

*Template/Pro forma for Submission*

NMHS-Himalayan Institutional Fellowship Grant

**FINAL TECHNICAL REPORT (FTR)**

<b>NMHS Reference No.:</b>	GBPNI/NMHS-2018- 19/HSF-26-04/155 Dated 19/12/2018
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<b>Date of Submission:</b>	1	7	0	2	2	0	2	3
	d	d	m	m	y	y	y	y

FELLOWSHIP TITLE (IN CAPITAL)

**ENTREPRENEURSHIP DEVELOPMENT AND LIVELIHOOD  
ENHANCEMENT OF SHINA TRIBE THROUGH VALUE CHAINS  
IMPROVEMENT OF NON-TIMBER FOREST RESOURCES IN GUREZ  
VALLEY OF KASHMIR**

**Sanctioned Fellowship Duration:** from **(19.12.2018)** to **(18.12.2021)**.

Extended Fellowship Duration (if applicable): from **(dd.mm.yyyy)** to **(dd.mm.yyyy)**.

**Submitted to:**

Er. Kireet Kumar  
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**Submitted by:**

[Dr. M.A. Islam]

[Professor and Head,

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## GENERAL INSTRUCTIONS:

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1. The Final Technical Report (FTR) has to be commenced from the date of start of the Institutional Fellowship (as per the Sanction Order issued at the start of the Fellowship) till its completion. Each detail has to comply with the NMHS Sanction Order.
2. The FTR should be neatly typed (in Arial with font size 11 with 1.5 spacing between the lines) with all details as per the enclosed format for direct reproduction by photo-offset process. Colored Photographs (4-5 good action photographs), tables and graphs should be accommodated within the report or should be annexed with captions. Sketches and diagrammatic illustrations may also be given giving step-by-step details about the methodology followed in technology development/modulation, transfer and training. Any correction or rewriting should be avoided. Please give information under each head in serial order.
3. Training/ Capacity Building Manuals (with detailed contents of training programme, technical details and techniques involved) or any such display material related to fellowship activities along with slides, charts, photographs should be sent at the NMHS-PMU, GBP NIHE HQs, Kosi-Katarmal, Almora 263643, Uttarakhand. In all Knowledge Products, the Grant/ Fund support of the NMHS should be duly acknowledged.
4. The FTR Format is in sync with many other essential requirements and norms desired by the Govt. of India time-to-time, so each section of the NMHS-FTR needs to be duly filled by the Fellowship Coordinator/ PI and verified by the Head of the Implementing Institution/ University.
5. Five (5) bound hard copies of the NMHS-Institutional Fellowship Final Technical Report (FTR) and a soft copy should be submitted to the **Nodal Officer, NMHS-PMU, GBP NIHE HQs, Kosi-Katarmal, Almora, Uttarakhand** via e-mail nmhspmu2016@gmail.com.

The FTR is to be submitted into following two parts:

**Part A – Cumulative Fellowship Summary Report**

**Part B – Comprehensive Report**

Following Financial and other necessary documents/certificates need to be submitted duly signed and verified along with Final Technical Report (FTR):

<b>Annexure I</b>	Consolidated and Audited Utilization Certificate (UC) & Statement of Expenditure (SE), including interest earned for the last Fiscal year including the duly filled GFR-19A (with year-wise break-up)
<b>Annexure II</b>	Consolidated Interest Earned Certificate
<b>Annexure III</b>	Consolidated Manpower Certificate and Direct Benefit Transfer (DBT) Details showing the education background, i.e. NET/GATE etc. qualified or not, Date of joining and leaving, Salary paid per month and per annum (with break up as per the Sanction Order and year-wise).
<b>Annexure IV</b>	Details and Declaration of Refund of Any Unspent Balance as Real-Time Gross System (RTGS) in favor of NMHS GIA General
<b>Annexure V</b>	Details of Technology Transfer and Intellectual Property Rights developed.

**NMHS-Final Technical Report (FTR) *template***

NMHS- Institutional Himalayan Fellowship Grant

**DSL: Date of Sanction Letter**

1	9	1	2	2	0	1	8
d	d	m	m	y	y	y	y

**DFC: Date of Fellowship Completion**

1	8	1	2	2	0	2	1
d	d	m	m	y	y	y	y

**Part A: CUMULATIVE SUMMARY REPORT**  
**(to be submitted by the Coordinating Institute/Coordinator)**

**1. Details Associateship/Fellowships**

**1.1 Contact Details of Institution/University**

NMHS Fellowship Grant ID/ Ref. No.:	GBPNI/NMHS-2018-19/HSF-26-04/155      Dated 19/12/2018
Name of the Institution/ University:	Division of Natural Resource Management, Faculty of Forestry, SKUAST-K, Benhama, Ganderbal-191 201 (J&K)
Name of the Coordinating PI:	Dr. M.A. Islam Head/ Professor-cum-Chief Scientist
Point of Contacts (Contact Details, Ph. No., E-mail):	Division of Natural Resource Management, Faculty of Forestry, SKUAST-K, Benhama, Ganderbal-191 201 (J&K) Cell: 06005707075/ 09469136279 Email: ajaztata@gmail.com

**1.2 Research Title and Area Details**

i.	Institutional Fellowship Title:	Entrepreneurship Development and Livelihood Enhancement of Shina Tribe through Value Chains Improvement of Non-Timber Forest Resources in Gurez Valley of Kashmir					
ii.	IHR State(s) in which Fellowship was implemented:	Jammu and Kashmir					
iv.	Scale of Fellowship Operation	Local:		Regional:	√	Pan-Himalayan:	

iii.	Study Sites covered (site/location maps to be attached)	The study was conducted in Gurez Valley of Bandipora district under Kashmir province in Jammu and Kashmir UT. The valley is situated at 34° 23' to 34°41'N latitude and 74°03' to 74° 46'E longitude at an altitude of 2370 meters above MSL.  (Location map attached as Annexure-I)
v.	Total Budget Outlay (Crore):	INR 16,06,968/-

### 1.3 Details Himalayan Research /Project Associates/Fellows inducted

Type of Fellowship	Nos.	Work Duration	
		From	To
Research Associates			
Sr. Research Fellow	01	19.04.2021	31.03.2022
Jr. Research Fellows	01	19.04.2019	18.04.2021
Project Fellows			

## 2. Research Outcomes

**2.1. Abstract** (not more than 1000 words) (it should include background of the study, aim, objectives, methodology, approach, results, conclusion and recommendations based on the institutional fellowship proposal sanctioned under the NMHS).

### **Background:**

Entrepreneurship development through value chains improvement by value addition (time, place, form and possession) and commercialization of non-timber forest resources is novel for rural livelihood diversification and economic development (Pandey et al., 2016). Basically, the success of NTFRs commercialization in increasing livelihood options depends on a number of factors viz., the products concerned and their characteristics, the markets in which they are sold, demand factors, risks and uncertainties and how value chains counter signs of over-harvesting. NTFRs constitute an important source of subsistence, cash livelihoods and safety nets for forest fringe *Shina* community in Gurez valley of Kashmir. However, instead the NTFRs sector has potential for economic growth, little attention have been given towards NTFRs based entrepreneurship and innovation development. Hence, it is essential for the success of local NTFRs-based enterprises to find suitable market niches, build new innovations and have good business management competency. The role of NTFRs based enterprises and entrepreneurship in economic development is likely to increase in the future because of the limited possibilities to expand public sector activities in the region. The present proposal is, therefore, planned to explore and exploit potential opportunities for entrepreneurship development and livelihood enhancement

by improving value chains through value addition (time, place, form and possession) and commercialization of non-timber forest resources in the *Shina* community in the Gurez valley of Kashmir.

**Objectives/ Aim:**

1. To identify and study the NTFRs widely collected/produced, consumed and traded, both locally and nationally.
2. To collect and analyze information on value chains, actors, market channel, pricing mechanisms and value addition of the potential NTFRs.
3. To develop entrepreneurship and enhance livelihoods of Shina tribe through value chains improvement by value addition (time, place, form and possession) and commercialization of non-timber forest resources.

**Methodology(ies):**

**Study Area:** Gurez Valley of Bandipora district under Kashmir province in Jammu and Kashmir UT.

Sampling technique and sample selection procedure: Multi-stage random sampling technique was carried out to select the blocks (3), villages (18) and the households (337).

**Data collection:** Both secondary and primary sources were being used in data collection. The data were collected using structured interviews, non-participant observation, focus group discussions (FGDs) and rapid market assessments (RMA).

**Data analysis:** Descriptive and inferential statistics were applied to analyze the data. Lorenz curve and Gini co-efficient (G) were applied to evaluate the influence of NTFRs incomes on income inequalities mitigation.

**Approach:**

Multiple regression analysis was used to determine the household variables that influence the household NTFRs incomes. The conceptual model based on multivariate function is given as follows:

$$Y = a + b_1X_1 + b_2X_2 + \dots + b_{10}X_{10} + e$$

Where, Y= Household NTFRs income (₹/year)

X<sub>1</sub>-X<sub>10</sub>= Household characteristics

a= constant or intercept

b<sub>1</sub>-b<sub>10</sub>= regression co-efficient

e= error term

**Results:**

**Collection and consumption NTFRs:** Collection of NTFRs were recorded to be fuel wood (902.55 q/year), herbal medicines (44.38 q/year), wild vegetables (37.91 q/year), edible fruits (28.71 q/year), fodder (168.10 q/year), beverages (8.29 q/year), spices (11.59 q/year), incense (4.38 q/year), edible nuts (32.52 q/year), cottage industry materials (32.52 q/year) and *shilajeet* (0.337 q/year). The subsistence consumptions of the NTFRs were found to be fuel wood (535.19 q/year), herbal medicines (16.64 q/year), wild vegetables (16.78 q/year), edible fruits (10.41 q/year), fodder (82.23 q/year), beverages (3.13 q/year), spices (5.36 q/year), incense (2.22 q/year), edible nuts (11.06 q/year), cottage industry materials

(7.68 q/year) and *shilajeet* (0.00 q/year).

**Marketing and economic valuation of NTFRs:** The NTFRs secured a total income of ₹ 10357156/year including subsistence (₹ 3973887.58/year) and cash income (₹ 6383268.65/year) @ ₹ 30733.4/household/annum.

**Contribution of NTFRs to the household economy:** Findings revealed that the household average gross annual income from off-farm and on-farm sources was ₹ 92811.24 which is differentiated as; agriculture (30.62%), livestock (22.68%), NTFRs (20.41%), service (12.44%), business (9.96%), wage labour (2.80%) and others (1.09%). Thus, NTFRs are the 3<sup>rd</sup> major constituent of household economy.

**Inequality mitigation by NTFRs income:** Gini coefficient was 0.2873 when NTFRs income was considered and 0.3539 when it was ignored which indicated that the NTFRs income have stronger equalizing effect on local income distribution.

**Socioeconomic and biophysical characteristics of NTFRs collectors:** The household survey indicated that most of the respondents were middle aged (62.14%) having low literacy upto primary level (54.35%) and large sized families (74.76%). Majority (57.28%) of them were marginal land holders and the herd size among majority (60.19%) of the households varied from 6 to 10 livestock.

**Correlation and multiple regression analysis:** Results indicated that out of eleven household factors, nine attributes were positively and significantly correlated with the NTFRs income.

$$Y = 7401.43 - 4.019X_1 + 204.86X_2 + 433.37X_3 - 158.09X_4 + 154.07X_5 + 830.29X_6 + 398.91X_7 + 0.03X_8 + 155.74X_9 + 2161.59X_{10} - 7394.15X_{11}$$

Where, Y = Household NTFRs income (₹/year)

X<sub>1</sub> – X<sub>11</sub> = Explanatory variables

**Value Chain Analysis (VCA) of the NTFRs:** The value chain analysis for NTFRs indicated that the regular value chain involves six actors the NTFRs flow as follow: local harvester → village collector → processor → transporter → wholesaler → retailer → consumer.

**SWOT analysis for developing NTFP entrepreneurship using AHP:** The overall combined priority value (61.90%) of internal (strengths and weaknesses) categories prevailed over the combined priority value (38.10%) of external (opportunities and threats) factors.

**Training needs assessment for developing NTFR entrepreneurship:** The NTFRs collector's perception on the training needs with respect to NTFR entrepreneurship indicated that the content 'commercialization of non-timber forest resources (NTFRs)' was considered most important and assigned 1<sup>st</sup> rank while 'conservation of non-timber forest resources (NTFRs) through domestication' was considered least important and ranked 10<sup>th</sup>.

### Conclusion:

1. The study led to conclude that there is a rich diversity of NTFRs extracted, consumed and marketed by the *Shina* tribe for livelihood security, income diversification and inequality mitigation.
2. The tribal people are in underprivileged position in all respects as reflected by their low socioeconomic conditions and hence, needs improvement by NTFRs interventions.

3. The value chain analysis indicated that NTFRs collectors make very low gross margins due to unorganized marketing, lack of value addition and commercialization.
4. The findings suggested that the trainings on NTFR entrepreneurship of stakeholders is the crucial intervention for livelihood diversification, socioeconomic development and NTFRs conservation.

**Recommendations:**

1. The NTFRs deserve a planned and continuous attention of policy makers, scientists, social workers and extensionists for livelihood diversification through NTFRs entrepreneurship development.
2. Branding and certification of NTFRs and marketing through cooperatives and e-commerce must be given due consideration.

**2.2. Objective-wise Major Achievements**

S. No.	Cumulative Objectives	Major achievements (in bullets points)
1.	To identify and study the NTFRs widely collected/produced, consumed and traded, both locally and nationally.	<ul style="list-style-type: none"> <li>• Literature review and Secondary data collection</li> <li>• Conduction of reconnaissance survey of the Gurez Valley of Bandipora district in Kashmir province</li> <li>• Design of research, sampling technique and sample selection procedure</li> <li>• Interview schedule structure and pre-testing for both village as well as household survey</li> <li>• Pre-testing of interview schedule for primary data collection</li> <li>• Conduction of household survey using structured interview schedule</li> <li>• Data collection and analysis on distribution pattern of NTFRs based on use categories, plant parts utilized, plant habits/ life forms and families</li> <li>• Data collection and analysis on collection, consumption, marketing and economic valuation of NTFRs</li> <li>• Database on household income composition and contribution of NTFRs to the household economy and inequality mitigation</li> <li>• Database on socioeconomic and biophysical characteristics of NTFRs collectors</li> <li>• Correlation and multiple regression analysis of household variables with the NTFRs income</li> </ul>

2.	To collect and analyze information on value chains, actors, market channel, pricing mechanisms and value addition of the potential NTFRs.	<ul style="list-style-type: none"> <li>• Household survey using structured interview schedule for primary data collection on value chains, actors, market channel, pricing mechanisms and value addition of the potential NTFRs</li> <li>• Value chain analysis (VCA) of fuel wood with main stakeholders</li> <li>• Value chains analysis (VCA) of medicinal NTFRs with main stakeholders</li> <li>• Value chains analysis (VCA) of mushroom <i>Morchella esculenta</i> with main stakeholders</li> <li>• Value chains analysis (VCA) of wild spice <i>Bunium persicum</i></li> <li>• Value chains analysis (VCA) of cottage industry materials/products</li> </ul>
3.	To develop entrepreneurship and enhance livelihoods of <i>Shina</i> tribe through value chains improvement by value addition (time, place, form and possession) and commercialization of non-timber forest resources.	<ul style="list-style-type: none"> <li>• Household survey using structured interview schedule for primary data collection on SWOT and training needs assessment for developing NTFR entrepreneurship</li> <li>• SWOT analysis for developing NTFR entrepreneurship using AHP</li> <li>• Training needs assessment for developing NTFR entrepreneurship</li> <li>• Training of NTFRs stakeholders on NTFR entrepreneurship</li> </ul>

### 2.3. Outputs in terms of Quantifiable Deliverables\*

S. No.	Quantifiable Deliverables*	Monitoring Indicators*	Quantified Output/ Outcome achieved	Deviations made, if any, and Reason thereof:
1.	Database on quantity of collection, consumption and marketing of key NTFRs and	<ul style="list-style-type: none"> <li>• Primary data</li> <li>• Statistical analysis</li> <li>• Tables</li> <li>• Graphs</li> </ul>	<ul style="list-style-type: none"> <li>• Distribution pattern of NTFRs based on use categories, plant parts utilized, plant</li> </ul>	



	contributory role of NTFRs in household income and employment generation.		<p>habits/ life forms and families</p> <ul style="list-style-type: none"> <li>• Quantification of collection, consumption, marketing of NTFRs and their economic valuation</li> <li>• Quantification of household income composition and contribution of NTFRs to the household economy and inequality mitigation</li> <li>• Database on socioeconomic and biophysical characteristics of NTFRs collectors</li> <li>• Correlation and multiple regression analysis of household variables with the NTFRs income</li> </ul>	
2.	Value chain analysis of NTFRs trading	<ul style="list-style-type: none"> <li>• Primary data</li> <li>• Graphs</li> </ul>	<ul style="list-style-type: none"> <li>• Value chain analysis (VCA) of fuel wood</li> </ul>	

			<p>with main stakeholders</p> <ul style="list-style-type: none"> <li>• VCA of medicinal NTFRs with main stakeholders</li> <li>• VCA of mushroom <i>Morchella esculenta</i> with main stakeholders</li> <li>• VCA of wild spice <i>Bunium persicum</i></li> <li>• VCA of cottage industry materials/ products</li> </ul>
3.	<p>Awareness generation among NTFRs collectors, processors, villagers, traders, local bodies and other stakeholders.</p>	<ul style="list-style-type: none"> <li>• Focus group discussions (FGDs) conducted</li> <li>• SWOT exercises conducted</li> <li>• Training organized</li> </ul>	<ul style="list-style-type: none"> <li>• Thirty-six (36) FGDs, two (2) at each sample villages were undertaken</li> <li>• SWOT exercises (36) were conducted in the all FGDs, two (2) at each sample villages</li> <li>• Two-day training programme on “Entrepreneurship development and livelihood</li> </ul>

			<p>enhancement of <i>Shina</i> tribe through value chains</p> <p>improvement of non-timber forest resources (NTFRs)” was organized during October 22<sup>nd</sup>-23<sup>rd</sup>, 2020 at Izmarg, Gurez (J&amp;K) where one hundred and twenty (120) NTFRs stakeholders were trained.</p>
4.	<p>Trainings on skill up-gradation and capacity building of stakeholders of <i>Shina</i> community.</p>	<ul style="list-style-type: none"> <li>• Training organized</li> <li>• Demonstration conducted</li> </ul>	<ul style="list-style-type: none"> <li>• One hundred and twenty (120) NTFRs stakeholders were trained in the two-day training programme organized on “Entrepreneurship development and livelihood enhancement of <i>Shina</i> tribe through value chains improvement of</li> </ul>

			<p>non-timber forest resources (NTFRs)” during October 22<sup>nd</sup>-23<sup>rd</sup>, 2020 at Izmarg, Gurez (J&amp;K).</p> <ul style="list-style-type: none"> <li>• Demonstration of NTFRs was conducted in the training programme</li> </ul>	
5.	<p>Entrepreneurship development through value chains improvement by value addition (time, place, form and possession) and commercialization of non-timber forest resources.</p>	<ul style="list-style-type: none"> <li>• Training organized</li> <li>• Demonstration conducted</li> </ul>	<ul style="list-style-type: none"> <li>• One hundred and twenty (120) NTFRs stakeholders were trained through lectures/ Interactions, group discussions and extension literatures in the two-day training programme organized on “Entrepreneurship development and livelihood enhancement of <i>Shina</i> tribe through value chains improvement of non-timber</li> </ul>	

			<p>forest resources (NTFRs)” during October 22<sup>nd</sup>-23<sup>rd</sup>, 2020 at Izmarg, Gurez (J&amp;K).</p> <ul style="list-style-type: none"> <li>• Demonstration of NTFRs was conducted in the training programme</li> </ul>
6.	PhD Registration should be done.	<ul style="list-style-type: none"> <li>• Ph.D. Forestry research scholar registration</li> </ul>	<ul style="list-style-type: none"> <li>• Name of Student: Mr. Ubaid Kar</li> <li>• Registration No.: 2020-1012-D</li> <li>• Ph.D. Degree Programme: Natural Resource Management (NRM)</li> <li>• Topic: Anthropogenic Pressure on Tree Structure, Biomass Carbon and Stand Quality of Temperate Forests in Gurez Valley of Kashmir</li> </ul>

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

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

S. No.	Particulars	Number/ Brief Details	Remarks/ Enclosures
1.	New Methodology developed:	<ul style="list-style-type: none"> <li>• Interview schedule structured for household survey for data collection on NTFRs collection, consumption, marketing, economic valuation and livelihood contribution</li> </ul>	<ul style="list-style-type: none"> <li>• Interview schedule given as Annexure-II</li> </ul>
2.	New Models/ Process/ Strategy developed:	<ul style="list-style-type: none"> <li>• Empirical model for prediction of NTFR income on the basis of socioeconomic and biophysical variables developed</li> </ul>	<ul style="list-style-type: none"> <li>• Empirical model given as Annexure-III</li> </ul>
3.	New Species identified:		
4.	New Database established:	<ul style="list-style-type: none"> <li>• Secondary data regarding location, physiography, boundaries etc. of the sample villages.</li> <li>• Secondary data regarding demographic profile of the sample villages.</li> <li>• Secondary data with regard to land utilization pattern in the sample villages.</li> <li>• Secondary data on Manpower potential &amp; employment status.</li> <li>• Secondary data with regard to livestock population in the sample villages.</li> <li>• Secondary data on infrastructure profile of the sample villages.</li> <li>• Primary data with regard to household socioeconomic and biophysical variables.</li> </ul>	<ul style="list-style-type: none"> <li>• New Database established given as Annexure-IV</li> </ul>

		<ul style="list-style-type: none"> <li>• Diversity, distribution, utilization, collection, consumption and marketing of NTFRs.</li> <li>• Primary data on NTFRs collection, consumption and marketing.</li> <li>• Contribution of NTFPs to household income and inequality mitigation.</li> <li>• Factors influencing the NTFRs exploitation in the locality</li> <li>• Value Chain Analysis (VCA) of the NTFRs</li> <li>• SWOT factors and categories of NTFR entrepreneurship development</li> <li>• Data on training need assessment for NTFR entrepreneurship development</li> </ul>	
5.	New Patent, if any:		
	I. Filed (Indian/ International)		
	II. Granted (Indian/ International)		
	III. Technology Transfer (if any)		
6.	Others, if any:	<ul style="list-style-type: none"> <li>• Skill Training of Rural Youth (STRY) on “Entrepreneurship Development in Value Chains Improvement of Non-Timber Forest Resources (NTFRs)” was conducted during March 16<sup>th</sup>-22<sup>nd</sup>, 2022 Faculty of Forestry, Benhama, Ganderbal-191201 (J&amp;K)</li> </ul>	

### 3. Technological Intervention

S. No.	Type of Intervention	Brief Narration on the interventions	Unit Details (No. of villagers benefited / Area Developed)
1.	Development and deployment of indigenous technology	<ul style="list-style-type: none"> <li>Indigenous traditional knowledges (ITKs) on uses of NTFRs in the <i>Shina</i> tribe of Gurez valley were documented for future preservation and prevent biopiracy.</li> </ul>	
2.	Diffusion of High-end Technology in the region		
3.	Induction of New Technology in the region		
4.	Publication of Technological / Process Manuals	<ul style="list-style-type: none"> <li>Training Manual for guidance to the trainers for training of NTFRs stakeholders is under preparation.</li> </ul>	
	Others (if any)		

### 4. New Data Generated over the Baseline Data

S. No.	New Data Details	Existing Baseline	Additionality and Utilisation of New data ( <i>attach supplementary documents</i> )



1.	<ul style="list-style-type: none"> <li>• Secondary data regarding location, physiography, boundaries, demographic profile, land utilization pattern, manpower potential &amp; employment status, livestock population and infrastructure profile of the sample villages.</li> <li>• Primary data with regard to household socioeconomic and biophysical variables.</li> </ul>	<ul style="list-style-type: none"> <li>• The village level data on land use classification, land holding pattern, demography and forest resources were existed from secondary sources including line departmental records, village records, census reports, institutional technical reports and national informatics centre (NIC).</li> </ul>	<ul style="list-style-type: none"> <li>• Secondary data of sample villages given as Annexure-V</li> </ul>
2.	<ul style="list-style-type: none"> <li>• Primary data with regard to household socioeconomic and biophysical variables.</li> </ul>	<ul style="list-style-type: none"> <li>• Baseline data already existing at household level which were collected and analysed through non-experimental research.</li> </ul>	<ul style="list-style-type: none"> <li>• Primary data on household socioeconomic and biophysical variables given as Annexure-VI</li> </ul>
3.	<ul style="list-style-type: none"> <li>• Diversity, distribution, utilization, collection, consumption and marketing of NTFRs.</li> <li>• Primary data on NTFRs collection, consumption and marketing.</li> <li>• Contribution of NTFPs to household income and inequality mitigation.</li> <li>• Factors influencing the NTFRs exploitation in the locality</li> </ul>	<ul style="list-style-type: none"> <li>• Baseline data already existing at household level which were collected and analysed through non-experimental research.</li> </ul>	<ul style="list-style-type: none"> <li>• Primary data on NTFRs given as Annexure-VII</li> </ul>

4.	<ul style="list-style-type: none"> <li>• Value Chain Analysis (VCA) of the NTFRs</li> <li>• SWOT factors and categories of NTFR entrepreneurship development</li> <li>• Data on training need assessment for NTFR entrepreneurship development</li> </ul>	<ul style="list-style-type: none"> <li>• Baseline data already existing at household level which were collected and analysed through non-experimental research.</li> </ul>	<ul style="list-style-type: none"> <li>• Data on VCA, SWOT and training needs given as Annexure-VIII</li> </ul>
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#### 5. Linkages with Regional & National Priorities (SDGs, INDC, etc.)/ Collaborations-N.A.

S. No.	Linkages /collaborations	Details	No. of Publications/ Events Held	Beneficiaries
1.	Sustainable Development Goals (SDGs)			
2.	Climate Change/INDC targets			
3.	International Commitments			
4.	National Policies			
5.	Others collaborations			

#### 6. Financial Summary (Cumulative)\*

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

1. Utilization Certificate (UC) and Statement of Expenditure (SE)-2018-19 & 2019-20 given as Annexure-IX

1. Utilization Certificate (UC) and Statement of Expenditure (SE)-2020-21 given as Annexure-X

1. Utilization Certificate (UC) and Statement of Expenditure (SE)-2021-22 given as Annexure-XI

#### 7. Quantification of Overall Research Progress

S. No.	Parameters	Total (Numeric)	Attachments* with remarks
1.	IHR State(s) Covered:	01 (Region)	<ul style="list-style-type: none"> <li>• Details of IHR State(s) Covered given as Annexure-XII</li> </ul>
2.	Fellowship Site/ LTEM Plots developed:		
3.	New Methods/ Model Developed:	<ul style="list-style-type: none"> <li>• New Method-01 (Interview schedule structured for</li> </ul>	<ul style="list-style-type: none"> <li>• Interview schedule given as Annexure-II</li> <li>• Empirical model predicting</li> </ul>

		household survey) • New Model-01 (Empirical model predicting the NTFR income)	the NTFR income given as Annexure-III
4.	New Database generated:	14	New Database established given as Annexure-IV-VIII
5.	Types of Database generated:	04 (Primary, Secondary, Qualitative and Quantitative)	New Database established given as Annexure-IV-VIII
6.	No. of Species Collected:	183 (NTFR species documented)	NTFR species documented given as Annexure-VII
7.	New Species identified:		
8.	Scientific Manpower Developed (PhDs awarded/ JRFs/ SRFs/ RAs):	01 (JRF, 19.04.2019-18.04.2021) 01 (SRF, 19.04.2021-31.03.2022) 01 (Ph.D.-Ongoing)	
9.	No. of SC Himalayan Researchers benefited:		
10.	No. of ST Himalayan Researchers benefited:		
11.	No. of Women Himalayan Researchers empowered:		
12.	No. of Knowledge Products developed:		
13.	No. of Workshops participated:	01 (Himalayan Researchers Consortium-2021)	
14.	No. of Trainings participated:	01 (Two-day training programme of NTFRs stakeholders was organized)	• Details of training conducted given as Annexure-XIII
15.	Technical/ Training Manuals prepared:	01 (Under preparation)	

Others (if any):		
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\* Please attach the soft copies of supporting documents word files and data files in excel.

### 8. Knowledge Products and Publications\*

S. No.	Publication/ Knowledge Products	Number		Total Impact Factor	Remarks/ Enclosures**
		National	International		
1.	Journal Research Articles/ Special Issue (Peer-reviewed/ Google Scholar)	02		4.86, 4.80 (NAAS)	Enclosed as Annexure- XIV-XV
2.	Book Chapter(s)/ Books:				
3.	Technical Reports/ Popular Articles	01			FTR to NMHS
4.	Training Manual (Skill Development/ Capacity Building)	01			Under preparation
5.	Papers presented in Conferences/ Seminars	04			Certificates enclosed (Annexure- XVI-XIX)
6.	Policy Drafts (if any)				
7.	Others (specify)				

\*Please append the list of KPs/ publications (with impact factor and URL link details) with due Acknowledgement to NMHS.

\*\*Please provide supporting copies of the published documents.

## 9. Recommendation on Utility of Research Findings, Replicability and Exit Strategy

### 9.1 Utility of the Fellowship Findings

S. No.	Research Questions Addressed	Succinct Answers (within 150–200 words)
1.	What is the conventional trend in NTFRs collection, consumption and marketing in the <i>Shina</i> community?	<ul style="list-style-type: none"> <li>• The fuel wood, fodder, edible fruits, vegetables, herbal medicines, and spices are the major NTFRs collected by majority of the sample households from the forests. Whereas, the involvement of households in collection of beverage, dye, oil seed, edible seed, detergent, edible nut, tooth brush, incense, mouth freshener, fungi and <i>Shilajeet</i> is comparatively low.</li> <li>• Sixteen different use categories of NTFRs have been recorded among the surveyed population in the study area.</li> <li>• Maximum number of species (54) were utilized as medicines followed by vegetables (29), fodder (13), edible fruits (11), beverages (11), fuel (7), cottage industry (3), dye (4), spices (3), edible seed (3), incense (2), oil seeds (1), edible nut (1), toothbrush (1), detergent (1), mouth freshener (1).</li> <li>• Almost all the parts viz., leaves (46), followed by root (27), twigs (21), fruit (14), flower (7), seed (5), rhizome (5), entire plant (5), bark (3), nut (3), cone (3), tuber (3), bulb (2), basidiocarp (2), stem (2) corm (1), resin (1), frond (1) were widely collected and utilized by the surveyed household.</li> <li>• The variety of NTFPs collected by the people were mostly represented by herbs (66.09%) followed by shrubs (14.78%), trees (12.17%), climbers (4.35%) fungi (1.74%), and fern (0.87%) in the sample household.</li> </ul>
2.	To what extent the <i>Shina</i> tribe depends on NTFRs for household incomes and employments?	<ul style="list-style-type: none"> <li>• The structure of household average gross annual income consisted of all off-farm and on-farm sources among the surveyed population was mostly accrued by agriculture while other sources were livestock, NTFRs, petty business, service, wage labour and others. Therefore, NTFRs are the 3<sup>rd</sup> major component of household economy in the study area.</li> <li>• The composition of household average gross annual employment comprised of all off-farm and on-farm sources in</li> </ul>

		<p>the surveyed households was made up of agriculture, livestock, NTFRs, business, service, wage labour and others. Thus, the NTFPs are the 3<sup>rd</sup> major constituent of household employment in the study site.</p>
3.	<p>What are the trading mechanisms and value chains of NTFRs of the <i>Shina</i> tribe? How entrepreneurial solutions will be designed to make the value chains more efficient and competitive?</p>	<ul style="list-style-type: none"> <li>• The marketing mechanism of almost all the NTFRs is predominantly individual oriented and majority of the NTFRs are sold in the raw form without any value addition except certain trivial functions fetching paltry income to the vendors.</li> <li>• The individual selling mechanism of small surplus forest resources restricts the collectors to access the remunerative markets which require tradable quantity. The poor marketing infrastructure and lack of storage facilities compels them to sell off their produces to the first market contact that is generally the petty traders.</li> <li>• The selling of almost all the forest resources is predominantly done in the local markets where transaction takes place on a mutually agreed price quote between vendors and petty traders. Generally, the forest produces hits the market during the peak season where getting a better price becomes difficult due to competitive market situation. The middlemen invariably exploit collectors of NTFRs on account of prevailing malpractices, forced and distress sales.</li> </ul>
4.	<p>What capacity building and skill development programmes among NTFRs collectors, processors and traders in value addition, commercialization and marketing mechanism are needed? How these programmes will be conducted?</p>	<ul style="list-style-type: none"> <li>• The NTFR stakeholder's perception on the training needs with respect to NTFR entrepreneurship indicated that the most important training need is found to be the 'commercialization of NTFR' (WMS, 3.00; rank 1<sup>st</sup>) which was closely followed by the 'entrepreneurship in value chains of NTFR' (WMS, 2.84; rank 2<sup>nd</sup>), NTFR for agri-business development (WMS, 2.79; rank 3<sup>rd</sup>) and demand forecasts and price determination in NTFR (WMS, 2.69; rank 4<sup>th</sup>). The 'livelihood diversification through NTFR based cottage industries and handicrafts' (WMS= 2.31; rank 5<sup>th</sup>), 'cost benefit considerations in NTFR production' (WMS= 2.26; rank 6<sup>th</sup>), 'collection, processing and value addition of NTFR' (WMS= 2.03; rank 7<sup>th</sup>), 'NTFR for achieving food and nutritional security' (WMS= 1.90; rank 8<sup>th</sup>), 'domestication and production of NTFR production' (WMS=</li> </ul>

		1.80; rank 9 <sup>th</sup> ) and 'conservation of NTFR through JFM' (WMS= 1.68; rank 10 <sup>th</sup> ) were noted as key training needs but were ranked lower in importance. The NTFR stakeholders viewed the 'commercialization of NTFR' as the very prominent training need accounting for 12.87% of the total perceptions while the training need 'conservation of NTFR through JFM' received lowest priority comprising 7.21% of the total perceptions.
5.	What NTFRs based entrepreneurship development and livelihood diversification strategies will be strengthened in the <i>Shina</i> tribe? And to what extent and how?	<ul style="list-style-type: none"> <li>• The short duration trainings (1-7 days) (WMS, 3.00; rank 1<sup>st</sup>) was the highest rated delivery method as adjudged by the NTFR stakeholders which was followed by the medium duration trainings (8-14 days) (WMS, 2.84; rank 2<sup>nd</sup>). The long duration trainings (3-4 weeks) (WMS, 2.79; rank 3<sup>rd</sup>) was perceived as the lowest rated delivery method by the NTFR stakeholders.</li> <li>• The findings on the preference in the training methods perceived by the NTFR stakeholders revealed that all the training methods including short duration trainings (1-7 days), medium duration trainings (8-14 days) and long duration trainings (3-4 weeks) were considered appropriate and should be adopted in future training programmes for NTFR stakeholders. The preference of low duration trainings over long duration trainings among NTFR stakeholders could be due to the reasons like poor utilization of sources of information, lack of awareness, low literacy, non- recognition of the information sources, difficult accessibility of the villages, primitive socio-cultural background and pressure of earning livelihoods. With the inclusion of all ten major training areas of NTFR entrepreneurship and with the continuance and adoption of the presently used and newly identified delivery methods, a new training model for the NTFR stakeholders should be used.</li> </ul>

## 9.2 Recommendations on Replicability and Exit Strategy:

Particulars	Recommendations
Replicability of Fellowship, if any	

Exit Strategy:	<p><i>Please describe the Exit Strategy of the fellowship, self-sustaining and benefitting the stakeholders and target communities:</i></p> <ul style="list-style-type: none"> <li>• Traditionally, the <i>Shina</i> people are exploiting multiple NTFRs for livelihood security in terms of subsistence consumption, cash income, employment opportunities and safety net. Hence, livelihood diversification through NTFR entrepreneurship and enterprises is needed as important strategy of poverty reduction, inequality mitigation and socioeconomic development.</li> <li>• The research findings are of great importance for planners, scientists, policy makers and extension workers for planning, formulation and implementation of NTFRs based developmental projects for livelihood security of <i>Shina</i> tribe in the Gurez valley of Kashmir Himalaya.</li> <li>• The research findings are useful in formulation of appropriate extension and communication strategies for effective dissemination of scientific information about NTFRs entrepreneurship devolvement through efficient utilization and mobilization of existing NTFR for livelihood security.</li> <li>• The research findings are applicable and the information may be disseminated in the areas having similar socio-demographic and ecological conditions in the Himalayan regions, hence, the significant data of this project are sustainable and have long-term effectiveness.</li> <li>• This project can be replicated across the Himalayan regions having similar conditions for livelihood security of the local communities through NTFR entrepreneurship and enterprises.</li> <li>• Further, this project will be shared within the district/city/state with specific partners.</li> <li>• Grant seeker and partners will be most pleased to make presentations on replicability and to assist in a wide dissemination of this program model.</li> </ul>
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**(Dr. M.A. Islam)**

**(NMHS FELLOWSHIP COORDINATOR)**

**(Signed and Stamped)**

**(HEAD OF THE INSTITUTION)**

**(Signed and Stamped)**

**Place: .....**

**Date: 17/07/2023**

## **PART B: COMPREHENSIVE REPORT (including all sanctioned positions of Researchers)**

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Based on the Fellowship Proposal submitted/approved at the time of sanction, the co-ordinating Principal Investigator shall submit a comprehensive report including report of all individual researchers.

The comprehensive report shall include an **Executive Summary** and it should have separate chapters on (1) **Introduction** (2) **Methodologies, Strategy and Approach** (3) **Key Findings and Results** (4) **Overall Achievements** (5) **Impacts of Fellowship in IHR** (6) **Exit Strategy and Sustainability** (7) **References/ Bibliography** and (8) **Acknowledgements** (It should have a mention of financial grant from the NMHS, MoEF&CC).

Further, description of Technical Activities, List of Trainings/ Workshops/ Seminars with details of trained resources, list of New Products developed under the fellowship, Manual of Standard Operating Procedures (SOPs) developed, Technology developed/Transferred etc should be enclosed as Appendix.

### **Report (hard copy) should be submitted to:**

Er. Kireet Kumar  
Scientist 'G' and Nodal Officer, NMHS-PMU  
National Mission on Himalayan Studies (NMHS)  
G.B. Pant National Institute of Himalayan Environment (GBP NIHE)  
Kosi-Katarmal, Almora 263643, Uttarakhand

### **Report (soft copy) should be submitted at:**

E-mail: nmhspmu2016@gmail.com; kireet@gbpihed.nic.in; kodali.rk@gov.in

# PART B: COMPREHENSIVE REPORT

## EXECUTIVE SUMMARY

The Executive Summary of the fellowship should not be more than 3–5 pages, covering all essential features in precise and concise manner as stated in Part A (Cumulative Fellowship Summary Report) and Part B (Comprehensive Report).

**Fellowship Report No.:**

***n of N*** (*n = Sequential number; N= Total no. of fellowships granted to the Institute/ University*)

### Researchers Details

Type of Fellowship (HRA/HJRF/HJPF)	Name of Himalayan Researcher	Date of Joining	Date of Resignation** (Date of project completion)	Research Title	Name of the PI & Designation
HJRF/HJPF	Ummar Atta	19.04.2019	31.03.2022	Entrepreneur Development and Livelihood Enhancement of Shina Tribe through Value Chains Improvement of Non-Timber Forest Resources in Gurez Valley of Kashmir	Dr. M. A. Islam Head/Professor, Division of Natural Resource Management Faculty of Forestry, SKUAST-K, Ganderbal-191201 Jammu and Kashmir
<i>(in case of continuation of fellowship)</i>					

\*\*If the appointed researcher resigned in the mid of the fellowship duration, then also mention the name of the Himalayan researcher who carried forward the fellowship.

## 1 INTRODUCTION

### 1.1 Background/ Summary of the Associateship / Fellowship Study undertaken (max. 500 words)

More than two billion people around the world depend on non-timber forest resources (NTFRs) for food, fodder, fuel, shelter, medicine, cash income and employment (Ahenkan and Boon, 2011). Despite their importance for sustaining rural livelihoods, alleviating rural poverty, biodiversity conservation and facilitating rural economic growth, NTFRs have not received the sustained and systematic support given to conventional agriculture and forestry (Maske *et al.*, 2011). Instead, they remain largely neglected by

national and state government development strategies and donor priorities, and are often overlooked by the formal private sector (Sarmah and Arunachalam, 2011). Nowadays, this is surprising, given the fact that there is large unused potential for NTFRs to support livelihood security, economic well-being, rural enterprises and socio-economic development (Ludvig *et al.*, 2016).

Value chain analysis has emerged as a new way of understanding markets and trade mechanism for NTFRs. Increasingly it is acknowledged that dependency and links to NTFRs go beyond village boundaries. NTFRs contribute significantly not only to the livelihood of rural people but also to the livelihood of residents of urban areas, as well as to national exchequers and the global economy (Weiss, 2011). By focusing on the whole range of activities and relations associated with production, exchange, transport and distribution of a particular commodity, the value chain approach is simultaneously a descriptive tool and an analytic instrument (Velde *et al.*, 2006). The information on quantification of NTFRs value chains, flow of a given NTFR from harvesting to final consumption, value created and retained in the chain help overwhelmingly to clarify the dynamics in the commercialisation of NTFRs. Further, the value chain analysis of NTFRs provides reliable and accurate estimates of value at the different stages in the value chain, uncovers patterns of value-addition by different actors involved and identifies domains of value-appropriation.

Entrepreneurship development through value chains improvement by value addition (time, place, form and possession) and commercialization of non-timber forest resources is novel for rural livelihood diversification and economic development (Pandey *et al.*, 2016). Basically, the success of NTFRs commercialization in increasing livelihood options depends on a number of factors viz., the products concerned and their characteristics, the markets in which they are sold, demand factors, risks and uncertainties and how value chains counter signs of over-harvesting. NTFRs constitute an important source of subsistence, cash livelihoods and safety nets for forest fringe *Shina* community in Gurez valley of Kashmir. However, instead the NTFRs sector has potential for economic growth, little attention have been given towards NTFRs based entrepreneurship and innovation development. Hence, it is essential for the success of local NTFRs-based enterprises to find suitable market niches, build new innovations and have good business management competency. The role of NTFRs based enterprises and entrepreneurship in economic development is likely to increase in the future because of the limited possibilities to expand public sector activities in the region. The present proposal is, therefore, planned to explore and exploit potential opportunities for entrepreneurship development and livelihood enhancement by improving value chains through value addition (time, place, form and possession) and commercialization of non-timber forest resources in the *Shina* community in the Gurez valley of Kashmir.

### **1.2 Baseline and Scope of the Associateship / Fellowship (max. 1000 words)**

Traditionally, the *Shina* people are exploiting multiple NTFRs for livelihood security in terms of subsistence consumption, cash income, employment opportunities and safety net. Hence, livelihood diversification through NTFR entrepreneurship and enterprises is needed as important strategy of poverty reduction, inequality mitigation and socioeconomic development. The *Shina* people have for centuries

depended on forest resources for their livelihoods and try to improve their living standards by extracting forest resources in terms of grazing, cutting trees for firewood and timber, extraction of non-timber forest products (NTFRs), etc. that may result in serious implications on conservation of biodiversity and natural habitats. Hence, it is imperative that the local or indigenous people and their social, physical, and economic well-being should be realised from the perspective of a holistic conservation effort.

Indigenous Traditional Knowledge (ITK) is an important part of the culture and history of communities which is co-evolved over the ages to adjust with the needs of the surroundings and transmitted among the generations. The biodiversity conservation and livelihood security in the valley can be achieved by preserving, safeguarding, promoting and transmitting ITK and entrepreneurship development through value addition and commercialization of ITK related forest products. Further, ITK related forest resources have a tremendous potential to create large scale income and employment opportunity, thereby reducing poverty and lead to empowerment of the *Shina* tribe in the Gurez valley. Hence, designing appropriate and effective perspective is essential for tribal people that would foster biodiversity conservation as well as livelihoods and motivate them for judicious forest resources management through exploiting ITK.

The entrepreneurship capital reflects a number of different legal, institutional, and social factors and forces which constitute the entrepreneurship capital of an economy and creates a capacity for entrepreneurial activity (Velde *et al.*, 2006). The small- and medium-scale enterprises (SMEs) play a central role in the livelihood and employment of *Shina* people in local NTFRs extraction, processing, marketing and allied activities. Furthermore, entrepreneurial opportunities in local NTFRs value chains can bring the highest added value to rural areas and closer to the origin where forests are growing. Hence, it is essential for the success of local NTFRs-based enterprises to find suitable market niches, build new innovations and have good business management competency. The role of NTFRs based enterprises and entrepreneurship in economic development is likely to increase in the future because of the limited possibilities to expand public sector activities in the region. The present research was, therefore, planned to explore and exploit potential opportunities for entrepreneurship development and livelihood enhancement by improving value chains through value addition (time, place, form and possession) and commercialization of non-timber forest resources in the *Shina* community in the Gurez valley of Kashmir.

The research findings will be of great importance for planners, scientists, policy makers and extension workers for planning, formulation and implementation of NTFRs based developmental projects for livelihood security of *Shina* tribe in the Gurez valley of Kashmir Himalaya. The research findings are also useful in formulation of appropriate extension and communication strategies for effective dissemination of scientific information about NTFRs entrepreneurship development through efficient utilization and mobilization of existing NTFR for livelihood security. The research findings are applicable and the information may be disseminated in the areas having similar socio-demographic and ecological conditions in the Himalayan regions, hence, the significant data of this project are sustainable and have long-term effectiveness.

### **1.3 Overview of the Major Issues to be addressed (max. 1000 words)**

1. What is the conventional trend in NTFRs collection, consumption and marketing in the *Shina* community? To what extent the *Shina* tribe depends on NTFRs for household incomes and employments?
2. What are the trading mechanisms and value chains of NTFRs of the *Shina* tribe? How entrepreneurial solutions will be designed to make the value chains more efficient and competitive?
3. What capacity building and skill development programmes among NTFRs collectors, processors and traders in value addition, commercialization and marketing mechanism are needed? How these programmes will be conducted?
4. What NTFRs based entrepreneurship development and livelihood diversification strategies will be strengthened in the *Shina* tribe? And to what extent and how?

### **1.4 Brief summary of the activities under taken by the researcher (max. 1000 words)**

1. Literature review: Extensive review of literatures was done to relate the present study with the previous ones and discuss and interpret the findings.
2. Secondary data collection:- In order to describe the study area, secondary data related to location, demography, sources of livelihoods, physiography, geology, soil, tribal communities, climate and weather, land use and cropping pattern, water resources and irrigation, forest resources, livestock, infrastructure were collected.
3. Reconnaissance survey of the study area:- Reconnaissance survey of the whole study area was conducted for identification of the layout of the experiments.
4. Design of research, sampling technique and sample selection.
5. Preparation of interview schedule and pre-testing:- Structure of interview schedule and pre-testing before household survey was done.
6. Procurement of instrument/ equipments
7. Primary data collection:- Household survey using interview schedule, non-participant observation, focus group discussion, key informant interview and case studies.
8. Rapid Market Assessment (RMA) of major NTFRs: A qualitative approach will be adopted to conduct rapid market assessment in the project locations.
9. Value Chain Analysis (VCA) of the NTFRs: A sizeable sample of various market functionaries such as traders, wholesalers, retailers and artisans, commission agents, forwarding agents, village collectors, processors will be surveyed for detailed analysis of entire value chain.
10. Assessment of training needs on entrepreneurship development in NTFRs value chain:- The knowledge and skill gap related to NTFRs collection/ production, harvesting and marketing will be studied
11. Identification of stakeholders/ clientele groups for capacity building and skill development

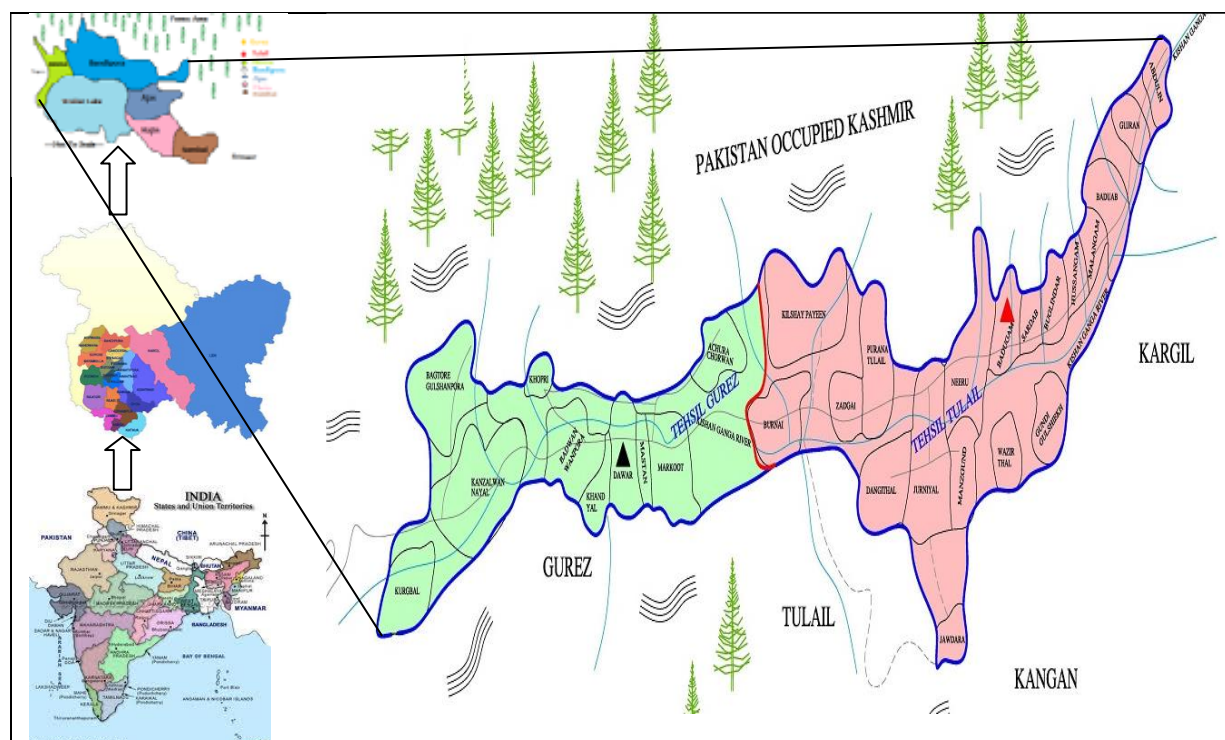
12. Entrepreneurship development and livelihood diversification through training in value addition, commercialization and marketing strategies of NTFRs
13. Data compilation and analysis
14. Compilation and tabulation of observations
15. Treatment, measurement, scaling and scoring of observations
16. Statistical analysis using suitable tools and interpretation of data
17. Report writing and concluding the findings

## 2 METHODOLOGIES, STRATEGY AND APPROACH

### 2.1 Methodologies used for the study (max. 1000 words)

#### Study Area

The study is being conducted in Gurez Valley of Bandipora district under Kashmir province in Jammu and Kashmir UT (Fig. 1). The valley is situated at  $34^{\circ} 23'$  to  $34^{\circ} 41'N$  latitude and  $74^{\circ} 37'$  to  $74^{\circ} 46'E$  longitude at an altitude of 2370 meters above MSL.

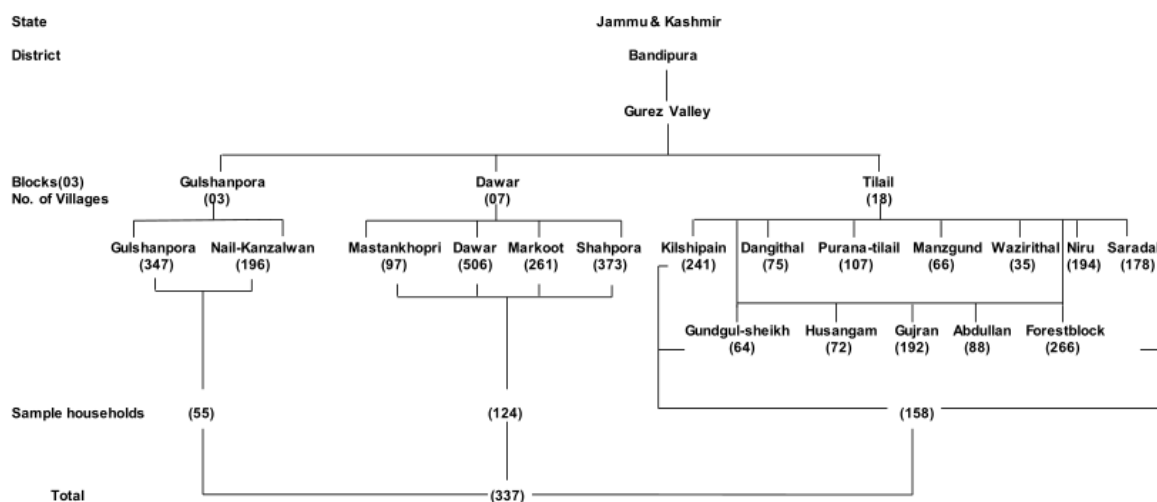


**Fig. 1.** Location map of the study area

#### Sampling technique and sample selection procedure

Multi-stage random sampling technique (Ray and Mondol, 2004) was carried out to select the blocks, villages and the households. In the first stage, three blocks including Gulshanpora, Dawar and Tilail were selected. In the second stage, eighteen (18) villages were sampled including two villages from Gulshanpora block, four villages from Dawar block and twelve villages from Tilail block. In the third stage, a

total of 337 households were withdrawn from the selected villages having 10% sampling intensity (Fig. 2) as follows:



**Fig. 2.** Flow chart of sample selection process

**Data collection:**

- Both secondary and primary sources were being used in data collection.
- The data were collected using structured interviews, non-participant observation, focus group discussions (FGDs) (Mukherjee, 1993) and rapid market assessments (RMA).
- The interview schedule was developed to record both qualitative and quantitative information pertaining to socioeconomic and biophysical characteristics, diversity, uses, collection, consumption, marketing of NTFRs and value chain analysis.
- The non-participant observations were carried out to have personal on-the-scenes contacts with the respondents in natural situation.
- The focus group discussions were conducted with 8-12 knowledgeable participants.
- The FGDs were conducted to cross check and validate the data generated.
- Rapid market assessment (RMA) of forest resources was conducted to understand the market dynamics and trade mechanism.

**Data analysis:**

Descriptive statistics including the frequency, percentage, average, standard deviation, range, correlation (Snedecor and Cochran, 1967) were applied to summarize the socioeconomic characteristics, NTFRs collection, consumption and marketing, income generation and contribution of NTFRs to households' income. Lorenz curve (Lorenz 1905) and Gini co-efficient (G) (Gini 1921) were applied to evaluate the distribution of household NTFRs incomes and their influence on income inequalities mitigation in stakeholders. The data collected were analyzed on MS Excel and Statistical Package for Social Sciences (SPSS) software and the results were displayed through tables and graphs.

**Analytical framework:**



Multiple regression analysis (Gujarati and Sangheeta, 2007) was used to determine the socioeconomic and biophysical variables that influence the household NTFRs incomes. It was hypothesized that household NTFRs income is inextricably influenced by the household's socioeconomic and biophysical characteristics. Here, the household NTFRs income was the regress and socioeconomic and biophysical characteristics were the repressors. The b-values in the analysis are the impact multipliers, which explain the magnitude of the effect of a unit change in the quantity of household NTFRs income. The conceptual model based on multivariate function is given as follows:

$$Y = a + b_1X_1 + b_2X_2 + \dots + b_{10}X_{10} + e$$

Where, Y= Household NTFRs income (₹/year)

X<sub>1</sub>-X<sub>10</sub>= Household characteristics

a= constant or intercept

b<sub>1</sub>-b<sub>10</sub>= regression co-efficient

e= error term

## **2.2 Details of Scientific data collected and Equipments Used (max 500 words)**

1. Secondary data regarding location, physiography, boundaries etc. of the sample villages
2. Secondary data regarding demographic profile of the sample villages:-
  - Human population i) Male ii) Female iii) Children
  - Literacy rate i) Male ii) Female iii) Total
  - Caste wise distribution i) ST ii) SC iii) OBC iv) General
3. Secondary data with regard to land utilization pattern in the sample villages:-
  - Forest, Non-agricultural use, Barren and uncultivable land, Cultivable waste land, Fallow land, Net sown area, Irrigated, Un-irrigated, Homestead, Other, if any and total.
4. Secondary data on Manpower potential & employment status:-
  - Cultivators, agricultural labourers, own profession, govt. employment, private employment, others, exodus trend
5. Secondary data with regard to livestock population in the sample villages:-
  - Poultry, goatry, draught animals, milch cattle *etc.*
6. Secondary data on infrastructure profile of the sample villages:-
  - Economic infrastructure: Bank, market, co-operative societies, self help groups
  - Basic amenities: Educational facilities, medical facilities, transportation facilities, recreational facilities, electricity facilities
7. Primary data with regard to household socioeconomic and biophysical variables:-
  - Socioeconomic and biophysical variables:- Caste, education, social participation, family composition, size of land holding, main occupation, subsidiary occupation, housing status, farm power, farm implements, livestock possession, wealth status, urban closeness
  - Biophysical variables:- Proximity to the forests, frequency of forest visits, forestry resources possession, family labour

8. Primary data on NTFRs collection, consumption and marketing:-
  - Diversity, distribution, utilization, collection, consumption and marketing of NTFRs,
  - Contribution of NTFPs to household income and employment
  - Factors influencing the NTFPs exploitation in the locality
9. Value Chain Analysis (VCA) of the NTFRs
  - Fuel wood value chain with main stakeholders
  - Value chains of medicinal NTFRs with main stakeholders
  - Value chains of mushroom *Morchella esculenta* with main stakeholders
  - Value chain of wild spice *Bunium persicum*
  - Value chain of cottage industry materials/products
10. SWOT factors and categories of NTFR entrepreneurship development
  - SWOT Categories and factors identified for NTFR entrepreneurship
  - Relative priority values of the SWOT categories and factors based on preference ranking technique
  - Local weight and global weight of SWOT factors
11. NTFRs collector's perception on the training needs with respect to NTFR entrepreneurship based on preference ranking technique

### 2.3 Primary Data Collected (max 500 words)

**NTFR Use category:** Among the use categories of NTFRs, medicines comprised maximum number (67) of NTFRs species followed by vegetables (31), fodder (17), edible fruits (15) and others (1).

**Plant parts used:** Almost, all the parts were extensively collected and consumed by the sample households with maximum (48) as leaves followed by root (33), fruit (18), twigs (16) and others (1).

**Life forms of NTFRs species:** Out of the 183 NTFRs collected by the rural people, maximum (66.18 %) were derivatives of herbs followed by shrubs (16.54 %), tree (10.79%), climber (4.31%), fungi (1.43%) and fern (0.71%).

**Family-wise distribution of NTFRs:** The study documented 183 NTFRs derived from 139 species belonging to 114 genera under 59 families. The family Asteraceae had the highest representation of 15 NTFRs species followed by Polygonaceae (10), Apiaceae (8), Rosaceae (8), Liliaceae (7) and and others (1).

**Collection and consumption NTFRs:** Collection of NTFRs were recorded to be fuel wood (902.55 q/year), herbal medicines (44.38 q/year), wild vegetables (37.91 q/year), edible fruits (28.71 q/year), fodder (168.10 q/year), beverages (8.29 q/year), spices (11.59 q/year), incense (4.38 q/year), edible nuts (32.52 q/year), cottage industry materials (32.52 q/year) and *shilajeet* (0.337 q/year).

**Marketing and economic valuation of NTFRs:** Current study revealed that the NTFRs secured a total income of ₹ 10357156/year including both subsistence (₹ 3973887.58/year) and cash income (₹ 6383268.65/year) @ ₹ 30733.4/household/annum.

**Contribution of NTFRs to the household economy:** Findings revealed that the household average gross annual income from off-farm and on-farm sources was ₹ 92811.24 which is differentiated as; agriculture (30.62%), livestock (22.68%), NTFRs (20.41%), service (12.44%), business (9.96%), wage labour (2.80%) and others (1.09%). Thus, NTFRs are the 3<sup>rd</sup> major constituent of household economy.

**Inequality mitigation by NTFRs income:** Gini coefficient was 0.2873 when NTFRs income was considered and 0.3539 when it was ignored which indicated that the NTFRs income have stronger equalizing effect on local income distribution.

**Socioeconomic and biophysical characteristics of NTFRs collectors:** The household survey indicated that most of the respondents were middle aged (62.14%) having low literacy upto primary level (54.35%) and large sized families (74.76%). Majority (57.28%) of them were marginal land holders and the herd size among majority (60.19%) of the households varied from 6 to 10 livestock.

**Correlation and multiple regression analysis:** Results indicated that out of eleven household factors, nine attributes were positively and significantly correlated with the NTFRs income. The explicit form of multiple regression equation fitted for NTFRs income is presented as:

$$Y = 7401.43 - 4.019X_1 + 204.86X_2 + 433.37X_3 - 158.09X_4 + 154.07X_5 + 830.29X_6 + 398.91X_7 + 0.03X_8 + 155.74X_9 + 2161.59X_{10} - 7394.15X_{11}$$

Where, Y = Household NTFRs income (₹/year)

X<sub>1</sub> – X<sub>11</sub> = Explanatory variables

**Value Chain Analysis (VCA) of the NTFRs:** The value chain analysis for NTFRs indicated that the regular value chain involves six actors the NTFRs flow as follow: local harvester → village collector → processor → transporter → wholesaler → retailer → consumer.

**SWOT analysis for developing NTFP entrepreneurship using AHP:** The averages and normalized scores of the overall perceptions across the SWOT categories indicated that the NTFRS collectors viewed highest perception for strength (50.00%) which was followed by opportunities (31.90%), weaknesses (11.90%) and threats (6.20%). The overall combined priority value (61.90%) of internal (strengths and weaknesses) categories prevailed over the combined priority value (38.10%) of external (opportunities and threats) factors.

**Training needs assessment for developing NTFR entrepreneurship:** The NTFRs collector's perception on the training needs with respect to NTFR entrepreneurship indicated that the content 'commercialization of non-timber forest resources (NTFRs)' was considered most important and assigned 1<sup>st</sup> rank while the 'conservation of non-timber forest resources (NTFRs) through domestication' was least preferred and ranked 10<sup>th</sup>.

#### **2.4 Details of Field Survey arranged (max 500 words)**

Field surveys were arranged on regular basis for the data collection administering the following techniques:

**Reconnaissance survey of the study area:** Reconnaissance survey of the whole study area was conducted for identification of the layout of the experiments.

**Structured interview:** Primary data were collected by personal interviews of the respondents through a well-structured pre-tested interview schedule (*Annexure II*). Interview schedule for household survey was prepared on the basis of literature referred, reconnaissance survey of the study area, discussion with local people and consultation with the experts. The interview schedule so prepared was employed to collect information on socioeconomic and biophysical characteristics, NTFRs collection, consumption and marketing and their contribution to the household economy and inequality mitigation. The data, thus generated through these approaches were used in exploring the impact of socioeconomic and biophysical implications on the NTFRs income so as to put forth suggestions for NTFRs entrepreneurial strategies.

**Non-participant observation:** The qualitative analysis was done on the basis of personal observation and interaction with the respondents. This technique helped to have firsthand on-the-scenes contact with the respondents, examine the behaviour in natural situation and study the situation-based features of conduct.

**Focus group discussion (FGD):** FGDs were conducted, two in each selected village among 10-15 participants consisted of the village chief, senior citizens of the village, members of village committee and representative of State Forest/Wildlife Department. The information gathered from these discussions supplemented and validated the household surveys which were finally used for interpretations of the results.

**Rapid market assessment:** Rapid market assessment of NTFRs were conducted to understand the market dynamics and trade mechanism of potential NTFRs.

## **2.5 Strategic Planning for each Activities (max. 1000 words)**

**Phase I:** Preparation and initiation phase (6 months)

1. Appointment of Himalayan Junior Research Fellow (HJRF):- One HJRF will be employed for smooth conduction of the project.
2. Literature review: Extensive review of literatures will be done to relate the present study with the previous ones and discuss and interpret the findings.
3. Secondary data collection:- In order to describe the study area, secondary data related to location, demography, sources of livelihoods, physiography, geology, soil, tribal communities, climate and weather, land use and cropping pattern, water resources and irrigation, forest resources, livestock, infrastructure will be collected.
4. Reconnaissance survey of the study area:- Reconnaissance survey of the whole study area will be done for identification of the layout of the experiments.
5. Design of research, sampling technique and sample selection.
6. Preparation of interview schedule and pre-testing:- Structure of interview schedule and pre-testing before household survey will be done.
7. Procurement of instrument/ equipments

**Phase II:** Execution phase (24 months)

8. Primary data collection:- Household survey using interview schedule, non-participant observation, focus group discussion, key informant interview and case studies.
9. Rapid Market Assessment (RMA) of major NTFRs: A qualitative approach will be adopted to conduct rapid market assessment in the project locations.
10. Value Chain Analysis (VCA) of the NTFRs: A sizeable sample of various market functionaries such as traders, wholesalers, retailers and artisans, commission agents, forwarding agents, village collectors, processors will be surveyed for detailed analysis of entire value chain.
11. Assessment of training needs on entrepreneurship development in NTFRs value chain:- The knowledge and skill gap related to NTFRs collection/ production, harvesting and marketing will be studied
12. Identification of stakeholders/ clientele groups
13. Capacity building and skill development of stakeholders
14. Entrepreneurship development and livelihood diversification through training in value addition, commercialization and marketing strategies of NTFRs
15. Data compilation and analysis

**Phase III: Data compilation, report writing and documentation (6 months)**

16. Compilation and tabulation of observations
17. Treatment, measurement, scaling and scoring of observations
18. Statistical analysis using suitable tools and interpretation of data
19. Report writing and concluding the findings

**2.6 Activity-wise Timeframe followed using Gantt/ PERT Chart (max. 1000 words)**

**Phase I: Preparatory and initiation phase (6 months)**

Activities	Time required (in months)					
	1	2	3	4	5	6
Appointment of Research Fellow (HJRF)						
Literature review, Secondary data collection, Reconnaissance survey of the study area						
Design of research, sampling technique and sample selection						
Preparation of interview schedule and pre-testing						
Schedule testing and modifications, Procurement of equipments/ instruments						

**Phase II: Execution phase (24 months)**

Activities	Time required (in months)																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	

Primary data collection	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Rapid Market Assessment (RMA) of major NTFRs	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Value Chain Analysis (VCA) of the NTFRs	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Assessment of training needs on entrepreneurship development in NTFRs value chain	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Identification of stakeholders/ clientele groups	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Capacity building and skill development of stakeholders	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Livelihood diversification through training in enhancement, value addition, commercialization and marketing strategies of NTFRs, Data compilation and analysis	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

**Phase III: Data compilation, report writing and documentation phase (6 months)**

Activities	Time required (in months)					
	1	2	3	4	5	6
Compilation and tabulation of observations	■	■	■	■	■	■
Treatment, measurement, scaling and scoring of observations	■	■	■	■	■	■
Statistical analysis using suitable tools and interpretation of data, Report writing and	■	■	■	■	■	■

### 3 KEY FINDINGS AND RESULTS

#### 3.1 Major Research Findings (max. 1000 words)

**Use category:** Among the use categories of NTFRs, medicines comprised maximum number (67) of NTFRs species followed by vegetables (31), fodder (17), edible fruits (15), beverages (13), fuel (9), spices (5), dye (4), cottage industry (4), edible seed (3), incense (3) edible nut (2), oil seeds (1), toothbrush (1), detergent (1) and mouth freshener (1).

**Plant parts used:** Almost, all the parts were extensively collected and consumed by the sample households with maximum (48) as leaves followed by root (33), fruit (18), twigs (16), flower (7), aerial part (7), seed (6), rhizome (5), entire plant (5), shoot (5), bark (4), cone (4), stem (4), nut (3), tuber (3), bulb (2), basidiocarp (2), apical part(2), corm (1), resin (1), frond (1).

**Life forms of NTFRs species:** Out of the 183 NTFRs collected by the rural people, maximum (66.18 %) were derivatives of herbs followed by shrubs (16.54 %), tree (10.79%), climber (4.31%), fungi (1.43%) and fern (0.71%).

**Family-wise distribution of NTFRs:** The study documented 183 NTFRs derived from 139 species belonging to 114 genera under 59 families. The family Asteraceae had the highest representation of 15 NTFPs species followed by Polygonaceae (10), Apiaceae (8), Rosaceae (8), Liliaceae (7), Fabiaceae (6), Lamiaceae (6), Salicaceae (5), Brassicaceae (4), Ranunculaceae (4), Alliaceae (4), Cuprifoliaceae (3), Pinaceae (3), Boraginaceae (2), Caryophyllaceae (2), Cupperaceae (2), Dipsacaceae (2), Solanaceae (2), Poaceae (2), Dioscoraceae (2), Juglandaceae (2), Malvaceae (2), Velerianaceae (2) and others.

**Collection and consumption NTFRs:** Collection of NTFRs were recorded to be fuel wood (902.55 q/year), herbal medicines (44.38 q/year), wild vegetables (37.91 q/year), edible fruits (28.71 q/year), fodder (168.10 q/year), beverages (8.29 q/year), spices (11.59 q/year), incense (4.38 q/year), edible nuts (32.52 q/year), cottage industry materials (32.52 q/year) and *shilajeet* (0.337 q/year). On the contrary, the subsistence consumptions of the NTFRs were found to be fuel wood (535.19 q/year), herbal medicines (16.64 q/year), wild vegetables (16.78 q/year), edible fruits (10.41 q/year), fodder (82.23 q/year), beverages (3.13 q/year), spices (5.36 q/year), incense (2.22 q/year), edible nuts (11.06 q/year), cottage industry materials (7.68 q/year) and *shilajeet* (0.00 q/year).

**Marketing and economic valuation of NTFRs:** Current study revealed that the NTFRs secured a total income of ₹ 10357156/year including both subsistence (₹ 3973887.58/year) and cash income (₹ 6383268.65/year) @ ₹ 30733.4/household/annum (Table 3). Of the total NTFRs income, herbal medicines contributed highest share (45.32%) followed by cottage industry materials (23.04%), spices (12.74%), wild vegetables (8.22%), fuel wood (3.59%), edible nuts (2.39%), *shilajeet* (1.80%), fodder (1.40%), edible fruits (0.74%), beverages (0.49%) and incense (0.27%).

**Contribution of NTFRs to the household economy:** Findings revealed that the household average gross annual income from off-farm and on-farm sources was ₹ 92811.24 which is differentiated as;

agriculture (30.62%), livestock (22.68%), NTFRs (20.41%), service (12.44%), business (9.96%), wage labour (2.80%) and others (1.09%). Thus, NTFRs are the 3<sup>rd</sup> major constituent of household economy.

**Inequality mitigation by NTFRs income:** Gini coefficient was 0.2873 when NTFRs income was considered and 0.3539 when it was ignored which indicated that the NTFRs income have stronger equalizing effect on local income distribution.

**Socioeconomic and biophysical characteristics of NTFRs collectors:** The household survey indicated that most of the respondents were middle aged (62.14%) having low literacy upto primary level (54.35%) and large sized families (74.76%). Majority (57.28%) of them were marginal land holders and the herd size among majority (60.19%) of the households varied from 6 to 10 livestock. Most of the households (41.75%) possessed labour force of > 3 workers, engaged mainly in cultivation or business (49.51-15.56%) and the gross annual income ranged from ₹ 90001 to ₹ 120000/ annum (55.34%). Majority of the households (75.63%) were having proximity of <5 km to the forests who visits the forests very frequently (72.14%). The extent of forest resource possession i.e. area owned under agroforestry/ homestead forestry plantation among most of the respondents (60.19%) was < 0.10 ha.

**Correlation and multiple regression analysis:** Results (Table 5) indicated that out of eleven household factors, nine attributes were positively and significantly correlated with the NTFRs income. The forest resource possession (-0.415) had exhibited negative and significant correlation with the NTFRS income whereas the relationship between age (0.180) and the NTFRs income was non-significant. The coefficient of determination ( $R^2$ ) of 0.920 implies that all the factors jointly explained 92.00% of variation on the NTFRs income. The magnitude of F value (95.06) indicated that the  $R^2$  is statistically significant ( $p < 0.05$ ) and all the six factors contributed significantly in the variation of the household NTFRs income.

The explicit form of multiple regression equation fitted for NTFRs income is presented as:

$$Y = 7401.43 - 4.019X_1 + 204.86X_2 + 433.37X_3 - 158.09X_4 + 154.07X_5 + 830.29X_6 + 398.91X_7 + 0.03X_8 + 155.74X_9 + 2161.59X_{10} - 7394.15X_{11}$$

Where, Y = Household NTFRs income (₹/year)

$X_1 - X_{11}$  = Explanatory variables

**Value Chain Analysis (VCA) of the NTFRs:** The value chain analysis for NTFRs indicated that the regular value chain involves six actors the NTFRs flow as follow: local harvester → village collector → processor → transporter → wholesaler → retailer → consumer.

**SWOT analysis for developing NTFP entrepreneurship using AHP:** The averages and normalized scores of the overall perceptions across the SWOT categories indicated that the NTFRS collectors viewed highest perception for strength (50.00%) which was followed by opportunities (31.90%), weaknesses (11.90%) and threats (6.20%). The overall combined priority value (61.90%) of internal (strengths and weaknesses) categories prevailed over the combined priority value (38.10%) of external (opportunities and threats) factors.

**Training needs assessment for developing NTFR entrepreneurship:** The NTFRs collector's perception on the training needs with respect to NTFR entrepreneurship (Table 8) indicated that the



content 'commercialization of non-timber forest resources (NTFRs)' was considered most important and assigned 1<sup>st</sup> rank. Other important contents where the NTFRs collector's needed trainings were entrepreneurship in value chains of NTFRs (rank 2<sup>nd</sup>), non-timber forest resources (NTFRs) for agri-business development (rank 3<sup>rd</sup>), demand forecasts and price determination in non-timber forest resources (NTFRs) (rank 4<sup>th</sup>), livelihood diversification through NTFRs based cottage industries and handicrafts (rank 5<sup>th</sup>), cost benefit considerations in NTFRs production (rank 6<sup>th</sup>), collection, processing and value addition of non-timber forest resources (NTFRs) (rank 7<sup>th</sup>), non-timber forest resources (NTFRs) for achieving food and nutritional security (rank 8<sup>th</sup>), domestication and production of NTFRs production (rank 9<sup>th</sup>) and conservation of non-timber forest resources (NTFRs) through domestication (rank 10<sup>th</sup>).

### **3.2 Key Results (max. 1000 words in bullets covering all activities)**

- The fuel wood, fodder, edible fruits, vegetables, herbal medicines, and spices are the major NTFRs collected by majority of the sample households from the forests. Whereas, the involvement of households in collection of beverage, dye, oil seed, edible seed, detergent, edible nut, tooth brush, incense, mouth freshener, fungi and *Shilajeet* is comparatively low.
- Sixteen different use categories of NTFRs have been recorded among the surveyed population in the study area.
- Maximum number of species (54) were utilized as medicines followed by vegetables (29), fodder (13), edible fruits (11), beverages (11), fuel (7), cottage industry (3), dye (4), spices (3), edible seed (3), incense (2), oil seeds (1), edible nut (1), toothbrush (1), detergent (1), mouth freshener (1).
- Almost all the parts *viz.*, leaves (46), followed by root (27), twigs (21), fruit (14), flower (7), seed (5), rhizome (5), entire plant (5), bark (3), nut (3), cone (3), tuber (3), bulb (2), basidiocarp (2), stem (2), corm (1), resin (1), frond (1) were widely collected and utilized by the surveyed household.
- The variety of NTFRs collected by the people were mostly represented by herbs (66.09%) followed by shrubs (14.78%), trees (12.17%), climbers (4.35%), fungi (1.74%), and fern (0.87%) in the sample household.
- The structure of household average gross annual income consisted of all off-farm and on-farm sources among the surveyed population was mostly accrued by agriculture while other sources were livestock, NTFRs, petty business, service, wage labour and others. Therefore, NTFRs are the 3<sup>rd</sup> major component of household economy in the study area.
- The composition of household average gross annual employment comprised of all off-farm and on-farm sources in the surveyed households was made up of agriculture, livestock, NTFRs, business, service, wage labour and others. Thus, the NTFRs are the 3<sup>rd</sup> major constituent of household employment in the study site.
- The marketing mechanism of almost all the NTFRs is predominantly individual oriented and majority of the NTFRs are sold in the raw form without any value addition except certain trivial functions fetching paltry income to the vendors.

- The individual selling mechanism of small surplus forest resources restricts the collectors to access the remunerative markets which require tradable quantity. The poor marketing infrastructure and lack of storage facilities compels them to sell off their produces to the first market contact that is generally the petty traders.
- The selling of almost all the forest resources is predominantly done in the local markets where transaction takes place on a mutually agreed price quote between vendors and petty traders. Generally, the forest produces hits the market during the peak season where getting a better price becomes difficult due to competitive market situation. The middlemen invariably exploit collectors of NTFRs on account of prevailing malpractices, forced and distress sales.
- The NTFR stakeholder's perception on the training needs with respect to NTFR entrepreneurship indicated that the most important training need is found to be the 'commercialization of NTFR' (WMS, 3.00; rank 1<sup>st</sup>) which was closely followed by the 'entrepreneurship in value chains of NTFR' (WMS, 2.84; rank 2<sup>nd</sup>), NTFR for agri-business development (WMS, 2.79; rank 3<sup>rd</sup>) and demand forecasts and price determination in NTFR (WMS, 2.69; rank 4<sup>th</sup>). The 'livelihood diversification through NTFR based cottage industries and handicrafts' (WMS= 2.31; rank 5<sup>th</sup>), 'cost benefit considerations in NTFR production' (WMS= 2.26; rank 6<sup>th</sup>), 'collection, processing and value addition of NTFR' (WMS= 2.03; rank 7<sup>th</sup>), 'NTFR for achieving food and nutritional security' (WMS= 1.90; rank 8<sup>th</sup>), 'domestication and production of NTFR production' (WMS= 1.80; rank 9<sup>th</sup>) and 'conservation of NTFR through JFM' (WMS= 1.68; rank 10<sup>th</sup>) were noted as key training needs but were ranked lower in importance. The NTFR stakeholders viewed the 'commercialization of NTFR' as the very prominent training need accounting for 12.87% of the total perceptions while the training need 'conservation of NTFR through JFM' received lowest priority comprising 7.21% of the total perceptions.
- The short duration trainings (1-7 days) (WMS, 3.00; rank 1<sup>st</sup>) was the highest rated delivery method as adjudged by the NTFR stakeholders which was followed by the medium duration trainings (8-14 days) (WMS, 2.84; rank 2<sup>nd</sup>). The long duration trainings (3-4 weeks) (WMS, 2.79; rank 3<sup>rd</sup>) was perceived as the lowest rated delivery method by the NTFR stakeholders.
- The findings on the preference in the training methods perceived by the NTFR stakeholders revealed that all the training methods including short duration trainings (1-7 days), medium duration trainings (8-14 days) and long duration trainings (3-4 weeks) were considered appropriate and should be adopted in future training programmes for NTFR stakeholders. The preference of low duration trainings over long duration trainings among NTFR stakeholders could be due to the reasons like poor utilization of sources of information, lack of awareness, low literacy, non- recognition of the information sources, difficult accessibility of the villages, primitive socio-cultural background and pressure of earning livelihoods. With the inclusion of all ten major training areas of NTFR entrepreneurship and with the continuance and adoption of the presently used and newly identified delivery methods, a new training model for the NTFR stakeholders should be used.

### 3.3 Conclusion of the study undertaken (maximum 500 words in bullets)

- The study led to conclude that there is rich diversity of non-timber forest resources (NTFRs) collected, consumed and marketed by the *Shina* tribal people in the Gurez valley of Kashmir. The NTFRs comprised twenty two types (22) of plant parts which were extensively collected from herbs, shrubs, trees, climbers, fungi, fern *etc.* and consumed under sixteen (16) different use categories by the tribal population to meet their livelihood needs.
- The NTFRs play a crucial role in livelihood security of the rural people by providing fuel wood, fodder, timber, wicker, fruits, vegetables, medicines, *etc.* and contributing significantly to the gross annual income and employment opportunities of the household besides acting as safety net in cases of exigency.
- Of the all off-farm and on-farm income sources agriculture contributed maximum income followed by livestock, NTFRs, business, service, wage labour and others. Likewise, among the employment sources agriculture generated maximum employment opportunities followed by livestock, NTFRs, business, service, wage labour and others. Hence, the NTFRs are the 3<sup>rd</sup> major component of household economy and employment after agriculture and livestock.
- Analysis of Gini coefficients with and without NTFRs income indicated that the NTFRs income have stronger equalizing effect on local income distribution.
- Socioeconomic and biophysical characteristics of NTFRs collectors indicated that people are in underprivileged conditions and hence, needs improvement through NTFR entrepreneurship and enterprises.
- The socioeconomic and biophysical characteristics of NTFRs collectors are crucial in predicting the NTFR income and entrepreneurship, hence, needs due attention during planning and implementation of NTFR entrepreneurship.
- The VCA indicated that marketing mechanism of almost all the NTFRs is predominantly individual oriented and majority of the NTFRs are sold in the raw form without any value addition except certain trivial functions fetching paltry income to the vendors.
- The individual selling mechanism of small surplus forest resources restricts the collectors to access the remunerative markets which require tradable quantity. The poor marketing infrastructure and lack of storage facilities compels them to sell off their produces to the first market contact that is generally the petty traders.
- The selling of almost all the forest resources is predominantly done in the local markets where transaction takes place on a mutually agreed price quote between vendors and petty traders.
- Generally, the forest produces hits the market during the peak season where getting a better price becomes difficult due to competitive market situation. The middlemen invariably exploit collectors of NTFRs on account of prevailing malpractices, forced and distress sales.
- SWOT analysis indicated that the internal (strengths and weaknesses) categories prevailed over the external (opportunities and threats) factors.

- Hence, it is imperative that promotion of NTFRs entrepreneurship be strengthened aiming to enhance the livelihood of rural poor on sustainable basis.
- Training needs assessment for developing NTFR entrepreneurship indicated that developing skill and capacity building through effective extension and training networks is imperative for enhancing NTFRs entrepreneurship-based livelihoods.
- Therefore, Trainings on skill up-gradation and capacity building of stakeholders of *Shina* community should be organized for Entrepreneurship development through value chains improvement by value addition (time, place, form and possession) and commercialization of non-timber forest resources.

#### 4 OVERALL ACHIEVEMENTS

##### 4.1 Achievements on Objectives [Defining contribution of deliverables in overall Mission (max. 1000 words)]

1. To identify and study the NTFRs widely collected/produced, consumed and traded, both locally and nationally.

- Literature review and Secondary data collection
- Conduction of reconnaissance survey of the Gurez Valley of Bandipora district in Kashmir province
- Design of research, sampling technique and sample selection procedure
- Interview schedule structure and pre-testing for both village as well as household survey
- Pre-testing of interview schedule for primary data collection
- Conduction of household survey using structured interview schedule
- Data collection and analysis on distribution pattern of NTFRs based on use categories, plant parts utilized, plant habits/ life forms and families
- Data collection and analysis on collection, consumption, marketing and economic valuation of NTFRs
- Database on household income composition and contribution of NTFRs to the household economy and inequality mitigation
- Database on socioeconomic and biophysical characteristics of NTFRs collectors
- Correlation and multiple regression analysis of household variables with the NTFRs income

2. To collect and analyze information on value chains, actors, market channel, pricing mechanisms and value addition of the potential NTFRs.

- Household survey using structured interview schedule for primary data collection on value chains, actors, market channel, pricing mechanisms and value addition of the potential NTFRs
- Value chain analysis (VCA) of fuel wood with main stakeholders
- Value chains analysis (VCA) of medicinal NTFRs with main stakeholders
- Value chains analysis (VCA) of mushroom *Morchella esculenta* with main stakeholders
- Value chains analysis (VCA) of wild spice *Bunium persicum*
- Value chains analysis (VCA) of cottage industry materials/products

3. To develop entrepreneurship and enhance livelihoods of *Shina* tribe through value chains improvement by value addition (time, place, form and possession) and commercialization of non-timber forest resources.

- Household survey using structured interview schedule for primary data collection on SWOT and training needs assessment for developing NTFR entrepreneurship
- SWOT analysis for developing NTFR entrepreneurship using AHP
- Training needs assessment for developing NTFR entrepreneurship
- Training of NTFRs stakeholders on NTFR entrepreneurship

4.2 Establishing New Database/Appending new data over the Baseline Data (max. 1500 words, in bullet points)

1. Secondary data regarding location, physiography, boundaries etc. of the sample villages
2. Secondary data regarding demographic profile of the sample villages:-
  - Human population i) Male ii) Female iii) Children
  - Literacy rate i) Male ii) Female iii) Total
  - Caste wise distribution i) ST ii) SC iii) OBC iv) General
3. Secondary data with regard to land utilization pattern in the sample villages:-
  - Forest, Non-agricultural use, Barren and uncultivable land, Cultivable waste land, Fallow land, Net sown area, Irrigated, Un-irrigated, Homestead, Other, if any and total.
4. Secondary data on Manpower potential & employment status:-
  - Cultivators, agricultural labourers, own profession, govt. employment, private employment, others, exodus trend
5. Secondary data with regard to livestock population in the sample villages:-
  - Poultry, goatry, draught animals, milch cattle *etc.*
6. Secondary data on infrastructure profile of the sample villages:-
  - Economic infrastructure: Bank, market, co-operative societies, self help groups
  - Basic amenities: Educational facilities, medical facilities, transportation facilities, recreational facilities, electricity facilities
7. Primary data with regard to household socioeconomic and biophysical variables:-
  - Socioeconomic and biophysical variables:- Caste, education, social participation, family composition, size of land holding, main occupation, subsidiary occupation, housing status, farm power, farm implements, livestock possession, wealth status, urban closeness
  - Biophysical variables:- Proximity to the forests, frequency of forest visits, forestry resources possession, family labour
8. Primary data on NTFRs collection, consumption and marketing:-
  - Diversity, distribution, utilization, collection, consumption and marketing of NTFRs,
  - Contribution of NTFPs to household income and employment

- Factors influencing the NTFPs exploitation in the locality

#### 9. Value Chain Analysis (VCA) of the NTFRs

- Fuel wood value chain with main stakeholders
- Value chains of medicinal NTFRs with main stakeholders
- Value chains of mushroom *Morchella esculenta* with main stakeholders
- Value chain of wild spice *Bunium persicum*
- Value chain of cottage industry materials/products

#### 10. SWOT factors and categories of NTFR entrepreneurship development

- SWOT Categories and factors identified for NTFR entrepreneurship
- Relative priority values of the SWOT categories and factors based on preference ranking technique
- Local weight and global weight of SWOT factors
- NTFRs collector's perception on the training needs with respect to NTFR entrepreneurship based on preference ranking technique

#### **4.3 Generating Model Predictions for different variables (if any) (max 1000 words in bullets)**

Empirical model predicting the NTFR income on the basis of socioeconomic and biophysical variables

Description:

The multiple regression model is a multivariate statistical technique to predict the household NTFR income on the basis of determinant socioeconomic and biophysical variables. The explicit form of multiple regression equation fitted for NTFRs income is presented as:

$$Y = 7401.43 - 4.019X_1 + 204.86X_2 + 433.37X_3 - 158.09X_4 + 154.07X_5 + 830.29X_6 + 398.91X_7 + 0.03X_8 + 155.74X_9 + 2161.59X_{10} - 7394.15X_{11}$$

Where, Y = Household NTFRs income (₹/year)

X<sub>1</sub> – X<sub>11</sub> = Explanatory variables

X<sub>1</sub> = Age (year)

X<sub>2</sub> = Education (No. of years undergone in education)

X<sub>3</sub> = Size of family (No. of family members in a household)

X<sub>4</sub> = Size of landholding (Land area under household management)

X<sub>5</sub> = Herd size (No. of livestock owned)

X<sub>6</sub> = Main occupation (Occupation in which an individual is engaged for six months or more in a year)

X<sub>7</sub> = Family labour (No. of workers in the family)

X<sub>8</sub> = Gross annual income (₹/annum)

X<sub>9</sub> = Proximity to the forests (Distance between forests and house)

X<sub>10</sub> = Forest visit (Frequency of forest visits)

X<sub>11</sub> = Forest resource possession (No. of trees owned by the households)

Impact

The magnitude of F value indicated that the  $R^2$  is statistically significant ( $p < 0.05$ ) which clearly showed that the model is very strong, reliable and has high predictive ability and established that 77.80% of NTFR income is induced by the determinant variables. Hence, the model developed is useful to identify the important household variables and estimate the NTFR income using small data samples from field surveys.

#### Commercial applicability

The important implication of the use of regression model is that policy makers and planning agencies can design strategies to increase the household NTFR income based on key variables rather than concentrating on many variables. Further, the model will help to minimize the efforts, money, time and confusion of the scientists, planners, extension workers and forest officials to design their strategies to strengthen the NTFR commercialization, entrepreneurship and enterprises.

#### **4.4 Technological Intervention (max. 1000 words)-N.A.**

#### **4.5 On-field Demonstration and Value-addition of Products (max. 1000 words, in bullet points)**

Two-day awareness-cum-training programme of NTFRs stakeholders was organized by the Division of Natural Resource Management, Faculty of Forestry Benhama, Ganderbal-191201 (J&K) in collaboration with Mountain Agriculture Research and Extension Station (MAR&ES) on “Entrepreneurship Development and Livelihood Enhancement of Shina Tribe through Value Chains Improvement of Non-Timber Forest Resources (NTFRs)” under National Mission on Himalayan Studies (NMHS) Fellowship Project during October 22<sup>nd</sup>-23<sup>rd</sup>, 2020 at Izmarg, Gurez (J&K). More than one hundred and twenty (120) NTFRs stakeholders were trained and skill developed for entrepreneurship development NTFRs stakeholders and officials of Agriculture and Forest departments participated in the programme. NTFRs stakeholders were trained through lectures/ Interactions, group discussions, extension literatures, on-field demonstration and value-addition of NTFRs in the two-day training programme organized.

#### **4.6 Developing Green Skills in IHR-N.A.**

#### **4.7 Addressing Cross-cutting Issues (max. 500 words, in bullet points)-N.A.**

### **5 IMPACTS OF FELLOWSHIP IN IHR**

#### **5.1 Socio-Economic Development (max. 500 words, in bullet points)**

- Socioeconomic and biophysical characteristics of NTFRs collectors indicated that people are in underprivileged conditions despite living in resource rich area.
- Hence, there is an urgent need to improvement their socioeconomic conditions through NTFR entrepreneurship and enterprises.
- Trainings on skill up-gradation and capacity building of stakeholders of *Shina* community for Entrepreneurship development through value chains improvement by value addition (time, place, form and possession) and commercialization of non-timber forest resources will improve their standard of living and socioeconomic status.

- The VCA will also improve marketing mechanism of almost all the NTFRs which are generally individual oriented and without any value addition fetching trivial functions fetching trivial income to the vendors.

**5.2 Scientific Management of Natural Resources In IHR (max. 500 words, in bullet points)-N.A.**

**5.3 Conservation of Biodiversity in IHR (max. 500 words, in bullet points)**

- The biodiversity conservation and livelihood security in the valley can be achieved by preserving, safeguarding and promoting NTFR domestication, management and entrepreneurship development through value addition and commercialization of NTFRs.
- Hence, designing appropriate and effective perspective is essential for tribal people that would foster biodiversity conservation as well as livelihoods and motivate them for judicious forest resources management through exploiting NTFRs.

**5.4 Protection of Environment (max. 500 words, in bullet points)-N.A.**

**5.5 Developing Mountain Infrastructures (max. 500 words, in bullet points)-N.A.**

**5.6 Strengthening Networking in IHR (max. 700 words, in bullet points)-N.A.**

**6 EXIT STRATEGY AND SUSTAINABILITY**

**6.1 How effectively the fellowship findings could be utilized for the sustainable development of IHR (max. 1000 words)**

- Traditionally, the *Shina* people are exploiting multiple NTFRs for livelihood security in terms of subsistence consumption, cash income, employment opportunities and safety net. Hence, livelihood diversification through NTFR entrepreneurship and enterprises is needed as important strategy of poverty reduction, inequality mitigation and socioeconomic development.
- The research findings are of great importance for planners, scientists, policy makers and extension workers for planning, formulation and implementation of NTFRs based developmental projects for livelihood security of *Shina* tribe in the Gurez valley of Kashmir Himalaya.
- The research findings are useful in formulation of appropriate extension and communication strategies for effective dissemination of scientific information about NTFRs entrepreneurship devolvement through efficient utilization and mobilization of existing NTFR for livelihood security.

**6.2 Efficient ways to replicate the outcomes of the fellowship in other parts of IHR (max. 1000 words)**

- The research findings are applicable and the information may be disseminated in the areas having similar socio-demographic and ecological conditions in the Himalayan regions, hence, the significant data of this project are sustainable and have long-term effectiveness.
- This project can be replicated across the Himalayan regions having similar conditions for livelihood security of the local communities through NTFR entrepreneurship and enterprises.
- Further, this project will be shared within the district/city/state with specific partners.
- Grant seeker and partners will be most pleased to make presentations on replicability and to assist in a wide dissemination of this program model.



### **6.3 Identify other important areas not covered under this study, but needs further attention (max. 1000 words)**

- The research findings are applicable and the information may be disseminated in the areas having similar socio-demographic and ecological conditions in the Himalayan regions which needs further attention.

### **6.4 Major recommendations for sustaining the outcomes of the fellowship in future (500 words in bullets)**

- Given under sub-heads 6.1 and 6.2.

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## **8 ACKNOWLEDGEMENTS**

All the Investigators are thankful to the funding agency National Mission on Himalayan Studies (NMHS) for providing research grant under Reference No. GBPNI/NMHS-2018-19/HSF 26-04/155 Dated 19-12-2018 to acquire adequate resources for completion of this research studies. We are also grateful to the local NTFR stakeholders of Gurez valley for spending their precious time and efforts during the household survey.

## **APPENDICES**

- Appendix 1 – Details of Technical Activities
  - Details of Technical Activities given as Annexure-XX
- Appendix 2 – Copies of Publications duly Acknowledging the Grant/ Fund Support of NMHS
  - Given as Annexure-XIV-XV
- Appendix 3 – List of Trainings/ Workshops/ Seminars with details of trained resources and dissemination material and Proceedings
  - Given as Annexure-XIII and XVI-XIX
- Appendix 4 – List of New Products (utilizing the local produce like NTFPs, wild edibles, bamboo, etc.)
  - Given as Annexure-VII
- Appendix 5 – Copies of the Manual of Standard Operating Procedures (SOPs) developed
- Appendix 6 – Details of Technology Developed/ Patents filed
- Interview schedule developed given as Annexure-II
- Appendix 7 – Any other (specify)
  - Empirical model developed given as Annexure-III

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**(Signature of HRA/HJRF/HPF)**



**(Dr. M.A. Islam)**

**(NMHS FELLOWSHIP COORDINATOR)**

**(Signed and Stamped)**

**(HEAD OF THE INSTITUTION)**  
**(Signed and Stamped)**

**Place: .....**  
**Date: 17/07/2023**

## Consolidated and Audited Utilization Certificate (UC) and Statement of Expenditure (SE)

**For the Period: 2018-2022**

1.	Title of the fellowship/Scheme:	Entrepreneurship Development and Livelihood Enhancement of Shina Tribe through Value Chains Improvement of Non-Timber Forest Resources in Gurez Valley of Kashmir
2.	Name of the Principal Investigator & Organization:	Dr. M. A. Islam Head/Professor, Division of Natural Resource Management, Faculty of Forestry, SKUAST-K, Benhama, Ganderbal-191 201 (J & K)
3.	NMHS-PMU, G.B. Pant National Institute of Himalayan Environment, Kosi-Katarmal, Almora, Uttarakhand  Letter No. and Sanction Date of the Fellowship:	GBPNI/NMHS-2018-19/HSF-26-04/155 Dated 19/12/2018
4.	Amount received from NMHS-PMU, G.B. Pant National Institute of Himalayan Environment, Kosi-Katarmal, Almora, Uttarakhand during the fellowship period (Please give number and dates of Sanction Letter showing the amount paid):	<ol style="list-style-type: none"> <li>1. 1<sup>st</sup> installment- Rs. 521400.00 (GBPNI/NMHS-2018-19/HSF-26-04/155 Dated 01/02/2019)</li> <li>2. 2<sup>nd</sup> Installment- Rs. 456599.00 (GBPNI/NMHS-2018-19/HSF-26-04/155/141 Dated 30/09/2020)</li> <li>3. 3<sup>rd</sup> Installment- Rs. 504000.00 (GBPNI/NMHS-2018-19/HSF-26-04/155/141/184 Dated 02/11/2021)</li> </ol>
5.	Total amount that was available for expenditure (including commitments) incurred during the fellowship period:	Rs. 1481999.00
6.	Actual expenditure (excluding commitments) incurred during the fellowship period:	Rs. 1318313.95
7.	Unspent Balance amount refunded, if any (Please give details of Cheque no. etc.):	-
8.	Balance amount available at the end of the fellowships:	
9.	Balance Amount:	Rs. 163685.05

10.	Accrued bank Interest:	Rs. 20506.00
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Certified that the expenditure of **Rs. 1318313.95 (Rupees **Thirteen lakhs eighteen thousand three hundred thirteen and ninety-five paise**)** mentioned against Sr. No. 6 was actually incurred on the fellowship/scheme for the purpose it was sanctioned.

Date:



**(Dr. M.A. Islam)**

(Signature of  
Principal Investigator)

(Signature of Registrar/  
Finance Officer)

(Signature of Head  
of the Institution)

OUR REF. No.

ACCEPTED AND COUNTERSIGNED

Date:

COMPETENT AUTHORITY  
NATIONAL MISSION ON HIMALAYAN STUDIES (GBP NIHE)

## Statement of Consolidated Expenditure

[Division of Natural Resource Management, Faculty of Forestry, SKUAST-K,  
Benhama, Ganderbal-191 201 (J & K)]

Statement showing the expenditure of the period from  
Sanction No. and Date

: GBPNI/NMHS-2018-19/HSF-26-04/155 Dated  
19/12/2018

1. Total outlay of the Fellowship : Rs. 16,06,968/-
2. Date of Start of the Fellowship : Sanctioned on 19/12/2018; Fund transferred on 01/02/2019
3. Duration : 3-years
4. Date of Completion : 2022
- a) Amount received during the fellowship period : Rs. 1481999.00
- b) Total amount available for Expenditure : Rs. 1318313.95

S. No.	Budget head	Amount received	Expenditure	Amount Balance/ excess expenditure
1	Salaries	958392.00	871776.00	86616.00
2	Contingency (including domestic travel)	382648.00	305578.95	77069.05
3	Institutional charges	140959.00	140959.00	0.00
4	Accrued bank Interest			20506.00
5	<b>Total</b>	<b>1481999</b>	<b>1318313.95</b>	<b>184191.05</b>

Certified that the expenditure of **Rs. 1318313.95 (Rupees: Thirteen lakhs eighteen thousand three hundred thirteen and ninety-five paise)** mentioned against Sr. No.5 was actually incurred on the fellowship/ scheme for the purpose it was sanctioned.

Date:



**(Dr. M.A. Islam)**

(Signature of  
Principal Investigator)

(Signature of Registrar/  
Finance Officer)

(Signature of Head  
of the Institution)

OUR REF. No.

ACCEPTED AND COUNTERSIGNED

Date:

COMPETENT AUTHORITY  
NATIONAL MISSION ON HIMALYAN STUDIES (GBP NIHE)

## Consolidated Interest Earned Certificate

Please provide the detailed interest earned certificate on the letterhead of the grantee/ Institution and duly signed.

S. No.	Year	Interest accrued
1	2019-2020	13246.00
2	2020-2021	3751.00
3	2021-2022	3509.00
4	<b>Total</b>	<b>20506.00</b>

Certified that the interest of **Rs. 20506.00 (Rupees Twenty thousand five hundred six)** mentioned against Sr. No. 4 was actually accrued on the fellowship/scheme for the purpose it was sanctioned.



(Dr. M.A. Islam)

(NMHS FELLOWSHIP COORDINATOR)

(Signed and Stamped)



National Mission on Himalayan Studies (NMHS)

**DIRECT BENEFIT TRANSFER (DBT) DETAILS**

Scheme Name:	<b>National Mission on Himalayan Studies (NMHS)</b>
Scheme Type:	<b>Central Sector (CS) Grant-in-Aid Scheme</b>
Scheme Code:	<b>NMHS</b>
Category:	<b>Fellowship Grant</b>
Month-Year:	

**PRO FORMA FOR DBT DETAILS**

**University/Institution Name:** .....

S#	Position (H-RA, H-JRF/ H-JPF)	Name	DoB*	DoI*	PI	Research title	Objectives	Study Area, IHR State	Contact details (Complete corresponding address), Mobile No., E-mail ID	Bank details (Account number, IFSC Code)	Emoluments /Fellowship	Aadhaar No.
1.												

**Note:** For each month, the DBT Details Pro forma dully filled and signed for each Himalayan Fellowship Grant under NMHS must be submitted at [finance.nmhspmu2017@gmail.com](mailto:finance.nmhspmu2017@gmail.com); [nmhspmu2016@gmail.com](mailto:nmhspmu2016@gmail.com). \*DoB (Date of Birth); DoJ (Date of Joining).

**(Authorized Signatory)**

*Month 2019 – Latest Updated List of Himalayan Researchers or Fellows (working in the current time)*

S#	Name	Fellowship (RA/JRF/JPF)
1.		
2.		

## **Details and Declaration of Refund of Any Unspent Balance**

Please provide the details of refund of any unspent balance as RTGS (Real-Time Gross System) in favor of **NMHS GIA General** and declaration on the official letterhead duly signed by the Head of the Institution.

Kindly note the further Bank A/c Details as follows:

**Name of NMHS A/c:** NMHS GIA General  
**Bank Name & Branch:** Central Bank of India (CBI), Kosi Bazar, Almora, Uttarakhand 263643  
**IFSC Code:** CBIN0281528  
**Account No.:** 3530505520 (Saving A/c)

In case of any queries/ clarifications, please contact the NMHS-PMU at e-mail: nmhspmu2016@gmail.com

## Technology Transfer and/ or Intellectual Property Rights Certificate

With a view to encourage the institutions to file patent applications on their innovations, motivate them to transfer their technologies for commercialization, and facilitate them to reward their inventions, the following instructions are issued.

### 1. In these instructions:

(a) **“Institution”** means any technical, scientific or academic establishment where research work is carried out through funding by the Central / State Government.

(b) **“Intellectual Property Rights”** include patents, registered designs, copyrights and layout design of integrated circuits.

(c) **“Inventor”** means an employee of the institution whose duties involve carrying out of scientific or technical research.

**2. Scope:** These instructions apply to those institutions receiving funds for research projects/ fellowships from NMHS, the Ministry of Environment, Forest and Climate Change (MoEF&CC).

**3. Inventions by institutions:** Institutions shall be encouraged to seek protection of Intellectual Property Rights (IPR) to the results of research through R&D projects/ fellowships. While the patent may be taken in the name(s) of inventor(s), the institutions shall ensure that the patent is assigned to it & DBT, GOI. The institution shall take necessary steps for commercial exploitation of the patent on non-exclusive basis. The institution is permitted to retain the benefits and earnings arising out of the IPR. However, the institution may determine the share of the inventor(s) and other persons from such actual earnings. Such share(s) shall be limited to 1/3<sup>rd</sup> of the actual earnings.

**4. Inventions by institutions and industrial concerns:** IPR generated through joint research by institution(s) and industrial concern(s) through joint efforts can be owned jointly by them as may be mutually agreed to by them and accepted by the Department through a written agreement. The institution and industrial concern may transfer the technology to a third party for commercialization on exclusive/non-exclusive basis. The third party, exclusively licensed to market the innovation in India, must manufacture the product in India. The joint owners may share the benefits and earnings arising out of commercial exploitation of the IPR. The institution may determine the share of the inventor(s) and other persons from such actual earnings. Such share(s) shall not exceed 1/3<sup>rd</sup> of the actual earnings.

**5. Patent Facilitating Fund:** The institution shall set apart not less than 25 per cent of such earnings for crediting into a fund called Patent Facilitating Fund. This Fund shall be utilized by the institution for updating the innovation, for filing new patent applications, protecting their rights against infringements, for creating awareness and building competency on IPR and related issues.

**6. Information:** The institutions shall submit information relating to the details of the patents obtained, the benefits and earnings arising out of IPR and the turnover of the products periodically to the Department/Ministry, which has provided funds.

**7. Royalty-free license:** The Government shall have a royalty-free license for the use of the intellectual property for the purposes of the Government of India.

**(HEAD OF THE INSTITUTION)**

**(Signed and Stamped)**