

## **The King and the Cloud – the story behind the Royal Rainmaking Project**

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Droughts have always prevailed in the plateau of Isan, the Thai nickname for the northeastern region of Thailand, where almost half of its population are farmers. Dependent on rainfall to sustain their crops, farmers would traditionally gather at the beginning of the wet season to shoot homemade *Bang Fai* rockets to the sky to ask the weather god to release the monsoon upon the earth. According to folklore, the higher and louder the rockets blast into the sky, the better. The deity will likely be more pleased with the offering and allow plentiful rainfall for the season's harvest.

On 14 November 1955, His Majesty King Bhumibol Adulyadej The Great travelled through the dried-up Isan region during a royal visit. The then 28-year-old monarch noted the effects of water deficiency in the area, which caused low crop yields and subsequently, the people to suffer from chronic poverty and malnutrition. When the young King looked up to the sky in hope of finding a solution, he noticed that the weather was cloudy, yet it did not result into precipitation. As every cloud has a silver lining, literally, King Bhumibol found one while watching the clouds - an idea of how to draw droplets from the clouds onto the farmlands.

“The idea of artificial rain came to me since 1955 when I visited Isan during the month of November. It was cloudy, yet the drought still persisted. So I had two ideas in mind. First was to build check dams, and second was how to bring the water from the clouds. Then I recalled that I had heard about rain-making before. Later, I mentioned it to Mom Rajawongse Debariddhi [an expert in agricultural engineering] that I have read from the books that it is possible to make artificial rain.” - (His Majesty King Bhumibol, interview with public officers from the Office of the Royal Development Project Board, 17 March 1986)

Having shown keen interest in science from a young age, the King was equipped with knowledge on technological research from his enrolment at the Faculty of Science at the University of Lausanne. After 14 years of research on meteorology and weather modification, the first experiment in making artificial rain was attempted on 1 July 1969. It was quite a remarkable success. After the fleet of aircraft had distributed dry-ice flakes over the top of the clouds, it started to rain within 15 minutes. This operation marked the dawn of what is now acknowledged by Thais as “The Royal Rainmaking Project”.

Since then, the project has gone through a series of transformations to perfect the artificial rainmaking process. His Majesty King Bhumibol recognized that a sufficient amount of moisture is crucial for rainmaking to be successful. Therefore, a new chemical formula was invented to maximise the humidity level for different types of clouds. The current technique of rainmaking now involves three processes. First, “agitating”, or to activate cloud formation by using salt and other chemical substances to accumulate humidity. Second, “fattening,” or to stimulate the accumulation of droplets in the cloud by scattering calcium chloride, and lastly “attacking,” to initiate rainfall from the heavy clouds by adding a mixture of salt and urea.

The project later manifested into the establishment of the Bureau of Royal Rainmaking and Agricultural Aviation in 1992 under the supervision of the Ministry of Agriculture and Cooperatives. The rainmaking technique, however, is exclusive to Thailand. In 2001, King Bhumibol received recognition for the Royal Rainmaking Project from the EUREKA organization “for an invention that is beneficial to the world.” In 2003, King Bhumibol was granted a patent for weather modification from the European Patent Office. Ever since the invention caught the attention of the international community, many countries have sought cooperation with Thailand to apply this know-how in addressing their own drought problems. Jordan, for instance, was granted the use of the rainmaking technique in 2009, through an MOU for training and technology transfer. Other countries who have sought cooperation include Mongolia, Sri Lanka, Indonesia, Australia, and the Philippines. In Thailand, 14 November is now celebrated as “Father of Royal Rainmaking Day” to commemorate the day that inspired this invaluable initiative that has benefitted many countries around the world.

Even 50 years since the birth of the Royal Rainmaking Project, the operation still remains very much active today. There is no need to rely on weather gods, when citizens can submit a request for rain where needed, and rain shall be granted. The project enables Thai farmers to harvest without disruption, and to fill hydroelectric dams to help fulfill the increasing demand for electricity.

In 2013, the Bureau of Royal Rainmaking and Agricultural Aviation was upgraded to become the Department of Royal Rainmaking and Agricultural Aviation due to the significance of its mission and expanded responsibilities. In 2019, the Department conducted 1,673 rainmaking operations across the country. Almost 89 percent of the flights were successful, producing rainfall over 63 million hectares of forest, agricultural area, and reservoirs. The downpour of rain has increased the amount of water reserves by 2,595 million cubic metres. Still, the demand of artificial rain is expected to rise due to air pollution problems and the effects of global warming, and the Department is now exploring the use of rockets to help scatter the rainmaking substance over the cloud.

Today, under the guidance of His Majesty King Maha Vajiralongkorn, the legacy of the Royal Rainmaking Project continues to live on. Following in his father’s footsteps, King Vajiralongkorn has also initiated various irrigation projects to address drought, such as the construction of six reservoirs in the western province of Ratchaburi, and the development of canal systems, check dams, and levees to assist farmers in the deep south of Thailand. This is one of the many testimonies of the vision, continued dedication, perseverance, and ingenuity of the monarchs in the Chakri Dynasty watching over the Thai people and the country.

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