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In pursuit of 'Ghost of the High Mountains' – untold stories of Snow Leopard Survey

Ugyen Tshering, ICS



Snow leopard image captured in camera trap placed in JKSNR

For the 147 forestry staff who formed a national team and who went up hiking for months through some of the Country's highest, steepest and remotest mountain ranges for national snow leopard survey, it was like going up there looking for ghost. This is because the snow leopard is rare and notoriously elusive cat species. It blends or camouflage so well with its mountain environment that it can be easily missed within stone-throw distance.

Getting the signs or images of snow leopard was one thing; going to the mountains, where snow leopard is, posed a huge challenge. They first need to climb to mountains, well above 4000 metres, often covered with knee-deep snow, brace chilling blizzard, find their own path and breathe thin mountain air. If they stood a chance to capture images of snow leopard, they need to think like one, act like one.

For last two years, the team scoured almost all the mountains of Jigme Khesar Strict Nature Reserve, Paro Territorial Forest Division, Jigme Dorji National Park, Wangchuck Centennial National Park, Bumdeling Wildlife Sanctuary and Sakteng Wildlife Sanctuary looking for signs, preys and the snow leopard. They physically visited each areas often carrying their own foods, water and clothes.

They climbed sheer rocky outcrop, holding by the blade of grass, dropped into deep ravines, walked along the

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-untold stories of Snow Leopard Survey

ridge line crest and saddles, meeting of ridgelines near the confluence of rivers and streams, base of the prominent rocky boulders and well-defined trails. They were looking for snow leopard signs such as tracks, scats, scrapes, scent marks and claw rakes.

The Department of Forest and Park Services, coordinated by Wildlife Conservation Division initiated nation-wide snow leopard survey, the first among the twelve Snow Leopard Range Countries. It is a hallmark of conservation achievement in Bhutan.

It was need to an important need to know about the cat, an umbrella or a flagship species in the alpine ecosystems that sent the team running after a mysterious creature. It being a totally protected species, listed in Appendix I of CITES and Schedule I of the Forest and Nature Conservation Act of Bhutan 1995, there was need to know exactly how many of them dwelt on the chilly mountain top of the country. This marvelous species is being increasing threatened by habitat degradation, prey depletion, conflicts with humans and climate change and if something is not done soon enough, it may disappear deeper into the mysterious world, with only a legend to remain.

The team spent some two years, which started from August 2014. For the first year, the team spent looking for snow leopard sign and its prey, basically trying to understand snow leopard and its prey distribution by looking for snow leopard, blue sheep sign and sighting and recorded their habitat utilization. They visited some 395 grids and encountered 345 sings of snow leopard, 426 sings of blue sheep. The hard work paid and the team brought back the indication that Bhutan has a swathe of suitable areas with high probability of occurrence for snow leopard and blue sheep.

Having done with the phase I, the team set out yet again to those unforgiving mountains, mountains which hardly proved hospitable for them, mountains which often greeted them with bone-chilling blizzard, mountains which challenged and threatened them to suck life out of their soul, depriving them of enough air to breathe. Come to think of it, it did claim a life of a team member. Late Ratna Bahadur Mongar, a forester in Wangchuck Centennial National Park succumbed to the high altitude sickness.

The harsh and brutal experience of first phase I was still fresh in their mind, but there is no looking

back. They headed for the second time and this time with camera trap. They set some 202 trap stations with 404 camera traps. These cameras had to be often set in places best for the snow leopard but worst for humans. The deep ravines, along the ridge line crest and saddles, meeting of ridgelines near the confluence of rivers and streams, base of the prominent rocky boulders are where snow leopard chose to be but such places are hardly anywhere any human would like to even thinking to go.

Deep ravines, looking up from which, one can hardly see the mountain top, ridge lines from where, looking down, one can hardly see the base of the mountain, base of prominent rocky cliff, which getting there alive is a big gamble. Who on earth would even dream to go to such places.

But their hard work and hardship finally rewarded when their persistence and adamancy paid with some 1,219 images and 6 videos of snow leopards from which 701 images and 4 videos showed clear images of desirable body parts. After sorting out and identifying the individual, based on distinct pelage patterns on limbs, rumps, thighs and



Monitoring despite several challenges

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-untold stories of Snow Leopard Survey



JDNP Survey members noting field evidences

tails, like that of tiger, the number of Snow leopard thriving in Bhutan was found to be 96.

In addition, the reward came when the presence of snow leopard was recorded for the first time in JKSNR and Paro Territorial Division. The survey revealed that JDNP and WCNP are two hotspots for snow leopard but there is no snow leopard in BWS and SWS. But all in all, Bhutan is indisputably, a stronghold for snow leopard conservation in the Eastern Himalaya.

Several donor agencies came forward with their generous support, which the Department remains thankful to. The World Wildlife Fund (WWF), Global Environmental Facility (GEF-5), World Bank (WB), Bhutan Trust Fund for Environmental Conservation (BTSEC), Nature and Biodiversity Union of Germany (NABU), International Fund For Animal Welfare-Wildlife Trust of India (IFAW-WTI) and Royal Government of Bhutan provided financial support to carry out the surveys.

Now that the survey has been a huge success, that all but one

could return hale and healthy from mountains, they are proud of what they could achieve. They panted and nearly ran short of breath walking up the narrow footpath leading to the mountain, some of them nearly lost their foothold on a small ledge on the rocky cliff, which would have sent them toppling down into the deep ravine, they braced frosty weather of the mountains, survived on thin mountain air for days, all for making it better for the snow leopard.

One lost his precious life while few nearly did, all so that the ‘mountain queen’ could live. They nearly gave their life so that 96 snow leopards would have theirs. They’re finally hopeful that their hardship would help increase chances of snow leopard’s survival and contribute in management of alpine ecosystem, from where originates our rivers, which supports livelihood of thousands downstream. The benefits of sound alpine ecosystem will cascade down the mountain slope helping maintain health of ecosystem downhill and finally contributing toward sound ecosystem in the country and in the world as well.

Late Ratna, sacrificial lamb of snow leopard survey



Late Ratna Bahadur Mongar, 28, from Lokchina village in Chukha, a forester working in Wangchuck Centennial National Park, Bumthang was high up in the mountain engaged in snow leopard survey. The Phase II intensive camera trapping exercise was mid-way in September 2015, when he suddenly became victim to high altitude sickness or acute mountain sickness. He complained of headache, dizziness, nausea and vomited.

Aware that he is inflicted with altitude sickness, his team members rushed him to lower altitude. They were high up in the hostile mountains, traversing most difficult terrain and several days away from nearest medical centres. They carried him on their back despite difficult mountain terrain and narrow footpath. But unfortunately, he succumbed to the altitude sickness mid-way, becoming the sacrificial lamb of nation-wide snow leopard survey.

The Department of Forest and Park Services and partners provided condolences to the bereaved family. In addition, a page has been dedicated with a message of loss, to the deceased in survey report of the nation-wide snow leopard survey while a moment of silence was observed by the distinguished guests and other guests gathered to observe 4th international snow leopard day in Bhutan at Centennial Park, Thimphu.



Empowerment of Women through Dairy and Poultry Projects

Remote Rural Community Development Project, Bhutan



Achievement through livestock and poultry

The Remote Rural Communities Development Project (RRCDP) was designed to improve living conditions and incomes in the country's poorer and more remote rural areas. The populations in these areas currently rely on subsistence agriculture. They lack roads, irrigation, technologies, and community and social infrastructure that would allow them to improve their incomes and social integration.

The main objective of the project is: to increase agriculture productivity and access community assets in remote rural areas by improving access to markets, irrigation, agriculture, technologies and community infrastructure.

The project covers 26 Gewogs (blocks) in 6 Dzongkhags (districts) located in south-western and south-central part of Bhutan: Chukha, Dagana, Haa, Trongsa, Samtse and Wangdue, all of which have significant concentrations of poverty. The project time line is from November 15, 2012 until June 30, 2018.

Under the component Improving Productive Assets of Existing Producer Groups, support were provided for agriculture, livestock and forestry including the central agencies dealing with the input supplies.

In this note, we are going to look

into poultry and livestock schemes covered under this component.

Involvement of Women in the Project

One of the major objectives of the RRCDP project is to empower the poorest households of the country. The women farmers fall into that category as well.

Altogether 89 females have been supported by RRCDP. The breakdown is as per the table below:

Financial Empowerment

The project has infiltrated the poorest of the poor through a thorough selection process by the Dzongkhag Livestock Centres with the help of Gewog Administration. As the initial design of the project was on a cost sharing basis by the beneficiaries, the poorest group of the society could not even meet the 40% of the cost as intended. The design then was changed keeping this factor into consideration. Following the revision, the beneficiaries received 100% support for their poultry farm and they have been satisfied with

Dzongkhag	Beneficiary		Total
	Male	Female	
Dairy			
Chukha	12	10	22
Dagana	15	15	30
Haa	23	4	27
Samtse	24	6	30
Trongsa	8	15	23
Total	82	50	132
Poultry			
Chukha	19	9	28
Dagana	18	12	30
Samtse	17	13	30
Trongsa	0	5	5
Total	54	39	93

Numbers of beneficiaries through poultry and dairy projects

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Empowerment of Women through Dairy and Poultry Projects

Dzongkhag	Egg Production	Revenue Generated	Milk Production	Revenue Generated	Total
Chukha	188,730	1,533,330	13,935	348,375	1,881,705
Dagana	165,284	1,652,840	15,890	453,597.50	2,106,438
Haa	0	0	20,580	284,240	284,240
Samtse	96,750	774,000	13,500	405,000	1,179,000
Trongsa	21,120	211,200	26,880	1,344,000	1,555,200
Grand Total	471,884	4,171,370	90,785	2,835,212.50	7,006,583

Revenue generated from 2013/14 until now

the results so far. Tshering Pem, a 29-year-old farmer of Chungkha under Chhukha Dzongkhag says she is able to look after her family through poultry. "It used to be very difficult for us to get by earlier. After the RRCDP's support, it has been a lot easier. I have been able to save 3-4,000 Ngultrum a month through this scheme. With the income, I buy stationery for my children and daily expenses such as salt and rice." The beneficiaries, like Tsering, have accumulated household items such as television sets, firewood heaters, rice cookers and smartphones after they started poultry farming. Also, looking after poultry is not that cumbersome. The women feel that the workload is relatively easier and not having to ask cash from their husbands have made them feel independent.

Strengthened Capacity Building

An independent survey of the project shows that women now have good income from dairy and poultry that has eased the manual labor. This means the women get to concentrate on other areas of interest such as devoting more time for their families. In most of the dzongkhags, the women are also benefitting from being in poultry groups. They can now openly discuss issues concerning their farms. The provision of loaning out the money within and outside the group has given them financial experience outside of their households. The women farmers claim that they have gained confidence through the

setting up of their poultry farms. Empowerment increases people's opportunities and capabilities to make and express choices and to transform those choices into desired actions and outcomes. People's capabilities to participate effectively in local development are determined not only by individual resource endowments, but also by social capital that provides the basis for collective action (World Bank). A few women are confident to start new ventures now that they have gained experience of running their own poultry farms. The trainings that they have received on cattle and poultry management have been highly beneficial.

Along with capacity building trainings, the farmers were supplied with:

1. Shed construction materials (CGI sheets, cement, barbed wire and wire mesh),
2. Dairy cows,
3. Pullets, and
4. Equipment (cream separator, butter churner, milk cans, milk measuring sets, feeder and drinkers).

In spite of good performance of farmers in livestock and poultry, one area they would need to work on is record keeping. Though they received trainings on it, the farmers do not tend to follow it. "This trend is perhaps triggered by their lack of interest or because record keeping is in nascent stage in the whole business community in Bhutan,"

says Dr. Kuenga Namgay, Deputy Chief, Policy and Planning Division, Ministry of Agriculture and Forests. The project focuses on the poorest communities of the country which also results as one of the most uneducated tier of the society.

Sustainability Issues

Bhutan is a Buddhist country. According to the Buddhist religion, killing is a sin. This religious sentiment has crept up as one of the fundamental issues on sustainability for poultry farming. The farmers are happy to rear chickens for eggs but they are not keen to get rid of the mature birds after their laying period. This has led the farmers to retain their pullets even after the laying period resulting in feeding them until they expire. This substantially affects their income generation. "In the southern part of the country, the farms have really flourished and they are actually doing very well for themselves. The majority of population in that area are either Hindu or some other religion and do not follow the same religious sentiments. For those who strongly follow Buddhism, we even tried taking the old birds and replacing those with the new but they still wouldn't agree," says Dr. Kuenga Namgay. The religious and social environment should be taken into consideration during the design of the project. For the areas with high level of Buddhist followers, schemes that are in line with their religious sentiments should be introduced.



Leisure

RNR (Diary) Extension Manual 2017

Encouraged by the huge popularity of the annual Sanam Drupdrey (RNR-Magazine) which serves as a medium for the Ministry to share its motivating stories of success and innovation in the fields of agriculture, livestock and forestry, ICS will be publishing the 7th issue of Sanam Drupdrey in 2017. Sanam Drupdrey has a very extensive readership within and abroad. Although, we record many achievements in the Ministry, regrettably many are not highlighted in the Magazine.

Therefore, I urge all the Departments, Agencies, Research Centres, Divisions, Central Programs and Dzongkhag Offices to contribute mandatorily at least two articles for Sanam Drupdrey 2017.

Articles can include success stories, breakthrough, cultivation tips or any write up related to the RNR Sector. The deadline for article submission shall be 23 November 2016. Please note the following few points:

- Report/article should not consist of more than three pages
- Relevant picture should be sent separately in picture format (not in word) with a maximum resolution as possible
- Proper credit for writer/contributor with designation and office should be mentioned

Please mention subject as 'Sanam Drupdrey' while submitting your article to ics@moaf.gov.bt to avoid confusion.

For any query, please contact ICS at 323765/321142 (Extension 117).

Minister, MoAF

Submit articles for
RNR-Newsletter, September 2016

to
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Sudoku Puzzle

Fill in the grid with digits in such a manner that every row, every column and every 3x3 box accommodates the digits 1-9, without repeating any.

Answer in the next issue

				6		2	7
5			3	2			9
					6	1	
		7				5	
		6		4		3	2
9	5	1			8		6
		8	5				
1				3			
					3		5

Last week's solution

2	8	1	5	4	6	3	9	7
4	5	6	3	7	9	1	8	2
3	7	9	8	1	2	4	6	5
8	3	2	7	9	4	5	1	6
1	4	5	2	6	3	8	7	9
6	9	7	1	8	5	2	3	4
5	6	8	4	3	7	9	2	1
7	1	4	9	2	8	6	5	3
9	2	3	6	5	1	7	4	8

Impact of Improved Technology and Adoption by Farmers

Remote Rural Community Development Project, Bhutan



Estimated data on Citrus and Cardamom Production at their best, average and worst.

In 2012, the Royal Government of Bhutan initiated the Remote Rural Communities Development Project (RRCDP) in six Dzongkaks, financed by the World Bank Group. The project covers 26 Geogs (blocks) in six Dzongkhags (districts) located in south-western and south-central part of Bhutan: Chukha, Dagana, Haa, Trongsa, Samtse and Wangdue, all of which have significant concentrations of poverty.

RRCDP's interventions centered on technical support to: (i) increasing the local capacity of the government as well as the farmers to produce healthy seedlings and (ii) enhancing disease diagnostic capacity within the country. Since the eventual sustainability of cardamom and citrus production would depend on adoption of best practices, the project has also built and raised the skills of extension agents to provide farmers with required advisory services on orchard/plantation management, storage and post-harvest techniques. RRCDP also focuses in strengthening the service delivery on rehabilitation of citrus and cardamom by providing propagation houses to produce disease free seedlings, trainings on disease management as well as advising on harvesting, storage and marketing. The eight propagation houses (one for citrus and seven for cardamom) built with the support from RRCDP caters not only to the project area but to the entire nation.

Citrus and Cardamom Farming in Bhutan

For the people of Bhutan, agriculture is a major social livelihood. Being a

small country with limited agricultural land (13.6%) and difficult terrain, agriculture needs to be innovative, ecologically sound and economically viable. Two crops that provide the best options are citrus and cardamom. Besides, the climatic advantages provide Bhutan comparative benefit to grow these crops for the expanding regional market. These two commodities featured as the top 9th and 10th export items for Bhutan in the Bhutan Trade Statistics 2012 earning Nu.

452.63 million and Nu. 424.68 million respectively. Due to the high potential for quick income and export, horticulture sector has been recognized as the engine of economic growth in Bhutan's agricultural development plan. In 2014 alone, Bhutan was able to earn as much as USD 10 million from the citrus export. However, the sustainability of this important sub sector has been threatened by viral diseases to the point that the very source of income on which many smallholder farmers depended became a liability.

The diseased plants had to be destroyed and replaced with new and healthy plants causing financial and economic losses to farmers. The limited disease diagnostic facilities and inadequate production of disease-free healthy seedlings made it difficult to revive citrus and cardamom production. Therefore, the rehabilitation of the diseased orchards and plantations are also a priority activity for Bhutan's Department of Agriculture in the 11th Five Year Plan. It clearly states that support will be

provided for the rehabilitation and plantation of citrus and cardamom, supply of high quality disease resistant seeds and seedlings, supply of labour saving farm machinery, irrigation and capacity development such as group formation, awareness, advanced training on farming and marketing skills.

Initial Impact of the Project

Although it is too early to demonstrate the impact of the project in just over three years into implementation, the following achievements are expected to contribute to the sustainable and profitable citrus and cardamom production system in Bhutan. With the support of RRCDP, the Ministry of Agriculture & Forests has already set up one insect proof citrus propagation house and seven cardamom propagation houses in Bhur, Gelephu. Locally produced seedlings are not only cheaper but are better adapted to the local environment. Since the beginning, the project has produced and supplied 78223 and 258248 seedlings of citrus and cardamom respectively covering a combined area of 969 ha benefitting 1300 households. The target of the project is to rehabilitate 908 acres (368 ha) of citrus and 673 acres (272 ha) of cardamom involving 2100 households. Already, with the strengthening of the National Seed Centre and capacity building trainings, over 1500 households have received various trainings on issues such as HLB vector control, nutrient management and canopy management. Although it is too early to assess the impacts in terms of production and economic benefit, following the initiation of the project, the Ministry of Agriculture expect significant increase in productivity from 29 to 45 kg of citrus per tree and 84 to 205 kg of cardamom per acre as a result of the interventions supported by the project.

National Seed Centre

The National Seed Centre (NSC) was established in 1984 with the



objective to produce and promote high quality seeds, planting materials and other agricultural inputs in adequate quantities and at affordable price to improve the livelihood of the farmers in Bhutan. The NSC is the only centre mandated for production of citrus planting materials ever since the detection of citrus greening disease in the country. The infection by citrus greening means there is no curative method but to replant with healthy seedlings. In terms of citrus (mandarin) planting materials, the project-supported propagation house has directly improved the capacity of NSC in producing citrus grafts for sale/distribution to Bhutanese growers. The demand, therefore, of planting materials has been increased by manifold due to rehabilitation program. Even at the modest estimate, these facilities have the potential to produce 90,000 and 60- 70,000 citrus and cardamom seedlings respectively, which can cover 600 acres of citrus and 34 acres of cardamom per year.

Distribution of Healthy Seedlings through RRCDP

With the production of healthy seedlings, there has been a reported increase of per clump cardamom by an average of 50%. This is significant. As a result there has been an increase in demand for cardamom. Last year alone saw over 2.1 million cardamom plants supplied through different channels in the country. NSC supplied more than 200,000 seedlings. The farmers now have access to citrus and cardamom management through improved advisory services. Through various training courses, farmers have been trained on citrus farming, nutrient

management, disease management (greening virus), and canopy management. Already the project has trained 1656 farmers including 802 females. They were also given instruments for better management of the crops. According to the Mid Term Review conducted in October 2015, the support to National Plant Protection Centre (NPPC) through supply of Polymerase Chain Reaction (PCR) machine – a diagnostic test machine and training of the technicians has enhanced capacity of the centre to process samples to detect citrus diseases. The PCR machine can now carry out rapid disease detection for citrus which, in the past, had to be sent overseas for the test. The gains made in citrus and cardamom production is expected to contribute directly to the project objective. Also, with regards to drying technology for cardamom, dzongkhags and central agencies did not have any knowledge on new technologies apart from traditional drying being done by the farmers. CGI sheets were supplied through the project to improve drying and it was mentioned to have improved the quality of drying resulting in quality final product. “Before the project, the farmers were unaware of the processes for better plantation and vector management but with the trainings, they are well equipped to manage their plantation now. Through the capacity building trainings, they have better knowledge on how it should be done,” says Mr. Sangay Dorji, Regional Manager of National Seed Centre, Bhur.

Lessons Learnt and Concluding Remarks

Sustainability is key and therefore the cost-sharing modality is highly regarded by the farmers according to the Mid Term Review conducted by an independent research organization. The study states that the farmers feel the cost-sharing strategy is one of the key components of the project (farmers have to share 20% in citrus and 30% for cardamom). This provision is a relatively new approach adopted by RRCDP in Bhutan. This has helped farmers take ownership and in turn has implications on the care, management and subsequent survival and success of their plantations. However, the sustainability also relies on the capacity building trainings provided to the farmers by the project. The advisory services for the rehabilitation and management along with the technology provided by the project is envisaged to have a long lasting effect on the citrus and cardamom farming in Bhutan. Fund allocation: Though the activities of the component went well, the allocated fund for the component was not enough to cover the citrus and cardamom rehabilitation targets outlined in the project appraisal document. Hence, in a little over three fiscal years, the agriculture component completely expended its allocated funds and wound up its programmed activities. This is mainly because of the construction of propagation houses for citrus and cardamom. However, the propagation centres supported by the project will increase the production of quality citrus and cardamom seedlings, which even at modest estimate can cover about 240 ha per year thus helping the project meet its original objective under rehabilitation by the end of the project.

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