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SEED Social Economic Environmental Development
A project funded by the Governments of Italy and Pakistan
SPECIAL EDITION

The SEED of development

Ev-K2-CNR and KIU's project for welfare improvement and economic growth of one of the remotest areas of Pakistan

By **Raffaele Del Cima**, SEED Projetc Director

The acronym SEED stands for Social, Economic, and Environmental Development, a five years (2010-2014) project conceived for the Central Karakorum National Park (CKNP) region, implemented by Ev-K2-CNR Committee and Karakorum International University (KIU) and fully financed by Pakistan Italian debt for development agreement (PISDA) with a total budget of Rs. 1,018,934,981.

SEED's partners are AKRSP, Central Karakorum National Park Directorate, Alpine Club of Pakistan, WWF Pakistan, Mountain Glacier and Protection Organization, Pakistan Meteorological Department, ISIAO, plus Politecnico of Milan and other Italian Universities.

SEED project's aim is an interactive development of CKNP region through the implementation and management of the National Park and the improvement of local social development, thank to a series of activities, workshops and interventions. The project area lies between 2500 and 8000 m a.s.l., while its core area that lies above 3500 m a.s.l; with its 10,000 square kilometers of surface situated in the north east of Gilgit-Baltistan CKNP is the largest protected area in Pakistan, a breathtaking beauty, wild and untouched with it's majestic glaciers, such as Baltoro and Biafo.CKNP belongs to three different administrative districts: Gilgit, Skardu and Ghanche, with their 230 villages and 97,608 people, located in zones adjacent to the park, that borders northwards with China and eastwards with Ladakh and Kashmir.

However, for the people making a living in this part of Pakistan,

To be continued on pag 2

"Future research will create pool of trained personnel"

Intervview with Najamm Najama KIU Vice Chancellor

With her vivid glance and multicolor dress, original from her country, the vice chancellor of the Karakorum International University Najama Najamm speaks of the wonder of Pakistan and that academic site embraced from the most beautiful mountains of the planet.

Professor Najamm, when the Karakorum International University (KIU) was born?

It was commissioned in 2003 and is the only university in the mountain area of Northern Areas in Pakistan. And new but is growing. There are already 12 departments, including computer science, management, biology, chemistry, physics, earth science, English, mathematics, and soon we'll have others.

We have almost 2000 students of whom one third are women, a great achievement for a land very traditional like that. Even more so when you consider that five of these girls are studying in Italy, alone, without parents to learn the processing of colored stones.

Environments and natural sources are the great opportunities in Pakistan...

The Karakorum-Hindu Kush mountain region, unique in the world, is our treasure and pride but at the time our responsibility. KIU and EvK2CNR's collaboration on the Seed project is a befitting tribute of the shared commitment and love of the mountains and its people and, therefore the Gilgit-Baltistan region. It also symbolizes the continuity of commitment across time: past, present and future.

How will this collaboration continue?

KIU is a partner for present and future, being the only university in the region which has since its inception focused on maximizing resource development (human, community, and natural) through research and teaching, in areas relevant to the region on the one hand and the national, international -and global- commitment on the other. KIU also has the vision of preserving not just the environment but also the cultural heritage and languages of the region.

Which sectors will be the focus of your work?

KIU scientists, academicians and students will have a critical role in the study of climate change, glaciology, water resources, tourism, mountain culture and heritage, languages, and most important environment and mountain and earth sciences. The future research in partnership with Ev-K2-CNR will create a pool of trained personnel for this region.

What is the nature of your links with EvK2Cnr?

This partnership between KIU and Ev-K2-CNR is the first of its kind and will go far in the strengthening institutions and as well bringing scientists of our two nations together in collaborations and in friendships.

Felicitations to the vision and efforts of all involved at KIU, Ev-K2-CNR, our partner organizations, Pakistani and Italian Governments and above all the people of the Gilgit-Baltistan. Environment and culture: this is KIU mission.

Gilgit-Baltistan, a land to be discovered

Interview with
Gilgit Baltistan Chief Minister:
Mr Syed Mehdi Shah

Mr Syed Mehdi Shah

How do you assess today the Italian presence in the region? What has been done?

Italy and Pakistan are linked by a cordial and friendly relation since long time and they share a common perception on important international issued of mutual interest. Both countries formally have friendly foreign relations: Italy provided Pakistan US$100 million under the Pakistan Italian Debt for Development Swap Agreement, an amount to be utilized for social development projects in health, education and sanitation in the whole Pakistan.

I would also like to appreciate the contribution of Ev-K2-CNR committee in socio economic development and in the field of research: thanks to them twenty candidates from Gilgit-Baltistan are attending a PhD. Moreover, Italian Government has agreed to provide credit for Italian investors willing to work in Pakistan, while Italy is one of the major player in the development of Pakistan, thank to its many projects.

It is also worth a mention the Italian help during the 2010 flooding in Gilgit-Baltistan, where went destroyed 1.6 million houses, leaving hundred thousands of people homeless. In that hour of need, Italian government provided 1.33 million of euros, including a humanitarian aid flight carrying stuff for the wellbeing of deprived people.

What about your province, Gilgit-Baltistan?

Being first elected Chief Minister of Gilgit Baltistan, I wish to give emphasis to this area. As a whole this region is very beautiful and nonviolent, but Skardu district is foremost in this pace.

The crime ratio with compare to rest of the parts of the country is 0.0%, but unfortunately, it is one of the remotest areas of the province.

The normal temperature in some areas during winter falls down to -17 degree centigrade. Famous Peak K2, Gasherbrum and Broad peak are located in this district, which attracts thousands of tourists from every corner of world, also a lot of expeditions come here for hiking every year and they are greeted cordially and with warmth.

As nowadays the entire world I facing violence activities weakening economic conditions, due to which media depict such state of affairs but in reality the situation, is not so worst.

What Italy can do for the future of the Gilgit-Baltistan?

I would invite Italians to travel across Pakistan and the Gilgit-Baltistan area to discover our land, with his breathtaking sights and wild nature.

There are splendid resources of water, minerals, gold, precious stones, fruits and herbs.

It would be in the common interest of both the countries if Italian Government would consider to invest in these sectors, particularly in the field of generation of hydro electricity and of education sponsoring. I also hope that Italian Government keep on presenting development projects in our area, a fact that will bring both countries closer one to each other.

OVERVIEW

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LOCAL COMMUNITY AND RURAL DEVELOPMENT

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remoteness of important education and health services and centers of commerce are the downside of the wild and untouched beauty of the region. Cash income sources are rare, in this harsh and dry mountain climate even subsistence agriculture is a feat and sickness can easily lead to serious chronic illness or death, facts that make people from Central Karakorum National Park living constantly at the brink of poverty.

Understanding the close interrelation between poverty alleviation, socio-economic development for local people, environmental research and... ...conservation of the unique natural beauty of the area, the SEED Project aims to catalyze an integrated social, economic and environmental development, including the realization of Central Karakorum National Park that has been officially notified as National Park in 1993.

This area, together with the rest of Gilgit-Baltistan has a unique and critical role to play in the sustainable development of Pakistan.

Although the district spans a relatively small geographical area, it hosts the vital catchment of the Indus River, a key water source for Pakistan's irrigated agriculture.

Nowadays there's still a tremendous pressure on the natural resources due to traditional usufruct rights of the local inhabitants, coupled with the need of visitors to the area. Unsustainable resource use and tourism practices are viewed as the key threats faced by the local ecosystem.

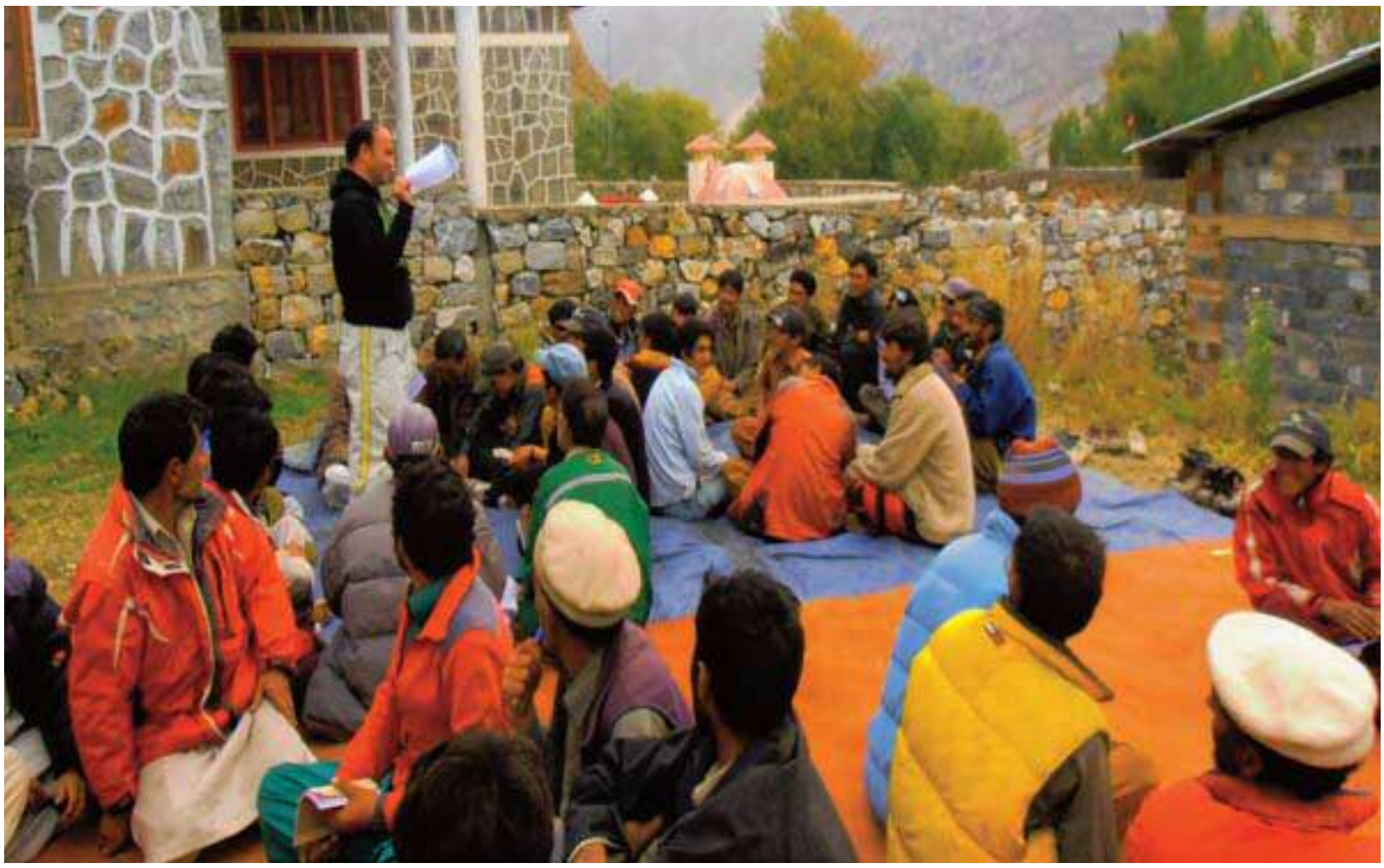
Right in this context the SEED project will launch campaigns to raise awareness, informing local communities not only about the park and its management, but also about basic needs, health, hygiene and sanitation beyond contributing to generate income opportunities thanks to tourism, craft and small trade industry.

The project will also help local communities to increase the yield of their crops in an ecologically sustainable way and to diversify their agricultural portfolio. With this aim, the project operates in compliance with the priorities defined in implementation plan for the Agenda 21, developed at the World Summit of Sustainable Development in 2002 to achieve the reduction of poverty and support the sustainable development of mountain ecosystems.

Aga Khan Rural Support Programme training courses

Form irrigation and farming to schooling and gender inclusion

*By **Aga Khan Rural Support Programme** Baltistan staff*



Baltistan area is geologically fragile, full of natural calamities, with lots of political issues and a weak economy, which is forced to depend on other areas of Pakistan. There are also many issues in the field of sanitation and development, even because there's a severe lack of women empowerment.

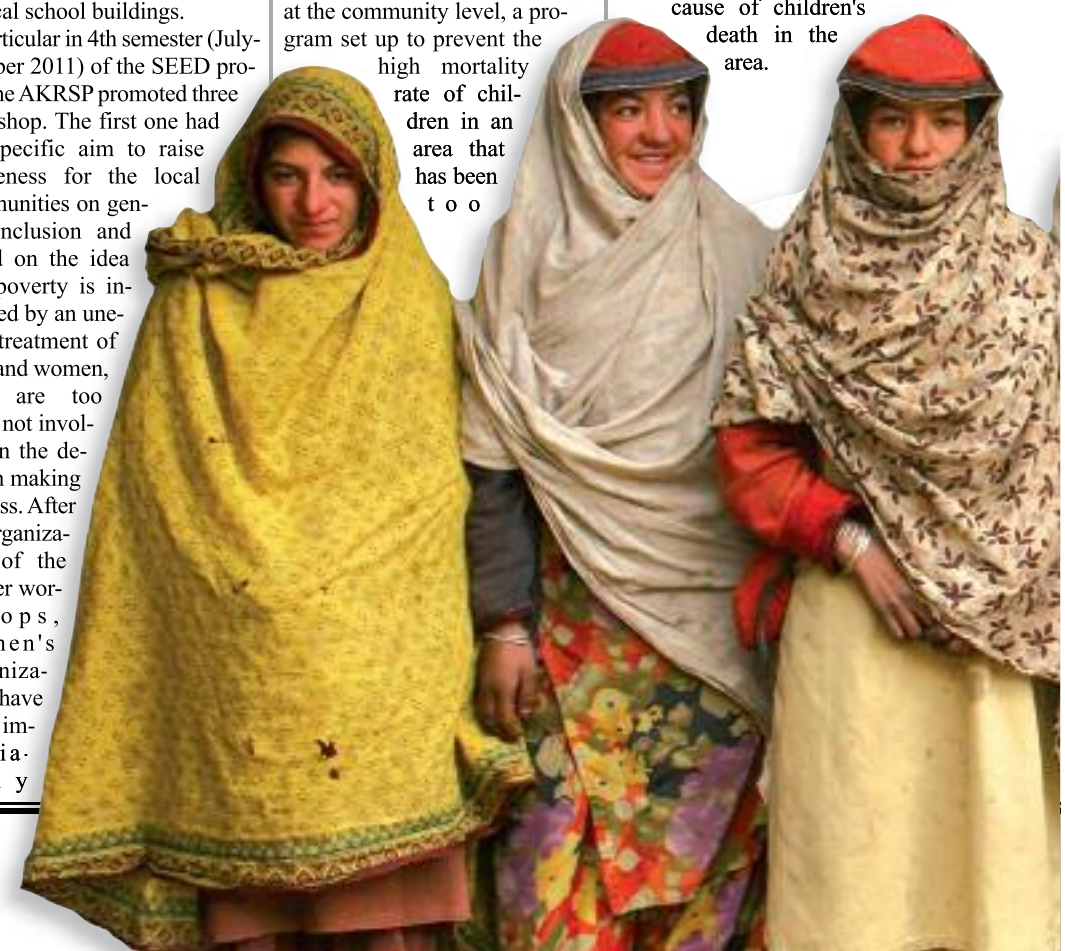
To provide a practical reply to these problems Ev-K2-CNR Committee and Aga Khan Rural Support Programme (AKRSP) has decided, in the framework of SEED project, to launch a series of activities in a specific area of Baltistan territory including four Union Councils of Skardu District which are Tisar, Basha, Dassu and Braldo.

This area (19,036 inhabitants and total household is 2,590) is characterized by a geologically fragile, ecologically unpredictable, politically instable, geographically sensitive, and economically dependent on other parts of Pakistan. Most of the population is living at high altitudes in a narrow strip of one of the world's highest and gigantic mountain range 'The Karakorum'. The roads often get block due to land sliding and other natural calamities make accessibility to the communities difficult. This arduous accessibility, harsh weather and complex social structure has made this area least developed.

AKRSP is working on the field in different thematic areas, starting from the improvement of water supplies, both for drinking and irrigation, going on with the ways of access for isolated villages, another focus of the program is on the establishment of fruit nurseries and farmer training for improved periodicity and marketing, together with a project of promotion of off-season vegetable farming for communities along trekking routes.

The programme includes also activities to raise community awareness for what concern health issues and education as well as interventions in the field of instruction: there are conduct teacher training courses, projects to provide contemporary teaching aid for local schools and other initiatives concerning the improvement of local school buildings.

In particular in 4th semester (July-October 2011) of the SEED project the AKRSP promoted three workshop. The first one had the specific aim to raise awareness for the local communities on gender inclusion and based on the idea that poverty is increased by an unequal treatment of men and women, who are too often not involved in the decision making process. After the organization of the gender workshops, Women's Organizations have been immediately formed in the four areas, where the program was activated. Another successful workshop has been the training birth attendants course, a program that has improved the skills of twenty traditional birth attendants created in collaboration with the Government Health Department. The third workshop has been conceived to raise awareness for health issues at the community level, a program set up to prevent the high mortality rate of children in an area that has been too long forgotten by NGOs and Government. With these workshops addressed to 12 local villages, a group of Women's Organization members has been involved in health and hygiene activates and they have been taught some hygienic practices, from how to clean teeth, to how to prepare oral rehydration salt, the basic medication to fight diarrhoea, the main cause of children's death in the area.



SEED Project guidelines

FRAMEWORK: Pakistan-Italian debt for development SWAP agreement

DONORS: Government of Italy, Government of Pakistan

PERIOD: 2009-2014

FOCUS AREA: Central Karakorum National Park, Gilgit-Baltistan Region

BUDGET: 1,018,934,981.05 PKR

IMPLEMENTING ORGANIZATION: Ev-K2-CNR Committee in collaboration with the Karakorum International University

COLLABORATIVE AGENCIES:
AKRSP Baltistan
Central Karakorum National Park Directorate (CKNP)
Alpine Club Pakistan (ACP)
WWF Pakistan
Mountain Glacier and Protection Organization (MGPO)
International Center for Integrated Mountain Development (ICIMOD)
Pakistan Meteorological Department (PMD)
ISIAO,
POLITECNICO MILANO
OTHERS ITALIAN UNIVERSITIES AND INSTITUTION

LOCAL COMMUNITY AND RURAL DEVELOPMENT

Baltistan women tell their stories

AKRSP activities support the women involvement in decision making processes

Zakia

"My name is Zakia and I am 28 years old. I am from Dassu Chukhill where I live in a joint family with my husband, my parents in law and five children, between 6 and 16 years, one daughter and four sons. I'm a birth attendant and when I've known about the chance to follow a traning workshop to improve my job I decided to attend it: after the training I felt a huge change, now I know when the mum can stay at home to deliver or when she need to go to the hospital. I've also known the importance of clean and safe health practices for the life of both mother and the baby, for this reason I use sterilize instruments and I keep the area clean. I have also learnt how to do the post and antenatal check-ups, to check the blood pressure and to sterilize the delivery instruments. Before traditionally women used to deliver themselves without any help of the birth attendants. Generally when attending a birth we used to keep the labour room warm and give herbal tea to the mother, after this workshop I know that there's much more I can do, that's why I feel more satisfied and confident about my work now".

Shazia Raza

"My name is Shazia Raza, I am 24 years old and I live with my husband in my village, Chaqpo. We have six children, two daughters and four sons aged between 11 years and 2.5 months. Thank to Social Mobilizer I got to know about this one day health and hygiene workshop, where I have learnt the way of proper hand washing and the most important thing, that water alone is not sufficient to remove pathogens. Soap and wood ash are both cleansing and disinfecting agents, when used with water, and they also kill the pathogens that cause the diarrheal diseases in children, the main cause for the infant mortality in my area, especially in summer. Before the workshop I didn't have these information and because in our village there was and is still lack of basic health facilities, I thought it could be good to know more about hygiene and also spread the voice about these practices between the women of my community: starting from the advice to wash hands with soap before eating, handling food, before and after feeding the children and after cleaning them if they have defecated. Knowing these practices will surely be helpful for my community, but unfortunately most of its members are still not using them, I think we would need more than one day long workshop to bring a change at broad level".

Saira Salman

"Saira Salman it's my name and I am 20 years old. I live in a joint family of 27 members in my village, Chukhill Dassu, where women are the most deprived part of our society. Traditionally we are excluded from power and decision making, we are less educated, with fewer skills and opportunities than the guys. Most of the people think that the duty of women is to upraise the children, to do the washing up and to cook. We shouldn't be allowed to speak for our rights and personal issues. But thank to the Women Organization I have known about this Women Inclusion Workshops, where I have learnt the numeracy, the Urdu and English alphabets and also how to write a letter. I've have learnt what is gender, what is difference between sex and gender, the role of women in society's prosperity, how to communicate effectively and the importance of communication. I've also discovered the role of activist in a Women Organization to mobilize women, something that has been very useful for me, considering that I am working as a manager of women organization. My main responsibilities are record keeping, conducting weekly meetings, collecting savings, creating awareness among women to avail different opportunities, from adult literacy training, to green house training. I also facilitate AKRSP and other service providers in conducting trainings and workshops through the Woman Organization platform. I have to say that in the beginning villagers were not happy about the formation of this group, particularly the religious figures were not ready to accept the women interference in social activities, but with the passage of time the trend has changed: now they have realized the importance of the Organization and people appreciate our activities and participate actively".

Gemstones mining training

By ***KIU and Ev-K2-CNR***

In the area around the CKNP, the intensive magmatic activity during subduction process since Jurassic period forced sedimentary deposits, island arc and reaming fragments of crust and mantle to go through metamorphic process and magmatic crystallization under favourable conditions for crystallization of gemstones, minerals, metallic and non-metallic and economic valuable rocks

Important gemstones ruby, emerald, sapphire, aquamarine, tourmaline, garnet, fluorite, parodist, spinal, zircon, topaz, berylspar, corundum, marganite, serpentine, moonstone, amethyst and metallic and non metallic minerals (chalcopyrite , antimony, gold , sulpher and etc) and economically valuable colour marble deposits, characterized by an international standard are present in the region. These rich deposits make mining a key factor of development for the local community. Bu the application of traditional instruments and blasting technology of mining make a huge wastage of minerals.The ratio between income and losses during mining due to unawareness of geological structures and formation and orientation and sizes of precocious crystals is about 1:3.

Therefore, systematic training programme of application of modern technology was initiated by KIU with the collaboration of Ev-K2-CNR to train miners of Nagar and Haramosh area to use modern technology in mining of gemstones and safety measures during work at high altitude and steep slopes, in order to prevent accidents, providing basic knowledge about both the appropriate use of safety equipment and the main safety rules in excavation techniques.

SEED trainers have been also informed about excavating shafts and tunnels and they received some elements and notions on how to properly drill the holes for the explosive charges and on safety rules in handling or storing explosives as well as the use of alternative explosion techniques such as the expansive mortar, to be used in case of fragile or valuable gemstones. Among the other topics of the courses there is the manual extraction of mineral using equipment such as hammers, chisels, picks and shovels. Miners have also learnt to use jackhammers and reduce the specimen to the appropriate sizes, moreover they have also been taught how to be safer by wearing the suitable equipment: from helmet and goggles, to gloves, mask and a protective suit. There was also an important part of the course dedicated to safety procedures for climbing in the most dangerous areas of mining: a professional mountain guide trained the students in the correct use of climbing equipments starting form the ropes, harnesses, to descenders and jumars. In the end came a short first aid courses, with theoretical and practical lessons.

LOCAL COMMUNITY AND RURAL DEVELOPMENT

"There are incidents and some people die also.... These training courses are very useful for us!"

*An interview to **Salman Alì**, mining course participant*

First of all, can I ask you to introduce yourself?
I'm Salman Alì from Dassu. I'm involved in the mining and in the season I work also as a guide. I go to Baltoro and I take expeditions wherever they like to go, it's my job.

I know that you have been very involved in mining last year. What is going on in Dassu area for what concern mining?
The mining activities are almost increasing, so last year I attended the mining workshop. I think it was quite useful but there were just a few people who was following it. All they thought it was a good workshop.

How many people are involved in this activity in Dassu?
Almost there are... in Dassu there are more than 160 houses, and almost all the families have at least 1 or 2 people involved in mining. So more than 250 people involved...

The season for working in mining is all year?
Yes, all year. But it is up to the luck, but people do it all year long.

Are they changing their work during the season as porters, or they're only working in mining, or they are doing both?
In Dassu there are some places where they do both: sometimes they work as porters, sometimes they work in mining. But in Dassu they are almost involved all in mining, so they don't like to go as porters.

Which kind of instruments are you using? what about security? Is it a dangerous activity?
Yes of course this is a dangerous activity. Sometimes they break the ropes while they are climbing, so they go deep in the mine, but they take risks anyway. People want to do it, but if it's not safe, there are accidents and some people also die.

You know, last year we provided some training for the people that are involved in mining with the Italian professor Mr. Barsanti. Have you some feedback about this training?
Yes, of course, the people involved in the mining training say it was very good, very helpful to them and useful, but it was for just one people in each village, ten people in all. So it was not enough, but who got the training says it was very useful.

***For your mining activity do you think you have to change your way of blasting or is not possible to use other ways? Mr. Barsanti told me that in the way you use it, you normally lose a lot of material, because blasting become very dangerous also for the stones and so a lot of things are broken and you can't take out the stones**.*
We didn't change. We are still blasting like we were doing before. Now we have no chances to change, but it would be a good idea.

What about the chemicals that can expand and break the stones without blasting. Can you introduce these techniques or not?
No, not yet. We haven't enough resources to bring here those chemicals; people have not resources to provide these things...

Ev-K2-CNR in the last years worked a lot around here, what do you think was useful for your community?
Yes, of course, I've known Ev-K2-CNR, they are very good people. The more important (thing) they have provided is the health centre, the people were very impressed by the health centre.

Is it working?
Yes, it is working, it's just started, but not completed. But people are hoping very much for it.

Is there a doctor?
Yes, there is a doctor, they are getting medicines, but it is still improving. It's not perfect, but it's improving and there are many hopes for this centre.

SUSTAINABLE DEVELOPMENT

Apple, apricot, cherry : a certain income in Skardu market, but also in the big cities.

KIU Training Workshop for farmers

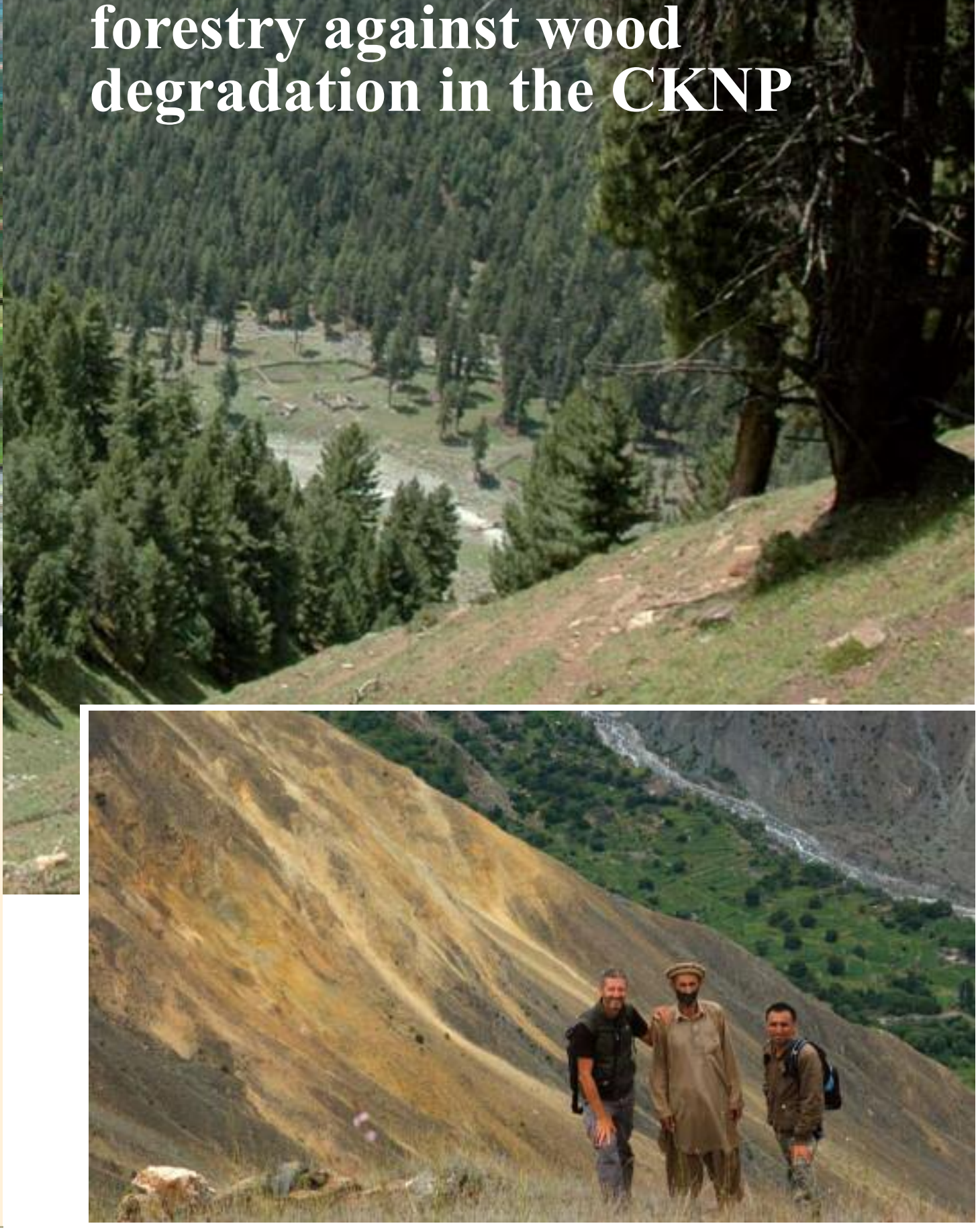
*By **Karakorum International University***

Baltistan region is famous for its fruit, from apples, apricots and cherries, to mulberries, walnuts and almonds. But in the CKNP area the trend of fruit farming is reverse, especially in Braldo, Basho and Dassu Union Councils. The fruit farming is a less focused activity in these UCs, although the people of Baltistan region is earning a good amount by selling their fruits in Skardu market and even in big cities of Pakistan. In the framework of SEED project, several training workshops were conducted by KIU in different sectors; In particular we had one addressed to local farmers that we carried out in collaboration with the Agriculture and Food Technology Department in CKNP region. The farmers were trained in various areas like : fruit harvesting, fruit grading, packing, marketing and fruit processing. Farmers in Gilgit still use traditional farming methods in fruit harvesting, they shake apricot trees vigorously, all the ripe and unripe fruit comes down

to ground and the ripe fruits gets damaged, becoming unmarketable. Farmers were advised to use bamboo sticks with hooks to gently shake branches and hold a plastic or cloth sheet underneath to avoid fruit injury.
They also didn't have to lump all apples in one basket, but grading them according to size: bigger fruits, medium and smaller ones went into separate boxes, before sending them to the market.
This would give farmers better prices. Proper marketing and labeling is essential for fruit interstate transportation and export. Farmers have been encouraged to organize proper packing and marketing of fruits on their own: taking out middle man make, farmers get better returns.
Each year a big amount of fruit goes wasted in Gilgit-Baltistan: for example 60% of mulberries, 40% of apples and 20% of cherries go wasted.
Farmers have been trained to process surplus fruit and go for value added products like James and juices to earn more from their efforts and they have been encouraged to use the sun to dry apricots.

SUSTAINABLE DEVELOPMENT

Reforestation and social forestry against wood degradation in the CKNP



*By **Efrem Ferrari** and **Tommaso Anfodillo**, TESAF Department, University of Padua*

Since the 1960s, mountain forests of Pakistan are facing strong degradation caused by illegal logging, uncontrolled grazing, unefective management guidelines and irrational management. The most recent statistics released by the Food and Agriculture Organization (FAO, 2011) estimate an average yearly deforestation rate for the years 2005-2010 at an alarmingly high -2.2%. This is well above nearby countries (Nepal -0.7%, India +0.5% and Bhutan +0.3%) and it's worse than the rate recorded during the '90s (-1.8%). As a direct consequence, serious concerns about the ability of Pakistan forests to provide essential environmental services like watershed regulation, biodiversity conservation or timber and non-timber forest products have been raised. Strong, efficient and effective mitigation measures against deforestation and forest degradation are needed to ensure a solid future, not only to forests but also to the livelihood and wellbeing of people.

Since 2010 the TESAF Department of the Italian University of Padova started a collaboration within the SEED project framework, coordinated by Ev-K2-CNR, to develop a sustainable forest management plan for the CKNP. As a first step, Bagrote valley in Gilgit district has been chosen as a pilot area for the development of sustainable forest management guidelines and the establishment of innovative and replicable good-practices. Thank to remote sensing and a field survey campaign, the forest biomass and annual increment of Bagrote valley forests have been quantified for the first time (total forest biomass 236.000 Mg of net biomass with annual increment 6511 Mg). These data are essential to estimate the wood amount which can be harvested sustainably from the forest. Indeed, in order to do not deplete the forest stock (total forest biomass), only harvesting an amount of wood equal or lower to the annual increment guarantees the maintenance of forest resources for the future generations. Last summer we conducted open interviews in the eight villages of the valley to obtain informations about actual forest uses, forest area trends and main threats to forest conservation. More than 250 perople expressed concerns about forest area shrinkage: forest is an essential asset for people living in high mountain areas with long cold winters as in Karakorum. Most of the wood used is firewood for cooking and house heating. According to our elaborations, the total annual wood consumption in Bagrote valley is 5000 Mg net biomass. This is slightly lower than the increment rate and demonstrates that forest degradation and depletion are mainly caused by a lack of management guidelines and good-practices. According to local households, this degradation is a recent phenomenon, partially fostered by the increase in population and therefore wood needs. However this trend has been exacerbated by other indirect causes as the increasing amount of livestock owned by villagers and lack of management guidelines. For example the young tree seedlings heavily browsed by livestock phenomenon is slowing, if not impeding, the forests natural regeneration capabilities. Additionally, lack of proper management guidelines, as target diameter or tree selection system, plus irrational laws and regulations, as the green trees cutting ban or the frequent branch cutting, are enhancing the degradation processes. Starting from summer 2012, Padova University researchers will begin to implement two mitigation measures to stop and reverse forest degradation: on one side social forestry specifically designated for firewood production, on the other natural reforestation using site adapted species already growing in Bagrote forests like Kail and Spruce. By a simple and effective planning scheme we aim at delivering a highly reproducible asset to the CKNP and Northern Areas Forest Department bodies. With the establishment of mitigation measures such as social forestry and natural reforestation we aim at increasing the adaptive knowledge of local communities towards forest restoration. Certainly nature conservation, in all its forms, can be hardly achieved without people involvement, that's why we are organizing a "Reforestation Day" with local schools to involve children in this important activity.

Social forestry. As most of the wood needs for local communities are in the form of firewood, we will evaluate the feasibility of starting public plantation specifically designated for the provision of firewood. This is innovative since most of the plantations in the Northern Areas are aiming at producing Poplar timber. We will adopt Coppice a system based on the ability of certain plant species - mainly broadleaved as Chinar, Willows and Poplar - to sprout new stems from the stump once being cut. This system allows frequent cutting (every 4/5 years) in a sustainable way: after every production cycle, the stumps will re-establish a canopy independently allowing a short-term continuous delivering of firewood. As an experimental site, Sinaker village, located at the entrance of Bagrote valley, has been chosen as a test location. In the last years The Sinaker community has experienced a dramatic shortage of firewood because of a naturally scarce and fragmented forest area. This, together with the long distance between village and forest suggest us to select it as a test site.

Reforestation. Forests of Bagrote valley have been heavily impacted by long-term human disturbances as overcutting or grazing. In some cases forest ability to regenerate and recover its natural state has been compromised. By helping the natural regeneration with additional seeds and by avoiding goat and sheep grazing on that area, we can help to restore the original forest cover. During various meetings with communities of Bagrote, two sites (Khama, in Bulchi and Shardein in Hopey) were selected by local households as favorable locations for the reforestation initiative. The two areas show clear signs of strong degradation with only few trees left. As a first step, both sites will be fenced with a solar-panel charged electric fence to prevent livestock to enter inside. Secondly, a large amount of Kail and Spruce seeds (10.000 per hectare) will be planted over more than 20 hectares. The use of site adapted native species is important to increase the germinability rate and guarantee a long-term success to the reforestation. It's important noting that this is one of the first reforestations in Northern Areas implemented using native tree species and with the strong support of local population. The first reforestation on Khama site is planned for this June. Sherdein area reforestation, instead, will be organized by autumn 2012 or spring 2013, according to seed availability. To deliver the local communities a set of good practices, we will additionally organize in September 2012 conifers cones harvesting. This will be an important occasion for local households to gain a simple and cost effective management toolbox for future reforestation areas enlargement.

SUSTAINABLE DEVELOPMENT

Discovering Baltoro

Type: Debris-covered glacier
Location: Karakoram range, Baltistan, Pakistan
Coordinates: 35°44'11"N 76°22'51"E
Length: 62 kilometres (39 mi)
Altitude: 3370 m – 8611 m a.s.l.
Drainage area: 1500 km2
Glacier area: 524 km2
Ablation area: 372 km2

Tributary glaciers: Godwin Austen Glacier, flowing south from K2; the Abruzzi and the various Gasherbrum Glaciers, flowing from the Gasherbrum group of peaks; the Vigne Glacier, flowing from Chogolisa, and the Yermandendu Glacier, flowing from Masherbrum.
The confluence of the main Baltoro Glacier with the Godwin Austen Glacier is known as Concordia

6 years of missions,
30 tons of waste collected

Keep Karakorum Clean

By EvK2Cnr

Oxygen tanks, cans, tend destroyed by the wind, kitchenware, gas cylinders for camp stoves or broken parts of mountain rucksacks. These are just some of the waste you can find on your way up to the Baltoro Glacier, along one of the most famous trekking route of the Karakoram. Trekkers and mountaineers left them on the way, irresponsibly leaving a dirty environment to other people coming here after them. That's why Keep Karakorum Clean is one of the most useful and successful campaigns in the area: an idea born from Ev-K2-CNR together with the Central Karakorum National Park within the SEED Project.

The first cleaning expedition was addressed to K2 and Gasherbrum II base camps: it was the year 2006, and more than three tons of waste (160 trash bags of 20 kilos each) were collected. Three years later it was time for the second mission, aimed to clean up Baltoro Glacier and K2 base camp. There were collected eight tons of rubbish and the team also built an ecological platform for organic waste at 4.700 mt. a.s.l., at the junction among Baltoro, Abruzzi and Godwin-Austen glaciers, an area called Circo Concordia. Baltoro Glacier and K2 higher camps were the target of the third campaign, carried on in 2010. The expedition reached 7300 mt. a.s.l. and collected 13 tons of trashes, 2800 kilos of which were human waste. Last summer the cleaning expedition climbed up to 7.800 mt. a.s.l. on Gasherbrum II, where climbers usually install their camp 4 on the way to the summit. In 2011 more than 8 tons of waste have been collected, on GII mountain and on the Baltoro Glacier. All the expeditions were run by Maurizio Gallo, mountain guide and technical officer for Ev-K2-CNR initiatives in Pakistan. All the burnable waste collected on the mountains were incinerated by Earth, the ecological disposer installed by Ev-K2-CNR Committee in the village of Askole.

The results of the whole environmental activity promoted by Ev-K2-CNR in Karakorum are extraordinary. Over a few yars, we have mort than 35 tons of waste collected and 20 toilettes installed in the Baltoro area to avoid human waste around: this is an area where every year more than 6000 people - local staff and tourists -, plus 700 mountaineers and trekkers, visit the glacier. Over the last few years, Ev-K2-CNR also organized training courses for more than 130 mountain guides and 60 high altitude porters.

Training is one of the most important activities promoted in this area within the Seed Project. The general aim of *Keep Kararorum Clean* is not just cleaning up glaciers, but also raising environmental awareness among local population and climbers. They have to understand the importance of environmental protection and of separate refuse collection. According to this aim, the cleaning staff of the project is entirely composed by locals. They are trained by Ev-K2-CNR, that every year chooses new porters, coming from different regions of Pakistan, in order to make them professional climbers and "ambassadors" of an environmental conservation culture in their own areas. The project also includes an analysis of turistic flows in the Karakorum National Park and the training of high altitude porters, trekking leaders and specialized tour operators. You can find some of their stories below.

"Keep Karakorum Clean figures"

- **6** expeditions
- **30** tons of waste collected
- **20** toilettes installed
- **130** professional guides trained
- **60** high altitude porters trained
- **60** trekking on Baltoro glacier every year
- **700** mountaineers and trekkers reach Baltoro glacier every year
- **6000** people, from tourists to local staff are active on Baltoro glacier every year

The eco-friendly trekker's vademecum

*By **Maurizo Gallo**, Ev-K2-CNR technical advisor*

- *Check supplies before leaving and eliminate useless packaging.*
- *Set up separate refuse collection during the trekking: so mind to burn paper, pick up cans and plastic items, plan to have litter bins to transport waste until the end of the trekking, even if this means paying specific porters.*
- *Regularly check the kitchen staff to verify the waste management.*
- *Plan the climbing with precision, trying to bring at altitude the essential material only. Bring back from time to time every waste and every material remained unused, even broken tents. If you are not able to do everything on your own, make sure to have high altitude porters, to retrieve material along the way, once the expedition is finished, even if this means to have a further cost in your budget.*
- *Be the last one to leave your base camp, after having checked that all the waste has been taken away.*
- *Eventually pick up even waste left by other people along the way and bring them back going downstream.*
- *Be aware that respecting the environment is a target of the same importance as acclimatization and the peak.*

SUSTAINABLE DEVELOPMENT

2012 new challange: a cleaning campaign at the 8000ers' base camps

*By **Maurizio Gallo**, Keep Karakorum Clean campaigns coordinator*

A new Keep Karakorum Clean expedition is starting this summer. The Baltoro trekking route and the base camps of the 8000ers will be the involved areas. As in the past years, the program includes eco platform and waste cleaning activities, but there is also a new entry in the project: the Concordia Rescue Team.

The Eco Platform activity is about the installation of new toilettes on the glacier, and the transportation of human waste in external areas where it can be disposed. We will add two toilettes to the ten already existing on the Baltoro Glacier. The new ones will be installed at the K2 base camp, where toilettes have never been installed. Thanks to this intervention, all the campsites located within the CKNP glaciers have toilettes as well as two base camps of two 8000ers of the Karakoram.

We will also promote the use of new biodegradable bags, easy to be transported and buried, avoiding the use of polluting plastics. We will also quantify the costs of this toilettes service, in order to evaluate if CKNP in the future will be able to directly fund the project with the entry fees of the park.
As far as Waste Cleaning activities are concerned, since this year trekking groups and expeditions will start to pay directly for waste disposal.
We have prepared 3 kinds of trash bags for waste disposal, differing in colour. These bags will be given out by our staff in all the campsites and at the park entrances. This year expeditions will be requested to carry the waste down to Concordia at their own expenses.
In a couple of years we hope they will pay all the transportation costs, carrying the waste down to the incinerator in Askole and to Skardu. To make sure that the process will be completed, a system of refundable deposits will be instituted: expeditions and trekking groups will leave some money as an "environmental guarantee", and they could have them back after their journey only in case of correct ecological behaviour. The CKNP staff will check waste collection and transportation in the campsites and on the route.

The latest word of our campaign is the newborn Concordia Rescue Team, a rescue service with two different fields of intervention: the first is medical assistance for tourists and porters, the other is rescue and first aid on the glacier in case of accidents (i.e. falling in a crevasse). This activity includes also fixing ropes and ladders on the route around Concordia, where at the end of the season some passages become dangerous to cross.

Our technical and paramedical staff, specifically trained at Skardu hospital, is equipped with medications for solar exposure without eyes protection, stomach diseases, muscle soreness, joint pain and headache. We have alsoe a rescue tent equipped with a little hyperbaric chamber and oxygen tanks for urgent intervention in case of acute mountain sickness.

Over the next years, this service will be managed by CKNP staff in order to make the locals as much autonomous as possible. It's an important activity, highlighted by CKNP visitors as one of the primary needs of the area, together with campsites renovation.

A chat with Shahzada a very famous Pakistani trekking guide

Mr Shaz Adà , can you introduce yourself?
I'm Shaz Adà Mokun, from Gilgit, I'm working with Ev-K2-CNR as a mountain guide. Ev-K2-CNR is doing so many projects in Gilgit Baltistan. One of the projects is about mountaineering training for Pakistani guides. Last year (2011) two training courses were organized in Gilgit-Baltistan, with a mountain instructor from Italy, Maurizio Gallo: many local alpine guides were trained. Both the people of the area and the students highly appreciated the project. In my area most of the people are involved with tourism and do business with tourist groups, some of them also run their own agency. After ten days of theoretical training in Gilgit, we did also a practical training about the equipments, i.e. which type of gear to use and other things that have been very essential. It was a very nice training and people said they have never seen something like that before.

We divided the training practical sessions into two steps, one was rock climbing and the other one was on the glacier. Which one do you think is more important for you?
For us the rock climbing training was very useful and highly appreciated. More than the glacier.

But normally you work more on the glacier...
Yes.

Ev-K2-CNR, in cooperation with Alpine Club Pakistan, have been organizing different kinds of training for 5-6 years: trekking leaders, rescue training, high quality instructors training and especially those for high altitude porters.
Yes, in Pasu we trained 22 people. In the second training course we visited Teheran's peak glaciers, Rakaposhi glacier. There were 12 instructors, that received instructor training.

We have spent 2-3 trainings for 20-25 high altitude porters. I hope that these trainings were useful for them because the request for high altitude porters is growing for the expeditions.

This course was really very useful. High altitude porters now are more important than before. A lot of expeditions hire Sherpas from Nepal because they think that the Pakistani high altitude porters are not enough trained to work with the climbers in fixing ropes and to help in case of accident. During the training, the instructors showed us new climbing gear, new techniques and teached us how to coordinate rescues and to give first aid.

The cleaning expeditions to K2 and the cleaning expeditions to Gasherbrum II involved 12 high altitude porters. They worked for one month with the techniques we taught them and with good equipment. I hope they have appreciated it very much.
A. Yes, they all appreciated it and they took up the very nice techniques that they didn't know before. After the trainings, we have taught these techniques to some other people as instructors during their training.

Do you think that the rescue at high altitude can be better after our trainings ?
Much better than before. Before we had so many examples of high altitude porters who left their clients in the high camps, at about 7000 metres, and then went away. These members had been laid off.
After that kind of situations, we hope that high altitude porters will never make mistakes like that and never leave people on the mountain, they must be brought back. If they know the rescue techniques, that's one of the benefits for them, for us, they can help other people in high camps.

Clean campaigns: the mountaineers thank for the good job.

Opinions from the K2 Italian museum guest book - Skardu

"Thanks, I will support your work in every way. I'm impressed and comforted by this cleaning project and by how it involves all the stakeholders"

***Allen Boh**, Canadian mountaineer*

"I'm proud of these men, who spend their time to clean the mighty Baltoro. It's a big engagement and I hope to contribute to reach the goal".

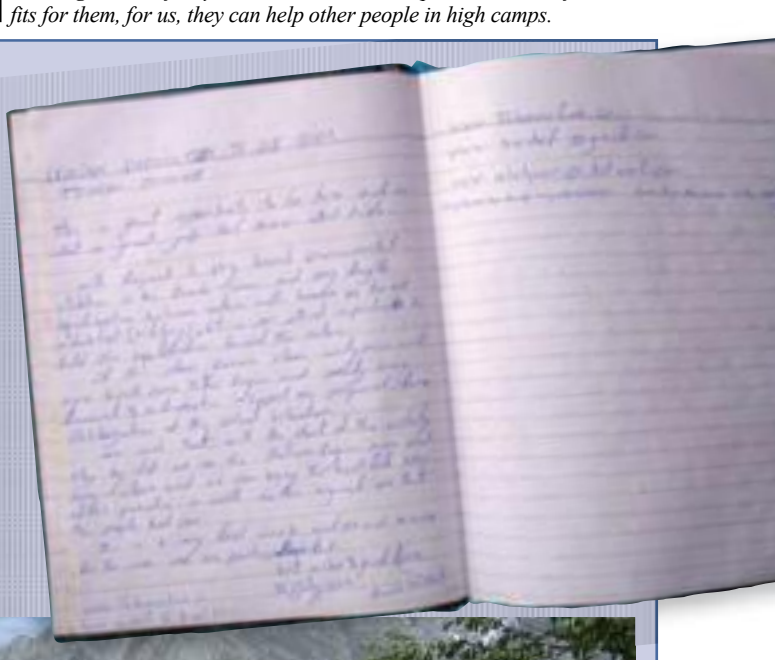
***Cleo Wiedlich** from California*

"Congratulations to Ev-K2-CNR because it's not only necessary to keep Baltoro clean, but above all to educate we all, from trekkers to the army, from mountaineers to porters, in order to conserve the most beautiful places in the world".

***Miguel Angel Perez**, Egocheaga expedition on K2*

"I think it's very important to educate all, tourist and Pakistani, to keep the glacier clean. Thank you Italy for having organized and paid this staff on Baltoro".

***Herbert Wolf** of Amical Alpin expedition on GII*

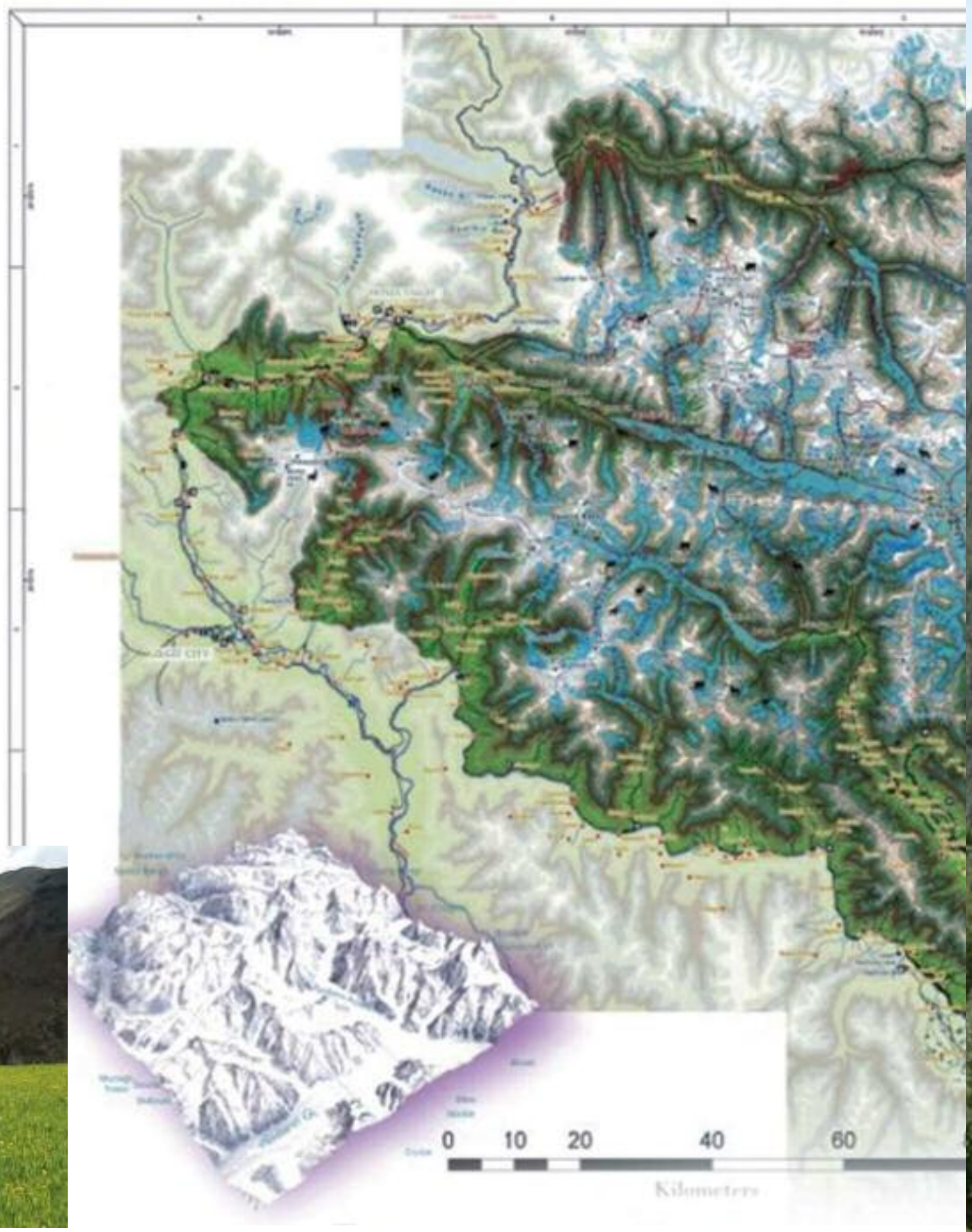


20 PhDs on environmental subjects for territory and park management

*By **Anna Bocci**, Ev-K2-CNR scientific advisor*

One of the main goals of SEED project is the establishment of a multidisciplinary Department for Mountain studies ("Integrated Mountain Areas Research Center" or IMARC) in the Karakoram International University (KIU). 20 PhD thesis have been then planned to be carried out at KIU in fields relevant to the sustainable development of the Central Karakoram National Park and its management, ie disciplines from natural sciences, social studies and economics. The general idea behind PhD programs was to exploit synergies with other project activities, giving support to the CKNP management as well as improving KIU capacity in areas in which there was not already a specific technical expertise.

Three sessions of interviews have been carried out, in different subjects, in the last 2 years. 18 PhD students have been already selected along this procedure. PhD students are directly involved in research activities, being at the same time part of the KIU staff inside the new IMARC Department. Furthermore, they are attending courses at KIU in different subjects, eg Research Methodology, Advanced Environmental Law and Policies, Population Genetics. At least 5 of them are supported by Italian research groups working in CKNP (in Forestry, Wildlife, GIS, Water management, Geology) and they are suppose to spend 2 months as visitor students in the respective Italian Universities. At the same time, the Italian Universities involved in the SEED project are also supporting the new Department organising specific seminars for the whole KIU staff linked to IMARC, on the specific subject in which there is no local expertise (not only the 5 research areas mentioned above, but also glaciology, mountain hydrology, atmospheric sciences).
Along the three-year PhD courses, students will be completing all the credit hours envisaged by the High Education Commission (HEC), collecting data in the field, analysing them, improving their capacities, writing down and defending their thesis.



"The studies on water resources of the CKNP region will provide a guideline for the future water availability of our country"

Interview to Maisoor Ahmed Nafees, SEED PhD student

Could you please tell a bit about yourself?
My Name is Maisoor Ahmed Nafees and belongs to the "Malik" family of Gilgit town. Married at an advanced age of 21 and now 40, have four children all school/college students.
I did Bsc (Hons) in Agriculture with specialization in Entomology from Azad Jammu and Kashmir University and continued with the same Subject by doing Msc (Hons) from Khyber Pakhtunkhwa Agricultural University Peshawar in 1996. I was a part of IUCN -Pak and worked as a Coordinator in Biodiversity conservation project in 1997 -98, Where actively involved in conducting wild life surveys, preparation of Village management and natural resource conservation plans.
I entered in Government service of Federal Plant protection department and assumed charge of the post of Assistant Quarantine Entomologist in 1999. I was posted at Sost (Pak China border). My duties were to inspect agricultural commodities going to and from china and to ensure pest and disease free entry and exit of the said commodities. I served there for 12 consecutive years.

Why you decided to apply for this PhD? What did you expected from it?
I was quite contented with my previous job having all fiscal and government amenities but the quest for an additional doze of higher education was always there, I tried many times to have an official study leave but all efforts gone in vain. Meanwhile the positions for PhD scholars were announced under Seed project, it was a unique opportunity for me to quench the thirst of higher education in my own area and offered by a native University. My expectations to the program is the pragmatic outcome in the form a consolidated and integrated type of research exfoliating a proper Management and conservation plan for the natural resources in a sustainable way. I was expecting a better and a contrast knowledge with novel exposure peculiar to my PhD studies i.e. water resources management, that I got during my trip to Italy on having on hands experience with sophisticated equipment in the state of the art labs like Arpa, Omegna and CNR-ISE, Pallanza, Verbania. The two months stay and subsequent training in Italy under Seed project has built my capacity to the fullest extent in analyzing the chemical and microbiological parameters of water quality.

And which is your research project, could you please tell a bit about it?
My Research Project is purely based on the Management of water resources in CKNP area Gilgit –Baltistan, the title of my research is "Physico-Chemical and Microbiological Assessment of water resources in CKNP region of Gilgit-Baltistan". The main theme of my project is to unveil the microbiological and chemical picture of the water resources in addition to the physical characteristics and their possible use.
Analysis of some selected point of use to evaluate the possible deterioration of water quality during the transport and define the strategies to tackle the problem.
This study will help to develop a permanent monitoring scheme to assure a proper surveillance of water quality from the source to the point of use. The evaluation of the traditional water storage and distribution systems with indication of water management improvement is also an objective of the study.

UNEP and Ev-K2-CNR a close collaboration towards the CKNP implementation

***Haruko Okusu**, PhD Programme Officer and biodiversity MEA Focal Point, UNEP Regional Office for Asia and the Pacific*

The Karakorum Trust project was jointly developed by UNEP and the Ev-K2-CNR Committee of Italy and has been in operation since 2009. The main objective of the project is to improve the quality of life of local communities and the conservation of environment, architectural and cultural heritage of the Central Karakorum region, enhancing the capacity of local communities and institutions to adapt to climate change and promoting sustainable development in the area. This would be achieved through: coordination of ongoing efforts and initiatives, strengthening of the decision support system, reinforcement of institutional mechanism to better manage the CKNP, and enhancement of capacity of local communities and institutions to face climate change.

The project is being implemented through partnerships with Ev-K2-CNR and its SEED/SHARE projects, Karakorum International University (KIU), Sustainable Development Policy Institute (SDPI), International Center for Integrated Mountain Development (ICIMOD), among others. They are making considerable effort despite setbacks, including a budget cut resulting in a significant reduction of outputs as well as the changing security situation in Pakistan.

The main expected outputs from the project include:

• A management plan: This will build upon existing strategizing/planning activities conducted in the past, and integrate climate change adaptation and sustainable ecosystem management options in order to develop a sustainable, integrated management plan for CKNP region. Working with local stakeholders in a participatory, the document will guide the activities that would be implemented on the ground in order to improve the quality of life of local communities while conserving the environment and dealing with possible impacts of climate change.

• Decision support tools: integrated and innovative geo-based tools and technologies that would be used by local managers, policymakers and researchers in the CKNP region. The tools aimed to meet the end-user needs for the strengthened management for sustainable development, environmental conservation, and preservation of cultural heritage.

• Climate Change Vulnerability Impact Assessment: Reports on climate change impact assessment, adaptation needs, and integrated ecosystem management that prioritize suitable mitigation and adaptation measures. The report will be coupled with a media campaign strategy for raising public awareness, and identification of pilot adaptation projects in the Gilgit-Baltistan area.

On 6-7 March 2012, a mid-term stakeholders' meeting was held at ICIMOD (Kathmandu, Nepal) to review the progress as well as to discuss successes and challenges of the Karakorum Trust project. The meeting was also an effort to maintain an effective mode of communication amongst project stakeholders, which consist of organizations and agencies involved in the Central Karakorum region, including the Ministry of Climate Change, KIU, SDPI, Pakistan Meteorological Department, IUCN, WWF, Mountain Glacier Protection Organization (MGPO), Global Change Impact Studies Centre (GCISC), among others.

During the meeting Ev-K2-CNR reported on the achievements made in scientific research and data collection, which form the functional basis of management planning in the region. The participants exchanged their views and ideas on how the project can balance the progress made so far by improving its effectiveness of providing better impact at the local community level. In particular, they underlined the need to proceed further with the management plan in parallel with strengthening of its scientific foundation. Other suggested areas of improvement included coordination by stakeholders, information-sharing, and local stakeholder engagement.

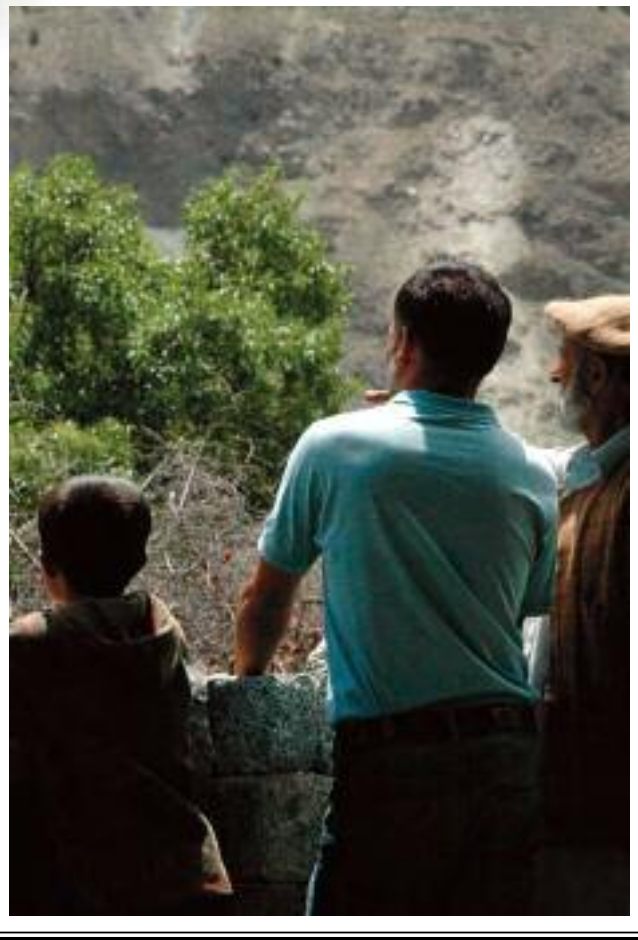
For the remainder of 2012, activities are planned with an eye to meet the needs identified at the meeting. Most notably, a series of workshops are planned in early June: SEED workshop (4-7 June) will include a review of the management plan, one of the main outputs of the Karakorum Trust project, proceeding in-depth discussions on scientific/policy issues; ICIMOD (8 June) will hold a consultation on its Decision Support Toolkit; and SDPI plans to review its Climate Change Vulnerability Impact Assessment Study. The back-to-back hosting of these meetings, centered around the World Environment Day on 5 June, is aimed to secure maximum participation and public awareness of the project.

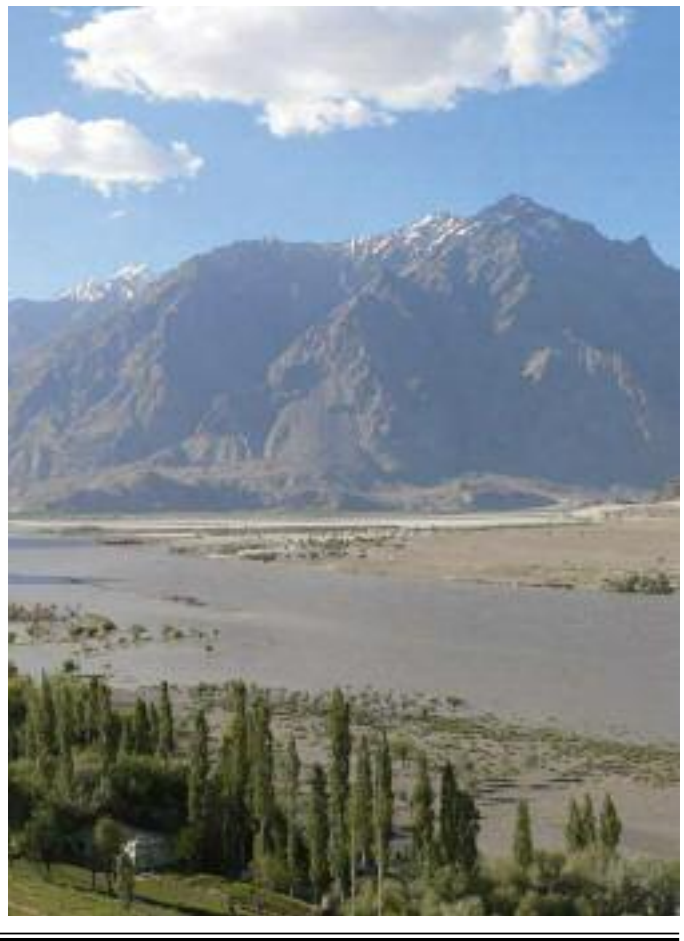
Since the mid-term meeting, communication among stakeholders have been reinvigorated – they will provide inputs to Ev-K2-CNR in the revision of the management plan, which will now also incorporate standard protocols for monitoring research methodologies.

The successful implementation of the management plan – and the positive impact on local communities – is very much dependent on their dedication as well as the continued financial and technical support of donors and partners.

What do people of your area tell you/think about your project?
Most of the area fall in CKNP is fed by the huge glacier systems outside the polar region so the question of quantity in not important for the people of the area, but the quality and availability of clean and safe drinking water matters. They have a hope that the water they use for drinking will now be tested in a Lab and we will provide them with necessary information and tips for the reclamation of the polluted water resources.

How do you think the researches of this PhD could help to improve your local area?
Water being the most important and vital part of all the forms of life, is considered to be the Nucleus around which all other natural resources grew. It is expected that the current studies on water resources of the CKNP region will definitely provide a guideline and propose various management practices for the improvement of water quality in the respective resources. After having PhD in my respective discipline I will definitely render my services to Karakoram International University (KIU) for the generations to come under the integrated mountain area research center (IMARC). My aim is to be a lynch pin in forming the Seed water quality Lab at KIU and to make it up to the level of a reference Lab in future. This Lab, no doubt will be a milestone in establishing international standards for the safe and healthy drinking water for the inhabitants along the CKNP region in particular and other parts of Gilgit-Baltistan in general. The total period for my PhD studies is three years of which I have completed my course work from KIU in 2011, and now this year is dedicated for the field work, sample and data collection. In the proceeding year I will muster data and submit my dissertation.





Why a Management Plan for the CKNP?

A tool for a socio and economic development of the local population and for the environment protection.

The Central Karakorum in the Northern Area of Pakistan is a mountain area endowed with rich biodiversity, natural beauty and important resources. It was formally declared as the Central Karakorum National Park (CKNP) in 1993. With its 10,000 square kilometro the Central Karakoram National Park is the biggest park in Pakistan. And until now it has remained a paper park. It is situated in the Northern Areas of Pakistan, falling into the administrative districts of Gilgit, Skardu, and Ghanche The Park host approximately 230 villages, 97,608 people and 13,159 households are located in areas adjacent to CKNP. The Park needs a Management Plan that accounts not only for conservation but also for the needs of the local population of this area, which is characterized by a high poverty rate.

Several activities aiming at safeguarding the environment, preserving the cultural heritage and promoting rural development in Gilgit-Baltistan are being carried out by different agencies and organizations, who largely share the same objectives. However, the effectiveness of interventions is hampered by poor coordination between actors, the lack of an integrated management plan for the park, and low capacity of relevant institutions and their staff.

Actually the Ev-K2-CNR Committee is carrying out in Gilgit and Baltistan Region several research activities within the framework of different integrated projects: Karakorum TRUST –phase II, SHARE –Stations at High Altitude for Reserch on Environment, SEED -Social, Economic, Environmental, Development in the Central Karakorum National Park. Starting from the analysis of the local community real needs as well of the potential of the environmental resources and through the scientific research, the projects developed in this area want to realize a real sustainable development and a long term stabilization of these territories and to improve the quality of life of local communities and the conservation of environment, architectural and cultural heritage. To achieve this goal, Ev-K2-CNR immediately recognize that a valid integrated management plan for the CKNP it could represent an essential tool. In the framework of Karakorum Trust II Project and in accordance with Unep, a preliminary survey of the available data for the CKNP was conducted, revealing a generalized lack of the necessary information to develop a CKNP Management Plan. The Management Plan would identify priorities thematic areas and related information requirement for CKNP management, foreseeing the activation of specific management researches and the realization of related sub-plans. The aim is to build up an updated Integrated Management Plan, fundamental milestone in the developing process of the CKNP.

Reflecting policies and legislation, the CKNP management plan is prepared in consultation with stakeholders involved in the Park at different level and with the contribution of the past feasibility studies and baseline studies as well as thanks to the inputs and the involvement of the different projects that currently or in the past have been conducted in the park. The plan also has to reflect the "park core vision" considering different and relevant objectives for Park conservation, and guide the overall direction of the Park in medium/long term, serving as framework for all planning within the area.

It is clear that a Management Plan drawing is a complex and time-consuming process that needs the presence of a sufficient amount of data through the analysis of background information and field collection of the lacking ones; this because it is not possible to manage what it is not well known.

The first development in CKNP towards management of its natural resources was the notification of the park about 15 years back, followed by the development of PC-II to conduct feasibility study in 1995-96. Later in 1996, IUCN developed a first draft management plan for CKNP. However, this plan could not be implemented and practical management of the park remained unsolved until recently. In 2004, IUCN working through the Hagler Bailly Pakistan carried out some baseline studies and prepared general recommendations for management planning. Recently, the Government of Pakistan has initiated a development and management process for CKNP, engaging WWF-Pakistan to develop PC-I (Participatory Management and Development of Central Karakoram National Park). The principal partners of this four year project (2007-2011) were: NAs Govt, HKKH partnership project, Karakoram Trust Project and WWF-Pakistan.

One of the main objectives of KT2 project, started in 2009, comprises the development of an Integrated Management Plan for CKNP, furthermore the launch of the Ev-K2-CNR's SEED Project improve the realization of this product with the development of management research and supporting GoP in CKNP management planning.

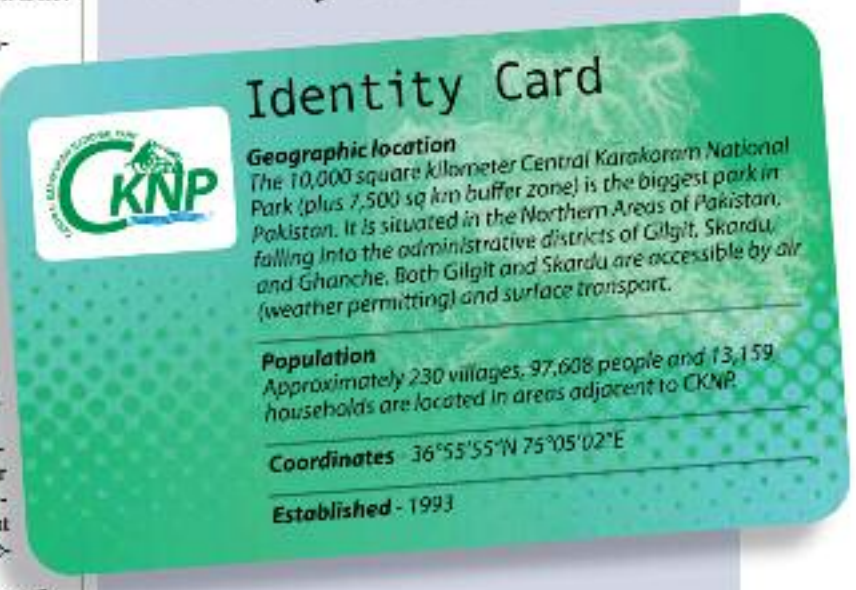
This Integrated Management Plan has been developed as a part of the KT2 project, and aims at identifying thematic areas and data requirements for the management of CKNP along with strategies to develop an updated Integrated Management Plan, before the end of the program, focal step to arrive at the definitive CNKP Management Plan.

This Integrated Management Plan is developed within KT2 project, and aims at identifying thematic areas and data requirements for the management of CKNP along with strategies to develop an updated Integrated Management Plan, before the end of the program, focal step to arrive at the definitive CNKP Management Plan.

A number of options are available for the future development of the area. In order to evolve the optimal plan, objectives need to be clearly defined. Some of them have therefore been defined as a basis for the functioning of a national park with high conservation requirements, specifically in the context of resident human populations.

To promote the development of a final document it is necessary to carry out some correlated activities in order to define an updated Integrated Management Plan, including an open and participatory decision-making process. A lot of these activities have been already activated in the framework of different project such as SHARE, SEED and of course KT II . A fundamental rule is to re-evaluate and adjust the plan , in consultation with affected stakeholders and involving all publics interested. From this approach it could be obtain the main acceptance of the Park from local communities, avoiding any kind of conflict and assuring a compatible co-existence of CKNP and humans traditional activities.

Central Karakorum National Park identity card



Biophysical characteristics

Located at an elevation above 2,000 m with peaks averaging over 6,000 m the park is characterized by heavy glaciation, with glaciers combining to form the largest and most extensive glacial systems outside the polar regions. The park is a refuge for a number of endangered species such as snow leopard and markhor. Mammals which inhabit the area of the park include: ibex, blue sheep, brown bear, musk deer, long tailed marmot, markhor, Tibetan wild ass, snow leopard and wolf. The status of these species within the park is not known as systematic surveys have not been done.

Highlights

The glaciers provide the many of the park's most famous and spectacular trekking routes as well as access to major peaks. It encompasses some of the worlds highest peaks and glaciers. Key park values include: unique mountain ecosystems and biodiversity, unique local culture, world class mountaineering and trekking opportunities, and wilderness. The park receives about 4,000 visitors per year.

Remote sensing and GIS activities as tools to support the development of the Central Karakorum National Park

By ***Maria Teresa Melis***, *University of Cagliari-Ev-K2-CNR*

Remote sensing technology has been used for more than a century. Beginning as photography acquired from balloons and later from aircraft and spacecraft, remote sensing has proven to be a versatile and valuable source of several geographic information. A wide range of airborne and spaceborne sensors generate imagery used in a broad range of application from weather forecasting and resource conservation to land-use planning and defence. Remote sensing and geographic information systems (GIS) are complementary technologies that, when combined, enable improved monitoring, mapping and management of natural resources. The information that supports environmental management is stored primarily in the form of thematic databases within a GIS environment. By the use of these data it is possible to produce different kinds of maps either for specialist like glaciologist and hydrologist or for environmental planner and decision makers.

Remote sensing is both a technology and a science. It is used to observe objects from a distance, especially from above, so as to measure and monitor them in a way that is quite different from taking direct measurements on the ground. An inventory is a survey of the location, composition and distribution of natural resources like water, soil, forest, wildlife and human infrastructures like crops, roads, settlements. In the high altitude environment the data collection is slow and often do not lend itself to a comprehensive analysis. Using satellite remote sensing coupled with GIS technologies have provided the capabilities to develop a database of thematic information that may be used as a basis for knowledge and systematic monitoring. The basis of remote sensing activity is satellite data acquisition. Several conditions have to be respected: temporal and spatial resolution, cloud cover, spectral range. Another issue is: what information do you want to extract?

In the SEED Project a specific task is dedicated to the acquisition and mapping of environmental data on the CKNP organised in a GIS model and shared between researchers and technicians. The data from different sources contribute to create a knowledge system that can be used in the different stages of management of the Park: in the programming phase when they are the basis for knowledge of the environment dynamics and of the distribution of resources and during subsequent monitoring activities. In this way, it becomes mandatory to follow a replicable methodology in time and in space based on calibrated data to the ground. The main source of data has been satellite imagery and a large time was dedicated to the choosing of these data. CKNP is an "Ice Park". For several months during the year it is covered by snow and ice and during monsoon seasons clouds mask the landscape. So only some windows leave during the summer and before winter to extract the information about land cover, glaciers morphology, geology and so on.

At this stage of the project some thematic maps was produced about forest cover and available biomass estimation, a specific map on glacier inventory and a series of topographic maps with contour lines, peaks and water courses. These last data was extracted from an altimetry model processed by ASTER satellite data that can be used in GIS environment to integrate with the other data.

The GIS model permits to calibrate satellite data with the samples acquired during the field work. The data are acquired with the GPS point and they are direcly used as input in the GIS model for the validation of satellite maps.

All these data are available for researchers through the web system developed in the framework of SHARE project, SHARE Geonetwork. This is a metadata catalogue integrated with a WEBGIS resource dedicated to the management of map data for the publication of maps and for publishing the same data in Google Earth.

SCIENCE AND RESEARCH

Nano SHARE:

science, technology and innovation for the climate monitoring and environment preservation in the Karakorum area.

An investigation of the synoptic scale atmospheric circulation showed that North Pakistan is a suitable area to characterize the chemical composition of the atmosphere in order to estimate the transport of these compounds from Central Asia as well as the contribution of the westerly outflow to the regional and transcontinental flow of atmospheric compounds.

The data collected by the SHARE network in Karakorum (Urdukas 3926 m asl on the Baltoro glacier , Askole 3015 m asl in Baltistan and the last one at Concordia 4000 m asl) have been analysed providing useful hints about the existing interactions between meteorological and transport processes acting at local, regional and synoptic scales .

An important step of an atmospheric and meteorological characterisation in Gilgit-Baltistan will be done during a field campaign planned for next July and that foresees the employment of the new sophisticated system for the monitoring of atmosphere composition at high altitudes, called Nano SHARE, developed by Ev-K2-CNR Committee, LGGE-CNRS and ISAC-CNR in the framework of SHARE Project.

The 2012 summer Nano SHARE campaign (a joint campaign EvK2Cnr -Pakistan Meteorological Department) will be carried out in the framework of UNEP-ABC programme and support SHARE and Karakorum Trust monitoring activities in the area. This new campaign from one side will permit a further check (3 months test) of Nano SHARE good running as well as the identification of some of its characteristics that could be improved (for instance the remote communication technology, or the improvement of instrument position inside the box to facilitate technical intervention).

On another side this mission will be useful to evaluate the suitability of the site where will be installed a new atmospheric monitoring observatory of aerosols and trace gases in the Karakorum region. During the previous joint Ev-K2-CNR/ PMD mission the area for this new installation was already identified as the National Park of Deosai, in this summer campaign the exact location will be defined.

The Deoasai area is considered sufficiently representative and accessible; the park is close to the village of Skardu and is situated on the Deosai tableland, one of the highest plateaux in the world, with an average height of 4,114 m asl and an extension of about 3,000 square kilometres.

Straight after the 2012 sumer campaign, the building of the permanent observatory will start: the new station called Pakistan Climate Observatory at Karakorum (PCO-K), will be of great importance for understanding environmental changes and their local impacts on the mountains of Karakorum, although also having repercussions on the regional and global levels.

Moreover, together with the Nepal Climate Observatory at Pyramid (NCO-P), installed in Nepal at the Pyramid Observatory, 5,079 metres a.s.l., operative since 2006, it extends the high-altitude background observation network of ABC project.

The Pakistan Climate Observatory at Karakorum will be equipped with sophisticated sensors for the monitoring of aerosols and trace gases and meteorology (precipitation, temperature, relative humidity, wind direction and velocity, pressure).

The main local partner in the implementation and management of the PCO-K observatory will be the Pakistan Meteorological Department (PMD), as part of a scientific collaboration begun in 2007 for the study of high-altitude climate change impacts in the Karakorum region, and in support of sustainable development initiatives in the area of the Central Karakorum National Park (CKNP), together with the Karakorum International University (KIU) of Gilgit, for the development of cooperative scientific and technological activities.

Observations of atmospheric pollution and climate change provide data and information that are essential to scientific studies, which in turn have important implications in political decision-making. The analysis of current environmental conditions, coupled with the development of global circulation models based on ground level observations of aerosols and other pollutants, will help in the formulation of preventive measures for the protection of the environment and human health.

Nano SHARE is a transportable system composed by two main modules which include:

Module 1
- *Thermo-regulated case*
- *Scientific instrumentation*
- *Sampling system*
- *System for data acquisition/transmission*

Module 2
Power system (batteries, electronic controls)

Power supply
Solar panels, windpower unit
- *Low power consumption*
- *Integrated power production unit*
- *Data transmission and remote control*

Characteristics:
1. *UV-absorption ozone analyser*
2. *Optical Particle Counter*
3. *Condensation particle counter*
4. *Black carbon analyser*
5. *NDIR CO2 sonde*
6. *Integrated weather station*

2011 tests:
Bologna *(Italy)*
Grenoble *(France)*
Mt.Cimone *(Italian Apennines)*
Stelvio Glacier *(Italian Alps) Summer campaign*

SCIENCE AND RESEARCH

Working on glaciers needs perpetual motivation, skilled manpower.

Prof. Arif Mahmood Parkistan Meteorological Department General Director

Prof Arif Mahmood, how do you evaluate the collaboration between Ev-K2-CNR Committee and PMD?

Pakistan Meteorological Department and Ev-K2-CNR have common understanding towards the impact of climate change on the fragile mountain ecology of Pakistan. Both of them believe in continued effective collaborative monitoring and assessment of the hydro-meteorological resources of mountainous Northern Pakistan, which is host to snow and glaciated ice that further serve as back bone of Pakistan's economy, upon melting. Ev-K2-CNR timely stepped in environmental monitoring of Karakorum and built an enduring set up of perpetual and reliable framework. And it extended its helping hand to like-minded local organizations for partnership, to further strengthen the monitoring system. It will build capacity of collaborating agencies from Pakistan, so that environmental monitoring system may keep on developing consistently.

In your opinion how this collaboration could be improved and in which sectors?

Though, both organizations are interacting very effectively but still there is a room for improvement in the system. This collaboration needs to underpin strengthening of hydro-meteorological monitoring network in Karakorum, especially on high altitude. Similarly, Ev-K2-CNR should also increase its monitoring sphere by installing hydro-meteorological and weather radars in other deserving hot spots in Gilgit and Ganchay etc. As, such area have proven history of meteorologically induced hazards and now GLOFs. Thus this monitoring system will also take care of early hazard warning, besides climate change impact assessment. Another sector of collaboration that is equally important to environmental monitoring is capacity building. In this regard it is suggested that Pakistani scholars may be invited to participate in higher studies being concluded by Ev-K2-CNR at international levels, extensively. A glacier monitoring and research base may be established at Gilgit or Skardu. Karakorum International University should be encouraged to open a faculty on cryospheric studies to educate/train young generation for addressing emerging global warming related mountain issues.

Ev-K2-CNR collaborates with PMD within the SHARE Project. Why the contribution of Ev-K2-CNR/SHARE expertise in high altitude research and monitoring is relevant?

High altitude environments, glacial and peri-glacial regions monitoring has obtained paramount importance in recent times. And Ev-K2-CNR has adopted role of herald in this regard by initiating SHARE project, in which, high altitude environment stations are installed at important hot spots across the world. No single organization, such as Ev-K2-CNR, has developed such expertise of working in politically, socially and environmentally divergent backgrounds. SHARE have trusted, reliable and competent team that may work in stressful environments, installation of AWS at south Cole in Nepal or AWS installation at Concordia, Baltoro Glacier can be quoted as examples. Furthermore, being matured after having numerous experiences of equipment installation in high altitude, now Ev-K2-CNR have distinct and clear understanding about its work plan. Thus it is monitoring climate change in area with clear mindedness and understands how it will be helpful in adaptation and sustainability.

Observations of atmospheric pollution and climate change provide data and information that are essential to scientific studies, which in turn have important implications in political decision-making. Which is the PMD strategy in this sense?

PMD, being sole weather forecasting agency of Pakistan, is responsible for keeping a vigilant eye on changes in day to day meteorology and factors affecting it. No doubt pollutants of various kinds and originating backgrounds affect weather activity in Pakistan, thus it is mandate of PMD to keep on evaluating role of such agents in disturbing meteorology of Pakistan. Observations and data generation is imperative in this regard and the conclusions based on these observations are so vital for decision makers. Trans-boundary origins of pollution may induce serious implications for weather phenomenon and human health. Black Carbon's presence on glaciers surface and transboundary aerosols have been causing dense fog formation hindering aviation and road transport.

Which will be PMD further engagements in the framework of climate change research?

Climate Change is being perceived as a serious threat to food security, water security and energy security of Pakistan, as being developing country it is not that much technologically advanced to deter spectre of climate change promptly.

To design comprehensive policy of deterring climate change or its adaptation it is imperative to address all affected sectors in parallel. For this purpose it is necessary to conduct extensive research in all such sectors equally.

Hydrology or water cycle of Pakistan is most endangered sector that may hamper growth in all sectors like economy, agriculture, health and stability alike. In Pakistan hydrological cycle is composed of diverse components ranging from glaciers to Arabian Sea.

Monsoon is the major source of water which in surplus and deficit becomes disastrous in the shape of floods and drought. And water cycle of region is largely depended on snow and glaciated ice runoff that keep on serving country nearly throughout the year.

Hindu Kush - Karakorum region in the north of Pakistan is house to world's highest peaks and is the most heavily glacialized part of the world after the Polar Regions. Glaciers are one of the most sensitive precursors of climate change, advancing and receding with long-term changes in temperature and precipitation. How is PMD working on this?

As already told, Glaciers residing lofty mountains of Northern Pakistan is life line of Pakistan's riverine network, thus, PMD is working on this chapter with utmost dedication and enthusiasm. Working on glaciers is equally expensive and laborious. It needs perpetual motivation and skilled man power who may sustain themselves in harsh environments for extended period of time. PMD have formed glacier monitoring and research group but they are all beginners in this field. Ev-K2-Cnr has developed capacity of PMD to conduct mass-balance experiments at Hinarchie Glacier, Bagrot valley, Gilgit and Baltoro Glacier, Skardu.

Furthermore, PMD engineers have gained hands on experience working with the devoted staff of Ev-K2-CNR on installation of AWS on sensitive glaciated regions, that seems impossible ostensibly. As climate change may bring serious implications for glacier in its advancement or retreat so PMD is also installing hydro-meteorological observatories to reckon true magnitude of this phenomenon.

Although PMD and Ev-K2-CNR have excellent working relationship for addressing the issues of glaciated mountains but collaboration in climate and glacier research has to be further strengthened taking on board KIU and local communities.

Evaluation of water availability: the third millennium challenge

PAPRIKA a Project devoted to determining state of glaciers, water reserves in Karakoram

*By **Elisa Palazzi**, Isac- CNR, Ev-K2-CNR Committee*

Karakorum, focus on the cryosphere: studying the effects of aerosols on mountain glaciers and water availability. This is the goal of the SHARE Paprika project.

The project SHARE Paprika (CryosPheric responses to Anthropogenic PRessures in the HIndu Kush-Himalaya regions), which includes the twin national projects PAPRIKA-France and PAPRIKA-Italy, is devoted to determining the state of the glaciers and of the water reserves in the Hindu-Kush Karakoram Himalaya (HKKH) region and to estimating their future conditions in different climate change scenarios. A particularly important issue is to quantify the differences possibly existing between the behaviour of the retreating glaciers in eastern Himalaya and those of the Karakorum, whose response is still largely unknown. The main focus of PAPRIKA-Italy, promoted by the Ev-K2-CNR Committee and conducted in collaboration with PAPRIKA-France, in terms of both data collection and modelling, is on the Karakorum area and, in particular, the Baltoro Glacier and the upper Indus basin in Pakistan, in strict cooperation with others research institutions in Pakistan.

Two Automatic Weather Stations (AWS) were installed in 2004/2005 by Ev-K2-CNR, in collaboration with the Pakistan Meteorological Department (PMD) at the Urdukas campsite (3962 m a.s.l.) and in the Askole village (3015 m a.s.l.), and another station is now active at Concordia (4700 m a.s.l.), to monitor the meteorology and micro-climate in the proximity of the Baltoro glacier. These AWSs continuously record the main meteorological parameters including precipitation, wind speed and direction, temperature, relative humidity, and incoming solar radiation. Measurements of aerosol mass concentration have also recently started at the Urdukas station during a summer campaign carried out in July-September 2011. Besides these atmospheric observations, also cryospheric and hydrological observations are being performing within PAPRIKA, to monitor the cryospheric resources, snow cover contribution and glacier melting (in terms of both water quality and quantity), to determine the ice thickness of Baltoro Glacier making use of radar measurements, to determine glacier properties and ice flow by remote sensing.

From a scientific viewpoint, PAPRIKA-Italy is addressing important challenging points, such as, among other issues:

(1) assess the effect of aerosols on the atmospheric circulation in high-altitude mountain areas and on the thermodynamical processes associated with seasonal snow melt, glaciermass/energy balance and ice ablation;

(2) study the interaction between the western weather systems, particularly important for the Karakoram, and the snow and ice distribution;

(3) understand and model the dynamics of partially debris-covered glaciers (such as Baltoro)and quantify how debris-covered glaciers respond to climate change;

(4) Obtain an average representation, at regional scale, of cryospheric and hydrologic budgets by the use of remote sensing data, validated on field measurements;

(5) build and validate an integrated modelling system that uses the boundary conditions provided by a global climate model with aerosol transport and chemistry, includes a regional climate model with snow/glacier/ land-surface interactions, and provides the input to hydrological models able to estimate water availability in different scenarios of climate change and aerosol emissions.

The analysis of precipitation sources addressed in point 2, for instance, is important since although a large portion of Asia receives most precipitation during the summer monsoon period (June to September), the winter is important for mountain regions of Northern Pakistan. Here, winter is a rainy season and it is the season when the water reservoirs accumulate in the form of snowpack.

Winter/early spring precipitation in the Karakoram is mostly associated with western disturbances that originate from the Mediterranean and Atlantic and travel eastward. It is therefore really important to better understand how the western weather patterns, being the main nourishment for glaciers in these Karakoram, interact with other circulations and might change in future climate scenarios, using the state-of-the arte global climate models. One of these models, the EC-Earth models, is being used by researchers from the ISAC-CNR (Institute of the Atmospheric Sciences and Climate-National Research Council) of Italy, involved in PAPRIKA, to assess changing in circulation patterns under future climate change scenarios.

The prosecution of aerosol monitoring is foreseen to ensure continuity with the research performed within PAPRIKA and in order to monitor atmospheric composition changes in this region. This represents a crucial and necessary step to understand background atmospheric conditions in the Karakoram and to quantify pollution and mineral transport at high altitudes, were they play a key role in climate process.

Theseinfromation will be extremely relevant for a better understanding of the complex interactions between high mountain ranges and climate processes, as well as to produce input data for atmospheric chemistry and climate modelling. Together with a number of other Italian research centres and universities, Ev-K2-CNR is also involved in the recent National Italian project called Next-Data, started in January 2012, which is focused on the development of integrated observing systems in mountain remote areas, such as the Karakorum in Pakistan, and on the management of the growing data base of both observational data and model outputs.

In particular, the construction of clear and well-organized data and metadata archives is planned to make their utilization available and friendly-usable to all interested users, and specific dissemination activities addressed to both expert users and to policymakers are strongly envisaged.

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