

# **PUNJAB BIODIVERSITY BOARD**

## **Agenda Notes**

### **5<sup>th</sup> Meeting of Punjab Biodiversity Board**

**Secretariat:**

**Punjab State Council for Science & Technology**  
MGSIPA Complex, Sector-26, Chandigarh – 160 019

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**Date : 24.10.2011**

**Time : 9.30AM**

**Venue : CM's Residence, Sector -2, Chandigarh**

# I\_N\_D\_E\_X

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## **AGENDA**

The 4<sup>th</sup> meeting of Punjab Biodiversity Board was held on 25.08.2010 under the Chairmanship of Hon'ble Chief Minister, Punjab.

### **Item No. 5.1: Confirmation of Minutes of 4<sup>th</sup> Meeting of Punjab Biodiversity Board held on 25/08/2010.**

The Minutes of the meeting were circulated to all the members. No comments/suggestions have been received. The minutes are placed at (**Annexure-I Pg.12-15**). The same may kindly be confirmed.

### **Item No. 5.2: Follow up action on the Minutes of the 4<sup>th</sup> Meeting of Punjab Biodiversity Board held on 25/08/2010.**

The follow-up actions on the minutes of the 4<sup>th</sup> meeting are placed at (**Annexure-II Pg.16**) for information of the members of Punjab Biodiversity Board.

### **Item No.5.3 Mega Event: Three day meeting of MoEF-GOI, National Biodiversity Authority (NBA) & State Biodiversity Boards (SBBs) in Punjab on "Implementing Biodiversity Act, 2002".**

Punjab Biodiversity Board (PBB), on behalf of National Biodiversity Authority (NBA), organized 'All India meeting of NBA, MoEF-GOI and SBBs' of 24 states at Chandigarh from 6<sup>th</sup> to 8<sup>th</sup> September, 2010. The main objective of this meet was to discuss issues relating to implementation of Biological Diversity Act by the States and preparation of India for Conference of Parties-10 (COP) to be held at Nagoya, Japan in October 2010 and COP-11 to be held in India in October 2012. The meeting was inaugurated by Sh. Jairam Ramesh, Hon'ble Minister for Environment & Forests, Govt. of India and presided over by S. Parkash Singh Badal, Hon'ble Chief Minister, Punjab. The other distinguished guests who attended the meeting were Sh. H. Rohluna, Minister of Environment & Forests, Mizoram; Sh. S.C. Agrawal, Chief Secretary; Govt. of Punjab; Sh. Hem Pande, Joint Secretary, Govt. of India; Sh. P.L. Gautam, Chairman; NBA, Sh. Viswajeet Khanna, Secretary, Science, Technology & Environment, Govt. of Punjab; Sh. C.A. Reddy, Secretary; NBA; Chairmen and Member Secretaries of 24 State Biodiversity Boards, NBA members, experts of biodiversity and the officers/officials of line departments of Punjab like Department of Agriculture, Horticulture, Fisheries, State Medicinal Plant Board, Punjab Biotech Incubator, Punjab Energy Development Agency, Pushpa Gujral Science City and other departments. .

During the inaugural session Hon'ble Minister for Environment & Forests emphasized on the need of preventing bio-piracy and conservation of traditional knowledge associated to biodiversity. He emphasized that the "Biological Diversity Act" would facilitate use of bioresources in a sustainable manner. The Minister desired that a proposal for "Interstate Shivalik Biodiversity Conservation Corridor" be prepared to ensure ecologically compatible economic development in this fragile eco-system. He also highlighted the importance of biodiversity heritage sites and advised the Punjab Biodiversity Board to prepare a proposal for declaration of 'Inami Baag' in distt. Hoshiarpur as a Biodiversity Heritage Site for *in situ* conservation of elite varieties of Mango. He also suggested that PBB should take action for declaration of area under 'Kayakalp Vriksh' district Fatehgarh Sahib as heritage site. He informed that the Elephant was being declared as 'National Heritage Animal of India' and the Gangetic Dolphin as 'National Aquatic Animal'.

S. Parkash Singh Badal, Hon'ble Chief Minister, Punjab, who is also the Chairman of Punjab Biodiversity Board, highlighted the actions taken by the State Govt. for conservation and cleaning of river waters which would positively affect biodiversity. He profusely thanked the Union Minister for his unstinted support in this endeavour. He desired that dedicated Institution for Biodiversity Education Research and Training in the Semi Arid Tropics be set up in Punjab for creating awareness and promotion of research on biological issues in semi arid areas. This institution could serve the nation, especially the northern region in this field. Hon'ble Chief Minister also emphasized on the need of setting up a medium term 'Gene Bank' for conservation of traditional crop varieties in Punjab Agricultural University.

Sh. H. Rohluna, Chairman, Mizoram Biodiversity Board, raised issues pertaining to conservation of biodiversity in the north east especially with respect to Jhum Cultivation. Chairman, NBA highlighted the activities of NBA and various SBBs for implementation of Biological Diversity Act. He also highlighted the need to inventorize and conserve microbial diversity and emphasized that IMTECH Chandigarh could play a lead role in this direction.

Chief Secretary, Punjab highlighted the need of conservation of different traditional varieties of crops and indigenous breeds of farm animals in context of agricultural development in Punjab, especially the need to conserve wild relatives of important crop varieties.

Joint Secretary, MOEF, GOI emphasized on the need of awareness campaign for biodiversity conservation and highlighted the efforts of the Central Govt. for implementing the Biological Diversity Act.

Sh. Viswajeet Khanna, Secretary, Science, Technology & Environment, Govt. of Punjab, pointed out that 80% of the population depended upon biodiversity for traditional medicines. In the context of Punjab the importance of protecting diversity in the farming sector was extremely important.

Hon'ble Minister for Environment & Forests, GOI & Hon'ble Chief Minister, Punjab also released books and CD published by Punjab Biodiversity Board and other Boards.

An exhibition on biological diversity with focus on Agro biodiversity were also organized in which various line departments of Punjab (Agriculture, Horticulture, Fisheries, State Medicinal Plant Board, Punjab Agriculture University, Guru Nanak Dev University, NGOs and 7 State Biodiversity Boards also participated.

During the technical sessions expert lectures were delivered on various aspects of biodiversity. All the State Biodiversity Boards also presented their activities. The three days brain storming session concluded on the following notes:-

- a) More emphasis should be laid on promoting access and benefit sharing mechanism and strengthening institutional mechanism to promote sustainable use of bioresources.
- b) Biodiversity Management Committees (BMCs) within the states may be established in a time targeted manner.
- c) More work be done to identify and notify endangered species of states and conservation of bioresources.
- d) The country should prepare for COP-10 and COP-11

The efforts of Punjab Biodiversity Board for organizing this meet were appreciated by the Central and State Govt.

This is for the information of Members of Punjab Biodiversity Board.

#### **Item No.5.4: Constitution of Biodiversity Management Committees (BMCs) and Technical Supporting Groups (TSGs)**

Secretary, Science and Technology & Environment, Punjab had taken up the matter for setting up of BMCs and TSGs with all the Deputy Commissioners in the state in accordance with provisions contained in Biological Diversity Act, 2002. Till date these have been notified in 10 districts only (**SAS Nagar, Fatehgarh Sahib, Hoshiarpur, Ludhiana, Amrtisar, Jalandhar, Taran-Tarn, Kapurthala, Bhatinda, Ferozpur**). An amount of Rs.50,000/- has been released to each of these districts for strengthening the BMCs and preparation of PBRs

However, BMCs and TSGs are yet to be constituted in districts **Mansa, Muktsar, Sangrur, Patiala Gurdaspur, Moga, Barnala, Ropar, Nawan Shahr and Faridkot**. As a result, PBR training programmes in all districts cannot be planned. Secretary, Science, Technology & Environment is taking up the matter with the concerned Deputy Commissioners. However, Chairman is requested that an advisory be issued through his office to these districts for immediate action for notification and PBR training.

For consideration please.

#### **Item No.5.5: Proposal on declaration of Biodiversity Heritage Site: Inami Baag**

As a follow up of the 4<sup>th</sup> meeting a proposal for declaration of 'Inami Baag' district Hoshiarpur, as a Biodiversity Heritage Site for *in situ* conservation of elite varieties of mango has been prepared and is annexed at **Annexure-III Pg.17-24** for kind perusal of Board Members. An amount of ₹173.23 lacs is likely to be incurred on the acquisition of site, constitution of local BMC, capacity building of local population, field studies in surrounding areas etc. The same may be approved.

In the meeting in Planning Commission held on 01.04.2010, Advisor (Environment) had desired that state allocation for biodiversity conservation be increased from Nil to ₹2 crore and funds be made available for the Inami Baag project. State Govt. has been requested vide letter No.8129/2010/STE(2)/3942 dated 07.10.2010 to make necessary provisions under Excess & Surrender revised estimates. Hon'ble Chief Minister may like to advise the Govt. accordingly. Another proposal with ₹150.50 lacs Govt. of India share and ₹22.73 lacs Govt. of Punjab share has also been submitted to Chief Minister's office for consideration and onward transmission to MoEF, Gol. Alternatively, Hon'ble Chief Minister may like to take up the matter with Ministry of Environment, Gol.

For consideration please.

#### **Item No.5.6: Proposal on Interstate Shivalik Biodiversity Conservation Corridor**

The Punjab State Council for Science & Technology had conducted a comprehensive study on Biodiversity in the Shivaliks of Punjab in collaboration with IIRS, BSI, ZSI and Punjabi University, Patiala and reported that the area was biologically extremely important but ecologically fragile and it had been neglected for a long time. The following threats to this important ecosystem were identified:-

1. The area of Shivaliks especially in the states of Punjab, Haryana and J&K and the Union Territory of Chandigarh is prone to erosion and floods due to loose soils and innumerable *choes* and *raos* which experience flash floods in monsoons due to poor vegetation in catchment areas.
2. The forest eco system is highly degraded due to fragile ecology and invasion of invasive alien species like lantana, congress grass, etc. and inadequate protection has led to degradation of biodiversity especially in Punjab, Haryana and Chandigarh areas.

3. Intensive and high-input agriculture is replacing traditional low-input agriculture thus affecting native crop varieties and livestock breeds and their conservation.
4. Biopiracy and overexploitation of medicinal and economically important plants and animals (including NTFP) is leading to species destruction.
5. The fragile ecosystem can be an impediment in developmental plans in the area. Hence unauthorized developmental activities need to be replaced with environmentally compatible and ecologically friendly developmental works.
6. Climate change and its impact on upper Himalayas can lead to habitat change and ecosystem disturbance in the Shivalik area.

Hence, Hon'ble Minister of Environment, Govt. of India had suggested establishment of 'Interstate Biodiversity Conservation Corridor' with following potential benefits:-

- It would conserve a wealth of medicinal and economically important resources (many of which are endemic, rare or threatened species) due to intermingling of Indo-Malayan and Palaeartic elements.
- It would help to protect wild genes linked to agricultural crops and farm animals as well as traditional crop varieties/land races, traditional ecologically adapted agricultural practices, associated knowledge and livestock breeds.
- It would help to devise mechanisms for protecting important genetic material from biopiracy and benefit sharing by local population as and when such material is accessed for commercialization.
- It would help to improve the habitat through special programmes for soil and water conservation.
- It would act as a moratorium to unrestricted exploitation of the area and regulate activities like overgrazing, deforestation and mining etc. leading to sustainable resource utilization.
- It would ensure ecofriendly & ecologically sound development of the area.
- It is expected that international & national funds would flow for conservation of the area.

A proposal to declare parts of Shivaliks as a National Park was mooted by His Excellency the Governor of Punjab, but the area was restricted to Punjab and Chandigarh, which would have had limited benefits. Hence, a proposal has been prepared and submitted to the Chief Minister's office for onward submission to Govt. of India vide note dated 15.9.2010. The present proposal, is more comprehensive and covers the entire range, instead of conservation of fragmented areas, and is expected to benefit the entire ecosystem and all stakeholder states.



The project envisages establishment of a Joint Coordination Committee with representatives of 5 states and 1 U.T. A short-term (5-10 years) and long-term (50 years) Action Plan is required to be prepared for management and conservation of Shivalik Biodiversity by initiating the following elements:-

- **Marking of boundaries** and identification of core, buffer and transition zones is the first and foremost task. However, besides bio-geographical and morphological maps, social and economic data base also needs to be generated.
- The **agricultural ecosystem** in the entire area including hill slopes and valleys needs to be assessed along with inventorization of diversity in traditional crop varieties/land races, agricultural practices and breeds of livestock and their wild relatives.
- **Threat perception** needs to be carried out with respect to:
  - Habitat destruction from grazing, deforestation, erosion, mining, etc.
  - Loss of traditional varieties.
  - Loss of economically important medicinal plants and animals.
  - Man-animal conflict.
  - Sustainable NTFP utilization, etc.
- JFM has been quite successful in many of these areas. Village Self Help Groups have also been constituted in some parts of Shivaliks. These need to be further strengthened to ensure people's participation in conservation efforts. Furthermore, the State Biodiversity Boards need to take up constitution of Biodiversity Management Committees and provide training for preparation of People's Biodiversity Registers along with capacity building for **implementation of successful ABS mechanism and curbing biopiracy**.
- Conservation of habitats, key vegetation types and larger eco-zones need to be formalized by taking up **specialized projects**, both, within and outside the existing protected areas as per local site requirements by concerned departments in each stakeholder state.
- The Biodiversity Conservation Corridor needs to be **notified** and accorded a legal status to ensure eco-friendly development.
- Sustainable utilization of economically and medicinally important species needs to be promoted along with appropriate benefit sharing with the local communities.
- Nature education and awareness campaigns need to be initiated and strengthened.

The matter has been discussed informally with UNESCO also and the area can be declared as a Biosphere Reserve wherein:-

- Areas which are already protected under the Wildlife Act would constitute the 'Core Zone' and will remain undisturbed.

- Areas surrounding the core zone will form the buffer zone where tourism, traditional agriculture, horticulture, fishing, grazing and human livelihood activities will be allowed in a manner that core zone remain protected.
- Area beyond buffer zone will form the transition zone where economic activities will be allowed and preference will be given to green activities.

Representatives of UNESCO and Department of Forest & Wildlife, Govt. of Punjab may like to comment.

Since Punjab can take a lead in this direction, Chairman may like to take up the matter with Ministry of Environment, Govt. of India. The proposal is annexed at **(Annexure-IV Pg.25-47)**.

For consideration please.

#### **Item No.5.7: Punjab State Biological Diversity Rules**

Board Members had been informed in the 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> meetings of Punjab Biodiversity Board that State Biodiversity Rules had been drafted and approved. These have also been vetted by NBA. The same were submitted to LR in 2005. Clarification has been provided twice to LR. But the notification of Rules is still pending. Meanwhile, many other state have already notified their rules and initiated action. Chairman may also like to advise the office of LR to expedite the same through his office.

For consideration please.

#### **Item No.5.8: Conservation of Peafowl in Punjab**

Hon'ble Chairman, PBB desired in 3<sup>rd</sup> meeting of PBB that the Board should take up the studies on Pea fowls and other important species. In order to implement the decision the Board had taken up the matter with Wildlife Institute of India (WII), Dehradun and Bombay Natural History of Society (BNHS), Pinjore. PBB in collaboration with Wildlife Institute Dehradun has prepared a proposal **(Annexure-V Pg.48-53)**. This proposal is being sent to DST, Govt. of India for consideration of funding.

May approve please

#### **Item No.5.9: Project on Inventorising Industries involved in utilization of bioresources in Punjab**

As informed in the previous meeting, National Biodiversity Authority had sanctioned a project on "Inventorising Industries involved in utilization of bioresources in Punjab"

especially with respect to resources used for medicinal purposes or those which provide direct livelihood to local population but are generally not commercially traded.

Searchable database regarding the information on biological resources utilized by industries in the State has been prepared. A CD was released by Hon'ble Chairman, Punjab Biodiversity Board during 'All India State Biodiversity Meet. The report of the project is on the verge of completion and shall be sent to NBA shortly.

This is for information of Members of PBB.

**Item No.5.10: Participation of Member Secretary, Punjab Biodiversity Board in Conference of Parties-10 (Cop-10) at Nagoya, Japan.**

Member Secretary, Punjab Biodiversity Board was selected by MoEF- Gol for participating in COP-10 held at Nagoya, Japan from 16<sup>th</sup> Oct. to 30<sup>th</sup> Oct., 2010. She was the only Member Secretary of a State Biodiversity Board to be selected for the event. She actively participated in the 'Strategic Plan' session of the Conference and contributed towards organizing an exhibition and three technical side events. Her contribution was duly appreciated and recorded in the meeting of SBBs held on 24<sup>th</sup> November, 2010 at Chennai by Additional Secretary, Environment, Govt, of India and Chairman, National Biodiversity Authority.

This is for information please.

**Item No.5.11: Annual Report and Statement of Accounts for 2009-10**

Under section 33 of the Biological Diversity, 2002, the Annual Report and Statement of Accounts of the Board are required to be placed before the Legislative Assembly. The Annual Report along with statement of account was released by Hon'ble Chairman at the National Meet of State Biodiversity Boards. 250 copies in English and Punjabi of Annual Report of 2009-10 were submitted to the State Govt. for placing it on the table of the House in September 2010. Copy of Annual Report is placed on table.

For information and ex-post facto approval please.

**Item No.5.12: Any other item with the permission of Chairman.**

**PUNJAB BIODIVERSITY BOARD**

**Sub: Minutes of 4<sup>th</sup> meeting of Punjab Biodiversity Board held under the chairmanship of Hon'ble Chief Minister, Punjab on 25.08.2010 at 6.00 PM at Punjab Bhawan, Sector-3, Chandigarh.**

1. Mr. R.C. Nayyar, IAS  
Financial Commissioner,  
Department of Forests & Wildlife,  
Govt. of Punjab.
2. Mr. Viswajeet Khanna, IAS  
Secretary, Science, Technology & Environment,  
Govt. of Punjab.
3. Mr. Ashok Kumar Gupta, IAS  
Secretary, Agriculture,  
Govt. of Punjab.
4. Dr. G.S. Kalkat  
Chairman, Punjab State Farmers Commission,  
Ex. Vice Chancellor, PAU, Ludhiana.
5. Prof. A.S. Brar  
Vice Chancellor,  
Guru Nanak Dev University, Amritsar.
6. Mr. Surjeet Pal Singh  
OSD to CM, Punjab.
7. Dr. S.S. Gosal  
Director of Research,  
Punjab Agricultural University,  
Ludhiana.
8. Dr. S.K. Srivastava  
Deputy Director, Botanical Survey of India,  
Dehra Dun.
9. Dr. Anjana Pant  
Senior Coordinator,  
WWF- India, New Delhi.
10. Dr. (Mrs.) Neelima Jerath  
Member Secretary, Punjab Biodiversity Board &  
Executive Director, PSCST.
11. Mr. Gurharminder Singh  
Senior Scientific Officer (Env), PSCST.

**Item No. 4.1: Confirmation of Minutes of 3<sup>rd</sup> meeting of Punjab Biodiversity Board held on 3.2.2010.**

Confirmed.

**Item No.4.2: Follow up action on the Minutes of the 3<sup>rd</sup> meeting of Punjab Biodiversity Board held on 3.2.2010.**

Noted.

**Item No.4.3: Mega Event: Three day meeting of MoEF-GOI, National Biodiversity Authority (NBA) & State Biodiversity Boards (SBBs) in Punjab on 'Implementing Biodiversity Act,2002'.**

Approved. Hon'ble CM was apprised that confirmation of participation of Shri Jairam Ramesh, Union Minister for Environment had been received from his office. Chairman & Secretary, NBA and Additional Secretary & Joint Secretary, MoEF had also confirmed. In addition, 8 Chairmen and 21 Member Secretaries from various State Biodiversity Boards had confirmed their participation which included Minister-Environment, Manipur; Chief Secretary, Mizoram and Additional Chief Secretary, Himachal Pardesh. The organization of exhibition was being monitored by Hon'ble Chief Secretary, Punjab and Secretary, Science Technology & Environment at their level.

Hon'ble Chief Minister desired that the Punjab Biodiversity Board may put its best foot forward. Officers at the appropriate level be got declared as State Guests and a formal dinner on behalf of Hon'ble CM be organized along with an appropriate cultural programme. Separate file be put up to AD.

**Item No.4.4: Constitution of BMCs and preparation of PBRs.**

Noted

**Item No.4.5: Declaration of 1<sup>st</sup> Biodiversity Heritage Site in Punjab.**

Members of the Board were informed that the matter had been taken up with DC, Hoshiarpur by SSTE. The area had been surveyed twice and the tentative value for acquiring land had been estimated to be between Rs.1.75 to Rs.2.00 crore. A provision was required to be made in the State Plan for the purpose. MS, PBB also informed that in the meeting held with Advisor, Planning Commission in April, 2010, a provision of Rs.2.91 crore had been proposed by the Commission for activities of the Board and Biodiversity Heritage sites. Provision for this was needed to be made in the State Plan either out of untied funds or during preparation of Excess & Surrender Statement of the State Plan. CM desired that file may be put up accordingly so that the matter can be taken up with State Planning Board and FD.

**Item No.4.6: Celebration of International Year of Biodiversity and International Biodiversity Day.**

Noted

**Item No.4.7: Identification of threatened species in the State.**

Approved

**Item No.4.8: Restructuring of Staff – PBB.**

Members of the Board were informed that presently the PBB had only one Scientist. Core staff was required to enable it to implement its mandate. A proposal for restructuring had been submitted for consideration of AD. Hon'ble CM desired that the Board be strengthened by providing adequate manpower and funds for which proposal be submitted to FD at the earliest.

Further proposals for rectification in notification of the Board ('Member Secretary' in place of 'Member Convener' as desired by MoEF-GOI) and creation of post of Asstt. Manager (Finance-cum-Admn) were approved in principle. However, since funds for the same were not available, as proposed, Jr. Accounts Executive, PSCST be given additional charge (as the Board is presently serviced by PSCST) as AMFA, PBB with appropriate honorarium (amounting to Rs.770/- p.m.) as per Rule 2.30 and 4.24 of the Punjab Civil Services Rules, till a provision is made in the State Budget and regular AMFA is appointed.

**Item No.4.9: Delegation of Powers to SSTE.**

Approved for routine administrative matters like, personnel matters wrt Class-I employees, hiring of contractual staff, sanction of leave, tours etc. and financial matters upto Rs.1.00 crore. However, Authority for appointment, disciplinary action etc. of Class-I employees and financial matters beyond Rs.1.00 crore would remain with the Chairman.

**Item No.4.10: Project on Inventorising Industries involved in utilization of biological resources in Punjab.**

Appreciated. CM desired that the Board should subsequently take up measures to promote cultivation of medicinal plants which are in maximum demand by the industry, especially those species which are required to be imported from other States.

**Item No.4.11: Compliance of Biological Diversity Act while accessing bioresources.**

Approved

**Item No.4.12: Nomination of Member Secretary, Punjab Biodiversity Board in Task Force (Expert Committee) for preparation of guidelines on creating structures, running administration and maintaining of accounts and other related matters pertaining to Biodiversity Management Committees.**

Noted

**Item No.4.13: Participation of Member Secretary, Punjab Biodiversity Board in meetings of NBA and other State Biodiversity Boards.**

Noted.

The meeting ended with a vote of thanks to the chair.

**Annexure –II**

**Follow up action on the Minutes of the 4th meeting of Punjab Biodiversity Board held on 25.08.2010**

<b>Item No.</b>	<b>Name of the Item</b>	<b>Decision taken</b>	<b>Action taken</b>
3.5	<b>Punjab State Biological Diversity Rules</b>		Separate item 5.7
3.9	<b>Collection fee for access of bio-resources for commercial purpose / research</b>	Board to inform general public and research bodies regarding collection fees	Action pending, as rules are yet to be notified
4.3	<b>Mega Event: Three day meeting of MoEF-GOI, National, Biodiversity Authority (NBA) &amp; State Biodiversity Boards (SBBs) in Punjab on 'Implementing Biodiversity Act, 2002.</b>	Noted	No action required
4.4	<b>Constitution of BMCs and preparation of Peoples Biodiversity Register (PBR)</b>		Separate item no.5.4
4.5	<b>Declaration of 1st Biodiversity Heritage Site in Punjab.</b>		Separate item no.5.5
4.6	<b>Celebration of International Year of Biodiversity and International Biodiversity Day</b>	Noted	No action required
4.7	<b>Identification of threatened species in the State.</b>	Approved	
4.8	<b>Restructuring of Staff – PBB.</b>		The matter has been again referred to AD for consideration of providing sufficient staff for strengthening Punjab Biodiversity Board vide letter no.297 dt. 26.8.2010.
4.9	<b>Delegation of Powers</b>	Approved	No action required
4.10	<b>Project on Inventorising Industries involved in utilization of bioresources in Punjab</b>		Separate item no.5.9
4.11	<b>Compliance of Biological Diversity Act while accessing bioresources</b>	Approved	No action is required
4.12	<b>Nomination of Member Secretary, Punjab Biodiversity Board in Task Force (Expert Committee) for preparation of guidelines on creating structures, running administration and maintaining of accounts and other related matters pertaining to Biodiversity Management Committees</b>	Noted	No action is required
4.13	<b>Participation of Member Secretary, Punjab Biodiversity Board in meetings of NBA and other State Biodiversity Boards.</b>	Noted	No action is required



## Project Proposal

# Declaration of Inami Baag, Distt. Hoshiarpur as Biodiversity Heritage Site



By  
**Punjab Biodiversity Board,**  
**O/o Punjab State Council for Science & Technology,**  
**MGSIPA Complex, Sector-26, Chandigarh**

## Background

India is traditionally the world's largest producer of mango; contributing nearly 40 per cent of the total global mango production from an area of 10.87 million ha with an annual production of 198.24 lac MT (Deptt. of Industries & Commerce, 2008-09). During 2007-08, almost Rs. 3.91 billion (US\$ 85 millions approx) worth foreign exchange has been earned from the export of fresh mango fruits and their value added products (APEDA).

Mango originated in Indo-Malayan region stretching from India to the Philippines and Papua New Guinea. It belongs to family Anacardiaceae and comprises 69 species of genus *Mangifera*, which are distributed throughout the world (Kostermans and Bompard, 1993). Although, mention of its cultivation in the Indian sub-continent dates back to at least 4000-6000 years, however, importance to its plantation was given during the dynasty of Mughals.

Mango is heterozygous in nature and exhibits wide genetic variability. A good repository of more than 1000 mango varieties/landraces belonging to genus *Mangifera* are available in different diversity regions in India, but to a large extent, commercial importance for orchard plantation is given only to nearly 20 mango varieties.

In the state of Punjab, located in north western part of India, mango cultivation has been mainly confined to sub-mountane zone known as *Kandi* area (in Districts Hoshiarpur, Gurdaspur, Ropar and Nawan Shehr). Nearly 80 per cent of total mango growing areas in the state are concentrated in these regions. Most native mango varieties/land races belong to the 'sucking' type of mango though a few table purpose varieties are also being cultivated for their market value. The area was famous for its rich mango grooves comprising, desi 'tapka' varieties of mango. However, for the last few decades mango seedling grooves and isolated/scattered plantations in the region have shrunk due to pressures of population, industrialization, urbanisation, unprecedented deforestation, land fragmentation, construction of check dams, widening of roads, etc. Orchards are being replaced by profit oriented cash crops. Erratic rainfall and adverse weather conditions due to environmental changes also pose a real threat to mango seedling plant diversity in the state. During these processes, many elite mono-embryonic mango seedling/germplasm known to possess desirable horticultural traits like good size, attractive fruit colour, flavour, tolerance/resistance to malformation, pests, diseases, various biotic and abiotic stresses, juice consistency, bearing regularity, fruit yield, etc. have been lost or are at the verge of extinction.

## The History of Mango in Punjab :

Old records, dating back to the early nineteenth century by Capt Montgomery in Hoshiarpur District Gazetteer (Anonymous, 1914) indicated a wide variety of mangoes in the region. These include “the *Panchpaya*: large fruit, said to weigh five quarters (*panch pao*) of a kacha ser; the *Kharbusa*: fruit average size, inside colour supposed to be like a melon (*kharbusa*); the *Kasumbra*: Small fruit, outer colour like safflower (*kasumba*); the *basantia*: small fruit, inner colour yellow (*basanill*); the *Pera*: small and very sweet, supposed to be in shape and taste like the local sweetmeat ‘pera’; the *Dihalu*: large fruit, inside like curds (*dahi*); the *Marabla*: large fruit, sweet, with a small stone used principally for making preserves (*maraba*); the *Pathar*: fruit average size, supposed to be like a stone (*pathar*) in weight and hardness of its skin, keeps for a long time; the *Laler*: shaped like a coconut: fruit, large and sweet; the *Bhadauria*: average size, ripens in the month of Bhadon (mid-August to mid-September), after other mangoes are over; the *Sandhuria*: average size, so called on account of its red (*sandur*) colour; the *Kesari*: large fruit, colour saffron (*Kesar*); the *kela*: long fruit like a plantain (*kela*), with a large stone; the *Misri*: large fruit, very sweet (*misri*); the *Jawainia*: large fruit, smells like aniseed (*ajwain*); the *Shahatia*: large fruit, sweet as honey (*shahad*); the *Gora*: large and brown like the bolls made up of cleaned cotton. The above species fetched the highest prices, especially the *Bhadauria* as it was available in the market even after other varieties were over. The remainder were less thought of like, the *Saru*: small fruit, rots very quickly (*sorjala*); the *Harar*: small like the fruit of *harar* (*Terminalia chebula*); the *Dohki*: small with a strong taste of turpentine; the *Sufeda*: small and of a white colour; the *Rara*: small and sweet in size like the fruit of the *bahera* (*Terminalia bellerica*); the *khala*: average size, bad colour and acid (*khata*) taste; the *kala*: average size, dark coloured skin even when ripe; the *Laichi*: small fruit, grows in clusters said to smell like cardamom (*ilaichi*); the *Dodhia*: small, white inside like milk (*dudh*); the *Chhali*: long fruit like maize cob (*chhali*); the *Kakra*: large long fruit, origin of name unknown”.

Many of the mango seedlings reported above, could not be recorded during a recent survey conducted by officers of Punjab Biodiversity Board, Punjab State Council for Science & Technology and Punjab Agricultural University. Amongst those recorded, many varieties were represented by only a few trees. Hence, the present survey indicated that the natural mango diversity in the region had declined considerably.

## Elite mango varieties in the Inami Baag :

The survey, brought the team to an old orchard (called Inami Baag) which was locally famous in the early nineties for winning awards (*inam*) for its elite mango varieties especially one particular variety called the ‘Inami amb’. The **Inami baag** is a biologically rich site with a

large diversity of native mango species. Some interesting mango strains observed in the area are locally known as *Anda Dusehree*, *Laddu Amb*, *Gola Ghassipur* and *Ber Amb* on the basis of fruit shape. In Punjabi folklore, some native mango strains are called as '*Chhalli*' on account of their oblong shape and large fruit size (resembling a small sized corn cob). Attractive yellow fruit colour with red blush on the shoulders was observed in seven mango strains (*Choe Sindhuri*, *Ghassipur di Chhalli*, *Sindhuri Chusa*, *Anami Chhalli*, *Mahantan di Laltain*, *Laddu Amb*, *Hariana Kanghi*). Fruit colour ranged from yellowish to light yellow, deep chrome, greenish, spinach green and dark green in select mango strains. Fully coloured fruits were locally preferred especially varieties called *Arru Amb* (resembling peach fruit), *Samrali* and *Throlli*. They were the preferred sucking type of mangoes mostly due to high juice content; soft flesh and coarse fibres and commanded higher price in the area.

Other popular strains include *Jogiya Chhalli* (which assumes the size of a small corn cob), *Anda Dushehree* (which had the flavour & taste of Dushehree variety of Mango, a popular table variety, but of the size of an egg averaging only 60.1g), *Thudi Amb*, *Gola Desi* and *Ber Amb* (with lowest recorded fruit pulp weight 18.3g, and appears like a ripe *Ziziphus* fruit), *Mahantan di Chhalli*, *Kala Amb*, etc. Further, strains like *Charan Achari*, *Gola Desi* and *Banta strains No. 1, 2 and 3* are locally conserved and used for pickle purposes on account of their higher juice acid per cent, pulp/stone ratio, sour taste, almost roundish shape and medium to abundant fibre content.

Besides, *Jogiya Chhalli* other long fruit variety sucking mangoes include *Thudi Amb*, *Anami Chhalli*, *Achari Gola*, *Kukian de Chhalli* and *Bhagva Chhalli*. The shortest fruit length was that of *Arru Amb* (6.01 cm average) and minimum breadth of *Ber Amb* (3.83 cm average). The team studied various phenotypic (fruit shape, length, breadth, colour, weight, taste, flavour, pulp %, lone & peel weight, pulp-stone ratio, etc.) and chemical TSS, Acidity, total sugars, reducing & non-reducing sugars, etc.) attributes and statistically significance variability was found among different mango strains.

## **Need for declaring Inami Baag as a Biodiversity Heritage Site**

**These native mango varieties/land races need to be conserved for the benefit of posterity. Besides, enriching our biodiversity and meeting nutritional requirement of local population, these seedling mangoes provide a wealth of material for carrying out selection of desirable traits and for building up material for hybridization to evolve new varieties of Mango.**

## SITE DETAILS

The Inami Baag site is on private land located in **village Bassi Umar Khan, Block-Bhunga, District Hoshiarpur** in an area of 10 acres. Presently, it comprises 165 trees of 29 confirmed varieties/land races and about 10 or more 'to be confirmed' varieties of mango. The site was earlier spread in 16 acre land with 256 mango trees of sucking type belonging to 43 native varieties/ land races.

The 6 acre land of the orchard has been already lost due to the fragmentation caused by passing of 'kandi canal', an irrigation channel, from the middle of the site. Further, several varieties are presently represented by a single tree. Thus, the site is under grave threat.

In view of the importance of the site due to rich biological diversity, it is proposed that the site should be conserved for in-situ preservation as a **Biodiversity Heritage Site**. The following activities have already been taken up :

- Meetings have been conducted on site and the local Sarpanch and villagers apprised of its importance.
- Site survey has been carried out in detail jointly by SDM and Horticulture Development Officers, Sarpanch of Bassi Umar Khan, concerned Patwari and Scientists of Punjab Biodiversity Board, Punjab State Council for Science & Technology and Punjab Agricultural University. The site falls in Khasra No. 113, 112/1, 112/3 and 111/2. The site map is enclosed.
- Assessment of biological resources has been made. The site contains the following biological resources :

Khasra No.	Detail of trees				Total No. of trees
	Jamun	Simbal	Mango	Eucalyptus (young plantation)	
113	-	1	43	467	511
112/3	2	-	118	-	120
112/1	-	-	54	-	54
111/2	-	-	-	-	-
Total	2	1	215	467	685

- Detailed phenotypic and chemical studies have been carried out and paper has been communicated to the International Journal of Biodiversity Conservation & Management (copy enclosed).
- General Assessment of rate of land + resources per acre has been made.

## **Proposed Actions**

The following actions are now required to be taken up :

1. Acquisition of site for in-situ conservation. The acquisition proceedings will be carried out by the district administration. The site will remain property of the government or handed over to BMC/Panchayat as per decision of PBB/Government.
2. Constitution of Biodiversity Management Committee in the area to ensure the cooperation of villagers for its management and long term sustenance and maintenance.
3. Constitution of a technical committee to oversee, support and advise the BMC under the chairmanship of DC/ADC/SDM. Representative of PBB, PAU, Deptt. Of Horticulture and other experts would be members of this committee.
4. Capacity building of BMC local population.
5. Involvement of Fruit Research Station, Gangian of Punjab Agricultural University for ex-situ conservation of selected germplasm.
6. Field studies in surrounding areas to identify additional native varieties, if available, and transferring the germplasm to the heritage site and to Fruit Research Station of PAU.

## **Long Term Sustainability**

The site would be sustained with funds received through annual auction of mango fruit, which fetches a good price in the market. The funds would be regulated by the BMC and would be utilized for the maintenance and upkeep of the site.

## Budget

The proposed budget break up is as under:

Head	Total amount required	Funds sought from GOI	Funds to be provided by GOP/PBB
Acquisition of 10 acres of land (including plantations) @ Rs. 15 Lakh per acre.	150.00	150.00	--
Construction of Boundary wall (6 feet) @ Rs. 700/- per running meter { 264 meter i. e (83m + 49m) x2} = 1,84,800/- X 10	18.48	--	18.48
Ex-situ conservation activities and survey of surrounding areas.	3.00	--	3.00
Setting of BMC and Capacity building of local population	0.50	--	0.50
Travel expenses	0.25	--	0.25
Contingency & Miscellaneous	1.00	0.50	0.50
<b>Total</b>	<b>173.23</b>	<b>150.50</b>	<b>22.73</b>

**Total funds sought from :**

<b>Govt. of India</b>	:	<b>Rs.150.50 lac</b>
<b>Govt. of Punjab/PBB</b>	:	<b>Rs. 22.73 lac</b>
<b>BMC</b>	:	<b>Conservation &amp; maintenance in Subsequent years.</b>

## REFERENCES

Agricultural and Processed Food Products Export Development Authority, Govt. of India, 2010. [www.apeda.com](http://www.apeda.com) (as viewed on 10.09.2010)

Anonymous. Mango and other cultivated trees. Hoshiarpur District Gazetteer (Part A); 1914:10-11.

Department of Industries & Commerce, Govt. of India, 2010. [www.commerce.nic.in](http://www.commerce.nic.in) (as viewed on 10.09.2010)

Kostermans AJGH and Bompard JM. The Mango: Their Botany, Nomenclature, Horticulture and Utilization, Academic Press Ltd., London; 1993



# The Interstate Shivalik Biodiversity Conservation Corridor (ISBCC)



**Proposal by**



**Punjab Biodiversity Board  
on behalf of the  
Deptt. of Science, Technology & Environment,  
Govt. of Punjab**

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## Introduction

The Shivaliks of North West States (Map-1) extend from Jammu & Kashmir through Himachal Pradesh, Punjab, Chandigarh, Haryana, Uttarakhand to Uttar Pradesh ( $29^{\circ} 57'$  to  $31^{\circ} 20'$  N Lat. and  $77^{\circ} 35'$  to  $79^{\circ} 20'$  E Long.). These are spread over an area of more than three million hectares and perhaps represent the most fragile eco-system of the country (Mittal *et.al.*, 2000)

Prior to the middle of 18<sup>th</sup> century, the Shivalik Hills were strictly preserved for hunting and were covered with lush acacia, shisham and pine forests with profuse under cover of shrubs and grasses replete with wild life. However, after the Sikh Wars (1845-49) the Sardars and Rajas who owned the hunting land were evicted and forests handed over to villagers as village common lands. In less than two generations, unrestricted tree falling and over grazing played havoc with the vegetation, and exploitation of the area exceeding its carrying capacity resulted in degradation of its natural resources including floral and faunal wealth. The area which was once dotted with gentle streams and perennial springs got converted into wide torrents and gullies (locally called *choes* and *raos*). The land affected by *choes* in Hoshiarpur district of Punjab alone increased from 194 km<sup>2</sup> in 1852 to more than 2000 km<sup>2</sup> by 1940. In order to protect the area The Punjab Land Preservation (*choes*) Act, 1900 was passed to close certain areas to grazing and prohibit tree felling, quarrying etc. in order to conserve the landscape. However, the implementation of the Act remained inadequate and as a result Shivaliks are facing severe ecological problems. **The Shivalik ecosystem is now referred to as the 8<sup>th</sup> most degraded eco-system of the country** and represents a highly dissected badland topography created by ephemeral streams which carry huge amount of silt and detritus leading to siltation of reservoirs and deposition of sand on agricultural fields.



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## **Statewise spread of North West Shivaliks**

The Shivaliks are spread in the following districts:-

<b>State / UT</b>	<b>Name of District</b>
Jammu & Kashmir (J&K)	Jammu, Kathua, Udhampur
Himachal Pradesh (HP)	Bilaspur, Chamba, Hamirpur, Kangra, Sirmaur, Solan, Una
Punjab	Gurdaspur, Hoshiarpur, Nawanshahr, Roopnagar
Chandigarh	Chandigarh
Haryana	Ambala, Panchkula, Yamuna Nagar
Uttrankhand	Dehra Dun, Haridwar, Nainital, Udham Singh Nagar, Champawat
Uttar Pradesh (U.P.)	Rampur, Saharanpur, Bijnor

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## **Bio-physical features of North West Shivaliks**

The Shivaliks experience Koeppen's Cwg category climate characterized by extreme seasonal temperatures, humid, tropical and dry winter and precipitation varying from 800 to 1200 mm annually. Evapotranspiration generally exceeds precipitation. The hills are characterized by tropical dry deciduous forests. The major vegetation types as per Champion and Seth (1968) are:

- Dry Shivalik Sal forest (5B/C1a)- parts of eastern HP, southern slopes in Uttrankhand, UP and Haryana
- Moist Mixed Deciduous forest (3C/C3)- northern slopes of HP, Uttrankhand, Haryana, Punjab and parts of J&K.
- Sub Tropical Scrub (10/DS1)- lower parts of J&K, western HP and north eastern Punjab.
- Sub Tropical Dry Evergreen Forests (10C/C)- small patches in HP and Uttrankhand
- Sub Tropical Pine Forests – lower parts of HP and Uttrankhand and northern Punjab

The percentage of forest area in various districts in Shivalik area has been assessed by FSI (2009) (Table-1).

Detailed GIS studies have been carried out by Indian Institute of Remote Sensing, National Remote Sensing Agency (IIRS, NRSA) under a nation wide BCLL project using Remote Sensing data which includes Broad Biodiversity Characterization. Land use Land cover map and vegetation type maps prepared by IIRS, Dehradun are enclosed (Map-2 & 3). The area is characterized by diverse flora and fauna. The district-wise distribution of Land use Land cover classes and vegetation classes is given in Figures 1 & 2 (Source: IIRS, Dehradun – personal communication).

Floristic and faunistic studies have been carried out by various workers in the region (especially by BSI, ZSI and Wildlife Institute of India). However, most of the studies are restricted to National Parks and Wildlife Sanctuaries located within the area. Some important references are given in Annexure-I. The Punjab State Council for Science & Technology also conducted a comprehensive study in the Shivaliks of Punjab in collaboration with IIRS, BSI, ZSI and Punjabi University, Patiala (Jerath, *et.al.* 2006). The study reported 104 species of Algae, 56 species of Fungi, 21 species of Lichens, 27 species of Bryophytes, 30 species of Pteridophytes, 1 species of Gymnosperm and 526 flowering plants from Punjab Shivaliks alone. Further, 19 mammals, 396 birds, 20 reptiles, 9 amphibians, 55 fishes, 31 molluscs, 819 arthropods, 23 annelids and 34 nematodes were also recorded. A copy of the publication is placed at Flag 'A'.

**Table-1: Districtwise Forest Cover (2007) in North Western Shivalik Region**(Area in km<sup>2</sup>)

Sr. No	State / UT	District	Total Forest Area	Percentage of Geographical Area
1.	<b>Jammu &amp; Kashmir</b>	Jammu	889	28.71
		Udhampur	2,878 <sup>^</sup>	63.25 <sup>^</sup>
		Kathua	1,492 <sup>^</sup>	56.28 <sup>^</sup>
2.	<b>Himachal Pradesh</b>	Chamba	2,436 <sup>^</sup>	37.35 <sup>^</sup>
		Kangra	2,062	35.93
		Hamirpur	245	21.91
		Una	521	33.83
		Bilaspur	362	31.02
		Solan	849	43.85
		Sirmaur	1,383	48.96
3.		<b>Punjab</b>	Gurdaspur	178
	Hoshiarpur		683	20.17
	Nawanshahr		110	8.58
	Roopnagar		387	18.32
4.	<b>Chandigarh</b>	Chandigarh	17 <sup>*</sup>	14.91 <sup>*</sup>
5.	<b>Haryana</b>	Panchkula	400	31.55
		Ambala	44	2.80
		Yamunanagar	193	10.92
6.	<b>Uttarakhand</b>	Dehradun	1,607	52.04
		Haridwar	618	26.19
		Pauri Garhwal	3,289 <sup>^</sup>	61.72 <sup>^</sup>
		Nainital	3,093	72.76
		Udhamsingh Nagar	543	21.36
		Champawat	1,181	66.87
7.	<b>Uttar Pradesh</b>	Bijnore	423	9.27
		Saharanpur	375	10.17
		Rampur	77	3.25

\* Out of this only 65% is tropical dry deciduous forest and rest is plantation.

<sup>^</sup> Only parts of the area falls under Shivaliks

Source: Compiled from 'India State of Forest Report, 2009' (Forest Survey of India).











Geological studies have also been carried out by Karunakaran and Rangarao (1979), Chaudhary (2000), Mahajan *et.al.*(2000) etc. Geologically the Shivalik rocks are made up of over 6000 meter thick indurated sand stones and clays and can be divided into upper, middle and lower Shivaliks. A geological map of the area is enclosed (Map-4).

Agriculture within the Shivaliks continues to be primarily of subsistence nature due to limited irrigation facilities. It is characterized by large number of varieties/land races of major and minor crops. Many of these traditional varieties are ecologically adapted and their germplasm needs to be preserved for posterity. However, in many parts (especially Punjab & Haryana) the introduction of HYVs is replacing native varieties pushing them to extinction. Only 18% of the cultivated area is irrigated. Due to undulating topography, cultivation on steep slopes, traditional agricultural practices and rain-fed conditions, the local population keeps large herds of cattle but the availability of fodder is about one third of its requirement thus leading to grazing pressure. Further, grasslands are infested with noxious weeds like lantana, congress grass, etc.

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### **Review of existing Protected Area Network in North West Shivaliks**

Protected areas serve as a repository of biological diversity and provide a variety of ecological services including maintenance of basic life support system. Three National Parks and Eighteen Wildlife Sanctuaries exist in the North West Shivaliks (Table-2). However, they cover a meager 2524.17 sq. km area. Out of this, maximum area falls in Uttrankhand including the Rajaji- Corbett National Parks which are the only reasonably sized protected areas and happen to be the only viable habitat of the Asian elephant and the tiger in the north west Shivalik landscape. The Protected Area Network in Punjab, Haryana and J&K is weak.



**Table 2: Protected Areas in Shivaliks landscape in Northwest India**

<b>State/UT</b>	<b>Protected Area</b>	<b>Area (in sq.km)</b>
Chandigarh	Sukhna Lake WLS	26.10
Haryana	Kalesar NP	46.82
	Kalesar WLS	54.36
	Morni Hills (Khol-Hi-Raitan) WLS	22.27
Himachal Pradesh	Gobind Sagar WLS	100.00
	Naina Devi WLS	123.00
	Pong Dam Lake WLS	307.00
	Shilli WLS	2.00
	Simbalbara WLS	19.00
Jammu & Kashmir	Jesrota WLS	25.75
	Nandini WLS	44.25
	Ramnagar Rakha WLS	12.75
	Surinsar Mansar WLS	55.50
	Trikuta WLS	27.75
Punjab	Jhajjar-Bacholi WS	1.16
	Takhni-Rehampur WLS	3.82
	Nangal WLS	2.89
	Kathlaur Kushlian WLS	7.67
Uttarakhand	Corbett NP	520.80
	Rajaji NP	820.00
	Sonanadi WLS	301.18
		<b>2524.17</b>

However, parts of Shivaliks are still interconnected with contiguous forests, thereby making the area a large viable natural unit- a rarity in modern India. Even this is gradually disappearing due to developmental pressures. The forest eco-system is highly degraded in Punjab, Haryana, J&K and Himachal Pradesh Shivaliks and needs to be restored on priority.

## **Threat Assessment**

The Shivaliks are a part of the Himalayan mountain chain but have been neglected for a long time even though the problems and conservation measures were identified as early as in 1895 (Aggarwal *et.al*, 2002). Threats to this important ecosystem include :

- The area of Shivaliks especially in the states of Punjab, Haryana and J&K and the Union Territory of Chandigarh is prone to erosion and floods due to loose soils and innumerable *choes* and *raos* which experience flash floods in monsoons due to poor vegetation in catchment areas. They cut across fields and spread sheets of sand over flooded areas. The width of some of these *choes* (especially in the region west to Yamuna river) is more than a kilometer and gushing waters can bring enormous boulders which can cause damage to life and property. The productivity of soil is also declining due to sand deposition.
- Since the Shivaliks are located between two diverse land forms, this eco system faces tremendous pressure due to activities and developmental pressures from both sides. The biotic pressures due to proximity to plains is especially high.
- The forest eco system is highly degraded due to fragile ecology and invasion of invasive alien species like lantana, congress grass, etc. Further, poor coverage under PAs and consequent inadequate protection has led to degradation of biodiversity especially in Punjab, Haryana and Chandigarh areas.
- There is a lack of continuity of buffer forest and crucial corridors between PAs. This serves as a limiting factor for movement of animals.
- Clearance of land for agriculture, limited availability of irrigation water and grazing pressure by Gujjars and Gaddis (which were earlier migratory communities but now

reside permanently in the area) further attenuates the problem of resource availability and leads to unsustainable natural resource utilization.

- In the recent past, several developmental activities have been initiated along North West Shivaliks (especially in Punjab, Haryana and Uttarakhand) which is posing a major threat to the biodiversity due to habitat loss, degradation and associated effects.
- Intensive and high-input agriculture is replacing traditional low-input agriculture thus affecting native crop varieties and livestock breeds and their conservation.
- Biopiracy and overexploitation of medicinal and economically important plants and animals (including NTFP) is leading to species destruction.
- Climate change and its impact on upper Himalayas can lead to habitat change and ecosystem disturbance in the Shivalik area.



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## Potential Benefits of declaring Shivaliks as an Interstate Biodiversity Conservation Corridor

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The need for protecting the entire Shivalik area has been long felt in view of the fragility of the ecosystem.

The Interstate Biodiversity conservation corridor will help to

- Adopt a holistic conservation approach through total ecosystem conservation concept.
- Conserve wild flora and fauna of the area which is unique in many respects due to intermingling of Indo-malayan and Palaeartic elements and offers a wealth of medicinal and economically important resources (many of which are endemic, rare or threatened species).
- Conserve precious wild genes linked to agricultural crops and farm animals.
- Protect important genetic material from biopiracy and establish the sovereign rights of the local population for future benefit sharing, as and when such material is accessed for commercialization.
- Improve the habitat through special programmes for soil and water conservation.
- Promote broad based species conservation along with conservation of specific species e.g. flagship species like the Asian elephant and tiger as well as many other Keystone species.
- Act as a moratorium to unrestricted exploitation of the area and regulate activities like overgrazing, deforestation, mining, etc. leading to sustainable resource utilization.
- Ensure proper Impact Assessment of large scale developmental projects, both industrial and infrastructure.
- Check unrestricted sand mining which attenuates the problem of erosion.
- Conserve traditional crop varieties/land races, traditional ecologically adapted agricultural practices, associated knowledge and livestock breeds.

Hence, the participating states and the local populations would gain from habitat protection and species conservation. The districts in the plains below will also benefit as a result of habitat protection in the upper hilly tracts.

Proposal to declare parts of Shivaliks as a National Park was mooted at earlier occasions also but the area was restricted to Punjab and Chandigarh, which would have had limited benefits. The Wildlife Institute of India, Dehradun, had also identified certain parts of Shivalik as sites of Incomparable Value. The present proposal, however, is more

comprehensive and covers the entire range, instead of conservation of fragmented areas, and is expected to benefit the entire ecosystem and all stakeholder states.

## The Task Ahead

The core objective of the Interstate Shivalik Biodiversity Conservation Corridor (ISBCC) is conservation of the Shivalik ecosystem as a whole, besides ensuring sustainable land use and promoting sustainable development in the area.

The primary objective is to focus on restoration of degraded landscapes so that the local population/dependent communities benefit from the ecological services provided by the ecosystem without damaging it. Hence, adoption of a holistic, multipronged total ecosystem management approach, is required.

A short-term (5-10 years) and long-term (50 years) Action Plan is required to be prepared for management and conservation. It would essentially include the following elements :

- **Marking of boundaries** and identification of core and buffer zones is the first and foremost task. A broad data base of the area (district-wise) in GIS domain is already available with National Remote Sensing Agency in 1:50,000 scale. This can be studied and various GIS maps overlaid to delineate the exact boundaries of the biodiversity corridor. Consultation of all State Govts. and experts would be essential. The existing information includes vegetation cover maps, land use and land cover maps, disturbance regime identification, etc. However, besides biogeographical and morphological maps, social and economic data base also needs to be generated.
- A complete **corridor analysis** needs to be taken up through detailed floristic and faunistic studies especially with respect to RET\* analysis, identification of endemic species, Ecological Index, Importance Value Index, etc. This will help to identify keystone, species and take up specific conservation projects.

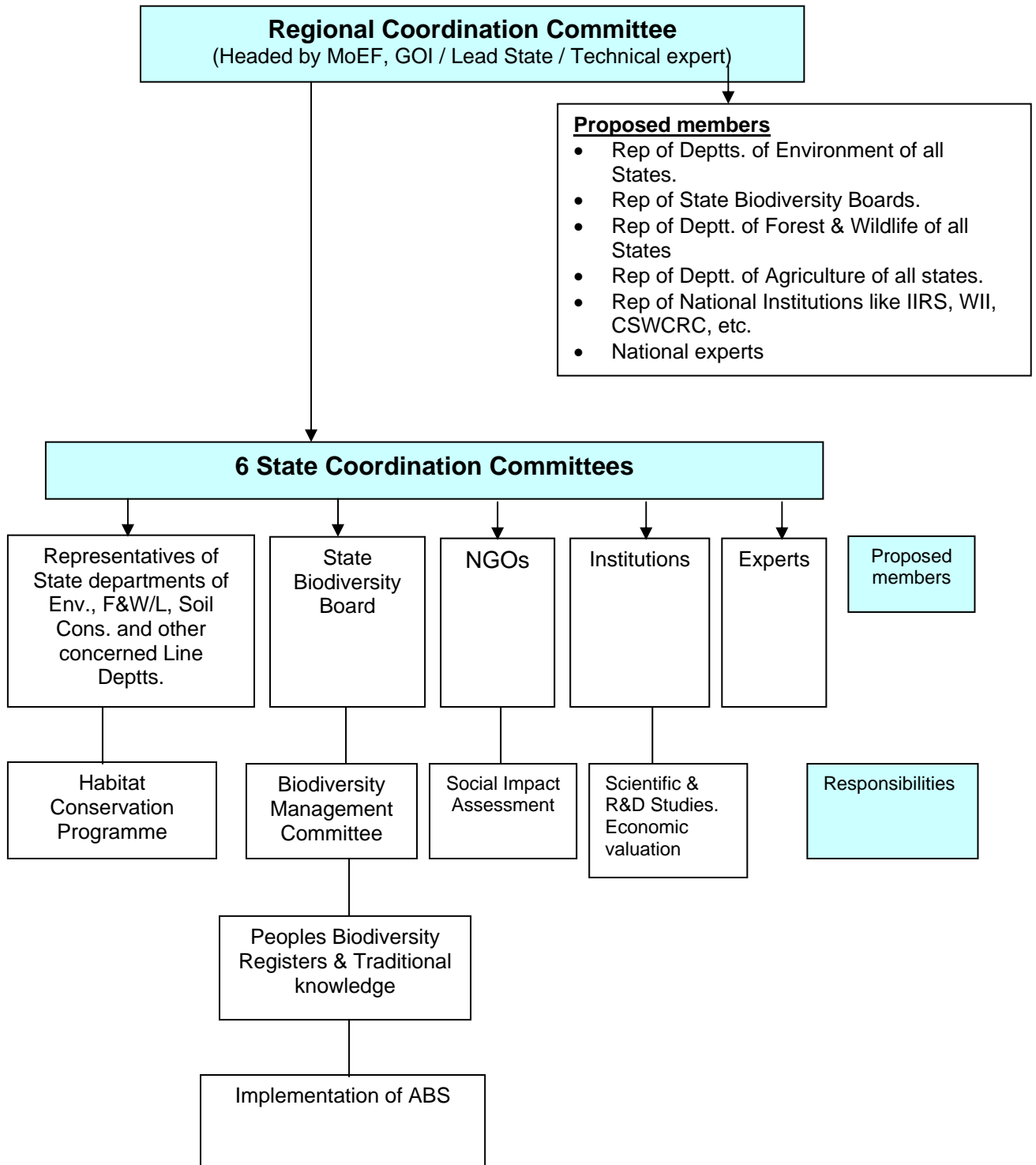
- The **agricultural ecosystem** in the entire area including hill slopes and valleys needs to be assessed along with inventorization of diversity in traditional crop varieties/land races, agricultural practices and breeds of livestock and their wild relatives.
- **Threat perception** needs to be carried out with respect to :
  - Habitat destruction from grazing, deforestation, erosion, mining, etc.
  - Loss of traditional varieties.
  - Loss of economically important medicinal plants and animals.
  - Man-animal conflict.
  - Sustainable NTFP utilization, etc.

\* Rare, endangered & threatened species

- **Gap analysis** needs to be taken up to assess areas requiring short-term and long-term conservation efforts.
- JFM has been quite successful in many of these areas. Village Self Help Groups have also been constituted in some parts of Shivaliks. These need to be further strengthened to ensure people's participation in conservation efforts. Furthermore, the State Biodiversity Boards need to take up constitution of Biodiversity Management Committees and provide training for preparation of People's Biodiversity Registers along with capacity building for **implementation of successful ABS mechanism**.
- Conservation of habitats, key vegetation types and larger eco-zones need to be formalized by taking up **specialized projects**, both, within and outside the existing protected areas as per local site requirements by concerned departments in each stakeholder state.
- The Biodiversity Conservation Corridor needs to be **notified** and accorded a legal status to ensure that unplanned developmental pressures are kept at bay and all developmental projects are subjected to thorough impact assessment prior to approval.
- This will also ensure restriction on bio-surveys in the area, regulation of access to bio-resources thus **curbing biopiracy**.

- However, sustainable utilization of economically and medicinally important species needs to be promoted along with appropriate benefit sharing with the local communities.
- Nature education and awareness campaigns need to be initiated and strengthened.

In order to carry out the above activities it is proposed that a Regional Coordination Committee and State Level Coordination Committees be constituted as outlined below:



## Assessment of Financial Resources

It is proposed that :

- A) The Ministry of Environment & Forests, Govt. of India may take a lead to :
  - a. Constitute a Regional Coordination Committee (RCC) to identify and delineate boundaries of the ISBCC based on existing information available with national and state institutions/departments.
  - b. Notify the ISBCC.
- B) The State Governments may notify State Coordination Committees (SCCs) to:
  - a. Provide inputs to the RCC.
  - b. Identify state specific conservation and R&D projects and programmes which may be funded out of existing state/central plan budget.
- C) Based on the over all financial requirements the Central Govt. may also make special provision in the Plan Budget at a later date.

## REFERENCES

- Agrawal, D.K., Farooquee, N.A., Samal, P.K., Sharma, S. and Palni, L.M.S. 2002. Shivalik development strategy 1. Action Plan. G.B. Pant Institute of Himalayan Environment & Development, Almora. pp:44.
- Chaudhri, R.S. 2000. Geology of the Siwalik group of western and central Himalaya. In : Fifty Years of Research on Sustainable Resource Management in Shivaliks (Eds. – Mittal, S.P., Aggarwal, R.K., Samra, J.S.). Central Soil and Water Conservation Research and Training Institute Research Centre, Chandigarh. pp.3-16.
- Champion, H.G. & Seth, S.K., 1968. Revised Forest Types of India. Govt. of India Publications, New Delhi.
- Forest Survey of India, 2009. India State of Forest Report. Ministry of Environment & Forests, Govt. of India.
- Jerath, Neelima, Puja & Chadha, Jatinder. 2006. Biodiversity in the Shivalik Ecosystem of Punjab, India. Punjab State Council for Science & Technology, Chandigarh.
- Karunakaran, C. & Ranga Rao, A. 1979. Himalayan Geology Seminar, New Delhi 1976 – Section III: Oil and Natural Gas Resources, GSI, Miscellaneous Publication No. 41, Part V.
- Mahajan Gautam, Plaha, J.K., Bhagi Vijayant and Bhandari Alok. 2000. Geology of the Siwalik group of western and central Himalaya. In : Fifty Years of Research on Sustainable Resource Management in Shivaliks (Eds. – Mittal, S.P., Aggarwal, R.K., Samra, J.S.). Central Soil and Water Conservation Research and Training Institute Research Centre, Chandigarh. pp.17-22.
- Mittal, S.P., Aggarwal, R.K. and Samra, J.S. 2009. Fifty years of research on sustainable resource management in Shivaliks (Eds.). Central Soil and Water Conservation Research and Training Institute, Research Centre, Chandigarh.

### Some Important Studies Conducted in the NW Shivalik Area

- Arya L. Swarn., Agnihotri Y. and Samra J.S., 1994. Watershed- Management: Changes in Animal Population Structure, Income and Cattle Migration, Shivaliks, India. *Ambio*, Vol.23, No.7 (Nov. 1994), pp. 446-450.
- Dogra K.S., Kohli R.K. and Sood S.K., 2009. An assessment and impact of three invasive species in the Shivalik hills of Himachal Pradesh, India. *International Journal of Biodiversity and Conservation* Vol. 1(1) pp. 004-010.
- Joshi P.C., 2007. Community structure and habitat selection of butterflies in Rajaji National Park, a moist deciduous forest in Uttaranchal, India. *Tropical Ecology* 48(1): 119-123.
- Joshi Ritesh and Singh Rambir, 2008. Unusual behaviour of Asian Elephants in the Rajaji National Park, North-West India. *Gajah* 29 (2008) 32-34.
- Joshi Ritesh and Singh Rambir, 2009. Gujjar Community Rehabilitation from Rajaji National Park: Moving Towards an Integrated Approach for Asian Elephant (*Elephas maximus*) Conservation. *J. Hum Ecol.* Vol.28(3): 199-206.
- Johnsingh A.J.T., Ramesh K., Queshi Q., David A., Goyal S.P., Rawat, G.S., Rajapandian K. & Prasad S., 2004. Conservation status of tiger and associated species in the Terai Area Landscape, India. RR-04/001, Wildlife Institute of India, Dehradun, pp:viii+110.
- Prasad Soumya, Chellam Ravi, Krishnaswamy Jagdish and Goyal S.P., 2004. Frugivory of *Phyllanthus emblica* at Rajaji National Park, northwest India. *Current Science*, Vol. 87.
- Rajapandian K. and Prasad S., 2004. Conservation status of tiger and associated species in the Terai Arc Landscape, India. RR-04/001, Wildlife Institute of India, Dehradun, Pp. viii+110.
- Rawat, G.S. and S.K. Mukherjee, 2005, Biodiversity of the foothills of the Himalaya (in) Rawat, J.K.,, Srivastava, S.K. Biswas, S., Vasistha, H.B. (Eds). *Proceedings of the Workshop on conservation of Biodiversity in India- status, challenges and efforts.* Indian Council of Forestry Research and Education, Dehradun. 43-50.
- Rawat, G.S. and N.S. Bhainsora, 1999. Woody vegetation of Shivaliks and outer Himalaya in north western India. *Tropical Ecology*, 40(1) 111-128.
- Roy, P.S. 2002. Biodiversity Characterisation at Landscape Level in Western Himalayas India using Satellite Remote Sensing and Geographic Information System . Indian Institute of Remote Sensing, NRSA, Department of Space, Govt. of India, Dehradun. pp:234.
- Singh M.J. and Khera K.L., 2008. Soil erodibility indices under different land uses in lower Shivaliks. Department of Soils, Punjab Agricultural University, Ludhiana 141010 Punjab. *Tropical Ecology* 40(2) pp 113-119.
- Singh M.J., Kukar, S.S., and Gupta N., 2010. Pattern and behaviour of gully erosion in Shivaliks of lower Himalayas. Department of Soils, Punjab Agricultural University, Ludhiana. Presented in 19<sup>th</sup> World Congress of Soil Science, Soil Solutions for a Changing World 1-6 August 2010, Brisbane, Australia. Published on DVD.

## Conservation of Peafowl in Punjab

**1. Title of the Project:**

Status, distribution and conservation of Indian Peafowl in the state of Punjab

**2. Name, Designation and Addresses of Principal and Lead Investigators:**

1. Dr. S.S. Ladhar, Joint Director (Env.) PSCST
2. Dr. K. Sivakumar & Dr. S. Sathyakumar (Advisers), Wildlife Institute of India, P.O. Box 18, Chandrabani, Dehradun 248 001, India

**3. Institution where the project will be implemented:**

Punjab State Council of Science and Technology

**4. Names of Network:** None

**5. Duration of the project (years, months):** 1 Year

**6. Total amount of Grant required:** Rs. 14,76,000/-

**7. Project Brief (Summary)**

Indian Peafowl, the National Bird of India is widely distributed species, and is native to the Indian Sub-continent. It has a unique place in the cultural landscapes of India, on account of its magnificent features and its association with mythology and traditional value systems. The species that was once widely distributed in India with the exception of the higher Himalayan ranges, north-east India and the Islands has now been reduced to discontinuous and declining populations. This has largely been attributed to poaching for meat/feathers, retaliatory killings against crop damage and mortalities due to changing agricultural practices. The available estimates of the Indian Peafowl populations in India are speculative or at the best, guesstimates. There was no detailed information about the status and distribution of species in the state of Punjab. However, annotated information reveals that the population of peafowl in Punjab is seems to be declining due to current landuse pattern. In this connection, a statewide survey is proposed to assess the peafowl population and their habitat in Punjab, and to devise a scientifically robust monitoring protocol. Output of this project will culminate into a comprehensive Species Conservation Plan for the Indian peafowl populations and their habitats in the State of Punjab and also will contribute to the National Conservation Plan for Indian Peafowl.



## **8. Specification of research question(s)**

The Indian Peafowl (*Pavo cristatus*), that was once widely distributed in India with the exception of the Himalayan ranges, north-east India and the Islands (Ali & Ripley 1983), is now reported to be discontinuously distributed in its former distribution range. It was introduced into the Andaman & Nicobar Islands (Ali & Ripley 1983) and also in South Sikkim (Choudhury et al. 2007). Although the Indian peafowl is locally abundant or fairly common in some areas, the present population status of this species is only speculative. Most of the Protected Areas (PAs) in India do not regularly monitor the populations of the Indian Peafowl within their areas despite this species being the 'National Bird' and even though it forms prey for large carnivores such as the Tiger and Leopard and many lesser carnivores. Since the early 1990s, there have been reports of increasing illegal trade in peafowl feathers, large-scale mortalities due to changing cropping patterns (Imam 2005) and increased use of insecticides/pesticides in agricultural lands, poaching for meat, and retaliatory killings by people due to alleged crop depredation by peafowl. Several peafowl stronghold areas in the country are now concerned about the current declining status of the Indian Peafowl.

The Wildlife Institute of India (WII), Dehradun, carried out a nationwide questionnaire based status survey for the Indian peafowl in Protected Areas (Choudhury et al. 2007). Based on this survey, the presence of Indian Peafowl was confirmed in 345 districts of India and its possible presence in 174 other districts that fall within the Indian Peafowl distribution range. The Indian Peafowl populations were reported to be present within 193 Protected Areas (PAs), 19 other forest land areas, and 141 revenue land areas. Of the total 353 localities that have reported Indian Peafowl presence, the population estimates were available for 195 localities only (Choudhury et al. 2007). In Punjab, of the total Protected Areas, in 9 Protected Areas reported with presence of peafowl, however, their status were not known. So far, there was no detailed survey on this species in Punjab.

Over 60% of the Indian Peafowl distribution and populations are outside PA network and forest lands making them vulnerable to poaching, habitat loss and anthropogenic impacts (Choudhury et al. 2007). For conservation of the Indian Peafowl, the PA centric approach would not work, since much of the preferred

habitat for Indian Peafowl are the scrub jungles and forest edges that mostly fall outside the PAs (Ramesh and McGowan 2009). From the above, it is clearly evident that there is an urgent need to obtain baseline data on the encounter rates and population estimates of the Indian Peafowl from all over its distribution range in the state of Punjab with a view to develop a state level conservation strategy and monitoring programme.

## **OBJECTIVES**

1. Assess the current distribution and population status of Indian Peafowl in Punjab
2. Develop and implement a Long term Monitoring Programme for the Indian Peafowl in the state of Punjab.
3. To develop a comprehensive Species Conservation Plan for this species at the state level.

## **9. Justification for the proposed project in relation to the Thematic Priorities:**

The Indian Peafowl has a unique place in the lives of the people of India due its magnificence and its association with Indian mythology. It is well recognized for its ecological and aesthetical values, and hence aptly declared as the 'National Bird' of India in the year 1963. A widely distributed species that is now becoming uncommon in Punjab has largely been attributed to poaching for meat/feathers, retaliatory killings to reduce crop loss, and mortalities due to changing agricultural practices. There was no information available on status and distribution of this species in the State which are crucial for taking up any conservation programme targeting this species. Therefore, the proposed study will be the first ever scientific assessment of the Indian Peafowl population in Punjab that would serve as a baseline for future monitoring.

## **10. Outline of research methodology**

**Distribution and Population Assessment:** '*Area Search Method*' would be undertaken at the level of Panchayats in human dominated landscapes and Forest Beats in the forested landscapes. A team of 2-3 trained persons would search a fixed area for counting the peafowl number, along with sex and composition, and

habitat type and its status along with information regarding sighting locations. Team would also collect information regarding prevailing threats to peafowl in the area. All the existing roads and paths in the Panchayat would be used as transect. In the Panchayat, the search would be undertaken either by motorcycle or on foot where area was not conducive for motorcycle count. In the forest areas, all trails, paths, roads, streams and rivers side would be used as transects. Transect walk would be carried out inside all the beats of forests area. Approximate length of these transect walk would be of 5 km, and motorcycle count would also be undertaken wherever possible. All these counts would be carried out in both morning and evening hours. Similarly, all the Panchayats and Forest Beats would be covered to enumerate the minimum population estimate of the species for the entire country. The data would be synthesized in terms of occupancy and abundance estimate of the species across India.

**Habitat Mapping:** Field information and secondary data would be simultaneously compiled, and a distribution map of the species at the level of minimum sampling units would be done. A detailed spatial database would be developed based on existing spatial data on habitat features, climate data and recent satellite data. Site locations (species occurrence data) would be linked to these spatial data and a continuous surface of peafowl distribution would be created using '*Interpolation and Extrapolation Method*'. This would serve a basis for future monitoring of habitat and species population status in fixed localities. Once the location information is available on GIS database, threats and poaching related issues could also be linked to these locations to fix responsibilities and to take preventive measures.

## **11. Data sources**

1. Primary data collected in the fields through this Project
2. Secondary data through literature review for historical account
3. Existing census data from the State Forest Departments

## **12. Surveys to be conducted**

In the entire range of the Indian Peafowl in Punjab

## **13. Staff required (Technical/Non-Technical)**

The project requires three Field Biologists to carry out field works at Panchayat/Beat level across Punjab. These three Field Biologists are required along

with vehicles and some equipment, satellite imageries and field assistant to successfully carry out this task.

**14. Budget for the proposed study:**

<b>S.No.</b>	<b>Head</b>	<b>Amount (in Rs)</b>
1	Wages for three Field Biologists (Rs.16000/month for 12 months)	5,76,000.00
2.	Travel (including TA & DA for PIs and Researchers)	2,00,000.00
3.	Field Survey	2,00,000.00
4.	Equipments & chemicals (3 GPS, 3 pedometer, 3 Digital camera, 3 binoculars)	2,00,000.00
5.	Purchase of satellite imageries and related maps of Punjab	1,50,000.00
6.	Wages for field assistants & other professional support	1,00,000.00
7.	Miscellaneous (consumables, publication etc)	50,000.00
	<b>Total</b>	<b>14,76,000.00</b>

## References

Ali, S., and Ripley, S.D. (1983) *Handbook of the Birds of India and Pakistan*. Oxford University Press, Delhi.

Choudhury, B.C., Sathyakumar, S., and Sylvia, C., 2007. An Assessment of the Current Status of the Indian Peafowl (*Pavo cristatus*) in India based on Questionnaire Surveys. (IN) Sathyakumar, S & Sivakumar, K. (Eds.) Galliformes of India. ENVIS Bulletin. Wildlife and Protected Areas: Vol.10 (1). Wildlife Institute of India, Dehradun. Pp. 53-60.

Novonil Das and K. Sivakumar, 2009. Population status and distribution pattern of Indian Peafowl (*Pavo cristatus* Linnaeus, 1758) in Chilla Range, Rajaji National Park. *The Indian Forester*, 135(10):1391-1396.

Sharma, I. K. (1978). Social and sexual behaviours of peafowl. *Environmental Awareness*, **1**: 169-171.

Johnsingh, A. J. T. and S. Murali. (1980). The ecology and behaviour of Indian peafowl *Pavo cristatus* Linn. of Injar. *Journal of Bombay Natural History Society*, **75**: 1069-1079.

Ramesh, K. and McGowan, P. 2009. On the current status of Indian Peafowl *Pavo cristatus* (Aves: Galliformes: Phasianidae): keeping the common species common. *Journal of Threatened Taxa* 1(2): 106-108.

**STATEMENT OF ACCOUNT OF PUNJAB BIODIVERSITY BOARD FOR THE YEAR 2009-10 (UPTO 31.03.2010)**

<b>Payments</b>	<b>01.04.2009 to 31.03.2010</b>		<b>Receipts</b>	<b>01.04.2009 to 31.03.2010</b>
<b>Expenditure</b>	<b>Amount (Rs.)</b>		<b>Income</b>	<b>Amount (Rs.)</b>
Salary and wages	5,17,615.00		Tech. Sectt. (Grant from GoP)	9,35,000.00
Travelling & DA	60,951.00			
Telephone expenses	16,700.00			
Seminars & Workshops	58,500.00			
R& M Vehicle	1,06,631.00		Interest on Bank	30,108.00
Printing & Stationery	95,071.00			
Office Misc. Exp.	56,465.00			
Postage	1030.00			
Meeting expenses	4574.00			
Insurance	11,228.00			
Dep.	3056.00	9,31,821.00		
Excess of income over expenditure		33,287.00		
<b>Total</b>		<b>9,65,108.00</b>	<b>Total</b>	<b>9,65,108.00</b>

**Sd/-  
Manager (Finance & Accounts)  
PSCST**

**Sd/-  
Member Secretary  
Punjab Biodiversity Board**