



Burning Issues

Thinking for more effective fire management

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Cloud seeding and Forest Fires

At various times “seeding” clouds to make rain and assist in fighting fires has been suggested. In 1997/98 during the very extensive and expensive fires in Indonesia this suggestion was taken up. In recent times interest in the approach had been expressed at various levels of government and elsewhere.

To support discussion and decisions on this aspect of weather modification this information note summarizes some of the history and explains the basis for cloud seeding. Considering the information gathered it is evident that Cloud seeding to increase rain remains scientifically uncertain and in no way should seeded clouds be considered as a fire-fighting tool. The high costs of cloud seeding will be more effective if the money is invested in fire prevention activities and the application of sound land-use and fire management planning principles in fire-prone areas.

Historical Background

Weather modification, of which cloud seeding is an element, has been researched since the 1950s. The various projects have been undertaken around the world, South Africa, South East Asia, Israel, Canada and Australia

with most effort in the United States. While there are some continuing programs the results have not been conclusive. Some researchers and water resource managers (not fire managers, since the technique has never been seriously considered for combating fires) believe that the results so far are inconclusive.

Where is Cloud Seeding Used for Fire Suppression?

An example of where and when cloud seeding has been used for fire suppression is during the 1998 fires, when the Indonesian government spent about US\$ 941 000 on cloud seeding efforts, using Transall and Cassa planes. Then, one day operational costs for a Transall plane were US\$ 4,000 and US\$ 2,500 per day for a Cassa type plane. The Indonesian cloud seeding program has stopped because of high costs. Meanwhile the Malaysian government just recently announced that it is looking into using rockets to generate rain and has posed a request with a Russian company to develop this technology. Presently planes are used to drop cloud seeding chemicals. Malaysia uses cloud seeding to bring about rain in places hit by drought or affected by air pollution and low visibility. According to the Malaysian government, using rockets will allow fire fighters to douse difficultly accessible large-scale fires from far

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“It may not make rain and will not put out fires.”

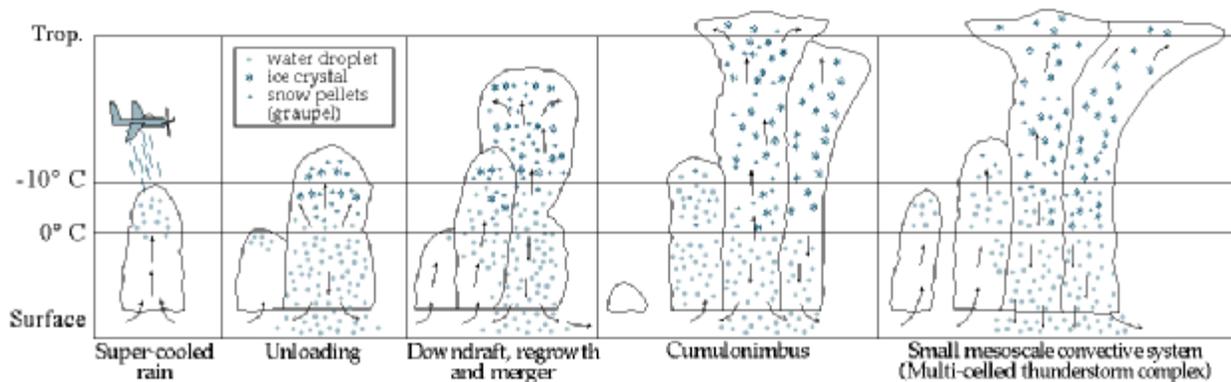
Dr. Peter F. Moore

distances. While this ‘remote fire control’ scenario may sound compelling, one has to remember that cloud seeding certainly needs natural pre conditions, which would allow it to work, which means rain clouds to be seeded and high humidity. However, during ‘normal’ dry years and even more so during El Nino years, which are the main fire years, clouds discharge the rain they carry over the Pacific before reaching Southeast Asia. Therefore air humidity is low and rain clouds scarce. This means that, even if cloud seeding technology were proven to work, the very meteorological conditions leading to forest and land fires in Southeast Asia would make cloud seeding difficult.

of water means that droplets do not freeze. Freezing temperatures are required for water to crystallize when additional particles are introduced, that is the cloud is “seeded”. To seed a cloud silver iodide compounds or frozen liquid carbon dioxide, “dry-ice” are dropped from airplanes or shot up into the clouds. The water freezes onto the particles, until they gain weight and fall. Cloud seeding is intended to increase the number of particles for water to freeze onto and speed up the change from water vapour into droplets (rain or snow). Cloud seeding to increase rain remains scientifically uncertain. New technologies may improve the measurements of researchers but improved data appears unlikely to alter the current understanding that cloud seeding is not a guarantee of rain. Varying opinion on cloud seeding can be identified and discussion continues

How Cloud Seeding Works

Clouds consist of small droplets. The lack of foreign particles and the purity



Source: George Bomar, Texas State Meteorologist and Texas Water Resources Institute

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Cloud seeding is not the answer to forest fires

In no way should seeded clouds be considered as a fire-fighting tool. The high investment required for cloud seeding will be more effective if the money is used for fire prevention activities and the application of sound land-use and fire management planning principles in fire-prone areas.

HOT FACTS

- § Research over 50 years has identified that conditions suitable for cloud seeding are infrequent.
- § Demonstrating that cloud seeding has made a significant difference to rainfall has proved difficult.
- § Cloud seeding convective clouds (e.g. storm clouds) in some cases may have reduced rainfall.
- § There is no control over where rain falls from a cloud that is seeded.
- § Cloud seeding can be regarded as "marginal technology"
- § Cloud seeding has been considered for breaking droughts, increasing rainfall and in one series of experiments to reduce lightning (and therefore fires). Its supporters have never identified it as a fire fighting method.

Further reading

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Project FireFight Southeast Asia is seeking to secure the essential policy reform at national & regional level within South East Asia that provides a legislative and economic basis for controlling harmful anthropogenic forest fires.



IUCN – The World Conservation Union seeks to influence a just world that values and conserves nature. It seeks to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable.



WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature. One focus is on forests and WWF works with its partners to protect, enhance and restore them through its national offices and programmes in the South East Asia and across the world.



The European Commission through its programs and projects throughout the world, and particularly in South East Asia the EC-Indonesia Forest Program, seeks to improve understanding and intensify relations between the EU and its partner nations in pursuit of mutual interests and cooperation in fields such as trade, development, science, education, human rights and culture.



The Centre for International Forestry Research (CIFOR) contributes to the sustained well-being of people in developing countries, particularly in the tropics, through collaborative strategic and applied research and related activities in forest systems and forestry, and by promoting the transfer of appropriated new technologies and the adoption of new methods of social organization of national development.



The International Centre for Research in Agroforestry (ICRAF) aims to reduce rural poverty, increase food and nutritional security and enhance ecosystem resilience in the tropics through improved agroforestry systems.

For more information or back issues, please contact:

Burning Issues
Project Officer
Project FireFight South East Asia
Phone: (+62) 251 622-622
Fax: (+62) 251 622-100
Email: nhaase@cgiar.org or visit: <http://www.pffsea.com>

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Contributors

This brief was developed with contributions from Dr. Peter Moore and Nina Haase of Project FireFight South East Asia.