

# ASSESSMENT OF BIODIVERSITY RISKS AND OPPORTUNITIES IN AN AGRICULTURAL LANDSCAPE – A CASE STUDY FROM INDIA

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## EXECUTIVE SUMMARY

**The subject and purpose of this case study:** An assessment of biodiversity and ecosystem services (BES) risks and opportunities in a spices growing landscape, to investigate and develop a plan for adopting sustainability practices in Andhra Pradesh state of India. The study was undertaken by a leading agri-business company in India, ITC Private Limited. A division of ITC, Agri-business Division (ABD) Indian Leaf Tobacco Development (ILTD), implemented the Biodiversity Risk & Opportunity Assessment (BROA) in two chilli growing areas: Gudepalli and Bhadrachalam. BROA is a field-based tool for companies with agricultural supply chains to assess BES risks and opportunities in the landscapes where they operate. It takes a holistic approach based on local stakeholder engagement.

## WHY BROA WAS IMPLEMENTED BY ITC IN THE SPICES REGION

ITC is India's largest exporter of agricultural products and is one of the leading corporate in terms of sustainability in India. ITC appreciates the importance of biodiversity to the sustainability of its agricultural supply chains, and has a track record of work on soil health, and agro-forestry. In the past ITC has assisted farmers to be certified by Rainforest Alliance. ITC has taken up BROA as it's a tool that takes a wider landscape approach, biodiversity and ecosystem services and which also complements their existing farm-level focus.

**How BROA was implemented by ITC in the Spices region**



Before taking up BROA, ITC organized training for its senior managers on BROA. A four day training was organized in collaboration with Earthwatch Institute in Mysore in May, 2013. After the training, ITC Agri-business Division (ABD) designated one trained staff to lead BROA in the spices growing landscape in the state of Andhra Pradesh, India.

## IMPLEMENTATION PARTNERS

The BROA process can be carried out by companies with local partners to provide ecological and technical expertise.

**ITC Limited:** ITC Agri-business Division took the lead in the overall implementation of BROA. A team of eight members was designated to complete BROA process.

**Earthwatch Institute India Trust:** An environmental scientific organization, Earthwatch Institute India Trust provided training and overall support on BROA and documented the process of BROA implementation.

**Conservation partners:** ITC recruited Rakshana, an NGO based in Andhra Pradesh, to implement BROA alongside ITC staff.

**Kakatiya University:** Two plant taxonomists from Kakatiya University were involved to record biodiversity aspects in the discussion during stakeholder engagement.

### Phase 1: Planning and information gathering

Phase 1 of BROA requires collection of relevant background information on the focus agricultural landscape. Secondary data and information required for BROA implementation was gathered by the designated ITC staff. Secondary data was available only for the villages in which ITC operations were active. 'Rakshana' conservation partner collected the village-level secondary data of the district in which BROA sites were located. ITC-BROA team prepared a stakeholder map in consultation with conservation partners.

#### Stakeholder meeting

Stakeholder meetings took place on 3<sup>rd</sup> and 4<sup>th</sup> April 2014 in Bhadrachalam and Gudepalli respectively. The ITC team and conservation partners met before the stakeholder meetings to define the role of moderators, including a principal investigator and a second investigator and two documentation officers to record discussion and keep a note of topics arising. They used a semi-structured approach with a checklist based on the BROA 'mandatory risk filter' (see below).

The meetings were attended by:

- ❖ Farmers from the villages (how many?)
- ❖ Irrigation department officials
- ❖ Agriculture department official
- ❖ Village panchayat members
- ❖ Kakatiya University

Meetings with farmers, and other government departments was followed by another meeting with held with only Government officials, this meeting was held to get an understanding of the various schemes offered by the various government departments. They reported the following:

- ❖ The Government has a scheme to promote green manuring, but it has not been very successful or farmers do not regard this as very profitable.
- ❖ The Government recommends farmers to grow paddy during the rainy season, however not many farmers have come forward.

***Note: The above meeting was held with only government officials, as during the meeting with farmers there was not much scope for government officials to provide details on the schemes and challenges in implementations of the schemes.***

## **Phase 2: Identifying, investigating and prioritizing risks and opportunities**

**Field visits:** There were two teams for data collection and one team for photographing the landscape and one team to interact with farmers to observe the topics discussed during the stakeholder engagement.

Phase 2 of BROA starts with a structured checklist of BES issues that arise in agricultural landscapes, called the 'Mandatory Risk Filter'. Based on what was learned from Phase 1 and from the stakeholder discussions, the ITC team and Conservation Partner made an initial attempt to complete the Mandatory Risk Filter table for the focus landscape.

**Field visits:** Stakeholder meeting with followed by field visits in April 2014. Farmers and government officials who participated in the meeting accompanied the ITC team in the field visits. There were two teams for data collection and one team for photographing the landscape and one team to interact with farmers to observe the topics discussed during the stakeholder engagement. Both the landscapes in Gudepalli and Bhadrachalam were visited and necessary data was collected as per the risk filters.

**Revisiting the mandatory risk filter table:** After the field visit exercise, the data collected from stakeholder engagement were matched with the observations from the field and mandatory risk filters table was revisited and necessary changes were made.

**Meeting to discuss the data requirement for further prioritizing risks and opportunities:** ITC team involved with BROA work met on 5<sup>th</sup> April 2014 to understand the data requirement for the further prioritizing risks and explore opportunities and collect the information which would aid in drafting action and monitoring plans. This was attended by ITC leads, members from partner NGO and Earthwatch representatives.

On the 3 May 2014, another meeting with farmers (in place of questionnaire survey) was conducted to discuss the specific impacts, and willingness to involve in action plans. Six farmers participated in the meeting, and farmers were keen on taking up measures to improve the soil health and they were keen on taking up vermi-composting.

### **Prioritizing risks and opportunities**

Prioritizing risks and opportunity was a very time consuming activity. ITC BROA team along with representatives from crop development team, conservation partners discussed each of the risks in detail. For each of the risks, causal factors were identified and categorized into primary/secondary ultimate cause. Representatives from Earthwatch India also attended the meeting in May 2015 at ITC office in Guntur to monitor the process.

## What was learned?

The learning from the stakeholder engagement, secondary data and field visits are:

### Learning from Farmers

- ✚ Replacement of traditional seeds by hybrid seeds i.e., Hybrid varieties like *Teja* replacing chilli areas with open pollinated cultivation like 334;
- ✚ Loss of forest leading to floods during rains;
- ✚ Decrease in number of water bodies;
- ✚ Extinction of wild animals due to deforestation, poaching and mining;
- ✚ Deforestation due to increase in agricultural land;
- ✚ Conversion of reserve forests into 'Patta' lands (registered in the name of farmers by revenue department) and handed over to farmers;
- ✚ Diverse traditional cropping systems like millets, wheat, rice, etc., replaced by mono cropping i.e., chilly and BT Cotton;
- ✚ Pesticides percolation in the local water bodies has affected the fish populations;
- ✚ Bird death due to rice bran bait- in which farmers mix rice bran, mixed with *jaggery*;
- ✚ Loss of earthworms in the soil and depletion of soil health due to indiscriminate usage of pesticides;
- ✚ No water management plans in the region;
- ✚ Increase in pesticide use due to increase in number of caterpillars (pests) as there are no more natural predators.
- ✚ Reduction in farmyard manure due to decline in livestock population;
- ✚ Increase in inorganic fertilizer due to subsidized fertilizer from Government;
- ✚ Increase of Congress weeds (*Parthenium*) in the region

### Learning from Famers and Government officials:

- ✚ Top soils have become very hard and it is very difficult to grow crops or any plants-
- ✚ Water in the region is rich in fluoride content;
- ✚ Major decline of ground water due to increase in number of bore wells in the region;
- ✚ Acute water shortage during summer due to no water channels and decrease in number of ponds in the village;
- ✚ Decrease in water table. The depth of borewells is increasing every year, earlier water was available at 10-15ft feet but now 50-100ft deep borewells sometimes do not contain water;
- ✚ The government is encouraging farmers to grow crops that require less water but farmers are only interested in growing cash crops. Farmers even prefer to leave the land fallow but are not interested in growing crops that fetch them less money;
- ✚ Poorly designed check dams have been demolished by the villagers as they overflow during the rains and flood the agriculture areas causing damage to the crops;
- ✚ Around 150 acres of agricultural lands depend on three ponds present in the village, and the rest are solely dependent on the bore wells;
- ✚ Ponds in the village are filled with *Ipomea spp*s and de-siltation has not been done for several years;

## Main Risks Identified as per Risk working Table for Bhadrachalam

Risk Topics	Description of Risks
1.2 loss of agroforestry systems	Lack of any agroforestry system in the landscape
1.3 loss of migratory routes / increase in barriers to movement of species, including loss or lack of native forest corridors for wildlife (e.g. tree lines, forests connecting protected areas)	Loss of connectivity due to construction of roads and encroachment
2.1 habitat loss, clearance or conversion to other uses	Loss of habitat due to conversion of forest area to Agricultural lands & infrastructure development
2.2 habitat fragmentation and/or habitat degradation	Loss of habitat due to conversion of forest area to Agricultural lands & infrastructure development
2.3 encroachment or proximity (5km or less) to areas of biodiversity significance or protected areas	1. Risk of intensive cultivation on Amaravaram reserve forest from the agricultural lands
2.4 loss or lack of natural vegetation buffers around field edges	1. Loss of buffer from water bodies and roads
3.1 decrease in native populations (number and / or range) e.g. through hunting or collection of native species	Decrease in native flora and fauna.
3.2 increase and/or spread of invasive / exotic species	Increase or spread of species impacting ecosystem balance by competing with native species.
3.3 loss of beneficial species e.g. pest predators or pollinators / species used or valued by community	Loss of beneficial species in chili cultivation
3.4 increase in species disturbance (e.g. resulting in species behavioural change, increased conflict with humans such as from crop-raiding)	Change in animal behaviour due to human interventions
4.1 soil erosion by water or wind (including landslides)	Erosion of soil due to flash floods, winds and heavy rains
4.2 decrease in soil structure e.g. through compaction or loss of soil organic matter (also including hard pans)	Increase of soil compaction at the depth of 9 inches from surface and decrease in Organic matter like earth worms and Organic carbon content
5.1 decrease in nutrient status, acidification or altered soil pH (e.g. through significant use of agrochemicals/inorganic fertilizers)	Reduction in soil nutrition due to excessive use of chemical pesticides and fertilizers.
5.2 salinization	Soil salinization due to Electrical Conductivity (EC) and high usage of fertilizers.
5.3 decrease or loss of soil species (including beneficial pest predators, detritivores etc)	Soil Quality degradation leading to loss of farmer friendly species
6.1 loss, conversion, change in aquatic habitat (e.g. through waterbodies being filled in/ dams or building water channels)	Decrease of waterbodies due to encroachment of tanks. Siltation due to soil erosion.
6.2 loss or lack of watercourse buffer (e.g. natural forest or vegetation along a river)	Reduction in natural buffer length due to encroachment resulting in negative impact to water body
6.3 decline in water flow / quantity / water table (e.g. due to increase in siltation, groundwater extraction)	Scarcity of irrigation and drinking water.
6.4 increase in water flow (e.g. flash flooding)	During unexpected cyclonic rains, the flow of water from top elevated areas to the rivers increases causing flash floods and resulting in crop loss.
7.1 reduction in water quality (e.g. through surface pollution, siltation or eutrophication (nitrates))	Water contamination due to surface run-offs or other sources of pollution
7.2 groundwater pollution	Contamination of ground water either through surface contaminant or due to surrounding rocks as the depth increases.
8.1 decrease/disturbance in native aquatic species e.g. through hunting / collection / fishing	loss of native aquatic species
8.2 increase or spread of invasive aquatic species	Increase on newer species which compete with native breeds
8.3 loss of beneficial aquatic species e.g. pest predators / species used or valued by community	Aquatic species like turtles, snails, frogs have come down due to siltation of tanks, drying up of water in the water bodies.

Maximum impact score (9)

Maximum Dependency score (9)

### **What this tells us about farm-level and landscape-level sustainability**

In farm level workshops farmers mainly concentrate on farm sustainability and mainly focus on productivity by using hybrid seeds, fertilizers and pesticides. Biodiversity and ecology are mostly ignored in farm level approach which covers farm sustainability through conservation of biodiversity and ecosystem services.

Landscape approach was an eye-opener in which risk to biodiversity and ecosystem services are given top priority for sustainability of farms. It also gives an opportunity to minimize the risks to biodiversity and ecosystem services it also helped in following:

- ✚ Landscape biodiversity is important for agriculture sustainability;
- ✚ Decline in water is linked to deforestation;
- ✚ Depletion of soil health and soil biodiversity due to use of inorganic fertilizer and pesticides;
- ✚ Link between livestock and soil health;
- ✚ Water scarcity due to anthropogenic pressure;
- ✚ Extinction of traditional seeds and introduction of BT and Hybrids in the area;
- ✚ Reduction in productivity;

### **What worked well in the BROA process?**

- ✚ The entire landscape approach wherein practices outside farms are also viewed and worked with.
- ✚ The scoring system is very well defined and gives clear direction to team on areas to focus/work.
- ✚ The identification of root cause and methodology of doing the same through the tree diagram approach gives the team clarity and simplifies the problem at hand.

### **WHAT WAS CHALLENGING IN THE PROCESS?**

- ✚ Identification of an appropriate conservation partner for the project.
- ✚ Details about specific requirements that is needed in a conservation partner could be elaborated further.
- ✚ Limitation of BROA to only environmental factors and not considering social or economic aspects of sustainability.
- ✚ Understanding the commercial value that BROA brings. This in particular becomes critical for acceptance and long term implementation.
- ✚ To get the secondary data.
- ✚ To get GIS maps of the area.

### **SPECIFICS OF HOW THE RAINFOREST ALLIANCE CERTIFICATION STANDARD WAS APPLIED IN THE SPICES REGION**

- ✚ Rainforest Alliance is a third party certification confirming that an entity complies to the laid down requirements. Although having a farm based approach (Where the farmer's house, other crops grown, cattle as well as the crop certified) the limitation is only to the farmers we certify. However, in BROA landscapes are generally chosen

in a way that various interaction factors amongst the community is also considered in the study.

- ✚ Rainforest Alliance (RFA) is primarily driven through customer requirement. It is a verification of already implemented activities and one gets the same only after achieving a basic benchmark. However, BROA is similar to self-certification which could be a prelude to RFA. Initial development and activities could be undertaken based on this study.
- ✚ Rainforest does include social as well as economic aspects however BROA limits itself to environmental factors.

## ACKNOWLEDGEMENTS

### Background

**Earthwatch:** Earthwatch is a not-for-profit organisation with a mission to engage people in scientific field research and education to promote the understanding and action necessary for a sustainable environment. The organization aims to work with leading scientists, academic & research institutions and community based organisations to help support long-term scientific field research to understand the most pressing environmental issues and in the process take positive actions to create a sustainable environment.

Earthwatch is one of the institutions that developed the BROA Tool, and provides training and support to companies that adopt BROA, including ITC.

**BROA:** Biodiversity Risk and Opportunity Assessment (BROA) is a tool that has been developed for businesses with agriculture supply chain. It is a participatory tool that takes into account landscape approach and helps the businesses to identify their dependencies and impact on biodiversity and ecosystem services and also gives them the opportunity to take actions and minimize the risks. The tool can also be used for planning of projects related to biodiversity and ecosystem services or any project that may impact the biodiversity and ecosystem services. It can also be used to analyse the impact of any development project on biodiversity and ecosystem service.

### ITC: ITC Private Limited

ITC is one of India's foremost private sector companies with a market capitalisation of US \$ 45 billion and a turnover of US \$ 7 billion. ITC is rated among the World's Best Big Companies, Asia's 'Fab 50' and the World's Most Reputable Companies by Forbes magazine and among India's Most Valuable Companies by Business Today. ITC ranks among India's '10 Most Valuable (Company) Brands', in a study conducted by Brand Finance and published by the Economic Times. ITC also ranks among Asia's 50 best performing companies compiled by Business Week.

Today ITC is one of the country's leading FMCG marketer, which is into Paperboard and Packaging industry, a globally acknowledged pioneer in farmer empowerment through its wide-reaching Agri Business, the second largest Hotel Chain in India and a trailblazer in 'green hoteliering'. ITC Infotech, a wholly-owned subsidiary, is one of India's fast-growing IT companies in the mid-tier segment. This portfolio of rapidly growing businesses considerably enhances ITC's capacity to generate growing value for the Indian economy.

ITC's Agri-Business is one of India's largest exporters of agricultural products. The ITC Group's

contribution to foreign exchange earnings over the last ten years amounted to nearly US\$ 6.0 billion, of which agri exports constituted 57%.

## **The ITC growing regions**

### **The Spices region**

ITC Spices take pride in having one of the largest captive cultivation programmes in India for chillies – IPM Chillies (Pesticide Residue Free), spread in the states of Andhra Pradesh and Karnataka, trials in Paprika, varietal trials covering a range of attributes and organic chilli cultivation. The IPM Chilli programme, into its fourth year, is one of the most popular programmes across its global customer base, especially the European, American, Japanese and South African markets.

### **A review of the Rainforest Alliance certification standard**

Specifics of how the Rainforest Alliance certification standard was applied in the Spices region (if possible): One of the achievements of ITC spices is the certification from Rainforest Alliance. Rainforest alliance certification is a farm based approach which takes into account ecological as well as social issues i.e., farmer details, their age, wage, etc. Based on the 100 criteria of Rainforest Alliance, survey in the chilli farms was conducted by ITC on the basis of which the certification was allotted. It is a valuable certification as far as value chain is concerned and has helped ITC in getting its product recognition and moves them globally.

## **A REVIEW OF THE BROA PROCESS**

### **A narrative record of the process of how BROA was implemented in the Spices Region**

In order to roll out BROA in the spices landscape, a conservation partner Rakshana was recruited by ITC to generate secondary data and conduct field based survey. Information and secondary data required for BROA implementation was gathered by the designated ITC staff. ITC crop development team provided the data listed under table 1. Secondary data was available only for the villages in which ITC operations were active. Conservation partner, an NGO based in AP, 'Rakshana' was recruited by the ITC to carry out the implementation work. Conservation partner collected the village-level secondary data of the district in which BROA sites were located. ITC-BROA team prepared a stakeholder map in consultation with conservation partners.

Stakeholder meeting was held on 3<sup>rd</sup> and 4<sup>th</sup> April in Bhadrachalam and Gudupalli respectively. ITC team and conservation partners met before the stakeholder meetings to define the role of moderators. The team was instructed to ask non-leading questions. Two of the ITC team members took on the role of documenting discussion the stakeholder meeting and keeping a note of topics from the checklist. The group consisted of farmers from the villages, irrigation department officials, agriculture department official, village *panchayat* members. There were also two plant taxonomists from Kakatiya University to record biodiversity aspect in the discussion.

Expert from conservation partner gave a detailed introduction on BROA and objectives of this meeting. He talked about the how agriculture is closely linked with biodiversity and particularly how maintenance of biodiversity can help in ground water restoration, pest control etc. Following questions were posed to the groups of stakeholders.

- a) What is the impact of chilly cultivation on the water, terrestrial and soil?
- b) What was the state of land before they began chilly cultivation?
- c) Has there been change in agriculture?
- d) What is the change?
- e) Has there been change in crop variety?
- f) Has there been a change in climate and rainfall? And Why?

After the stakeholder meeting, ITC team and Conservation Partner completed the mandatory risk table based on secondary data and discussion with stakeholders. After completion of the mandatory risk table, four teams were formed for field level data collection. Earthwatch Institute representative also visited the field to monitor the process. After a thorough field survey the risk table were revisited by the team and all the observations were noted on BROA working table.

On 5<sup>th</sup> April 2014 to understand the data requirements for the further prioritizing risks and explore opportunities and collect the information which will aid in drafting action and monitoring plans. A meeting with farmers in place of questionnaire survey was conducted to discuss the specific impacts, and willingness to involve in action plans. This meeting was conducted on 12<sup>th</sup> May 2014 in which nine progressive farmers practicing spices production were present in the meeting.

After completion of all the field work, ITC BROA team along with representatives from crop development team, conservation partners discussed each of the risks in detail and for each of the risks, causal factors were identified and categorized into primary/secondary ultimate cause. For each risk filter dependency and impact of the business was projected by the tool. This was done in the presence of Earthwatch Representatives.

Risks that could be addressed by ITC were taken to action and monitoring table and a detail action plan was prepared for each of the risk. The other risks identified as part of the exercise should be addressed by other stakeholders working in the landscape.