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# Trans-boundary Pests and Diseases: A threat in Agriculture

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## Abstract

Food security is one of the most critical issue for humanity as well as agricultural production. The threats analysed were environmental degradation, climate change and diseases and pests of animals and plants. Transboundary diseases contribute substantially in pest and disease-induced global food loss which is approximately 1/3<sup>rd</sup> of annual food production. Some of Important transboundary diseases & pests are Brown Streak virus, banana bunchy top disease, greening disease of citrus, Powdery rust of coffee, Soybean downy mildew, Blue mold of tobacco, rust of maize, locusts, armyworm, fruit flies, cassava diseases and wheat rusts are among the most destructive transboundary plant pests and diseases. So as a protective measure, a country must have suitable contingency plans to respond quickly to high threat diseases. This could only be achieved by timely application of scientific technology for rapid response.

## Introduction

Transboundary diseases are those epidemic diseases which are greatly contagious, transmissible, rapidly spread irrespective of national borders, and causing serious socio-economic and possibly public health consequences (Otte *et al.*, 2004). Transboundary diseases contribute substantially in pest and disease-induced Global foodloss which is approximately 1/3<sup>rd</sup> of annual food production. The world, and more specifically the Asia-Pacific region, faces severe threats from a number of diseases that occur as epidemics or are endemic across national boundaries. Transboundary diseases not only adversely affect agricultural productivity but also contribute to poverty and hunger, particularly of smallholding agricultural producers, and act as barriers to trade. It affects food crops, causing significant losses to farmers and threatening food security. This expansion will continue to result in huge financial losses and require large eradication programmes and control measures. Among the major occurrences, the spread of coffee leaf rust throughout the world, soybean rust into the Americas, and citrus tristeza virus in South and Central America and now in the Mediterranean. In addition, unforeseen emergence of “new” diseases and pests has been relatively common. Climate change is creating new ecological platform for the entry and establishment of pests and diseases from one geographical region to another (FAO, 2008). Several new transboundary diseases emerge, and old diseases reemerge, exhibiting increased chances for unexpected spread to new regions, often over great distances. Climate change may also result in new transmission modalities and different host species. Some of Important transboundary diseases & pests are Brown Streak virus, banana bunchy top disease, greening disease of citrus, Powdery rust of coffee, Soybean downy mildew, Blue mold of

tobacco, rust of maize, locusts, armyworm, fruit flies, cassava diseases and wheat rusts are among the most destructive transboundary plant pests and diseases. So as a protective measure, a country must have suitable contingency plans to respond quickly to high threat diseases (Basagoudanavar and Hosamani, 2013). This could only be achieved by timely application of scientific technology for rapid response. Thus, it's a big challenge in managing and controlling transboundary diseases without collective and collaborative action between neighboring countries.

## Factors Incite Transboundary Pests and Diseases

**F**actors that affect the entry, establishment and spread of pests and diseases are-Globalization, Human population growth, Ecosystem diversity, function and resilience, Industrial and agricultural chemical pollution, Land use, water storage and irrigation, atmospheric composition, CO<sub>2</sub> and oceanic acidification by carbonic acid, Species interactions with hosts, predators and competitors, and Trade and human movements. These factors are not independent of each other and climate change interacts with each of them.

## Mode of Transmission of Transboundary Diseases

Pests and diseases spread in three principal ways:

- Trade or other human-migrated movement
- Environmental forces – weather and windborne
- Insect or other vector-borne – pathogens

## Transboundary Diseases and Food Security

**F**ood security is defined as “When all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life” (World Food Summit, 1996). The devastating effects resulting from diseases and pests introduced along with international movement of planting material, agricultural produce and products are well documented. The historical Irish famine of 1845, caused by late blight of potato introduced from Central America; coffee rust introduced in Sri Lanka in 1875 and its subsequent introduction in India in 1876; fluted scale on citrus introduced from Sri Lanka in 1928; San Jose scale on apple introduced into India in 1930s; bunchy top of banana introduced from Sri Lanka in 1943; the dreaded Golden

nematode infesting potatoes introduced in 1960s from the UK and the noxious weed *Lantana camara* introduced in 1809 from Central America are glaring examples that clearly demonstrate that introduction and establishment of quarantine pests including weeds into new areas can severely damage the crop production and economy of a region/country. Animal and plant pests and diseases and alien invasive aquatic species reduce food access through reduction of income from animal production, reduction of yields of food and cash crops, reduction in forest productivity, changes in aquatic populations as well as increased costs of control.

## Transboundary Diseases in India Perspective

**I**t is not the first time a pathogen/pest from overseas has caused agricultural losses in India. India has experienced many other serious instances of pest-pathogen infestation. Environmental factors and global warming be responsible for the acclimatization of invasive pests to newer geographies. Insects are ectothermic, which means their caloric needs and metabolism depends on the external air temperature. When the climate warms, their metabolic rate accelerates which, in turn, makes them hungrier.

## Measures for Trans-boundary Diseases

**T**ransboundary diseases and pests management requires utmost cooperation amongst the neighbouring countries. Regional co-operation needs to be emphasized. Focus has to be on identifying the transmission mechanisms of trans-crop pathogens and developing multiplex diagnostics and diagnosis for ease surveillance and preparedness without wasting time. Quarantine and trade of exotics and seed materials. Existing surveillance programmes need to be reinforced.

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