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Localizing indicators of Sustainable Development Goals : A model in the context of Indian Himalayan States for SDG 13 and 15.

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Abstract:

This paper argues the need and the mechanism to localize the indicators of SDG[Sustainable Development Goals] for Indian Himalayan States in the context of SDG Goal 13 and SDG Goal 15.Goal 13 of the SDG is to take urgent action to combat climate change and its impacts while Goal 15 of SDG aims to protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss. These two goals out of the seventeen goals are directly related to environment, ecology and climate change. The Indian Himalayan Region[IHR] being the life sustaining system of millions of people and vast species of flora and fauna in uplands and much more in lowland areas due to its vast bio physical diversity also acts as a climate regulator for the continent. This paper first develops the context arguing why Goal 13 and 15 should be topmost priority for the Indian Himalayan states. The paper then recommends some sequential suggestive steps to develop a schema for monitoring the indicators suggested by UN, MoSPI, NITI Ayog. The paper suggests that the same can be substantiated into actual monitoring mechanism by mapping the relevant Centrally Sponsored Schemes(CSS),State Schemes (SS) and EAP(Externally Aided Projects)in consonance with such indicators. The paper thus proposes the need for localized implementation of schemes for achieving the Goals and thereafter relevant monitoring of the same considering the basic characteristic of Himalayan states. The paper also insists for the research and study needs to identify the data gaps in each indicator proposed , by taking a case of Uttarakhand as a representative of Himalayan states of India and presents a model on how a Himalayan state should decentralize the monitoring mechanism of each indicator in different departments by following the model of the State of Uttarakhand. The paper finally presents policy asks for achieving those time bound targets by substituting SDG with HDG[Himalayan Development Goal].Indicators of UN, MoSPI, NITI Ayog, DES of Uttarakhand and some other Indian Himalayan states and various state government level departments have been used to carry out the study.

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Context:

"Mountains are an important source of water, energy and biological diversity. Furthermore, they are a source of such key resources as minerals, forest products and agricultural products and of recreation. As a major ecosystem representing the complex and interrelated ecology of our planet, mountain environments are essential to the survival of the global ecosystem. Mountain ecosystems are, however, rapidly changing. They are susceptible to accelerated soil erosion, landslides and rapid loss of habitat and genetic diversity. On the human side, there is widespread poverty among mountain inhabitants and loss of indigenous knowledge. As a result, most global mountain areas are experiencing environmental degradation. Hence, the proper management of mountain resources and socio-economic development of the people deserves immediate action".[Agenda 21, Section 13.1 (UNCED, 1992)].The munificent endeavour made by the Earth Summit held in Rio de Janeiro of Brazil in 1992, International Centre for Integrated Mountain Development(ICIMOD) and other major stakeholders of Sustainable Mountain Development[SMD] , the Government of Switzerland, Mountain Agenda etc set the ball rolling for SMD. In recent decades a large number of agencies like nongovernmental organisations(NGOs), government departments , intergovernmental organisations, United Nations, research institutes, funding organisations, voluntary alliances have started to pay attention to the issue of mountain sustainable development. Moreover the celebration of International Year of Mountains in 2002, successful organisation of Bishkek Summit in 2002 and many other regional and national seminars and platforms for discussion have always made a stand for the mountain voices be heard at policy making level and forced the respective governments in the Mountain regions and UN Agencies to focus on mountain issues separately.

In 2006 , Price et al. raised many issues that needs to be addressed for sustainable developments of the mountains. Some of these includes issues like proper use of water and natural resources, ever-increasing hazards and their way outs, desertification, implications of climate change in highlands and improving access to basic infrastructures including communication and energy. Development of legal, economic and compensation mechanism in favour of SMD could strengthen the basic fundamental rights of the mountain communities they proposed. Democratic and decentralized institutions are a must for sustainability of the mountains. We argue in this paper that with sustainable cashing of bio resources, identifying

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sustainability indicators at local level and a decentralized set up with better implementation and monitoring mechanism may be adopted. We draw attention to the fact that localizing the SDG indicators for Indian Himalayan States can help accelerate the process of achieving the SDG goals. As far as IHR is concerned, Singh(2006) points out that IHR is facing anthropogenic pressure leading to overall degradation of its environment. His paper points out that once indication of environmental deterioration become noticeable, most often the only option left is to respond to the situation and try to cure the problems by cost inefficient corrective measures. Therefore the paper suggests that it is much better however, to be able to anticipate the problem in advance and take up preventive measures in the beginning. In 2017 International Conference on "Resilient Hindu Kush Himalaya-Developing Solutions towards a sustainable future for Asia" was held which was organized by ICIMOD. The conference had brought together more than 400 experts from around the world, to discuss solutions to the problems faced by mountain communities[3].Thus it is very clear that the need to give special focus to the Himalayan states have been felt in different forums but with SDG responsibility bestowed upon the world from 2016, the liability of Himalayan states for Goal 13 and Goal 15 not only confines to the Himalayan territory but beyond and hence needs prioritization and special attention.

The States in Indian Himalayan region extending from Jammu & Kashmir to the North East are at unfavourable situation in terms of difficult terrain, harsh weather conditions, huge forest land, scattered habitations, frequent natural disasters, undersized and under-developed scattered markets, long international borders, poor connectivity and inadequate general infrastructure in most parts of IHR. Compared to other States the cost of delivery of public services in these States are higher due to their typical topography. All these acts as limitations in terms of development compared to other States of the country. With the procedures for environmental clearances being generally identical for all States, these States having a large forest cover find it difficult to get environmental clearances, even for infrastructural projects which sometimes hamper their basic developmental initiatives. Moreover in many cases there are no free or open land to take up compensatory afforestation, which by definition means converting open land into a forest by planting trees/seeds. As a result, the funds available under schemes like compensatory Afforestation Fund Management and Planning Authority (CAMPA) cannot be effectively utilised in these States. Moreover Green Dividends and Green Bonus for the IHRs for restoring the forest covers and the sacrifices

[3]As reported by Kathmandu Post dated 07-12-17.

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made thereof are yet to be implemented at the policy level. However some studies[4] are carrying out the cost benefit analysis for evidence based policy asks. These Himalayan States are also unable to utilize forest resources for raising revenue and at the same time have to incur considerable amount of expenditure for maintaining the forests. There is no provision for DBT[Direct Benefit Transfer]s for private owners retaining the green cover though the external economies due to such green cover are very high. Hence the Himalayan States stand at crossroads and realizing Goal 13 and 15 of SDG becomes more challenging and crucial for Indian Himalayan States.

Though the Environment Sustainability Index[ESI] shows[Table 1] an encouraging picture for most of the Indian Himalayan States but a few states like Uttarakhand, Jammu and Kashmir are areas of concern as far as Environment Sustainability is concerned. Moreover as these states in IHR generates a plethora of services like permanent snow cover and glaciers in some regions, water reservoir that feeds perennial rivers, vast green cover that acts as 'carbon sink', hub of global bio diversity hot spot etc not only for Himalayan inhabitants but also influences the lives of people living well beyond its boundaries, therefore if visualized from this perspective , all those states should be in the category of 'most sustainable states' in ESI. Therefore the environmental issues being faced by the IHR are of critical importance.The Twelfth Five Year Plan document clearly recognized[5]that the development process cannot afford to overlook the environmental consequences and cost of economic activity, or allow unsustainable depletion, declining and deterioration of natural resources.

Table 1: Status of Environment Sustainability Index(2009 and 2011) for the Indian Himalayan States.

Himalayan States	ESI 2009	ESI 2011	Improvement / Deterioration
Assam	Moderately Sustainable State[40-60 percentile]	Among More Sustainable States[60-80 percentile]	Improved
Meghalaya	Among More Sustainable States[60-80 percentile]	Among More Sustainable States[60-80 percentile]	No Change
Manipur	Among Most Sustainable State[80-100 percentile]	Among Most Sustainable State[80-100 percentile]	No Change
Nagaland	Among Most Sustainable State[80-100 percentile]	Among Most Sustainable State[80-100 percentile]	No Change
Mizoram	Among Most Sustainable State[80-100 percentile]	Among Most Sustainable State[80-100 percentile]	No Change
Arunachal Pradesh	Among Most Sustainable State[80-100 percentile]	Among Most Sustainable State[80-100 percentile]	No Change

[4]E.g IIFM , Bhopal
[5] India 12th Plan document

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Tripura	Among More Sustainable States[60-80 percentile]	Among More Sustainable States[60-80 percentile]	No Change
Himachal Pradesh	Among More Sustainable States[60-80 percentile]	Among Most Sustainable State[80-100 percentile]	Improvement
Uttarakhand	Among Most Sustainable State[80-100 percentile]	Among More Sustainable States[60-80 percentile]	Deterioration
Jammu and Kashmir	Less Sustainable State[20-40 percentile]	Less Sustainable State[20-40 percentile]	No Change
Sikkim	Among Most Sustainable State[80-100 percentile]	Among Most Sustainable State[80-100 percentile]	No Change

Source: Dash. R. et. al. Environmental Sustainability Index 2011,Centre for Development Finance.

Research Questions and Methodology:

In this paper we primarily address the following research questions.

Research Question 1: Why environmental indicators for Himalayan states are crucial?

Research Question 2: Why Sustainable Development Goal 13 and 15 should be the topmost priority for Indian Himalayan states?

Research Question 3: Do we need to localize environmental SDG indicators for Himalayan States[Addressing Goal 13 and 15]?

Research question 4: What should be the model to implement this localization process at the policy level?

The first and second research questions have been addressed through facts, figures and arguments. The third research question has been countered by taking the indicators of UN and the sub indicators. Along with them the indicators of NITI Ayog, MoSPI and DES have been mapped with identification of problems of data and monitoring of such indicators for Himalayan states. The priority indicators are the indicators which are directly related to the priority areas of the government while the schematic indicators are those which can be directly linked to a government scheme. The fourth question has been presented by suggesting some proxy indicators, identifying the data gaps and presenting a mechanism on how to decentralize the monitoring machinery for effective result oriented outcome. The study has used secondary data sources from Directorate of Economics and Statistics(DES), Uttarakhand, , the DES of other Indian Himalayan States, Ministry of Statistics and Programme Implementation (MoSPI), NITI Ayog and the United Nations to carry out the study.

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How to localize the indicators? A path model

FIGURE 1: The Proposed Model for implementation of SDG/HDG[6] for Himalayan States with Steps for Implementation of SDG/HDGs for the Indian Himalayan States.

STEP 1 :
Study extensively the SDG indicators of UN substantiated by NITI, GoI ,MoSPI and Other stake Holders for each Himalayan State.

STEP 2 :
Preparation of the Targets, Strategy and Vision for achieving the Goals. Also giving extensive weightage of the needs of the Himalayan Cluster and Himalayan character of development.

The work has already been undertaken by States like Uttarakhand and Assam. The leading States have already been working on the same with relevant support from UNDP, Line Departments and dedicated Team. However the States are working in Silos and the need for Integration for Uniform Mechanism is the need of time.

STEP 3 : Prepare comprehensive document[Tables] based on the study for comparable indicators and discussions. Choose proxy indicators for Himalayan States

STEP 4 :

Identify the existing implementable CSS ,SS, EAP and mapping the same with respect to the framed SDG indicators through which regular monitoring can be made possible.

STEP 5 :

Analysing the Data Gaps of the Existing Mechanism and Devising the Tool to eliminate the Data Gap.(As substantiated in Figure 2)

STEP 6 :

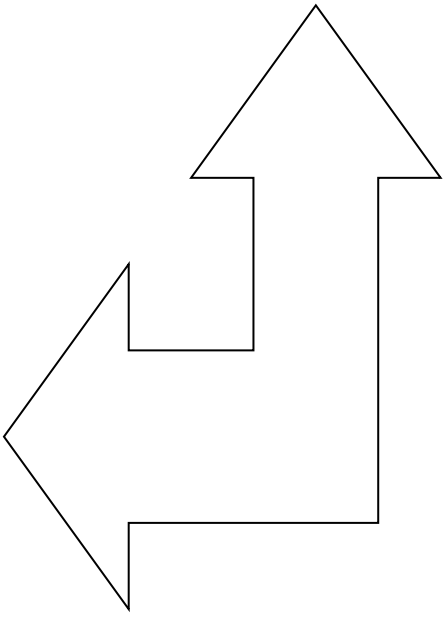
Relevant Monitoring by ensuring Data Flow for each Indicator (after determining the frequency of Data) and Unit. Preparing the Relevant Index by due Weightage to the assigned Indicators. Further some other related Index like Environment Performance Index etc can also be prepared for better Monitoring purpose using the same data sets.

STEP 7 :

Comparable Monitoring of the HDGs of the State. Comparable Ranking of the Districts in the State for internal monitoring needs.

STEP 8 :

Ranking of the States. Assured Policy Measures for Correction in the Flaws of the Policies and replicating the Best / Success Practices among



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Source: Developed by the Researchers

For facilitation of implementing the SDGs in the Himalayan Belt, at first the existing CSS , EAPs and SS needs been identified and mapped considering the targets, sub targets of the goals. Relevant SDG based Budget mapping needs to be undertaken by the State government to study the financial expenditure pattern and its relative impact on the State.

Table 2: Review Of Tentative Indicators For SDG Goal 13[Target 13.1](Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries)

(Major departments covered Forest and Environment, Climate Change cell etc)

Target/Sub-Target and Indicators STATE INDICATORS (DES,UTTARAKHAND)		**Target/Sub-Target and Indicators NATIONAL INDICATORS (MOSPI)**	**Target/Sub-Target and Indicators (NITI AYOG)**	
			PRIORITY INDICATORS	**SCHEMATIC INDICATORS**
Target 13.1	***Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries***			
13.1.a)Annual CO2 emissions (metric tonnes per capita)		Number of states with strategies for enhancing adaptive capacity and dealing with climate extreme weather events.	• Number of states with strategies for enhancing adaptive capacity and dealing with climate extreme weather events.	• Effective Carbon trading • No. of States who have aligned their Disaster Management Plan with Sendai Framework[7] for Disaster Risk Reduction (2015-2030);Disaster Management Plan
13.1.b) Consumption of ozone-depleting substance (ODS tonnes)				
13.1.c) Greenhouse gases (GHG) emitted by transport sector (%)				
13.1.d) Greenhouse gases (GHG) emitted by industrial sector (%)				
13.1.e) Greenhouse gases (GHG) emitted by commercial sector (%)				
13.1.f) Greenhouse gases (GHG) emitted by agriculture sector (%)				
13.1.g) GHG emission (in CH4) from agricultural sector (Gg)				
13.1.h) GHG emission (in N2O) from agricultural sector (Gg)				
13.1.i) GHG emission (in CO2) from agricultural sector (Gg)				
13.1.j) GHG emission (in CO2) from industrial sector (cement and lime) (Gg)				
13.1.k) GHG emission (in CO2) from energy sector (industrial, transport and other) (Gg)				
13.1l)Area growing drought-resistant and flood-resistant crops (% of total)				
13.1m) Length of river with perennial flow of water (km)				
13.1n) Number of casualties due to disaster				
13.1o)Number of people affected due to disaster				

[7]The Sendai Framework for Disaster Risk Reduction is an international document which was adopted by UN member states between 14th and 18th March 2015 at the World Conference on Disaster Risk Reduction held in Sendai, Japan.

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Source: DES Uttarakhand, NITI Ayog and MoSPI

At the policy level the best indicators our of these indicators have to be culled out for each target of the goal and we propose inclusion of some more indicators considering the Himalayan characteristic. For example in target 13.3 , the following indicators may be adopted :

- Percentage of survival rate of trees from all afforestation schemes in the state.
- Number of women affected in a year due to natural disaster[disintegrate nature of effect as mild, severe, very severe and select parameters for each category]. Also disintegrate age groupwise. Categorization of natural disaster is also required.
- Number of children affected in a year due to natural disaster[disintegrate nature of effect as mild, severe, very severe and select parameters for each category].
- Number of works carried out in schemes like MGNREGA(Mahatma Gandhi National Rural Employment Guarantee Act), which address the problem of climate change and natural disaster and estimation of the effect of such works on climate change and natural disaster. Taking out a cost benefit analysis

Table 3: Review of Tentative Indicators for SDG Goal 13[Target 13.2](Integrate climate change measures into national policies, strategies and planning)

	Target/Sub-Target and Indicators STATE INDICATORS (DES,UTTARAKHAND)	**Target/Sub-Target and Indicators NATIONAL INDICATORS (MOSPI)**	**Target/Sub-Target and Indicators (NITI AYOG)**	
Target 13.2	***Integrate climate change measures into national policies, strategies and planning***		**PRIORITY INDICATORS**	**SCHEMATIC INDICATORS**
Climate change action plan	13.2a Number of sectors prioritize under climate change action plan	Pre-2020 action Achievements of pre-2020 goals as per countries 'priorities Achievement of Nationally Determined Contribution(NDC) goals in post-2020 period.	• Achievement of Nationally Determined Contribution(NDC) Goals (reduce the emission intensity per unit of GDP by 33% to 35% by 2030 relative to its 2005 levels; Creating an additional carbon sink of 2.5-3 billion tonnes through additional	• CO2 emission from energy (tCO2/capita) ; • Effective carbon rate (Economic Survey of India)
	13.2b Number of sectors covered under climate change action plan			

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			tree cover; 40% of electric power installed capacity from non-fossil fuel by 2030.)	

Source: DES Uttarakhand, NITI Ayog, MoSPI

Some proposed indicators for inclusion in target 13.2 are

- Number of contents/ topics in curriculum in primary school level that addresses target 13.2
- Number of contents / topics in curriculum in secondary school level that addresses target 13.2
- Number of contents/topics in curriculum in higher secondary level that addresses target 13.2
- No. Of GOs[General orders] in state policy level that addresses target 13.2
- Number of trainings undertaken by government officials that addresses target 13.2

Table 4: Review Of Tentative Indicators For SDG13[Target 13.3](Improve Education, Awareness-Raising And Human And Institutional Capacity On Climate Change Mitigation, Adaptation, Impact Reduction And Early Warning)

	Target/Sub-Target and Indicators STATE INDICATORS (DES,UTTARAKHAND)	**Target/Sub-Target and Indicators NATIONAL INDICATORS (MOSPI)**
Target 13.3	***Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning***	
Education, Awareness and IEC	13.3a Proportion of population covered by climate change education (%)	Number of States that have integrated climate mitigation and adaption in education curricula and outreach programs
	13.3b Trained persons in climate change mitigation (early warning etc.) (number)	
	13.3c Number of awareness program at State level have integrated climate mitigation and adaptation	
	13.3d Number of awareness program at sub-state level have integrated climate mitigation and adaptation	

*AWD is Alternate Wetting and Drying which is a water-saving technology
**The Priority Indicators and Schematic Indicators for Target 15.8 were not documented by NITI Ayog during this Research

Some proposed indicators for target 13.3 are

- Number of NGOs working on climate change.

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- Number of colleges, higher education institutions having specialized courses on climate change[Private, Government, Aided etc],
- No. of trained faculty in the state on climate change.
- Number of enrolment per year in those courses and home district of the student enrolled in the course.
- No. of camps and awareness programmes in different parts of the state in a year that addresses mitigation, adaptation etc.
- Number of women in the age group [14-49] who have received training on climate change mitigation and adaptation.[village wise , block wise, district wise, state wise].
- Number of occupations/livelihood options that are most prone to climate change.
- Number of schools that have under taken climate change adaptation, mitigation programme for students[primary, secondary, higher secondary]
- No. Of scholarships / grants etc for study and research related to target 13.3

Besides these for early warning mechanism there is need to integrate indigenous knowledge of hills with modern scientific knowledge.

Table 5: Review of Tentative Indicators for SDG Goal 15, [Target 15.1](By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and dry lands, in line with obligations under international agreements)
(Major departments covered Forest & Environment ,Wildlife, Watershed Management, Water Resources)

Target/Sub-Target and Indicators STATE INDICATORS (DES,UTTARAKHAND)		**Target/Sub-Target and Indicators NATIONAL INDICATORS (MOSPI)**	**Target/Sub-Target and Indicators (NITI)****	
			PRIORITY INDICATORS	**SCHEMATIC INDICATORS**
Target 15.1	***By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and dry lands, in line with obligations under international agreements***			• Area covered under protected habitats • Total area covered under afforestation • Capacity of sewage treatment plants created
Conservation and Restoration of Forest	15.1a)Total land area covered by dense forest against total forest cover(%)	Forest area as a proportion of to tall and area Percentage of Tree outside forest (TOF) in total forest cover.	• Forest area as a proportion of total land area	
	15.1b)Total land area covered by bushes /scrub(%)			
	15.1c) Forest under community based management (as% of total forest area)(Van Panchayat)			

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	15.1d) Conservation areas (including Forest)(in proportion to total land area)			
	15.1e) Conservation of lakes, wetlands and ponds (No)			
	15.1g) afforestation (ha)(Including all type of plantation departmental & Mass planting)			
	15.1i) Soil &Water conservation works (Number)			
Conservation & Restoration of Water Bodies	15.1 j) Number of river and riverlets covered			
	15.1 k afforestation for river & riverlets (Ha)			
	15.1 l)Number of lakes taken for treatment			
	15.1 m) afforestation for lakes (Ha)			
	15.1n) Number of countor trench, chal-khal(pits & Pond) Constructed			
	15.1 o) Area covered under pits and ponds (Chal-khal)			
	15.1p) Soil& Moisture Conservation			
	15.1 q) Maintenance of Herbal Garden (number)			
	15.1 r)Protection of *Bugyals*			
	15.s) River front development (ha)			
	15.t) Bioremediation & Bio filteration (Ha)			
	15 u) Institutional/Industrial Plantation (ha)			
	15.v)Ganga Van(Eco Park Development) (ha)			
	15.w) Riparian Wildlife Management (ha)			
	15.x) Brick construction/Tree guard Plantation(ha)			

Source: DES Uttarakhand, MoSPI, NITI Ayog.
**The Other Priority Indicators and Schematic Indicators for Target 15.1 were not documented by NITI Ayog during this Research

Some more proposed indicators for IHR for target 15.1 may be:

- No. of blocks with scanty rainfall in a year
- No of blocks with excess rainfall in a year
- No of blocks with normal rainfall in a year
- No of rainwater harvesting projects undertaken
- No of works carried out in schemes e,g MGNREGA related to Conservation & Restoration **of** Water Bodies
- No of households whose livelihood is solely dependent on forests
- No of households whose livelihood is partially dependent on forests.
- Livelihood where resources are dependent on forests [e,g *Ringal,Baans*]

Table 6:Review Of Tentative Indicators For SDG Goal 15, [Target 15.2](By 2020, Promote The Implementation Of Sustainable Management Of All Types Of Forests, Halt Deforestation, Restore Degraded Forests And Increase Afforestation And Reforestation)

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	Target/Sub-Target and Indicators **STATE INDICATORS (DES,UTTARAKHAND)**	**Target/Sub-Target and Indicators** **NATIONAL INDICATORS (MOSPI)**	**Target/Sub-Target and Indicators** **(NITI)**	
			PRIORITY INDICATORS	**SCHEMATIC INDICATORS**
Target 15.2	***By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and increase afforestation and reforestation***			
Afforestation and Reforestation				
15.2 a)Rate of forest loss and degradation (%)		Percent change in Forest Area coverage Total area covered under different afforestation schemes Total tree cover achieved outside forest area Number of Nagarvans and School Nurseries created.	• Total tree cover achieved outside forest area	• Total tree cover achieved outside forest area
15.2 b) Handover of forest to leasehold forest groups (000 ha)				
15.2 c) Additional plantation (Ha) per annum				
15.2 d) Growing of Seedlings (Lakh seedlings)				
15.2 e) Percentage change in forest cover				
15.2 f)Number of Plants raised for schools(Lakh seedlings)				
15.2 g) Total tree covered achieved outside forest area(Sq.Km)				
15.2 h) Total area covered under different afforestation schemes (Ha)				

Source: DES Uttarakhand, NITI Ayog, MoSPI

Some proposed indicators for target 15.2 may be :

- Estimated number of trees destroyed due to forest fire
- Estimated number of species destroyed due to forest fire
- Estimated number of trees destroyed due to flash floods and cloud bursts
- Estimated number of species destroyed due to flash floods and cloud bursts
- Estimated number of trees destroyed due to earthquake
- Number of works carried out for restoration of degraded forests
- Number of reforestation works carried out through various schemes
- Number of afforestation works along with species specification.
- Number of plantations in urban areas.
- Number of trees planted [species wise] in different government schemes and the survival rate of such planted trees..

Table 7:Review Of Tentative Indicators For SDG Goal 15[Target 15.3](By 2020, Combat Desertification, Restore Degraded Land And Soil, Including Land Affected By Desertification, Drought And Floods, And Strive To Achieve A Land-Degradation-Neutral World)

	Target/Sub-Target and Indicators **STATE INDICATORS**	**Target/Sub-Target and Indicators** **NATIONAL**	**Target/Sub-Target and Indicators** **(NITI)**

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	(DES,UTTARAKHAND)	INDICATORS (MOSPI)		
			PRIORITY INDICATORS	**SCHEMATIC INDICATORS**
Target 15.3	***By 2020, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land-degradation-neutral world***			
Combat desertification, restore degraded land and soil				
15.3a) Identification and management of watersheds (number of districts)		• Percentage of restoration of degraded area • Increasing Tree/ forest cover in degraded area • Percentage of net sown area increased.	• Increasing Tree / forest cover in degraded area • Percentage increase in net sown area	• Increasing Tree / forest cover in degraded area
15.3b) Conservation of wetlands (number)				
15.3c) Reclaim flooded and other degraded land (in 000 ha)				
15.3d) Number of watersheds undergone adaptation practices for soil and water stress management				
15.3e) Conservation of rivulets and rive banks through bioengineering (km)				
15.3f)Increase tree/forest cover in degraded area				
15.3g)Percentage of net sown area increased				
15.3 h) Assisted natural regeneration (ha) by Forest Department				

Source: DES, NITI Ayog, MoSPI

Some proposed indicators for target 15.3 are:

- Number of works carried out to restore degraded land
- Percentage of Consumption of Chemical Fertilizers.
- No of centres of distribution of certified seeds
- No. Of flood prone rivers and identification of villages that are flood prone
- Identification of villages that are drought prone
- No. of trees planted in a year in degraded area.
- Ratio of degraded area to net sown area

  Besides these to realize target 15.3, Soil survey in detail . Land degradation mapping, Soil resource mapping, irrigation mechanism that stops soil degradation, control on overgrazing by livestock, etc needs to be carried out. The '*bugyals*'[high altitude medows] needs to be restored to control overgrazing and degradation.

Table 8:Review Of Tentative Indicators For SDG Goal 15[Target 15.4](By 2030, Ensure The Conservation Of Mountain Ecosystems, Including Their Biodiversity, In Order To Enhance Their Capacity To Provide Benefits That Are Essential For Sustainable Development)

	Target/Sub-Target and Indicators STATE INDICATORS	Target/Sub-Target and Indicators NATIONAL INDICATORS

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	(DES,UTTARAKHAND)	(MOSPI)
Target 15.4	***By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development***	
conservation of mountain ecosystems, including their biodiversity		
15.4a) Potentially dangerous glacial lakes (%)		• Increase in forest/vegetative cover in mountain areas • Restoration of water bodies/ stream in mountain areas • Conservation of local wild life species • Improvement of local livelihoods • Increase In per capita income of mountain dwellers
15.4b) Mountain ecosystems covered by the protected areas (%)		
15.4c) Restoration of waterbodies/streams in mountain areas		
15.4 d) Improvement of local livelihood (increase in (%)(Livelihood will be generated indirectly not through department)		
15.4 e) Increase in per capita income of mountain dwellers		

Source: DESUttarakhand, MosPI, NITI Ayog

***The Priority Indicators and Schematic Indicators for Target 15.4 was not documented by NITI Ayog during this Research

Some proposed indicators for target 15.4 may be

- No. Of known species of flowering plants
- No. Of known species of non-flowering plants
- No of endemic species of flowering plants
- No of endemic species of non-flowering plants
- No of threatened species of flowering plants
- No of threatened species of non-flowering plants
- Number of vascular plants under threat
- The number of threatened species can be calculated for those groups that are completely or almost completely evaluated
- Category of different taxonomic groups-Extinct, Valuable, Data Deficient, Critically endangered, endangered, Threatened etc
- Inclusion /exclusion in number of endangered species of Flora and Fauna

Table 9: : Review Of Tentative Indicators For SDG Goal 15[Target 15.5](Take Urgent And Significant Action To Reduce The Degradation Of Natural Habitats, Halt The Loss Of Biodiversity And, By 2020, Protect And Prevent The Extinction Of Threatened Species)

	Target/Sub-Target and Indicators **STATE INDICATORS (DES,UTTARAKHAND)**	**Target/Sub-Target and Indicators** **NATIONAL INDICATORS (MOSPI)**

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Target 15.5	***Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species***	
Prevent the extinction of threatened species		
15.5a)Threatened flora (medicinal and aromatic plants) (%)		• Red List Index[8]
15,5 b)Threatened fauna (mammals, birds, reptiles, amphibians, fishes, insects, platyhelminths, molluscs, etc.) (%)		
15.5 c) Wild tigers (number)		
15.5 d) Black bucks(number)		
15.5 e) Red list Index		
15.5 f) Number of endangered species		
15.5 g) Construction of Water Holes (numbers)		
15.5 h) Removal of lantana (ha)		
15.5 i)Patrolling for protection (Number)		
15.5 j) Maintenance of Fire lines (Km)		
15.5 k)Control burning (Ha)		
15.5 l)Fire watcher (number)		
15.5 m) Strengthening of Check Posts (number)		
15.5 n) Construction/maintenance of Boundary Pillars (Number)		
15.5 o) Creation of large water bodies for elephant		

Source: DESUttarakhand, MoSPI, NITI Ayog.

***The Priority Indicators and Schematic Indicators for Target 15.5 was not documented by NITI Ayog during this Research

Some of the indicators proposed in target 15.4 may be used here . There should be provision for monitoring of migratory birds as IHR is considered a heaven for bird watchers. However more campaigns and awareness programmes are in need. Cases of intervention of wildlife in human settlements needs to be regularly monitored and the root cause identified for proposed plan of action. Plan of action should be more pro natural habitat of the region.

Regular monitoring of population of endangered species of flora and fauna is the need of the hour.

Table 10: Review Of Tentative Indicators For SDG Goal 15[Target 15.6](Ensure Fair And Equitable Sharing Of The Benefits Arising From The Utilization Of Genetic Resources And Promote Appropriate Access To Such Resources)

	Target/Sub-Target and Indicators **STATE INDICATORS (DES,UTTARAKHAND)**	**Target/Sub-Target and Indicators** **NATIONAL INDICATORS (MOSPI)**

[8]The Red List Index(RLI) tracks the rate of extinction for marine and terrestrial species groups in the near future(10-50 years) in the absence of any conservation action.

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Target 15.6	***Ensure fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources***	
15.6a) Poaching of tigers and other wild life prevented to curb the wildlife		Number of Access and benefit Sharing(ABS) agreement sign
15.6b)Community led anti-poaching units mobilized (number)		

Source: DES Uttarakhand, MoSPI, NITI Ayog.

**The Priority Indicators and Schematic Indicators for Target 15.6 were not documented by NITI Ayog during this Research

For target 15.6 there is need to develop awareness of PGR[plant genetic resources]. Conservation is basically the sustainable use of these resources to facilitate future generations benefit. They can be adequately conserved through in situ and ex situ approaches. These are balancing and require an improved integrated approach. More so, there is need to understand diversity as a way to improve their utilization. A decentralized system may be in place to monitor the loss of existing PGR that have been evaluated. Focus should also be extended beyond existing crops and their wild and weedy relations to cover all PGR of the Himalayan Region. For conservation the local efforts needs to be strengthened.

The community , the youth of the community needs to be utilized at its optimum to fulfil the target. A blend of scientific knowledge with the aboriginal knowledge of the Himalayan region from the local communities can help in fulfilling the target 15.6.

Table 11: Review Of Tentative Indicators For SDG Goal 15[Target 15.7](Take Urgent Action To End Poaching And Trafficking Of Protected Species Of Flora And Fauna And Address Both The Demand And Supply Sides Of Illegal Wildlife Products)

	Target/Sub-Target and Indicators **STATE INDICATORS (DES,UTTARAKHAND)**	**Target/Sub-Target and Indicators** **NATIONAL INDICATORS (MOSPI)**
Target 15.7	***Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both the demand and supply sides of illegal wildlife products***	
Poaching and Trafficking of wild life and endangered species of flora & fauna	15.7a) Number of poaching cases prevented to curb the wildlife trafficking	Reduction in traded wild life that was poached or illicitly trafficked.
	15.7b) Community led anti-poaching units mobilized (number)	
	15.7c) Number of detection and prevention of traded wildlife that was poached or illicitly trafficked	

Source: DES Uttarakhand, NITI Ayog, MoSPI

***The Priority Indicators and Schematic Indicators for Target 15.7 was not documented by NITI Ayog during this Research

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For fulfilling target 15.7 , alternative livelihood approaches to be identified which can control illegal wildlife product usage. The legal issues related to poaching should be made clear through campaigns in the media. Helplines to record cases of complaints of poaching should come up. Reward for complaints can make some differences.

Table 12: Review Of Tentative Indicators For SDG Goal 15[Target 15.8](By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species)

	Target/Sub-Target and Indicators **STATE INDICATORS (DES,UTTARAKHAND)**	**Target/Sub-Target and Indicators** **NATIONAL INDICATORS (MOSPI)**
Target 15.8	***By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species [IAS]on land and water ecosystems and control or eradicate the priority species***	
15.8a Percentage change in prevention and control of invasive alien species		Percentage change in prevention and control of invasive alien species
15.8.b Nationwide surveys and research on invasive alien plant species (number)		

Source: DES Uttarakhand , MoSPI , NITI Ayog

***The Priority Indicators and Schematic Indicators for Target 15.8 was not documented by NITI Ayog during this Research

For target 15.8 , developing a risk index for IAS[Invasive alien species**]** is in need for IHR. Data on species list, classification of species , natural history of species, ecology , distribution , impacts, risk assessments, control measures, literature citations etc are required for monitoring of IAS.

For target 15.9, integrating bio diversity at each stage of planning cycle is required. State of environment reports, poverty status reports, National or sectoral development plans, studies and reports, e.g., agriculture, fisheries, forest, land use, etc are required. Participatory poverty assessments, strategic and environment impact assessment, biodiversity valuation, biodiversity wealth accounting needs to be carried out.

Table 13: Review Of Tentative Indicators For SDG Goal 15[Target 15.9](By 2020, Integrate Ecosystem And Biodiversity Values Into National And Local Planning, Development Processes, Poverty Reduction Strategies And Accounts)

	Target/Sub-Target and Indicators **STATE INDICATORS**	**Target/Sub-Target and Indicators** **NATIONAL INDICATORS**

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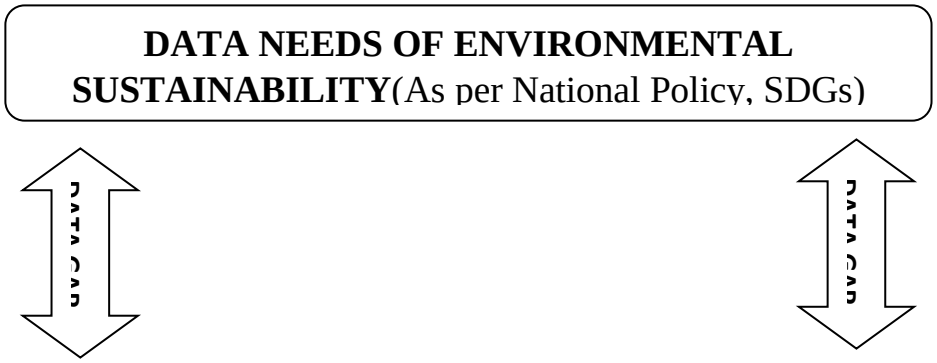
	(DES,UTTARAKHAND)	(MOSPI)
Target 15.9	***By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts***	
15.9a) Plant (floral) species under conservation plans (number)		Progress towards national targets established in accordance With Aichi Biodiversity Target 2 of the Strategies Plan for Biodiversity2011-2020
15.9b) Animal (faunal) species under conservation plans (number)		
15.9c) Number of department identified covered under the biodiversity programmes directly/indirectly		
15.9d) Number of schemes identified covered under the biodiversity programmes directly/indirectly		
15.9e) Total direct/indirect budgetary allocation under the biodiversity programmes over the total budget		
15.9f)Total expenditure(%) against the allocation		
15.9g)Increase if biodiversity Index		
15.9h1) Ecotourism-- Development of awareness center, information center/ Picnic spots		
15.9 h2) Ecotourism-- Maintenance of Zoos		
15. h3) Ecotourism-- Strengthening of FRH		
15. h4) Ecotourism-- Maintenance of Van Chetna Kendra		
15. h5) Ecotourism-- Construction of Zoos (Number)		
15.9 i1)Infrastructure--Strengthening of Forest Roads (Km)		
15. 9 i2)Infrastructure--Maintenance of Forest Roads(Km)		
15. 9 i3)Infrastructure-- Maintenance of Bridle Paths (Km)		
15. 9 i4) Infrastructure-- Construction of Buildings(Number)		
15. 9 i5) Infrastructure-- Maintenance of Buildings (number)		
15. 9 i6) Infrastructure-- Construction/Maintenance of *Pul[Small Bridges]/Pulias* (Number)		
15.aMobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems		Official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystem.
15.bMobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation		Percentage of fund utilized for environmental conservation.
15.cEnhanceglobalsupportforeffortstocombatpoachingand trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities		Number of detection and prevention of traded wild life that was poached or illicitly trafficked.

Source: DES Uttarakhand, MoSPI, NITI Ayog.

*AWD is Alternate Wetting and Drying which is a water-saving technology

**The Priority Indicators and Schematic Indicators for Target 15.9 was not documented by NITI Ayog during this Research

FIGURE 2: PLAN FOR DATA NEED ANALYSIS: DIAGRAMATIC PRESENTATION



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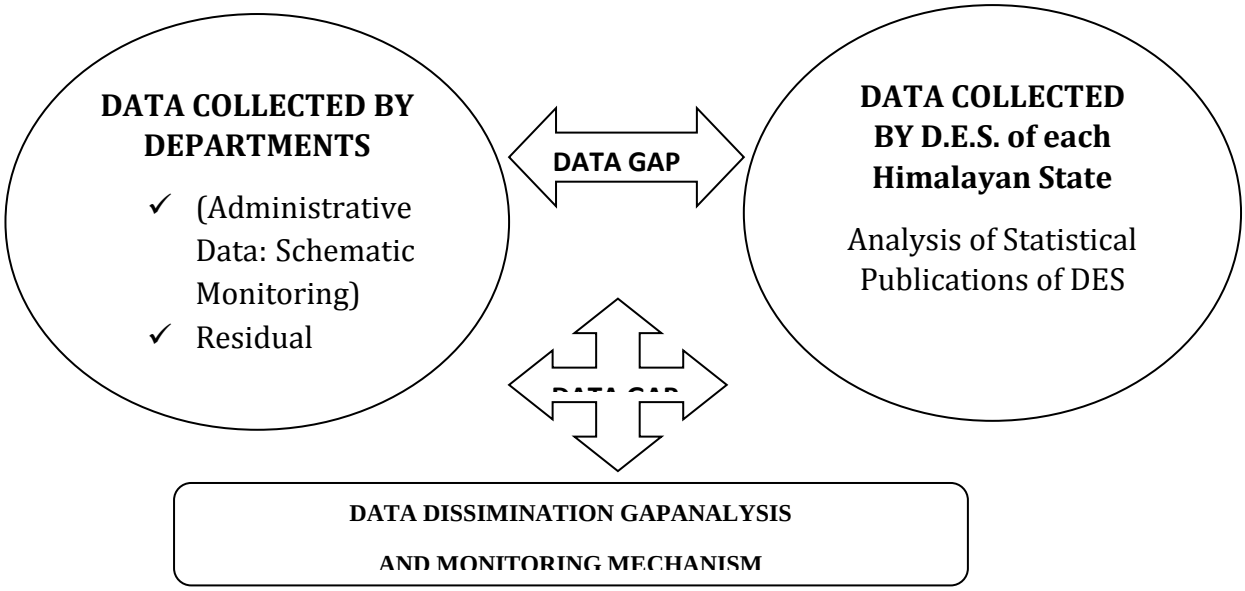

Source: Developed by the Researchers

After identifying the gaps through the above mechanism, the concerned Departments can be asked to generate the data by reshaping state schemes or implementation of new schemes.

Concluding Remarks

The journey of SDGs till the grass roots shall need to facilitate the concept of 'Localising the SDGs' and the monitoring of the implemented schemes through indicators which becomes crucial for creating a clear roadmap for the realization of SDG 13 and SDG 15. The need of the hour isspirited coordinated efforts and prioritization . Through this course, the fruits of sustainable economic development can be channelized directly towards the general masses and the community of Himalayan region. The protection of the natural wealth from the human greed can also be ensured through strong coordination, convergence, data based monitoring mechanism, within the ministries and also various sub national bodies. It will act as key for promoting effective and coordinated climate action for the Indian Himalayan States. Indeed, several countries have already established national institutions and bodies that provide a strong starting point for organizing national cooperation to achieve SDG 13. Moreover for SDG 15 ,sustainable use of terrestrial ecosystems, sustainably managing forests, halt of land degradation and halt of bio diversity loss are crucial for Himalayan states. Localizing SDG indicators will help in better monitoring mechanism and realizing time

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bound targets. The model presented in the paper will help to realize the target through a step by step mechanism.

SDGs for Himalayan States of India should replace SDG with HDG[Himalayan Development Goals] with those proxy indicators as the regional characteristics of Himalayan region , the nature of fragility, territorial constraints, weather conditions are far different from other regions. Moreover though the states have certain constraints in giving local shape to CSS[Centrally Sponsored Schemes] but the states have complete freedom to do so in State Schemes. Thus there is a great need to give a new shape to the state schemes with more focus on these indicators. No Department can work in silos, as there are overlapping of intervention by departments in each schemes, but if a single Himalayan state becomes successful in the model as discussed in the paper, the same model may be replicated for other Himalayan states as well. For due cognizance of such a schema , all the concerned departments at the state level should sit together and discuss the implementation process. This will basically be replica of SDG but with a new nomenclature of HDG which will be more region specific, result oriented and will help the Himalayan community , ecosystem, ecology and climate and land related issues in the long run.

Since climate change and sustainable use of terrestrial ecosystem , managing forests, halt of bio diversity loss and halt of land degradation are highly crosscutting issues, steps toward the realization of SDG 13 and SDG 15 will also enable States to make strides towards the achievement of the other SDGs. To this end, in implementing SDG 13 and SDG 15 , States should consider complementarities between different international law instruments in order to more effectively tackle their legal commitments and obligations. For example, States should consider how constructive linkages could be forged between pledges or transparency and review mechanisms adopted in the Paris Agreement and in other relevant conventions, in order to better streamline reporting and data collection processes. States should focus on the trade-off issue of development and environment, climate, ecosystem etc andon cost benefit analysis in terms of sustainability . In the end, the states should not stop at this junction; the Indian Himalayan Belt should extend its boundaries in 'knowledge sharing' and the monitoring mechanism should reach the vicinage of other neighbouring countries ,of course embellishing the concept of "*Vasudhaiva Kutumbakam*"[The world is one family] through SDGs implementation. Besides the Himalayan states should focus on restoration and conservation of environmental resources, inter and intra generational equity on environmental resources, integration of environmental concerns in social and economic development

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through the five great elements (space, air, fire, water, and earth), the "*panchamahabhutas*" that constitute the environment through a ' *Panchamahabhuta monitoring mechanism'* framework for realizing HDG in line with SDG exclusively for Indian Himalayan States.

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