THE HIMEK ALLIANCE PROPOSAL

HIMEK stands for the Himalayan and Mekong regions.

PREAMBLE

The Himalayan range is 2500km in length and has an average width of 300km spanning across India, Nepal, Bhutan and China. This region is vitally important not just for these countries but many others in South Asia and South East Asia as it is the source of a number of rivers sustaining one-fifth of humanity in this region. As our civilization is so dependent on rivers, degradation of the Himalayan ecosystem due to climate change and ecosystem mis-management will have disastrous consequences on the Himalayan region and on the millions of people across South Asia, and South East Asia including China.

A similar struggle is seen in the case of the Mekong river basin which again originates from the Himalayas and stretches across six countries – China, Vietnam, Lao PDR, Vietnam, Thailand and Cambodia. It is important to note that the Mekong River and other important rivers draining South East Asia also originate in the Himalayas. The Himalayas and the Mekong basin are contiguous and interdependent ecological regions. Coordinated efforts guided by regional cooperation can help to conserve these ecosystems and save the mass of humanity dependent on these ecological regions.

Scientific studies have revealed that the rapid glacier melt and reduced snow fall in the Himalayas could be addressed through drastic reduction of regional greenhouse gas emissions containing Short Lived Climate Pollutants especially Black Carbon (soot).

Scientific research has also established that forests and vegetation play a major role not only as sinks for Co2, but also in absorbing massive amounts of Short Lived Climate Pollutants (SLCPs) including Nitrous Oxides, Sulphur Dioxide and particulate matter including Black Carbon.

This indicates that along with reduction of emissions of Black Carbon there is a need for a massive program of Forest landscape restoration and tree planting around areas of emission such as large cities and industrial centers. These projects need to be taken up urgently in all the Himalayan Countries, Bangladesh and the countries of the Mekong Basin.

The broader guiding principle for developing projects to reduce the threat to Himalayas would be:

A. Increased resilience of people can be addressed though ecosystem management.

B. Forest resilience can be increased by Sustainable Forest Management (SFM) and Community Development.

C. Resilience of people can be further enhanced by using alternate energy source though use of biogas and micro hydro energy. The project will look for cooperation with various other organizations such as the Asia Pacific Forestry Network, Climate and Clean Air Coalition, the Global Alliance for Clean Cook Stoves, and Centre for People and Forests [RECOFTC] etc.

The proposed HIMEK Alliance is an idea to move forward towards a Regional cooperation between the Himalayan nations and the countries of the Mekong Basin to protect the Himalayas and the Mekong region from adverse effects of climate change.

Black Carbon

Black Carbon is commonly known as Soot. Black Carbon is the term used for minute particles or aerosols that are formed by incomplete combustion due to open bio mass burning, forest fires, vehicular emissions, domestic cook stoves, brick kilns, etc.

Black Carbon is an environmental concern as its deposition on the ice and snow reduces its reflectivity and amplifies the melting rate. It enhances the atmospheric heating by 50 to 100% and results in the retreat of Himalayan Glaciers. Unlike Co2, the Black Carbon stays in the atmosphere only for about two weeks.

Moreover, steep reduction in levels of Black Carbon can be achieved through relatively simple, practical and cost effective measures. Reduction of Black Carbon

is therefore a sound strategy for protecting the Himalayas from Climate Change and buys time for global level efforts to reduce Co2 to acceptable levels.

Forest Land Restoration

Forest land restoration of degraded forested landscapes in the Himalayas and the Mekong Basin would be an excellent nature-based activity to complement the reduction of Black Carbon in the same region. There would also be a need for well-planned tree planting projects in large cities and industrial areas closer to the Himalayas and in the Mekong Basin. This would be useful to absorb SLCPs (Short Lived Climate Pollutants) generated from automobiles and industries.

As a corollary, it has also been proved that reducing emissions of particulates enhances the capacity of trees to act as sinks for Co2.

The HIMEK Alliance Project

The HIMEK Alliance Project would therefore be based on a two-pronged strategy comprising of reduction of Black Carbon Emissions, restoration of forest land on a large scale and the planting of trees.

Project Management

The overall project coordination would be under the aegis of IUCN ARO Bangkok.

Forest Land Restoration programs will be undertaken by RECOFTC/Bonn Challenge.

Programs that are specific to reduction in Black Carbon will be undertaken by the Climate and Clean Air Coalition [CCAC]. The CCAC could coordinate with agencies such as the Global Alliance for Clean Cook Stoves, etc.

STABILISATION OF CLIMATE CHANGE IN THE HIMALAYAS AND THE MEKONG BASIN

PART I - THE HIMALAYAS

Introduction

1. The Himalayan range stretches across a length of 2500 km and averages a width of 300 km. It stands in the path of the moisture bearing currents from the South and the freezing cold air from the North and has a vital meteorological influence not only on the weather patterns of South Asia but on the entire global climate.

2. Three of the major river systems of South Asia, namely the Indus, Ganges and the Brahmaputra originate from the Himalayas. 500 million people inhabiting the plains of North India, Nepal, Pakistan and Bangladesh depend directly on these waters. Considerable areas of the Indus and Brahmaputra river basins fall within Chinese territory. The Salween, Yangtze, Irrawady and Mekong are some of the important Chinese rivers that originate in the Himalayas. It is estimated that 1400 cu km of freshwater are locked up in the Himalayan glaciers that act as the fountainhead of South Asia.

3. It is therefore a matter of deep concern to the entire global community and to the people of South Asia in particular, that the Himalayan environment is under serious threat due to the effects of climate change. Lester Brown of the World Watch Institute, USA says that due to the effects of global warming the pattern of precipitation in the Himalayas and the regions contiguous to the Himalayas will undergo a more drastic change in the years to come. The increase in temperature will reduce the amount of snowfall and the snow-fed rivers of China and the Indian subcontinent will have less water flow in the summer months when the snow melts.

However, since the quantum of water in the atmosphere is constant, the reduced snowfall will convert to excessive rainfall during the monsoons. The rivers will

have reduced water in the summer months and the flooding of these rivers during monsoons will be more intense. We are already witness to a cycle of more pronounced drought and floods in the region.

Another alarming trend is the shrinking of the glaciers due to the rise in temperatures. The Gangothri glacier which is the source of the Ganges has receded by 600 meters in the past 40 years. There has been a marked increase in the rate at which it recedes since 1971 and the glacier has been shrinking by 30 meters per year. According to ISRO's Space Application Centre, as many as 127 glaciers of less than 1sq km size have lost 38 percent of their geographical area since 1962. The larger glaciers, which are progressively getting fragmented, have receded by as much as 12 percent.

It is predicted that at this rate, many of the Himalayan glaciers will be severely degraded in the decades to come and most of the snow-fed Himalayan rivers including the Ganges will become seasonal rivers.

4. It is evident that if the trend of reduced snowfall, increased precipitation and shrinking of the Himalayan glaciers continues, the result would be catastrophic for several millions of people in South Asia, South East Asia and China. Food productivity of the entire region would be severely affected due to the cycle of droughts and floods. It has been estimated that during this century, the accelerated ice melts in the Himalayas flowing into the seas will cause sea levels to rise by 1 meter. Such rise in sea levels would destroy fifty percent of the rice fields of Bangladesh. It would also result in millions of 'climate refugees' fleeing from low-lying areas in India, China, Bangladesh, Indonesia, and Vietnam.

5. The mountains and valleys of the Himalayan region are home to 100 million people that include several indigenous communities whose livelihoods and culture are closely linked to the mountain ecosystem. They face an uncertain future in the face of climate change. Increased temperatures will have a drastic impact on their water and food security and on horticulture. They will become increasingly dependent on food imports and will be more vulnerable to flooding and Glacial Lake Outburst floods.

6. As regards the direct implications for the forests in the Himalayan region, mitigation strategies are vital in order to ensure that the forests themselves do

not get degraded and destroyed due to climate change. In the middle altitudes of the Himalayas, Chir Pine is taking over Oak dominated forests. Degradation of natural forests due to invasive species and other climate associated factors will accelerate climate change and the rise in temperatures will in turn result in further degradation of the forest ecosystems. In this context it is very important to take urgent measures to check the trend of rising temperatures in the Himalayas.

7. The rise in temperatures will adversely affect the biodiversity of the Himalayas. As regards the riverine ecology, the degradation of biodiversity will be felt not only in the Himalayan region but along the entire course of the rivers and up to the estuaries where they drain out into the oceans. Changes in the river regime, will impact the aquatic biodiversity and river dependent livelihoods.

8. It does not require a Nostradamus to predict the impending doom that is awaiting a region already battling with crippling poverty and over population. It is also vital to realize that we do not have the luxury of time. The clock is ticking away and we must act now before it is too late. A problem of this magnitude has to be tackled in its totality. A two-pronged strategy is essential.

Firstly, we have to be prepared for the consequences of climate change. This would involve adaptive measures such as planning for disaster management at the national level, changing cropping patterns, implementing water conservation measures, etc.

The second aspect of the strategy would be to try to stabilize the climate to the extent possible so that the impacts of climate change are minimized. This concept paper deals with the second aspect, i.e. stabilization of climate with reference to the Himalayas.

PART II-THE MEKONG BASIN

Introduction

The Mekong Basin is home to almost 65 million people and grows the rice that feeds almost 300 million people in the world

The Mekong along with other important rivers draining South East Asia and China also originate in the Himalayas**.** The Himalayas and the Mekong Basin could be

viewed as interdependent ecological regions. While the Himalayan waters sustain the Mekong basin, the pollutants from this heavily populated region would have an especially adverse effect on the Eastern Himalayas. Therefore, reduction of Black Carbon in the Mekong basin together with Forest Land Restoration to improve the health of the ecosystems would have a positive effect in mitigating climate change both in the Himalayas and the Mekong basin. Tree planting and development of Parks in certain cities and industrial hubs should also be undertaken in the Mekong Basin.

Note: The Mekong Basin will require further elaboration.

THE CONCEPT OF THE HIMEK ALLIANCE

The Mekong Basin region is contiguous to the Eastern Himalayas that are facing the maximum threat due to rapid glacier melt. It has been established that the glaciers in the Eastern Himalayas are melting at a faster pace as compared to the Central and Western Himalayas.

The implication is that the effect of Black Carbon in the Eastern Himalayas is more profound, since the areas of the Mekong Basin have some of the highest population densities in the world. This has resulted in greater industrial and automobile emissions that generate more Black Carbon.

It would be vital therefore to curtail Black Carbon emissions in the Mekong Region in order to prevent further degradation of the Eastern Himalayas.

Therefore, the concept is to establish a regional cooperation of the eleven countries of the Himalayan and the Mekong Basin Region to reduce Black Carbon and other SLCP (Short Lived Climate Pollutants) emissions in conjunction with Forest Land Restoration and Tree planting programs around urban areas and industrial hubs.

CLIMATE STABILIZATION OF THE HIMALAYAN REGION AND THE MEKONG BASIN

Like any other eco-system, the Himalayas will be adversely influenced by emission of green house gases in any part of the world. **However, it is crucial to**

understand that there would be a considerable influence from the emissions of certain green house gases and aerosols from within the Himalayan ranges and the contiguous areas.

The local emissions create a regional climate impact that combines with the overall global warming to further accentuate the temperature rise. Being a snow covered mountain eco-region; the Himalayas are particularly vulnerable due to the 'trapping' effect of the valleys. The Green House Gases with a shorter life span will also remain in the atmosphere for longer periods in cold climates. In this context, it is relevant to note that the rapid melting of ice caps in the Arctic is influenced not only by Global warming but also due to regional emissions mainly from Eurasia and oil and off-shore oil exploitation.

Heavy shipping traffic with large concentrations of Nitrogen Oxide emissions is another cause for the Arctic Haze that compounds the overall effect of Global warming. The Siachen Glacier is another case in point.

According to a study by the WWF, the past two decades has seen a rapid melting of the glacier and it is amongst the fastest melting glaciers in the world. It was precisely two decades ago that the Siachen Glacier dispute flared up between India and Pakistan, with massive troop deployment in the area by both countries. The study states that the Siachen Glacier has been melting alarmingly more due to military activity of India and Pakistan than due to global warming.

THE REGIONAL EMISSIONS AND PRESSURES IN THE HIMALAYAN REGION CAN BE CATEGORIZED AS UNDER:

A. The Asian brown haze

The Asian Brown Haze is caused mainly by domestic wood and coal fires and vehicle exhaust fumes**.** Certain mega-city hotspots such as Delhi, Beijing, and Dhaka have been identified as places that contribute significantly to the Black Carbon in the Asian Brown Haze. The Asian Brown Haze is causing a regional heating effect that is accelerating the glacier melt in the Himalayas. In fact it is estimated that the heating effect of the brown haze is the same as that of the global warming due to Green House Gases.

In a sense, the Himalayan region is perhaps being subjected to a 'Double Whammy' due to the combined effect of overall Global warming coupled with the impact of the Brown Haze. Black Carbon is an important component of the Haze and reduction in Black Carbon emissions should be given top priority. ***According to an IGSD/INECE report, the impact of Black Carbon on melting snow-pack and glaciers in the Himalayas may be equal to that of Co2***.

B. Concentration of Green House Gases at the source of emissions

While the effect of Carbon Dioxide emissions has a more global effect, there is sufficient scientific evidence to prove that other non-Co2 gases and aerosols have a more pronounced effect on the climate in the immediate vicinity of the emissions.

C. Urban Heat Islands (UHI)

Both the core Himalayan region and the contiguous areas have a number of large cities and townships that form Urban Heat Islands. The UHI effect is like a balloon of higher temperature formed over the urban areas. This balloon of higher temperature is shifted to the adjoining non-urban areas due to wind factors and causes a higher temperature in these contiguous areas outside the cities/towns. The effect could be more intense in mountainous regions due to the 'trapping' effect of valleys. This is indicated in the high levels of pollution in the Kathmandu Valley. Levels of air pollution in Kathmandu are one of the highest in Asia, although the number of vehicles is far less than cities such as Mumbai and Delhi.

UHI effect can extend to a range of up to 2.4 times the size of the city, beyond the city limits. Hence increased urbanization in the Himalayan region could create a number of climatic 'hotspots' that could contribute to the overall regional temperature rise if further unplanned expansion of these cities is not curbed. Well- planned tree planting with selected quick growing tree species and shrubs in these cities will also help to diminish the effect of the Urban Heat Islands

D. Pressures of Tourists and Pilgrims

Tourists and Pilgrims form a large floating population in the Himalayas. They are concentrated more in the cities and popular tourist and pilgrimage destinations. They exert a more direct 'point' influence and contribute to the Urban Heat Island effect in cities such as Srinagar and Kathmandu. This effect is also pronounced in

site-specific pilgrimage destinations such as the Gangothri Glacier that is the source of the Ganges River.

E. Military presence in the Himalayas

There is a large and permanent military presence in the Himalayan region. The overall emissions are a result of both the troop deployment and the movement of maintenance and administrative convoys that result in heavy movement of truck transport. It is emphasized that this paper does not attempt to make a case for demilitarization of the Himalayan region, since troop deployment is linked to security concerns and national policies of the concerned countries. However it is pointed out that there is ample scope for the respective countries to take practical steps to see that there is considerable reduction in the emissions caused by army deployment and administrative convoys.

COST BENEFIT ANALYSIS

It is beyond the scope of this paper to present a detailed cost-benefit analysis of reducing emissions [principally black carbon and non-Co2 Green House Gases] in the Himalayas. However, available information points towards huge savings by way of improved health conditions [especially of women], and savings in the energy sector. Other benefits include the avoidance of disasters caused by climate change, such as bursting of glacial lakes due to increased levels of glacial melt. Huge benefits would also accrue by preventing climate-induced drought/floods in the lower regions such as the Indo-Gangetic plains, Southern China and Bangladesh.

Regional strategies for mitigation of Climate Change in the Himalayas and adjoining regions will address key issues such as food productivity and water security for large parts of South Asia, South East Asia and China. This would again lead to reduced tensions within the region. A review of the economics of climate change by the Government of the UK states that, if no action is taken now, the overall cost and risks of climate change could be equivalent to the loss of 5% of global gross domestic product (GDP) each year**. If a wider range of risks and impacts is considered, the estimated damage could reach as high as 20% of global GDP.**

THE TIME FACTOR AND THE REGIONAL PERSPECTIVE

Leading climatologists have warned of the need to act immediately to cut greenhouse gas emissions, with a window of 10-15 years for global emissions to peak and decline, and a goal of at least a 50 percent reduction by 2050.

However, it is to be understood that from the regional perspective of the Himalayan Ecology, we may not have so much time. ***Moreover, the Himalayan region will witness increased population pressures in the coming decade. This is all the more reason that emission reduction strategies must worked out and put into execution mode at the earliest***.

Concentrated efforts must be made to drastically reduce aerosol and non-Co2 emissions within the next five years, primarily to cut down on the formation of the Brown Haze over the Himalayas. If this is not done, the ecological damage to the Himalayas and especially the Himalayan Glaciers may be irreversible.

There is no time to be lost in carrying out further exhaustive research and analytical studies. Findings of credible research studies already carried out need to be taken into account. The stress should be on identifying and categorizing the principal sources of aerosol, Black Carbon and non-Co2 emissions such as Nitrous Oxide. This will need to be followed by working out strategies for achieving required scale of reduction for these emissions within a mutually agreed time-frame. Forest land restoration and judicious tree planting in selected cities and industrial hubs will have to complement the reduction in emissions

THE WAY AHEAD

The Eleven countries of the Himalayas and the Mekong Region, together with certain other global agencies should form an organization to formulate and execute a joint strategy for mitigation of climate change in the Himalayas and the Mekong basin. ***Such an organization could be modeled along the lines of the existing Arctic Union***.

ADVANTAGES OF REGIONAL COOPERATION ON THE HIMALAYAS

A joint strategy by the eleven countries will have tremendous advantages. It will ensure that there is an integrated, time-bound approach to tackling the issue with the active involvement of other concerned International Agencies.

HIMEK - FRAMEWORK FOR A JOINT STRATEGY

A joint strategy for emission reduction in the Himalayas and the Mekong Basin could be based on the following parameters:-

A. Identifying the extent of the zone requiring intervention. This would include the Himalayan ranges and contiguous areas including the Mekong basin. Broadly, the Himalayan Ranges would be the core zone and the contiguous areas would be the outer zone. Initially, the outer zone could be for a radius of fifty Kms from the core zone and the Mekong basin. The outer zone could then be increased periodically till a maximum laid-down radius is covered under the action-plan.

B. An analysis of the interventions required in the core zone and the outer zone in order to reduce emissions and mitigate climate change and to stabilize the effects of global warming to the extent possible.

C. The countries concerned will then have to sign an agreement on the various interventions and the time frame within which these will be implemented.

D. The process will need to be facilitated by other organizations such as UNEP, RRCAP, GREEN CLIMAE FUND, GEF, GLOBAL ALLIANCE FOR CLEAN COOK STOVES, etc These organizations should also be involved in organizing the required funding mechanisms.

RECOMMENDED INTERVENTIONS

Certain measures that could be considered are enumerated below. Some of these will have to be applied more stringently and on priority in the core zone as compared to the outer zone.

A. Industries

Certain types of industries will have to be banned and phased out. Alternatively, they should be permitted only on introduction of upgraded technology that will sufficiently minimize emissions. They will also require financial assistance to incorporate cleaner technologies. There is good scope for reducing Black Carbon emissions by improved technology for thousands of brick kilns in the region. Nepal, Bhutan and Bangladesh may need financial support for installing cleaner

technologies. An international funding mechanism will be required for this purpose.

B. Automobiles

Automobiles in both the core zone and the outer zone should convert to environment friendly fuel. As far as the Govt of India is concerned, priority for converting to CNG or LPG should to given to Jammu, Dehradun, Srinagar, Shimla and Manali. All the countries concerned maintain a very large military presence in the core zone. Thousands of Army trucks move within the core zone every day. Therefore environment friendly fuel for these vehicles is essential. However, in view of logistical considerations, this may not be practical in the near time. Hence the Himalayan countries must ensure that military vehicles plying in the Himalayan region conform to required emission norms. Adequate mass transport facilities such as buses should be provided for tourists and pilgrims.

A simple cost-effective innovation developed and patented by Somender Singh, a Mysore-based technician is also available for reducing vehicular emissions and improving fuel efficiency.

C. Road Construction activity

There is constant road construction and maintenance activity in the Himalayan region. The obsolete road construction methods require burning large quantities of coal tar. This contributes substantially to the Green House gas and Black coal aerosol emissions in the Himalayas. Hence there is an urgent need to introduce cleaner technologies for road construction and repair in the Himalayas.

D. Demography

Demographic pressure always translates to greater levels of human activity. Concentrations of populations should be avoided. The Governments should encourage well-planned satellite townships in the Himalayan region, rather than increased growth of cities such as Kathmandu, Jammu and Shimla.

E. Forest land restoration

An intensive forest land restoration programme by the countries concerned will be of vital importance. The establishment of trans-boundary National Parks could be considered. This would be a useful initiative by neighboring countries to improve the management of forests along border areas. Ecological Territorial

Army Battalions comprising of ex-servicemen will be able to play a very important role in forest land restoration in the Himalayas in India.

F. Improved technologies in domestic fuel consumption

There is good scope for improving technologies for domestic fuel consumption requirements, such as cooking. The National Programme on Improved Cook stoves [NPIC] in Himachal Pradesh, the Western Himalayan Indian State is a good example. Such initiatives will have dual benefits of emission reduction combined with improved health of women and children.

G. Land use practices

Burning of huge Agriculture residue such as paddy in the North Indian State of Punjab could have a direct influence on the Brown Cloud over the Himalayas. Burning of agriculture residue is also a common practice in some of the Himalayan states. The fires from the fields frequently spread to the Himalayan foothills causing forest fires. These issues need to be addressed in the areas close to the Himalayas. There is considerable stress on the Himalayan landscape due to the pressures of over-grazing. Slash and burn cultivation in Eastern Himalayas must also be taken into account.

H. Mega-City hot spots

There will be a need to concurrently reduce Black Carbon emissions in some of the identified mega-city hot spots and industrial hubs closer to the Himalayas. These could be Delhi, Kolkata, Dehradun, Dhaka, Karachi, Quetta and Xinning etc.

THE TIME FACTOR

It is of utmost importance to emphasize that we do not have the luxury of time. The project will need to be implemented well before 2030 or else we would have crossed the Tipping Point. If reductions in SLCPs (Short Lived Climate Pollutants) are delayed until 2030, it will be more difficult if not impossible to keep the increase in warming under 2°C by the end of the century.

BROAD OUTLINE FOR THE SUGGESTED HIMEK PROJECT

Introduction

The project proposal given below is basically just a foundation on which the final project proposal could be built up.

HIMEK ALLIANCE PROJECT PROPOSAL

Background

The HIMEK Alliance proposal was first drafted by Col CP Muthanna (Retd) during 2009. He took up the subject with IUCN India and IUCN ARO. This was followed up by a number of consultations and discussions at various forums in India, China, Thailand, Nepal and Bhutan. Two key developments were the discussions at IUCN ARO during March 2012 and a two Hour presentation at the IUCN Regional Conference at Bangkok during September 2015.

During the consultations, there was active participation of delegates of the concerned countries and other agencies including IUCN, FAO, UNDP, Chinese Academy of Sciences, TERI WHO, AIT, RMFN Asia, RECOFTC, GB Pant Institute, etc. There was consensus on the importance of reducing BC emissions and for Large scale Forest Restoration programs in the Himalayas and Mekong Basin through Regional cooperation. Col Muthanna has also had consultations with the Indian Army with regard to reduction in Black Carbon in the Himalayas.

The HIMEK Alliance Proposal

As a result of the consultations, discussions and presentations, there is a broad agreement in forming a regional cooperation, at present termed as the HIMEK Alliance. The following eleven nations would be involved:

Himalayas

India, China, Pakistan, Nepal, Bhutan and Bangladesh.

Mekong Basin

Myanmar, Vietnam, Laos, Cambodia, Thailand and China.

Apart from IUCN, there would be a need to involve various other agencies including UNEP, UNDP, RECOFTC and RRCAP. RECOFTC and RRCAP would be especially relevant as partners in the project. RECOFTC has wide experience in carrying out Community Based Forest Land Restoration in the Asian Region, while RRCAP is focused on reduction of Black Carbon and other Short life Climate Pollutants.

Ongoing efforts:

Some initial steps that have been taken are as follows:

(a) IUCN Document.
In 2011, IUCN ARO published a document titled"Stabilization of Climate Change in the Himalayas: Strategy for a Regional Response". The document was based largely on the concept note by Col CP Muthanna

(b) Trial project on Cookstoves at Balkila in Indian Himalayas
The Environment and Health Foundation has donated 40 fuel efficient cook stoves to IUCN India about two years ago to be distributed to economically weaker families in the Balkila Watershed of Uttarakhand in the Indian Himalayas. The feedback from the families is very positive.

(c) Innovation by Garuda R&D for petrol and diesel vehicles
The Garuda R&D is based at Mysore in South India. The founder of the organization is a technician named Somender Singh. He has developed and patented an innovation for petrol and diesel vehicles. There is good scope to give greater impetus to this innovation that would result in reduced emissions of Black Carbon and greater fuel efficiency.

(d) Projects implemented by RECOFTC
RECOFTC has been working on Community based forest land restoration in the South Eastern countries and Nepal. This work could be scaled up and dovetailed into the HIMEK alliance proposal.

(d) IUCN India-Forest Restoration programs
IUCN India is working on developing some Forest Restoration programs in the Himalayan States of Himachal Pradesh, Uttarakhand and Sikkim. This project will also need to be scaled up and made inclusive for all the Himalayas states in India.

(e) MOU on the HIMEK Alliance Proposal
During July 2018, IUCN [Asia Regional Office] and the Asian Institute of Technology have signed an MOU on the basis of the HIMEK Alliance proposal.

BROAD WORK PLAN FOR PHASE I [FIRST FIVE YEARS]

COUNTRIES INVOLVED

Himalayan Region -

India, China, Pakistan, Nepal, Bhutan and Bangladesh.

Mekong Basin -

Myanmar, Vietnam, Laos, Cambodia, Thailand.

The phase I of the implementation will commence after adequate consultations have been held by IUCN ARO and funding agencies have been confirmed.

Pilot projects would normally be necessary. However to save time these could be replaced by evaluation and assessment of the existing projects on Black Carbon emissions and Forest Land restoration in the region. For example, projects in South and South East Asian countries are already under way with regard to Forest Land Restoration, fuel efficient cook stoves, and upgrading brick kiln technology. This evaluation and assessment process could be done along with the consultation and planning process

HENCE THE PLANNING WILL BE DIVIDED AS:

Preliminary Phase:

Consultations, cost estimates and planning - 1 year.

Phase 1:

3 years - the various phases may not be strictly time bound and may spill over in time and in Geographical Area.

Forest Land Restoration-

1000 hectares per country.

As regards the direct implications for the forests in the Himalayan region, mitigation strategies are vital in order to ensure that the forests themselves do not get degraded and destroyed due to climate change. In the middle altitudes of the Himalayas, Chir Pine is taking over Oak dominated forests.

Degradation of natural forests due to invasive species and other climate associated factors will accelerate climate change and the rise in temperatures will in turn result in further degradation of the forest eco-systems. In this context it is very important to take urgent measures to check the trend of rising temperatures in the Himalayas.

There has also been severe loss of forest cover and degradation of natural forests in both the Himalayan region as well as the Mekong basin. Hence it will be vital to launch a massive forest land restoration program to regain natural forest cover in the Himalayas and the Mekong Basin. The forestry related part of the project will be taken up through Community Based Forest Land Restoration/Landscape restoration [CBFLR/CBLR]. The program will be under the overall coordination of RECOFTC. For added benefit of addressing water security concerns, the attempt will be to carry out the CBFLR/CBLR projects in important water shed areas.

If there is paucity of resources, Forest Land Restoration could be 1000 hectares for the Himalayan countries and 500 hectares for the others.

Forest Land Restoration in Bhutan may not be required due to the excellent forest cover in that country.

Note:

In the case of India, China, Pakistan and Bangladesh, it is envisaged that the Forest Restoration and emission reduction programs will be in areas that are in the Himalayan region or in close proximity to the Himalayas.

Emmission Reduction

<u>The main sources of Black Carbon emissions in the Himalayas and the Mekong basin could be categorized as follows:</u>

- House-hold emissions due to inefficient cook stoves
- Obsolete technology for brick kilns
- Vehicular emissions
- Obsolete road building methods in the Himalayas
- Forest fires
- Burning of agriculture crop residue
- Involvement of Armies in the Himalayas

Cook stoves

100,000 cook stoves to be distributed at subsidized cost in each country. There is also scope for training women to manufacture and market fuel-efficient cook stoves. This will address livelihood and encourage women's entrepreneurs. The Global Alliance for Clean Cook stoves and the SNV program of Netherlands would be important partners.

Brick Kilns

All obsolete brick kilns to be phased out. Existing legislations and projects on brick kilns in some countries could be adopted by other nations in the Alliance.

Vehicle Emissions

In the case of mega cities close to the Himalayas and large cities in the Mekong region, incentives could be offered for electricity and CNG operated taxies. There could also be a law by the end of the first five year period making it mandatory for all new taxis to run on electricity or CNG.

Each mega city will have a team of trained technicians for vehicle modification through the Garuda R&D technology. This will be subject to evaluation and assessment of the technology by the concerned countries. The CCAC may be approached to act as the agency for the initial evaluation. The bus transportation companies could be considered for the initial modifications.

Road construction and maintenance

Obsolete methods for road construction and maintenance result in high levels of black carbon emissions in the core areas of the Himalayas. This is due to preparation of coal tar. There is a need to replace these obsolete technologies and eradicate this source of Black Carbon emmissions in the Himalayas

Forest Fires

The Canadian Forest Department has excellent expertise on early warning systems and prevention of forest fires. The Canadian Government Forest Service could train forest department personnel on fire management for every country including Indonesia. This is a service for which payment will need to be made to the Canadian Government. Indonesia is being considered due to the massive forest and peat fires that would have an influence in the Atmospheric Brown Clouds affecting the Himalayas and Mekong Region. The other very important agency with regard to prevention of Forest Fires is the FAO. The FAO Regional Office for Asia Pacific could play a very important role.

Burning of Residual agriculture crop

This aspect will need to be addressed through creating awareness among farming communities in the region. Alternate methods of agriculture and other practices for improving soil fertility will need to be provided to the farmers.

Phase 2

The activity for the next five year period to be planned during the second year of implementation of Phase 1.

This is a very broad suggested outline in order to initiate the planning process. It is to be noted that the work plan will also need to be finalized after detailed analysis and consultations.

CONCLUSION

1. There is sufficient evidence to indicate that regional emissions of Non-Co2 Green House Gases (GHGs), aerosols and Black Carbon are a key factor in the rise of temperatures in the Himalayan region. Reducing these emissions will result in mitigating the overall effect of climate change in the Himalayas. A massive forest land restoration programme across the Himalayan Region will also be essential. In turn, this could check the trend of reduced snowfall and rapid glacier retreat.

2. This could best be achieved by forming an alliance of the 11 Himalayan and Mekong basin countries, along the lines of the existing Arctic Union. International agencies will need to facilitate the process.

3. The concept for cutting down on regional emissions, combined with efforts to improve the forest cover could herald a new dimension to dealing with Climate Change. It is for consideration that the idea could be applied to other similar eco-regions such as the Alps and the Andes and also the Arctic.

4. International agreements such as the Kyoto Protocol, the Bali Declaration and the Paris agreement call for achieving desired level of reduction in emissions by 2050. The Himalayas and other similar eco-regions may not have that much time. Hence there is an urgent need for the Himalayan Nations to formulate and

execute a joint strategy for the Himalayas and the Mekong Basin before it is too late.

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