

Hailstorm Induced Crop Losses in India: Some Case Studies

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I. INTRODUCTION

Weather related natural disasters are becoming increasingly disruptive both in developed and developing nations. India being mainly an agriculture oriented economy whose growth purely depends on the vagaries of the weather particularly the extreme weather events like hailstorms. The damage appears to be a function of the intensity and duration of storms and the size of the hailstones, which these produce. Hailstorm is localized natural calamity does a great deal of damage to crops and the associated losses run into hundred of millions of dollars annually. While hailstones have been found weighing as much as 0.75 kilograms (1.67 pounds), even much smaller hail can destroy crops, slicing corn and other plants to ribbons in a matter of minute (Fig 1). Precipitation of condensed atmospheric moisture in the form of small bolls or pieces of ice having diameter more than 5 mm

is termed as hail. The ice pieces may be of different polygonal shapes i.e. trigonal, pentagonal, hexagonal etc. The size of hail is sometime very large i.e. 50 mm or more, depending upon the upthrust within the cloud in which hail formation takes place. Cumulonimbus clouds are mainly associated with hailstorms. Hail is most destructive form of precipitation. Hail structure resembles to that of onion. It consists of concentric layers of ice with layer of snow in between. The damage itself is often produced not only by the impact of falling hailstones, but also by the high winds and torrential rains associated with hailstorm. One of the most notorious regions for large hail is northern India during winter season which have reported more hail-related losses than anywhere else. Some of the case studies pertaining to hailstorm induced losses in Indian context have been discussed here.

II. SOME CASE STUDIES

In India, the cropped area of 0.46 million hectares in the states Haryana, Punjab, Himachal Pradesh, Rajasthan, Uttar Pradesh, Maharastra and Andhra Pradesh was badly hit during the year 1994-95 (Anon 1995).

Again during 1995-96, the hailstorms damaged standing crops in an area of about 0.74 million hectares in the above states of India (Anon 1996)..

In 1997-98 the states affected were the same but the hailstorm was much more devastating and caused damaged in about 1.2 million hectares of cropped area. In 1998-99 the area affected by hailstorms was much larger (2.9 mha) in aforesaid Indian states (Anon 1999)..

During 5-8 January 2002, many parts of Karnataka state were lashed by hailstorm and the estimated loss suffered by the farming community was around Rs 27.5 Crores (US \$ 0.61 million).

In the state of Orissa about 375 villages during the year 2005 were severely affected due to hailstorms and whirlwinds. Thus, a whopping budgetary allocation was made for disbursement of House Building Assistance, providing Input Subsidy to the affected farmers sustained crop-losses and repair/restoration of public utilities damaged due to these hailstorms/whirlwinds (Anon 2006)..

In Andhra Pradesh, hailstorm caused a huge agricultural lose in 77 thousand hectares area in the 2005-06 was damaged and about US \$ 1.6 millions were released as the compensation to the farming community to cope up with the calamity. The state of Madhya Pradesh was badly hit during 2-14 March

2006 by heavy hailstorm in causing wide spread damages to standing winter crops. The State Government sought a federal assistance of about (US \$ 14.62 millions from National Calamity Contingency Fund (NCCF).

During February, 2007, most parts of the state of Rajasthan in NW India were badly hit by hailstorm and authorities announced a relief package of US \$ 3.78 millions for the hailstorm affected farmers.

Very recently (March, 2007), heavy rains accompanied by hailstorm damaged wheat, sugarcane and oilseed crops in thousands of hectares in Punjab and Haryana (Fig 1). The estimated loss ran into billions of rupees. And crops were severely damaged in 50,000 hectares of land (Anon 2007).

III. CONCLUSIONS

The phenomena of climate change, global warming and extreme weather events have focused the attention of scientists, policy makers and general public in recent times. In recently released AR4 on climate change (IPCC, 2007), there are apprehensions of increasing extreme events like hailstorms etc. Monitoring of such events will be of immense use for impact assessment studies and adaptations under anticipated climatic variability scenarios. These studies will help in strategy adoption and relief measures to be undertaken by different agencies for sustainable development particularly in agrarian based economies like India.



Figure 1. Hails and damaged standing crop in a recent hailstorm in India

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