

MORE RAIN AND LESS HAIL IN
SOUTHWEST ALBERTA PROJECT

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Further indications of more rain with less hail during the six-week rain-increasing project south of Calgary in the summer of 1977 (Bishop, 1978) are found from analysis of (1) monthly rainfalls during the preceding seven summers and (2) hail insurance records for the preceding five seasons. In the project, 25.6 kg of AgI were released during 1.382 hours of operation of the 36 generators. Further details were given last year (Bishop, 1978).

Although the project ran from 6 July through 17 August, 1977, for convenience July and August have been considered seeded, May, June and September unseeded. Official rainfall figures collected by Environment Canada for 12 stations inside the 3.2 million acre target and for another 36 "control" stations around it were averaged separately for each of these periods during each summer (Table 1). The ratio of average target to control rainfalls in non-seeded periods in each year was applied to the average control rainfall during the seeded period to predict the target area rainfall expected in the absence of seeding.

In the preceding six years, with no seeding, the actual July-August rainfall in the target area was 0 to 25% greater than the predicted value, but in 1977 the target received 62% more rain than predicted from the 1977 ratio. Similar increases of 60% for the actual six-week operational period had been inferred from official daily rainfall records, and of 54% for the seven weeks including the operational period from weekly totals at grain elevator gages (Bishop, 1978). When the 7-year average May-June-September rainfalls in the target and control areas (1.03) is used instead of the 1977 ratio (0.89), the rainfall during the operational period is $3.19 / (2.22 \times 1.03) = 1.40$, or 40 percent more than predicted. Although no statistical significance can be attached to the apparent increase, it was quite gratifying to the farmers who paid \$10 per quarter-section for the project.

At the same time, much less hail was reported in the target during the project. Records of the Alberta Hail and Crop Insurance Corporation show that in the 25 southernmost rows of townships, during the five years, 1973 to 1977, 336 townships had claims totalling \$1,000 to \$10,000 while 223 had claims ranging from \$10,000 to \$100,000 and 18 were still greater, up to \$325,000. In contrast, during the six-week 1977 project, covering about 1/5 of these 25 southernmost rows, only 2 of the 133 townships had any damage claims while 18 had such claims during the two weeks before and two weeks after the project (Table 2). The loss-risk ratio before and after the project was 6.5%, while during the seeding it was only 0.45%, again without statistical significance but of considerable satisfaction.

Table 1

Observed Precipitation (inch) in Target and Surrounding Control Areas of Southwestern Alberta Project, with Estimated Target Precipitation and Apparent Percentage Increase from Seeding.

<u>May + June + September</u>				<u>July + August</u>			
<u>Year</u>	<u>Control</u>	<u>Target</u>	<u>Ratio</u>	<u>Control</u>	<u>Target</u>	<u>Pred.</u>	<u>Incs.</u>
1971	5.16	5.89	1.14	2.83	3.23	3.23	0
1972	4.49	4.02	0.90	3.65	3.77	3.25	+16
1973	5.44	4.88	0.90	3.66	3.50	3.29	+ 6
1974	4.41	4.80	1.09	2.99	4.08	3.26	+25
1975	7.81	8.13	1.04	2.80	3.60	2.91	+24
1976	4.90	6.33	1.29	4.70	6.11	6.06	+ 1
1977	7.42	6.61	0.89	2.21	3.19	1.97	+62
<u>Avg.</u>	<u>5.66</u>	<u>5.81</u>	<u>1.03</u>	<u>3.26</u>	<u>3.93</u>	<u> </u>	<u> </u>

Table 2

Crop Hail Insurance Record for Target Area of Southwestern Alberta
Cloud Seeding Project, 1977

	<u>Number</u>	<u>Coverage</u>	<u>Claims</u>
Townships with insured crops	133	\$21,871,164	- - - -
Townships with before or after claims	18	3,713,084	\$225,073
Townships with claims during project	2	521,500	2,382

REFERENCE

Bishop, James T., 1978: Six Weeks of Seeding in Southwest Alberta.
J. Weather Mod. 10, 51-53.