

Water Quality Assessment of Rain Enhancement Program in Thailand

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Abstract

Thailand is known as agricultural country as most of people are farmers who need the sufficient water for crop growth and development. Formerly, farmers only rely on natural rainfall. Unfortunately, the start of rainfall is delayed in some years and there is no rain for some months even during rainy season. This prolonged dry spell affect the living and agricultural production. Royal Rainmaking Project is one of His Majesty the King Bhumibol Adulyadej's initiative projects. HMK Bhumibol devoted himself to alleviate the suffering of his subjects and farmers who lacked water for consumption and agriculture.

The Royal Rainmaking is the weather modification technology of which the technique is to disperse substances into the air that serve as cloud condensation or ice nuclei, which alter the microphysical processes within the cloud which then becomes raindrops. The seeding chemicals were sodium chloride (NaCl), calcium oxide (CaO), calcium chloride (CaCl₂), urea (CO(NH₂)₂), dry ice (CO₂) and silver iodide (AgI). A usage of various dosages of salt contents causes the hypothesis of the effect on water quality. This research is focused on assessment of physical and chemical characteristics of rainwater quality with 20 parameters: color, pH, conductivity, total dissolved solids (TDS), hardness, acidity, alkalinity, chloride (Cl⁻), nitrate (NO₃⁻), nitrite (NO₂⁻), sulfate (SO₄²⁻), ammonium (NH₄⁺), magnesium (II) ion, calcium (II) ion, chromium (Cr), iron (Fe), copper (Cu), silver (Ag), lead (Pb) and mercury (Hg) which are all conducted toward monitoring and surveillance of rainwater quality resulted from the royal rainmaking operations. This rainwater is used for consumption and agriculture.

The 120 samples of rainwater from 7 stations during March to October 2015 were collected all over the country for research examination. It has been declared to 47 samples (39%) of rainmaking and 73 samples (61%) of natural rainwater. Outstandingly, the result of research revealed that testing parameters of the averaged water quality from rainmaking and natural rain samples conform to benchmark of the recommended figures by World Health Organization (WHO) Guidelines for Drinking-water Quality (2011) and Food and Agriculture Organization of the United Nations (FAO). Researchers have continually followed and monitored water quality surveillance system with the ongoing operation with an aim to ensure that people can get access of good quality of water for the consumption and agricultural use.

Keywords: Royal Rainmaking project, artificial rainmaking, weather modification, water resources management, water quality assessment