

Development and Evaluation of Indigenous Anti-Hail Guns



Problem Statement: Himachal Pradesh (H.P.), known as the fruit basket of India, has a variety of fruits and vegetables. However, many crops are damaged every year, as this area comes in a heavy hailstorm zone. So the researchers have indigenously designed an anti-hail gun to stop/minimise the effects of hailstorms, protect the crops, and maintain the quality of the crop.

Uniqueness of the solution: Strong shock waves sent through the anti-hail gun reach up and mix the positive and negative charges of the clouds, creating a neutralised zone within the cloud. This prevents the cyclic movement of water droplets and eventually prevents the formation of hails by stopping the droplets from freezing. The gun operates on LPG, making it cost-effective and eco-friendly compared to other gases. The maintenance cost is also low. The few imported anti-hail guns currently operating in an upper area of H.P. are costly, costing around INR 70 lakhs to

1 crore (including import charges). The proposed indigenous anti-hail gun will cost approximately INR 15 lakhs.

Current Status of Technology: The researchers created a prototype of an Anti-Hail Gun at the IIT Bombay Aerospace department Lab. A fully functional anti-hail gun, made on a larger scale, is installed at Krishi Vigyan Kendra, Kandaghat, District Solan (H.P). Experimental data is being captured, and several parameters have been changed to improve its efficiency to generate a strong shock wave at a minimum fuel/air mixture and to minimise the pollutants.

Societal Impact: The anti-hail gun helps farmers protect their crops from hail damage and save much money as it can cover a large area. The development of the anti-hail gun will also generate employment for the local people and the industry, helping to generate revenue through export. Currently, farmers use plastic anti-hail nets as a hail protecting

method, but they are costly and harmful to the environment due to the use of plastic. The new anti-hail gun will be a cost-effective alternative for hail protection methods. The product will be in high demand in H.P. and Jammu & Kashmir region.

Patent(s): In progress

Relevant Industries: Manufacturing, Aerospace, Environment.

Faculty: Prof. Sudarshan Kumar, Aerospace Engineering.