices. Timeline: Month 4–12 (Ongoing) Key Deliverables Baseline Survey Report on current irrigation practices and water resources in the villages. Technology Adaptation Report with finalized designs for gravity-fed micro-irrigation systems and solar-powered pumps. 10–12 rainwater harvesting structures installed across the target villages. 15–20 micro-irrigation systems set up for demonstration and adoption by local farmers. 5–7 solar-powered pumps installed to address water access issues. Training Materials and Workshop Reports for at least 50–100 beneficiaries. Monitoring & Evaluation Reports with data on water use efficiency, crop yields, and system performance. Community Engagement Reports with feedback and increased participation in water management practices. Expected Outcomes: Enhanced water-use efficiency in rainfed agriculture, reducing dependency on rainfall. Increased crop yields through improved irrigation practices. Improved water security through the installation of rainwater harvesting structures and solar-powered pumps. Empowerment of local farmers with the skills to maintain and manage modern water-saving irrigation technologies.
4	To strengthen agricultural value chains by establishing mobile processing units, improving market linkages, and promoting local entrepreneurship for high-value crops, thereby increasing incomes and reducing post-harvest losses.	1. Baseline Survey & Market Research Activity: Conduct a baseline survey to assess current agricultural practices, post-harvest losses, and market access challenges in the target villages. Identify key high-value crops (e.g., turmeric, garlic, ginger, medicinal plants, orchids, etc.) and analyze the current state of market linkages and processing capabilities. Outcome: Market research report highlighting key crops, existing value chain gaps, and potential market opportunities. Timeline: Month 1–2 2. Establishment of Mobile Processing Units Activity: Design and establish mobile processing units that are capable of processing high-value crops on-site. These units will include machinery for cleaning, sorting, packaging, and basic processing (e.g., drying, grinding, packaging for spices, herbs, etc.). The units will be designed to be energy-efficient and portable to reach remote areas. Outcome: At least 3–5 mobile processing units deployed across the 30 villages to serve as processing hubs for farmers, reducing post-harvest losses and adding value to the crops. Timeline: Month 3–6 3. Capacity Building & Training for Entrepreneurs Activity: Organize training workshops to empower local entrepreneurs, SHGs, and farmers with skills in operating mobile processing units, understanding value addition, and managing small businesses. Focus on business management, quality control, packaging, marketing, and digital tools for business growth. Outcome: 100+ local entrepreneurs (youth, women, and SHGs) trained in the processing of high-value crops and entrepreneurship skills. Timeline: Month 6–8 (ongoing as needed) 4. Developing Market Linkages & Branding Activity: Build strong market linkages for processed products through collaborations with local markets, regional buyers, online platforms, and direct-to-consumer sales channels. Develop a branding strategy that highlights the uniqueness of the crops and their local, organic origin. Establish a regional brand for the processed products, enhancing their marketability. Outcome: At least 3–5 market linkages established for processed products, ensuring access to regional and national markets. A strong brand identity for locally processed products. Timeline: Month 7–9 (Market Linkages & Branding) 5. Post-Harvest Management & Quality Assurance Activity: Implement post-harvest management systems for crops, including best practices in harvesting, storage, and transportation to reduce spoilage and loss. Provide training to farmers and SHGs on quality assurance standards for processed products, ensuring that products meet

		market requirements. Outcome: A significant reduction in post-harvest losses, with products meeting market standards for quality. Timeline: Month 6–10 (Ongoing support) 6. Entrepreneurship Support & Seed Funding Activity: Provide seed funding, mentoring, and business incubation support to local entrepreneurs and SHGs starting businesses based on processed crops. This support will help scale their businesses, improve production capacity, and enter larger markets. Outcome: At least 15–20 rural entrepreneurs (with a focus on women and youth) supported with seed funding, business mentoring, and market access. Timeline: Month 7–12 (Ongoing) 7. Monitoring. Outcome: Regular monitoring reports documenting the reduction in post-harvest losses, the increase in income levels, and the number of successful entrepreneurial ventures. Timeline: Ongoing (Monthly and Quarterly Reports) 8. Community Engagement & Awareness Campaign Activity: Conduct a community engagement campaign to raise awareness about the benefits of value addition, processing, and market access for high-value crops. Encourage active participation from farmers, SHGs, and local entrepreneurs in the project's activities. Outcome: Increased participation and awareness in the value chain, with a broader base of farmers and entrepreneurs adopting value-added practices. Timeline: Month 3–9 (Ongoing) Key Deliverables Market Research Report outlining existing value chains, crops, and market gaps. Mobile Processing Units (3–5) established and operational, serving rural farmers. Training Reports for 100+ local entrepreneurs in crop processing, quality assurance, and entrepreneurship. Branding Strategy developed for locally processed products with market linkages in place. Reduction in Post-Harvest Losses through improved handling, storage, and transportation practices. Seed Funding & Business Support for 15–20 rural entrepreneurs. Monitoring & Evaluation Reports tracking project progress, income generation, and value chain efficiency.
5	To enhance rural health and education infrastructure by giving awareness of solar-powered smart classrooms, and digital learning platforms, improving access to healthcare and education in remote communities.	1. Baseline Survey & Needs Assessment Activity: Conduct a baseline survey in the target villages to assess the current state of healthcare and education infrastructure, including availability of medical services, educational facilities, and digital literacy levels. Identify gaps in access to healthcare and education, especially in remote areas. Outcome: Needs assessment report outlining existing healthcare and education infrastructure, identifying key gaps and areas for intervention. Focus on building technical skills and improving digital health literacy. Outcome: At least 30–40 healthcare workers trained in telemedicine operation, digital health data management, and remote consultation protocols. Timeline: Month 5–6 4. Deployment of Solar-Powered Smart Classrooms Activity: Install solar-powered smart classrooms in rural schools, including solar panels, projectors, and digital learning tools (e.g., interactive whiteboards, tablets, laptops). Ensure that the classrooms can function independently from the grid, providing access to digital education materials even in remote, off-grid locations. Outcome: At least 5–10 solar-powered smart classrooms set up in remote schools, with solar power backup to support uninterrupted learning. Timeline: Month 4–7 5. Development & Deployment of Digital Learning Platforms Activity: Develop or adapt digital learning platforms that can be accessed on mobile phones, tablets, and computers. These platforms will offer online courses, interactive lessons, and educational content for students, teachers, and the broader community. Ensure that the platforms are tailored to local curriculum needs and are available in local languages. Outcome: A digital learning platform launched, with 500+ students and teachers accessing content regularly. Include content on digital literacy, basic education, and skill development. Timeline: Month 6–8 6. Capacity Building for Teachers & Educators Activity: Conduct training workshops for teachers and educators on using digital tools and platforms to enhance teaching. Focus on integrating ICT (Information and Communication Technology) into the classroom, using smart devices and digital content effectively, and engaging students with interactive learning methods. Outcome: 100+ teachers trained in integrating ICT in teaching and using digital learning platforms in their classrooms. Timeline: Month 6–9 7. Community Awareness Campaign for Healthcare & Education Activity: Launch a community awareness campaign to promote the benefits of telemedicine services, digital learning, and the role of technology in improving education and health outcomes. Use community meetings, local media, posters, and social media to raise awareness and encourage participation. Outcome: Increased community participation in telemedicine consultations and digital learning programs, with 500–1,000 community members engaged in the campaign. Timeline: Month 4–10 8.

Monitoring & Evaluation Activity: Set up a monitoring and evaluation system to assess the effectiveness of the telemedicine services, smart classrooms, and digital learning platforms. Collect data on health outcomes, student learning progress, teacher engagement, and overall satisfaction from community members. Regularly review the deployment and usage data to improve program implementation. Outcome: Monthly and quarterly reports on the effectiveness of telemedicine services and digital learning platforms, including user feedback, usage statistics, and health/education improvements. Timeline: Ongoing (Monthly and Quarterly Reports) 9. Expansion and Scaling Up Activity: Based on the success of initial deployments, solar-powered classrooms, and digital learning platforms to other villages and health centers in the region. Continue to integrate feedback from stakeholders to improve systems and expand coverage. Outcome: Expansion plan for scaling telemedicine and digital learning infrastructure to an additional 20–30 villages. Timeline: Month 12 and onwards (Scaling) Key Deliverables Needs Assessment Report documenting current health and education infrastructure and gaps. Telemedicine Kits deployed in 10–15 rural healthcare centers. Training Reports for 30–40 healthcare workers on telemedicine usage. Solar-powered Smart Classrooms set up in 5–10 rural schools. Digital Learning Platform launched with content for 500+ users. Training Reports for 100+ teachers on using ICT in classrooms. Community Awareness Campaign reaching 500–1,000 community members. Monitoring & Evaluation Reports documenting project impact on health and education. Expansion Plan for scaling the project to more villages.

Selected Plant Species in Hydroponic Cultivation:

The selected plant species—*Cymbidium* (boat orchids), *Lilium* spp (lilies*), Amomum subulatum* (black cardamom), *Ferula asafoetida* (hing), Blueberries (Vaccinium spp)—represent a strategic blend of ornamental, medicinal, aromatic, and indigenous horticultural value. These species are well-aligned with the ecological, economic, and cultural context of Uttarakhand and hold immense potential for hydroponic adaptation and livelihood generation.

Cymbidium (Boat Orchids):

A high-demand ornamental flower with excellent export value. Traditionally grown in temperate zones, Cymbidiums thrive in controlled hydroponic environments with minimal disease incidence. They offer long-lasting blooms and high returns per plant, making them ideal for floriculture-based income generation in hilly regions.

Lilium spp (Lilies):

Lilies are globally popular cut flowers with year-round market demand. Their requirement for clean root zones and precise nutrient control makes them highly suitable for hydroponic systems. In Uttarakhand, where land fragmentation limits large-scale cultivation, lilies in hydroponic vertical farms can revolutionize micro-floriculture entrepreneurship.

***Amomum subulatum* (Black Cardamom):**

An economically vital spice crop native to the eastern Himalayas, black cardamom suffers from climatic vulnerabilities and pest issues in soil-based cultivation. Hydroponics offers an opportunity to standardize growth conditions, ensure clean root health, and scale propagation, contributing to the spice economy and sustainable farming practices.

***Ferula asafoetida* (Hing):**

Recently introduced for cultivation in India, Hing is a high-value medicinal spice with import dependency. Hydroponic propagation of Ferula spp. can allow for controlled rooting and initial establishment, reducing mortality and enhancing transplant success in field or vertical setups. This can pave the way for commercial domestic Hing cultivation in Uttarakhand.

Blueberries (Vaccinium spp):

Blueberries are globally recognized as a nutrient-dense superfood, packed with antioxidants, vitamins, and flavonoids. Despite their massive demand in health-conscious and wellness markets, blueberries are rarely cultivated in India, primarily due to unsuitable soil conditions and lack of awareness. However, their shallow root system, sensitivity to pH (acidic), and controlled environmental requirements make them highly compatible with hydroponic systems.

In the context of Uttarakhand, where the temperate agro-climatic zones mirror the natural growing conditions of blueberries, hydroponic introduction can enable commercial cultivation of this exotic crop in areas otherwise limited by poor soil fertility or slope constraints.

Hydroponics offers:

Precision-controlled acidic nutrient media

Stable environment for consistent berry quality and size
Opportunities for fresh produce sales, dried berries, jams, nutraceutical processing
Access to premium urban, export, and health-food markets
Cultivating blueberries through hydroponics can position Uttarakhand as a pioneer in India's domestic superfruit revolution, creating new-age livelihood models for rural youth, women entrepreneurs, and farmer producer organizations (FPOs).

UPDATED VALUE CHAIN POINTS

Plant Species	Input Supply	Production (Hydroponic)	Post-Harvest	Market Linkages	Livelihood Opportunities
Cymbidium (Orchid)	Tissue culture plants, cocopeat, nutrients	Polyhouse-based NFT/ebb & flow hydroponics	Grading, packing, floral packaging	Florists, event decorators, national/export markets	Flower nurseries, cut-flower business, women floriculturists
Lilium spp	Bulbs, growing trays, hydroponic setup	NFT system with support media	Cold storage, bouquet packing	Urban florists, retail chains, wedding/event markets	Urban-rural floriculture startups, cooperative marketing
Amomum subulatum	Quality planting material, PGRs	Controlled hydroponic germination and nursery	Drying, curing, packing	Spices companies, Ayurveda brands, regional mandis	Spice nurseries, rural agro-enterprises, propagation centers
Ferula asafoetida	Imported seeds/tubers, trays, micronutrients	Root propagation under controlled hydroponics	Rhizome processing, drying	Medicinal processors, pharma industry, research bodies	Medicinal plant clusters, Hing cultivation clusters
Blueberries	Imported cultivars, acidic grow media, trays	High-tech hydroponic setup (pH-sensitive)	Sorting, chilling, dehydration, vacuum packing	Health food brands, premium stores, hotels, e-commerce	High-value fruit farming, berry entrepreneurs, rural startups

Architecture and fabrication of the Hydroponic System:

The architecture of the hydroponic system would consist of several subsystems:

- Microclimate control system—responsible for monitoring several parameters of the environment, including air temperature and relative humidity. The readings of these sensors are also used to estimate the vapor pressure deficit of the air; Water control system—responsible for monitoring some parameters of the nutrient solution, including water temperature, pH and electric conductivity (EC). Furthermore, the system monitors the water level within the reservoir.
- Lighting system—natural lights shall be used to grow various crop
- Ventilation system—responsible for ensuring appropriate air exchange and mixture within the hydroponic systems. It will be implemented with an exhaust fan and appropriate air inlet, which blocks insects and light.
- Water pumps—responsible for providing the necessary water debit within the hydroponic system. One of them provides the water flow through the grown vegetables' roots, and the other one creates the flow through the system controller's measuring/actuator chamber.
- Nutrient tanks—responsible for maintaining the required fertilizer parameters and pH levels within the water. Additional pumps for each tank will be used, if necessary.
- System controller—responsible for controlling all mentioned systems and maintaining the required environmental and hydroponic conditions within the system.

The controller will be connected to a server via a cable or wireless connection. It will store all sensor data and actuator operation characteristics in a database. This will allow all data to be accessible and monitored on remote devices (computers, laptops, mobiles, etc.) via the internet.

Hardware Implementation of the Hydroponic System

A multifunctional, four types of hydroponic systems will be implemented in practice to investigate efficacy and efficiency of water usage. The general scheme of the prototype is summarized in Figure 1 below:

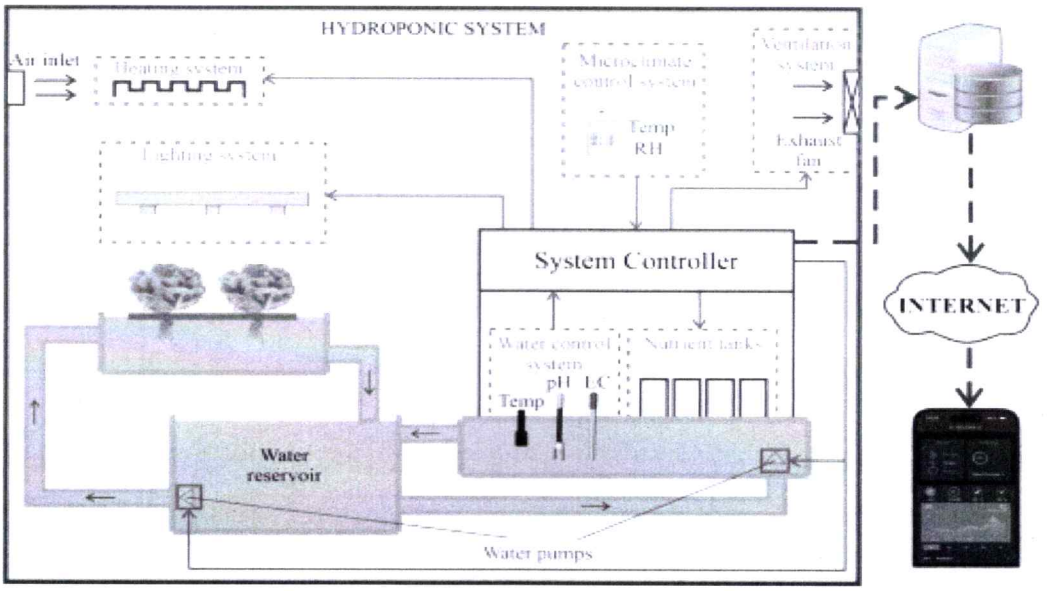


Fig. 1 Design of Hydroponics systems for growing crops (Courtesy: Neiko V. Nikolov, Agriculture 2023)

Four types of hydroponics system would be:

1. Nutrient Film Technology (NFT)- Flat bed type Horizontal system
2. Nutrient Film Technology (NFT)- Vertical A shape type
3. Dutch Buckets
4. Trough System

Each type of hydroponic system would be approximately 5000 sq ft, a total of 20000 sq ft hydroponic system would be housed in 2000 sq meter polyhouse/ Net house. In the hilly areas of Himachal Pradesh, Uttarakhand and Meghalaya as well as in plains of Delhi-NCR both polyhouse and Net house would be fabricated. Design of Polyhouse and Net house are given below Fig. 2 and Fig. 3

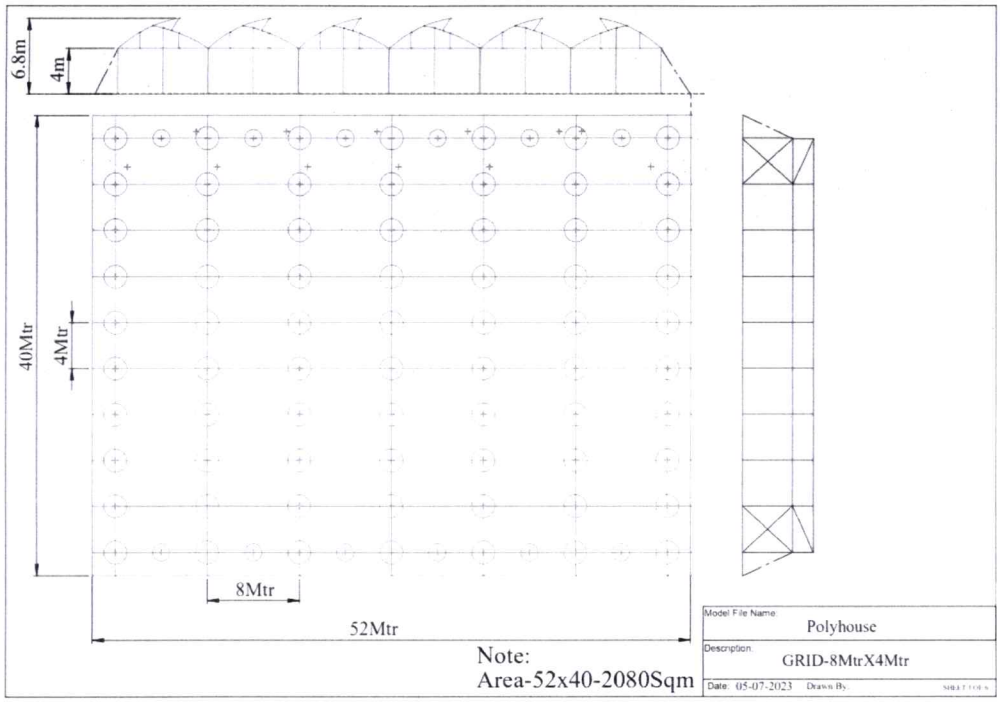


Fig.2 Design of Polyhouse where Hydroponics systems would be installed.

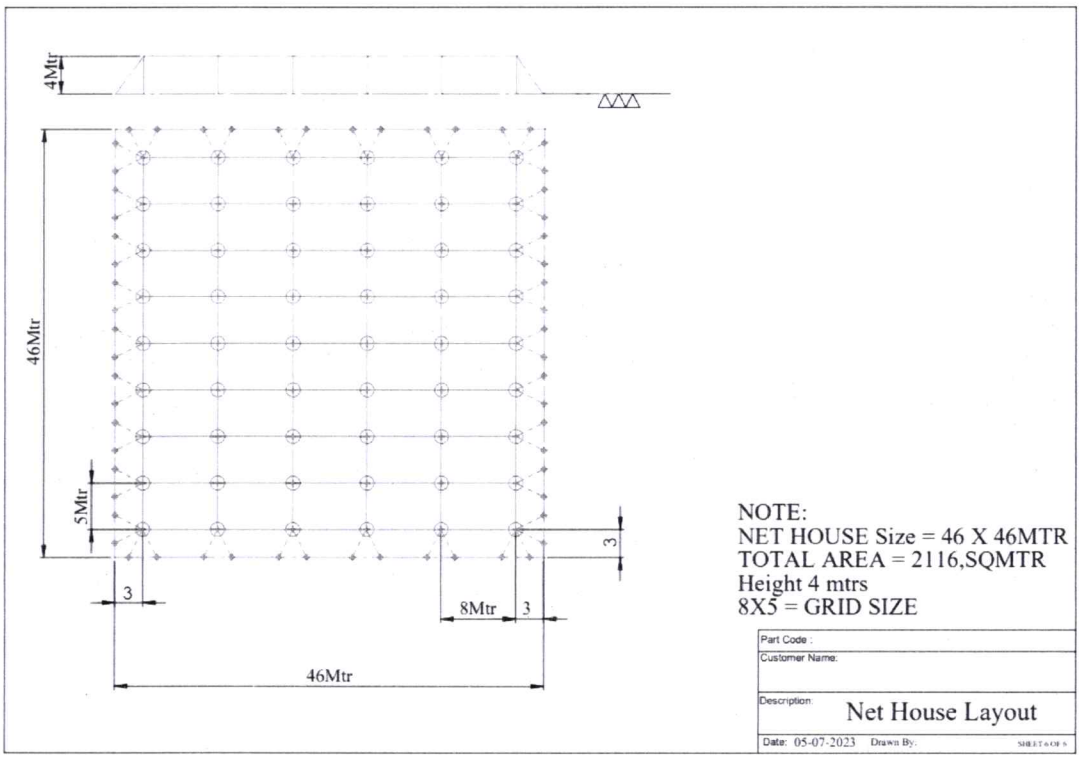


Fig. 3 Design of Net House where Hydroponics systems would be Installed

1. **Nutrient Film Technology (NFT)- Flat bed type Horizontal system:** NFT is a true hydroponics system where the plant roots are directly exposed to nutrient solution. A thin film (0.5 mm) of nutrient solution flows through channels. Hydroponic NFT horizontal system of 5756 sq ft would be installed which will house a total of 8640 number of plants. It will be to grow leafy high value crops like lettuce, Kale, Lolo rosa, Iceberg, Bok choy etc. MS Frame stand of MS pipes at the height 3 ft. above the ground would be constructed. On this flat frame, NFT Channels of UPVC 6 Mtr length,100X80mm, double layered (openable) will be fitted with NFT pipes 20/10 ft long pipes, end caps and accessories with holes in each pipe (as per final dimension). Length of pipes will be decided

on available area, possible pathway & slope of land inside polyhouse / net house. Nft channels modifications are done at as per primary site availability. One electric motor, sand filter, end caps, pipe connecter and accessories will be fitted by plumbing. All NFT channels will be connected with each other using a pipe to control water flow other pipes will have replaceable fittings for easy maintenance of the system. Outlet water will be collected through a closed pipe and fed back to the recirculation piping system. 3inch net cups will be fitted to grow plants in A frame system.

2. **Nutrient Film Technology (NFT)- A frame type Vertical system:** Hydroponic NFT vertical system of 5756 sq ft would be installed which will house a total of 7680 number of plants. It will be to grow leafy high value crops like lettuce, Kale, Lolo rosa, Iceberg, Bok choy etc. 6-layer A frame stand of MS pipes will be erected. NFT Channels of UPVC 6 Mtr length,100X80mm, double layered (openable) will be fitted with NFT pipes 20/10 ft long pipes, end caps and accessories with holes in each pipe (as per final dimension). Length of pipes is decided on available area, possible pathway & slope of land inside polyhouse / net house. One electric motor, sand filter, end caps, pipe connecter and accessories will be fitted with A frames. Each A shape stand will have 6 level with a gap between two pipes determined by sunlight exposure in the region. Each A shape frame will have a height of up to 6 ft including foundation. Distance between frames Two a shape frames will have up to 4 to 5ft distance between each other. Walking Distance between frames Approximately 4 to 4.5 ft walking distance will be maintained in frames so that one labour with a crate can move freely. All NFT channels will be connected with each other using a pipe to control nutrient rich water flow. Other pipes will have replaceable fittings for easy maintenance of the system. Outlet water will be collected through a closed pipe and fed back to the recirculation piping system. 3inch net cups will be fitted to grow plants in A frame system.

Basically, NFT horizontal and vertical A frame are working on the same principle. Only thing is that A frame shall demonstrate hydroponics produce in vertical system to economize space availability.

3. Hydroponic Dutch Bucket system: In approximately 5000 sq ft, number of plants grown will be 1,092. In Dutch Bucket system, it is like growing in buckets where water will be supplied to roots and stored in the reservoir for recirculation. This system is used to grow large plants comparative to leafy plants like wine crops: cherry tomato, tomato, capsicum, chili etc. and certain flowers. Dutch Bucket made up of Polypropylene with Co polymer fitted with PVC pipe, UPVC Pipes, Connectors & Micro Tubes. To provide support to the growing plants roots, Dutch buckets will be filled with clay balls. For circulating water with nutrients, One electric motor, sand filter, end caps, pipe connecter etc. will be fitted through plumbing. All dutch buckets will be connected with each other using a pipe to control water flow and other pipes will have replaceable fittings for easy maintenance of the system. Outlet water will be collected through a closed pipe and fed back to the recirculation piping system. To grow larger plants, 5-inch net cups will be fitted in each Dutch bucket. Nutrient shall be supplied through circulating water.

4. Hydroponic Trough system: In a total area of 5,756 sq. ft., total number of plants will be 1,092. In trough system we can grow Cherry tomato, tomato, capsicum, chili, broccoli, cauliflower cabbage etc. and flowers like Gladiolus, Gerbera, Anthurium, Lily etc. Trough dimension of 18" x 12" x 240 ft made up of HDPE virgin material, filled with inert material like cocopeat will be used for growing crops. Trough shall be placed on the floor inside the polyhouse/ Net house. All Trough systems will be connected with each other using a pipe to control nutrient rich water flow through a electric motor and sand filter. There shall be aero drippers to feed plant with nutrition at their root's zones. Other pipes will have replaceable fittings for easy maintenance of the system.

There will be a nutrient solution tank with a volume of 1000 L. With the help of a water pump, the nutrient solution will be fed through the irrigation system to different growing system.

The stepwise process of constructing and assembling the system involved:

(1) Assembly of the metal structure of the system.
(2) Installation of the lighting, for working in the nigh hours.
(3) Assembly of the rails.
(4) Installation of the irrigation system.
(5) Installation of the drainage system.
(6) Mounting the growing trays.
(7) Mounting the tank with the pump.
(8) Installation of the Hydroponics Automatic Control Unit.
(9) Installation of temperature and humidity sensors.

The automation of the process will be based on the hydroponic controller system. It will use sensors to monitor different indicators, such as relative air humidity, air temperature, amount of nutrient solution and pH of the nutrient solution. Automation is a control unit for automatic regulation of the nutrient solution within hydroponic

systems and the climatic parameters of cultivation within poly house/net house. Cloud and IoT technologies will be used for remotely monitoring plants and managing individual measurement indicators.
The following nutrient solutions sensors will be used:

- A pH sensor for monitoring acidity with the following parameters: reading scale from 4 to 10, 0.01 pH resolution and 0.1 pH accuracy.
- An EC monitoring sensor with the following parameters: reading scale from 0 to 5.0 mS, 0.01 mS resolution and 0.1 mS accuracy. Furthermore, it will have an integrated temperature sensor for EC/TDS temperature compensation.
- A solution level sensor.

Furthermore, the following air parameters sensors will be used:

- Air temperature sensor with the following parameters: reading scale from 0 to 50 ◦C, 0.1 ◦C resolution and 0.2 ◦C accuracy.
- Relative humidity sensor with reading scale from 10 to 100%, 1% resolution and 2% accuracy.

The frequency of supplying the nutrient solution, the light and temperature regime can be adjusted depending on the biological requirements of the grown vegetables.
The automatic control unit monitors pH and EC values and adds nutrition, additives or pH regulators according to the user's settings. The communication between the hydroponic system controller and the server will be implemented over a Wi-Fi network via a gateway, which does not require a permanent online connection for normal operation. The remote access to the system will be implemented using the smartphone app or with a web-based interface. The application can be used to create different programs for growing crops according to the preferences. The software tool also allows one to observe the data from the database, which represents the monitored indicators within the hydroponic system.

14.PERT Chart – Quarterly Activity Table (1st Year)

Quarter	Activity Description	Category	Remarks
Q1	Baseline survey, needs assessment, and review of existing data	Planning, Partnerships, Infrastructure	Initial diagnostics across 30 villages
	Stakeholder consultations (Govt, academia, NGOs, locals)	Partnerships	
	Formation of Farmer Producer Groups (FPGs)	Community Mobilization	
	Formation/strengthening of Women Self-Help Groups (SHGs)	Community Mobilization	
	Selection of demonstration fields and active farmers	Agriculture	
	Input distribution – spices, herbs, millets, tools, seeds, organic kits	Agriculture Support	
	Identify STI tools and tech partners	Innovation & Tech Linkage	
Q2	Crop plantation (turmeric, ginger, lemongrass, medicinal herbs, fruits)	Agriculture	Focus on high-value crops
	Training to the local stakeholders: Organic methods, crop rotation, harvesting, grading, etc.	Agriculture	Delivered via Krishi Vigyan Kendra, experts
	On-farm expert visits, soil analysis, and records (ongoing)	Involvement of scientists and researchers	Continues till end of the year
	Data base for crop regular assessment (ongoing)	Involvement of scientists and researchers	Continues till end of the year
	Capacity building of FPGs and SHGs	Community Mobilization	

Q3	Registration, records, legal formalities for SHGs and FPGs	Cooperatives, Banks & NABARD	Legal & administrative foundation
	Company/Cooperative registration for processing & marketing	Agriculture & Business	
	Off-farm Skill Trainings (Plumber, Electrician, etc.)	Skill Development	Liaising with Skill India Team
	Digital platform setup for health, education & market info	Technology & Education	Start with mobile-based delivery
Q4	Processing units setup (turmeric, lemongrass, millet)	Installation & Community Resource Centres	Infrastructure development
	Training: Basic digital literacy, progressive farming practices	Training & Education	For farmers, youth, SHGs
	Irrigation, water, sanitation infrastructure installation	Infrastructure Development	Based on baseline survey results
	Launch farm/off-farm products locally & online	Marketing & Sales	Launch through trade fairs

PERT Chart – Quarterly Activity Table (2nd - 3rd Year)

Quarter	Activity Description	Category	Remarks
2nd Year	Harvesting (Millets, Herbs, Spices)	Post-Harvest, Skill Training, Enterprise Initiation	
	Post-harvest processing & packaging	Agriculture & Business	
	Sales through market linkages, local fairs	Marketing & Sales	
	Monitoring: income, impact, migration trends	Monitoring & Evaluation	
3rd Year	Advanced training on product processing, grading, packaging, labelling	Market Access & Branding	Branding initiated for visibility
	Branding & packaging strategy development	Marketing & Business Development	
	Start-up Launching	Entrepreneurship	
	Final Product Dissemination	Marketing & Sales	
	Training on marketing & skill training	Skill Development	
	Trade fairs	Marketing & Networking	
	Local promotion: SHG products & village enterprise	Local Entrepreneurship	
	Local wild production utilization	Agriculture & Resource Utilization	
	Processing units, trainings, and yield collection from the state	Agricultural Support	
	Way forward: Stakeholder consultation (Govt, academia, NGOs, locals)	Strategic Planning & Review	Sharing results, strategic planning

PERT Chart – Quarterly Activity Table (4th - 5th Year)

Quarter	Activity Description	Category	Remarks
4th Year	Evaluate overall impact of hydroponic farming systems	Monitoring & Impact Analysis	Measurement of agricultural productivity, income, and resource conservation
	Scale-up hydroponic systems to additional villages	Expansion	
	Training workshops for advanced farming techniques	Skill Development	
	Advanced market access strategies (export potential)	Business Development	
	Promote eco-friendly and sustainable farming practices	Environment & Sustainability	

5th Year	Consolidate community-based agro-enterprise development	Community Empowerment	
	Strengthen local value chains through strategic partnerships	Business Networking	
	Conduct final evaluation and impact assessment	Monitoring & Evaluation	Final measurement of project success
	Prepare for project handover and sustainability plan	Project Sustainability	

15. **Details/ Mechanism for ensuring the involvement and participation of the target population in the project area (in 100 words only)**

To ensure active involvement of the target population in the project areas of Block Jaiharikhal (Pauri Garhwal) and Bhilangana (Tehri Garhwal), community mobilization will be undertaken through regular village meetings, awareness drives, and participatory rural appraisals (PRAs). Local stakeholders including SHGs, youth clubs, and panchayats will be engaged from the planning stage through implementation. Feedback mechanisms like gram sabhas and community monitoring committees will be established to ensure accountability. Capacity-building workshops will empower local residents to take initiative and ownership. Special emphasis will be placed on involving women, marginalized communities, and youth, ensuring inclusive and sustained participation across both blocks.

Expected Outcomes:

The expected outcomes of the project "S&T-Driven Integrated Development for Sustainable Livelihoods and Well-being in Rural Uttarakhand Using Hi-tech Farming: कृषि नवाचार" are:

1. **Increased Agricultural Productivity**: Demonstrated adoption of hydroponic systems and efficient water management practices will lead to improved crop yields, resource conservation, and year-round production of high-value crops.
2. **Sustainable Livelihoods**: Empowerment of local communities, particularly youth, women, and SHGs, through skill-building programs and entrepreneurial initiatives, resulting in enhanced income generation and reduced migration.
3. **Improved Water Use Efficiency**: Adoption of micro-irrigation systems, rainwater harvesting, and solar-powered pumps will ensure sustainable water usage in agriculture, benefiting the environment and local farmers.
4. **Strengthened Agricultural Value Chains**: Establishment of mobile processing units and market linkages will increase product value, reduce post-harvest losses, and promote local entrepreneurship.
5. **Enhanced Rural Health and Education**: Deployment of telemedicine kits, solar-powered classrooms, and digital learning platforms will improve access to healthcare and education, contributing to overall well-being.
6. **Community Empowerment and Ownership:** The project will prioritize active participation of local communities in decision-making processes, reinforced through regular feedback mechanisms and capacity-building workshops. To further enhance sustainability, a dedicated unit in the form of Farmer Producer Organizations (FPOs) will also be established.

16. **Number of training programs planned for beneficiaries (Topic, purpose, no. of training/yr., duration of training days, level of Participation, cost/training):**

Topic	**Purpose**	**No. of Trainings/Year**	**Duration (Days)**	**Level of Participation**
1. Hydroponic Farming Systems	Introduce and demonstrate water-efficient, soilless farming systems for high-value crops.	4	5	Progressive farmers, FPOs, agri-entrepreneurs
2. Post-Harvest & Value Addition in Spices	Train on drying, grading, packaging, and value addition	3	4	Women SHGs, rural youth, FPCs

	for better marketability of agricultural produce.			
3. Sustainable & Organic Farming Methods	Promote eco-friendly farming practices using organic inputs and integrated pest management (IPM).	4	3	Smallholder farmers, NGOs, youth
4. Entrepreneurship Development & Business Planning	Build spice-based enterprises and market strategies, focusing on value-added products and business models.	2	5	Budding entrepreneurs, start-ups, incubators
5. Establishing Innovation & Resource Centres	Build capacity to set up local innovation hubs for agricultural technologies and livelihoods.	2	6	NGO leaders, Panchayat reps, Govt. officers
6. Training of Trainers (ToT)	Create a cadre of local trainers to scale up innovations in farming, processing, and entrepreneurship.	2	7	Master trainers, extension agents
7. Digital Literacy & Administrative Skills	Enhance administrative and digital skills for youth, especially in marketing and communication.	3	5	Rural youth, women
8. Plumbing & Electrical Skills for Farming Equipment	Provide technical skills for maintenance of farming infrastructure and irrigation systems.	3	6	School dropouts, rural technicians
9. Agri-produce, Dairy, Handicrafts, Rural Marketing	Develop skills in sustainable livelihood activities, including agri-business, dairy, and marketing.	4	4	SHGs, local artisans, farmers
10. Green Livelihood Skills	Promote inclusive green livelihoods for persons with disabilities (PwDs) in agriculture and related sectors.	3	5	PwDs, caregivers, NGOs
11. Handmade Paper/Fiber Production from Lantana Biomass	Train communities on using local biomass for income-generating activities through sustainable practices.	2	4	Local artisans, SHGs

Training in the Current Project under SRHU

Topic	Purpose	Duration (Days)	No. of Trainees	Cost (in Rs.)	Output
Organic Training	To raise awareness about organic farming practices	2 days	36	₹1,50,00	36 organic farmers trained
Lemon Grass	Awareness on aromatic crop cultivation and its benefits	2 days	79	₹20,000	17 hectares under lemongrass cultivation
Optional Farming & Cash Crop	Introduce a variety of seeds and saplings for diversified farming	1 day	40	₹5,000	Increase in optional farming and cash crop production
ARSH Training	Sensitization of adolescents on reproductive and sexual health education	3 days	400	₹40,000	Enhanced awareness among adolescents
MCH Training	Sensitization on mother and child health practices	3 days	50	₹25,000	Improved awareness of M

17. **Plan of the institution about the usage, maintenance, and retention of capital equipment to be procured under the project (in 50 words only):**

The institution will ensure optimal usage of capital equipment through regular Implementation, training, and monitoring. A dedicated team will oversee maintenance, with annual servicing schedules and proper documentation. Equipment will be retained within project sites for community benefit and integrated into ongoing rural development and skill-building programs for long-term sustainability.

18. **PUBLICITY, PROMOTION & DISSEMINATION PLAN: (provide a publicity, promotion & dissemination plan which shows how the project achievements will be properly disseminated, in 50 words only):**

- Project achievements will be disseminated through community meetings, digital platforms, local media, and social networks.
- Success stories will be showcased via brochures, videos, and exhibitions. Collaborations with local institutions and government departments will ensure wider reach.
- Awareness campaigns and training modules will further promote impact and replication across regions.