

Template/Pro forma for Submission

NMHS-Himalayan Institutional Project Grant

NMHS-FINAL TECHNICAL REPORT (FTR)

Demand-Driven Action Research and Demonstrations

NMHS Grant Ref. No.:	GBPNI/NMHS-2020-21/MG	Date of Submission:	0	7	0	8	2	0	2	4
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PROJECT TITLE (IN CAPITAL)

EXPLORING LIVELIHOOD POTENTIAL OF WILD GROWING STINGING NETTLE (*URTICA DIOICA*) IN UTTARAKHAND

Project Duration: *from* (15.07.2020) *to* (14.07.2023)

Submitted to:

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Submitted by:

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Demand-Driven Action Research Project

DSL: Date of Sanction Letter

DPC: Date of Project Completion

1	9	0	6	2	0	2	0
d	d	m	m	y	y	y	y

3	1	0	1	2	0	2	4
d	d	m	m	y	y	y	y

Part A: Project Summary Report

1. Project Description

i.	Project Grant Ref. No.:	GBPNI/NMHS-2020-21/MG					
ii.	Project Category:	Small Grant		Medium Grant *		Large Grant	
iii.	Project Title:	Exploring livelihood potential of wild growing stinging nettle (<i>Urtica dioica</i>) in Uttarakhand					
iv.	Project Sites (IHR States/ UTs covered) <i>(Location Maps attached):</i>	Almora district of state of Uttarakhand					
v.	Scale of Project Operation:	Local	*	Regional	*	Pan-Himalayan	
vi.	Total Budget:	INR 0.9706000 (in Cr)					
vii.	Lead Agency:	Green Hills Trust KrantiKutir. East Pokharkhali Almora-263601 www.greenhillsalmora.org					
	Lead PI/ Proponent:	Dr Vasudha Pant Founder Trustee and Secretary Green Hills Trust, Kranti Kutir East Pokharkhali, Dr Tularam Joshi Marg, Almora- 263601, Uttarakhand					

	Co-PI/ Proponent:	Dr Sunita T Pandey Professor, Agronomy, GBPUA&T, Pantnagar
viii.	Implementing Partners:	National Collateral Management Services Ltd Team Towers, Plot No: A-1/2/A, - Industrial Park IDA - Uppal, Hyderabad - 500 039 www.ncml.com
	Key Persons (Contact Details, Ph. No., E-mail):	Ritu Singh Head Laboratory/T&C/Gurgaon/NCML ritu.s@ncml.com Mb No- 9599088616

2. Project Outcomes

- Thorough nutritional testing of nettle
- Ready to eat and ready to cook edible, marketable products developed
- Awareness raising and capacity building in selected villages across all the blocks of Almora district regarding nutritional potential of nettle and its edible products
- Capacity building of selected, farmers across blocks of district Almora for using vrikhshayurveda based herbal kunapajala, growth stimulant our legacy of 1000 years old vrikhshayurveda.
- R &D validation of the application of herbal kunapajala and its variants in various horticultural and field crops of district Almora.

2.1. Abstract/ Summary Background:

Farmers are migrating away from agriculture due to uncertainties and risks associated with agriculture. Hence, it is imperative that researchers, policy makers, and other stakeholders must get-together to address problem. This project was proposed to address the dual challenges of ensuring sustenance of agriculture and focus on nutritious wild plants such as Stinging nettle for the welfare of mankind.

Objectives/ Aim: utilize the stinging nettle for improving the health and livelihoods of the hilly communities with awareness raising, skill development and product development.

Awareness, Training & Demonstration programme and Standardization and validation of application nettle-based preparation of herbal Kunap jala an important decoction of Vrikshayurveda based agriculture for its used in various selected crops of district Almora.

Methodology/Approach: 1. Plant research- • Field trial to standardize harvesting protocol, • product development • Field trials on the use of nettle based Vrikshayurveda concoctions on the various selected crops of district Almora

2. Extension work- Raising awareness regarding nutritional potential and livelihood generation potential of nettle” required thorough extension work to create awareness, transfer of technology developed and dissemination of information.

Results/ Outcomes:

- Ready to eat and ready to cook edible, marketable products developed and working on market linkages
- Awareness raising and capacity building in selected villages across all the blocks of Almora district regarding nutritional potential of nettle and its edible products and also on vrikshayurveda based herbal kunapajala, growth stimulant
- R &D validation of the application of herbal kunapajala and its variants in various horticultural and field crops of district Almora.

Conclusions: nettle is a nutritious plant, suitable for the development of naturally fortified nutrition rich food products. On test basis it can be said that novel products are being relished by health conscious people primarily.

Not only for human nutrition, application of nettle based Vrikshayurveda concoctions for plant nutrition and plant protection enhanced the yield and quality of different horticultural and field crops.

2.2. Objective-wise Major Achievements

S#	Objectives	Major achievements (<i>in bullets points</i>)
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1	Standardization of harvesting protocol.	<ul style="list-style-type: none"> • Nettle leaf samples were collected from four different experimental plots over four different months • Samples comprise of harvesting from three different plant parts top, bottom and middle • $4 \times 4 \times 3 = 48$ samples were tested for various nutritional components in 2 replications. Thus a total of 96 samples tested for nutritional components. • All the nutrients tested were high in dried nettle leaves irrespective of plant parts • Apparently nutritional variation does not occur when compared between different plant parts. • ANOVA suggests significant variation occurs for antioxidant activity, antinutrients: oxalate and phytate content in different plant parts. • Mean values for antioxidant activity is best in the leaves from top plant part and lowest in the leaves from lower plant part. • Mean values for antinutrients calcium oxalate and phytate content is lowest in the leaves from the top plant part. • Considering high antioxidant activity, and low calcium oxalate and phytate content collection of leaves from top plant part and in the months from July to September is best to develop edible products. • It was realized the palatability varies and taste was best from the top when used either fresh leaves or dried leaves in different products. • Thus top soft portion of the shoots (6 inches maximum) harvested during monsoon were best for the use. • On the basis of taste also for product development best harvest comes from fresh germinating shoots or from monsoon harvest.
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2	Validation of traditional knowledge with regard to consumption and processes.	<ul style="list-style-type: none"> • Traditional use of nettle leaves as green leafy vegetable was validated with the nutritional testing of leaves • Taking a clue from this the marketable edible products were developed
3	Raising awareness regarding nutritional potential and livelihood generation potential of nettle.	<p>Awareness raising pertaining to food value</p> <ul style="list-style-type: none"> • A total of 38 meeting were held in 38 different villages covering all the blocks of Almora district • More than 1413 people participated including 840 females and 573 males • Participation from SC/ST was 15%. <p>Awareness raising pertaining to Kunapjal</p> <ul style="list-style-type: none"> • 16 programmes on Awareness, Training and Demonstrations on Nettle based Herbal Kunapajala (a Vrikshayurveda based preparation) has been conducted in eight blocks(Dwarahat, Lamgarah, Chokhutia, Dholadevi, Pilkholi, Hawalbagh, Takula and Baisiachana.) of District Almora, since inception of the project till date.We have done the Demonstration and imparting knowledge in villages covering eight developmental blocks of Almora district.
4	Standardization and validation of nettle-based preparation of Kunapjala an important decoction of Vrikshayurveda based agriculture for its used in various selected crops of district Almora.	<ul style="list-style-type: none"> • Vrikshayurveda based herbal kunap jal was standardized and validated by using in different field crops, horticultural crops in farmers field and by laboratory testing in varied combinations.

5	To test the decoction for its medicinal and nutritional values.	<ul style="list-style-type: none"> • Nettle based herbal kunapajala as per the principle of vrikshayurveda has been developed and tested for plant growth promoter and for plant protection in different crops
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Note: Further details may be summarized in DPR Part-B, Section-5. Supporting materials may be enclosed as annexure/ appendix separately to the FTR.

2.3. Outputs in terms of Quantifiable Deliverables*

S#	Quantifiable Deliverables*	Monitoring Indicators*	Quantified Output/ Outcome achieved	Deviations, if any, & Remarks thereof:
1	Plantation of <i>Urtica dioica</i> in wasteland (20 ha)	Area in ha	Plantation done in >20 ha in patches in fields, in waste lands, on boundaries of fields across Almora district and some area in Pithauragarh district	Survival is very poor
2	Document on nutritional profiling of stinging nettle and its products	Documents on nutritional profiles of stinging nettle and its products (No.)	One product catalogue One nettle product recipes One booklet on nettle use in hindi (published)	
3	Developing value added food products, supplements and processes using stinging nettle (at least 8 nos)	Number of products developed(No.)	60 products in 13 different categories	
4	Demonstration and imparting		.Creation of Awareness on vrikshayurveda based	

	<p>training to 1000 people including 600 women and 400 youth. Among these 1000 people to be trained we would include at least 300 people from SC and ST.</p>		<p>natural farming through, Trainings & Demonstrations at farmer's field. Preparation of vrikshayurveda based decoctions viz. Nettle based , and other ,decoctions.</p> <p>2.16 programmes on Awareness, Training and Demonstrations on Nettle based Herbal Kunapajala (a Vrikshayurveda based preparation) has been conducted in eight blocks (Dwarahat, Lamgarah, Chokhutia, Dholadevi, Pilkholi, Hawalbagh, Takula and Baisiachana.) of District Almora, since inception of the project till date. We have done the Demonstration and imparting knowledge in villages covering eight developmental blocks of Almora district.</p>	
5	<p>Development of nettle based kunapjala and its testing as plant growth promoter and plant protector</p>	<p>Development of Various Vrikshayurveda based herbal concoctions to nourish soil and plant and ecology.</p>	<p>Production, development, testing and standardization of nettle based Vrikshayurveda concoctions for plant nutrition and plant protection to enhance the yield and quality of different crops of district</p>	

			Almora.	
6	Demonstration and imparting knowledge in 25 villages covering at least one village in all 11 developmental blocks of Almora district.	Number of people to participate in awareness/training and demonstration program (No.) No. of Stakeholders benefitted (No. of Rural Youth, No. of Women, and Total No. of Beneficiaries)	<p>Awareness raising pertaining to food value</p> <p>A total of 38 meeting were held in 38 different villages covering all the blocks of Almora district</p> <p>More than 1413 people participated including 840 females and 573 males</p> <p>Participation from SC/ST was nearly 15%.</p> <p>16 programmes on Awareness, Training and Demonstrations on Nettle based Herbal Kunapajala (a Vrikshayurveda based preparation) has been conducted in eight blocks(Dwarahat, Lamgarah, Chokhutia, Dholadevi, Pilkholi, Hawalbagh, Takula and Baisiachana.) of District Almora, since inception of the project till date.We have done the Demonstration and imparting knowledge in villages covering eight developmental blocks of</p>	

			Almora district.	
7	Creating awareness on benefits amongst local population (at least 5000 people mainly from SC community)	Technology Transfer Manual for Rural Entrepreneurs/ Eco-entrepreneurs etc. and other Publications and Knowledge Products (Nos.).	1 booklet in hindi (published) 1 catalogue of products 1 recipe book 1 prasar manual on kunap jal in hindi 2 research papers (published) 1 radio talk 1 article in Kumauni language 1 article in local news paper	

*As stated in the Sanction Letter issued by the NMHS-PMU.

2.4. Strategic Steps with respect to Outcomes (in bullets)

S#	Particulars	Number/ Brief Details	Remarks/ Attachment
1.	New Methodology/ Technology developed, <i>if any</i> :	>60 ready to cook/ ready to eat nettle based products developed of which 30 will be new to the market	List attached
2.	New Ground Models/ Process/ Strategy developed, <i>if any</i> :	-	
3.	New Species identified, <i>if any</i> :	-	
4.	New Database established, <i>if any</i> :	-	
5.	New Patent, <i>if any</i> :	-	
	I. Filed (Indian/ International)	-	
	II. Technology Transfer, <i>if any</i> :	-	
6.	Others, <i>if any</i>	-	

Note: Further details may be summarized in DPR Part-B, Section-5. Supporting materials may be enclosed as annexure/ appendix separately to the FTR.

3. New Data Generated over the Baseline Data: NO

S#	New Data Details	Status of Existing Baseline	Addition and Utilisation New data

Note: Further details may be summarized in DPR Part-B. Database files in the requisite formats (Excel) may be enclosed as annexure/ appendix separately to the soft copy of FTR.

3. Demonstrative Skill Development and Capacity Building/ Manpower Trained

S#	Type of Activities	Details with number	Activity Intended for	Participants/Trained		
				SC/ST	Women	Total Including General
1.	Workshops	Numbers of trainings to create awareness and to train 642 Farmers on vrikshayurveda based Kunap jal	Awareness, Training and Demonstration programme	141	377	642

		38 meetings were held in 38 different villages covering all 11 developmental blocks of Almora district. More than 1413 people participated including 840 females and 573 males on nettle based edible/marketable products	Awareness, Training and Demonstration programme	283	840	1413
2.	On-Field Trainings					
3.	Skill Development	On farm preparation of nettle based liquid fermented Product and its variants	Farmers of various blocks of district Almora			

4.	Academic Supports	i) Training, & demonstration ii) Distribution of pamphlets on product development. iii) Seven Masters & one PhD thesis have been submitted across the disciplines in agriculture	Farmers of various blocks of district Almora Researchers & academicians				
	Others (if any)						

Note: Further details may be summarized in DPR Part-B. Supporting materials may be enclosed as annexure/ appendix separately to the FTR.

4. Linkages with Regional & National Priorities (SDGs, INDC, etc.)/ Collaborations

S#	Linkages /collaborations	Detail of activities (No. of Events Held)*	No. of Beneficiaries
1.	Sustainable Development Goals (SDGs 1,3,13)/ Climate Change/INDC targets addressed	Attended Meetings and conferences at State Agriculture Universities, ICAR, CSIR-NIScPR, Attended and presented in 54 th Annual conference of nutrition society of India, UCoST and many other local platforms Attended Civil 20 India 2023	
2.	Any other:		

Note: Further details may be summarized in DPR Part-B, Section-6. Supporting materials may be enclosed as annexure/ appendix separately to the FTR.

5. Project Stakeholders/ Beneficiaries and Impacts

S#	Stakeholders	Support Activities	Impacts in terms of income generated/green skills built
1.	Line Agencies/ Gram Panchayats:	Awareness, Training, & Demonstration for product development and its application in various crops.	Yet to be realized
2.	Govt Departments (Agriculture/ Forest/ Water):do.....	
3.	Villagers/ Farmers:do.....	
4.	SC Community:do.....	
5.	ST Community:do.....	
6.	Women Group:do.....	
	Others, <i>if any</i> :		

Note: Further details may be summarized in DPR Part-B, Section-6. Supporting materials may be enclosed as annexure/ appendix separately to the FTR.

7. Financial Summary (Cumulative)

Please attach the consolidated and audited Utilization Certificate (UC) and Year-wise Statement of Expenditure (SE) separately, *ref. Annexure I.*

8. Major Equipment/ Peripherals Procured under the Project** (*if any*)

S#	Name of Equipment	Quantity	Cost (INR)	Utilisation of the Equipment after project
1.	Bomb Calorimeter	1	1,80000	
2.	RI Detector	1	5,20,169	
3.	Water activity meter	1	4,40000	

**Details should be provided in details (*ref. Annexure III &IV.*)

9. Quantification of Overall Project Progress

S. No.	Parameters	Total (Numeric)	Remarks/ Attachments/ Soft copies of documents
1.	IHR States/ UTs covered:	<i>Uttarakhand</i>	
2.	Project Sites/ Field Stations Developed:	<i>Almora district/ 1.D7 block of crop research center, of GBPUAT, Pantnagar 1. Field lab</i>	
3.	Scientific Manpower Developed (PhD/M.Sc./JRF/SRF/ RA):	<i>1 JRF 1 Phd Thesis 7 MSc Thesis</i>	
4.	Livelihood Options promoted	<i>Yes</i>	
5.	Technical/ Training Manuals prepared	<i>Yes, 4</i>	
6.	Processing Units established, if any	<i>No.... (attach photos)</i>	
7.	No. of Species Collected, if any	<i>NA</i>	
8.	No. of New Species identified, if any	<i>NA</i>	
9.	New Database generated (Types):	<i>NA</i>	
	Others (if any)	<i>NA</i>	

Note: Further details may be summarized in DPR Part-B. Supporting materials may be enclosed as annexure/ appendix separately to the FTR.

11. Knowledge Products and Publications:

S#	Publication/ Knowledge Products	Number		Total Impact Factor	Remarks/ Enclosures
		National	International		
1.	Journal – Research Articles/ Special Issue:	2		Impact Index: 6.38	
		+		NAAS	

S#	Publication/ Knowledge Products	Number		Total Impact Factor	Remarks/ Enclosures
		National	International		
		1		rating 7.03	
2.	Book – Chapter(s)/ Monograph/ Contributed:	3			
3.	Technical Reports:				
4.	Training Manual (Skill Development/ Capacity Building):	1			
5.	Papers presented in Conferences/Seminars:	3+2=5			
6.	Policy Drafts/Papers:	-			
7.	Others, if any:	-			

Note: Please append the list of KPs/ publications (with impact factor, DOI, and further details) with due Acknowledgement to NMHS. Supporting materials may be enclosed as annexure/ appendix separately to the FTR.

12. Recommendation on Utility of Project Findings, Replicability and Exit Strategy

Particulars	Recommendations
Utility of the Project Findings:	<p>The detailed and thorough nutritional analysis of dried nettle leaf samples across months and across plant parts has successfully established the nutritional significance of stinging nettle. Numerous products developed out of the project have marketable potential in long term that will be able to provide good livelihood option with good market linkages.</p> <p>Nettle based herbal Kunap jal application in agricultural fields and horticultural crops fruit trees as well as vegetables is encouraging that will be helpful in adopting natural farming successfully.</p>

<p>Replicability of Project/ Way Forward:</p>	<p>The benefits of nettle plant and its products are with us. The data clearly indicates Stinging nettle is rich in elemental composition which is essential for wellbeing of humans it can be consumed by all for improving their health and also for product development. The beneficiaries have been trained well in collection of quality nettle harvest. The forward linkage work for the products is in pipeline and hope to achieve in next few months. The results of nettle based kunapjal are quite encouraging for providing good nutrition to crops, improve soil health and plant protection. That shows promise for wide scale adoption of natural farming.</p> <p>The project has been implemented only in Almora district. By undertaking wider awareness and training programs across the hilly areas of Himalayas, it has a good potential for replicating the success obtained in Almora.</p>
<p>Exit Strategy:</p>	<p>Since the project focuses to address socio-economic development of the local populations, there is a greater chance that the stakeholders will continue to get benefited. The project outcomes are also geared towards addressing the needs of local populace including creating additional sources of income for women of Himalayan region for upliftment of their socio-economic status. These will encourage success and continued adoption of the project objectives.</p> <p>There should be continuous refinement in the tools and technologies of Indian knowledge system w.r.t. crop production technologies and their dissemination particularly plant production and protection through continuous R&D. Funds need to be allocated in good amount by Govt. & private agencies to conduct the R&D.</p>

(PROJECT PROPONENT/ COORDINATOR)

(Signed and Stamped)

(HEAD OF THE INSTITUTION)

(Signed and Stamped)

Place: ...Almora.....

Date: ...12../12/...2024...