

MEMBERS PRESENT: Chairman Hickey
Vice Chairman Rackley
Mr. Banner
Mr. Dini
Mr. Horn
Mr. Kovacs
Mr. Sader
Mr. Marvel
Mr. Redelsperger

MEMBERS ABSENT: . None

GUESTS PRESENT: Bob Erickson, Senior Researcher
Jac Shaw, Nevada Division of State Lands

Chairman Hickey called the meeting to order at 2:08 P. M. and announced the purpose of the meeting was to organize the committee and adopt the Committee Rules.

Mr. Hickey explained that the meetings will be at the call of the chair and that he would hold the bills until there were enough to justify the traveling of witnesses to testify on same.

Mr. Hickey explained generally how the meetings will be held and that there would be some traveling involved to the outlying areas occasionally. However, he said most of the tours would be in the evenings with the longer ones scheduled for the weekends. He added that he wanted to travel to the areas which are of particular interest to members of the committee.

The University of Nevada Agriculture School will be involved in some of the tours. Transportation problems have been indicated by Mr. Stone who wants to show the committee some of the roads. Jac Shaw will be talking with the committee about state lands. Some MX representatives will be on the tours. Various local organizations will be involved such as Cattlemen's Associations and Chambers of Commerce.

Mr. Hickey directed the attention of the committee to a report on Drip Irrigation which had been previously distributed to the committee members. He explained that the committee would be looking into the irrigation projects in southern Nevada. The report is attached hereto and referred to as EXHIBIT B.

Mr. Erickson brought to the attention of the committee that an alcohol fuels plant in Wabuska is now in operation. They will be utilizing agricultural products to create the alcohol fuels for the manufacture of gasohol. They will be experimenting with Jerusalem artichokes and onion culls in addition to other plants. He suggested that the committee go to the plant and observe the use of the products. Mr. Hickey agreed it was an excellent idea to plan such a tour.

Mr. Horn moved that the committee adopt the Rules to Govern Committee Procedures in the Assembly of the Nevada Legislature. The motion was seconded by Mr. Marvel and carried unanimously by the full membership of the committee. A copy of the rules is attached as EXHIBIT A.

There being no further business, the meeting was adjourned at 2:15 P. M.

Respectfully submitted,

Janice Fondi
Janice Fondi
Committee Secretary

TITLE 49

AGRICULTURE

CHAPTER

- 547. Agricultural Districts and Associations
 - 548. Conservation Districts
 - 549. Extension Work in Agriculture, Home Economics and Rural Welfare
 - 550. State 4-H Camp Institute and Exhibit
 - 551. Fairs and Exhibits
 - 552. Bees and Apiaries
 - 553. Demonstration and Experimental Farms and Plots
 - 554. Quarantines of Agricultural Commodities
 - 555. Insect and Pest Control; Noxious Weeds
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TITLE 50

ANIMALS

CHAPTER

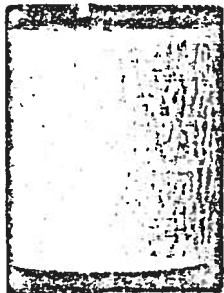
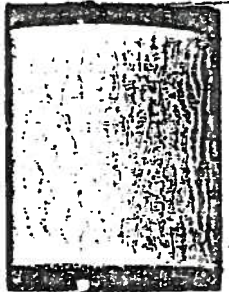
- 561. State Department of Agriculture
 - 562. State Board of Sheep Commissioners
 - 563. Nevada Junior Livestock Show Board
 - 564. Brands and Marks
 - 565. Brand Inspection Districts
 - 566. Inspection of Hides and Carcasses
 - 567. Noxious and Predatory Animals; Crop-destroying Birds
 - 568. Grazing and Ranging
 - 569. Estrays; Animals Running at Large
 - 571. Diseased Animals
 - 573. Public Livestock Sales
 - 574. Cruelty to Animals: Prevention and Penalties
 - 575. Miscellaneous Provisions Concerning Animals
 - 576. Livestock and Farm Products Dealers, Brokers, Commission Merchants, Cash Buyers and Agents
-

TITLE 51

**FOOD AND OTHER COMMODITIES:
PURITY; SANITATION; STANDARDS;
LABELS; WEIGHTS AND
MEASURES; MARKETING**

CHAPTER

- 581. Weights and Measures
- 582. Public Weighmasters
- 583. Meat, Fish, Produce, Poultry and Eggs
- 584. Dairy Products and Substitutes
- 585. Food, Drugs and Cosmetics: Adulteration; Labels; Brands
- 586. Pesticides; Dangerous Caustic or Corrosive Substances
- 587. Agricultural Products and Seeds
- 588. Commercial Fertilizers and Agricultural Minerals
- 589. Woolen Products
- 590. Petroleum Products and Antifreeze



RULES

AGRICULTURE COMMITTEE

60TH SESSION

I. Duties of the Chairman

- A. Prepare agenda;
- B. Call committee together;
- C. Require minutes to be kept and presented at following meeting; and
- D. Prepare committee reports.

II. Duties of Vice Chairman

He shall assume the duties of the chairman in his absence.

III. Committee Action

- A. A quorum must be present to hear a bill;
- B. A quorum shall consist of at least five (5) committee members;
- C. A simple majority of the committee present can pass or reject a bill;
- D. Attendance shall be recorded at each meeting;
- E. "No" votes shall be recorded;
- F. A two-thirds majority of all committee members (6) shall be required to reconsider a bill; and
- G. The committee shall address the chair to gain the floor.

Any rule not stated in the special rules of the Agriculture Committee shall be governed by Mason's Manual on Parliamentary Procedure.

SUGGESTED ASSEMBLY COMMITTEE RULES

1981 Session

1. The secretary of the Committee shall call the roll at each meeting and record in the minutes the members present and the members not present. Excused absences will be so recorded.
2. A quorum consists of at least five (5) Committee members.
3. It will require at least a quorum to hear a bill, budget, or resolution.
4. It will require a simple majority (5) of the entire Committee to pass or reject a bill, budget, or resolution.
5. It will require a two-thirds majority (6) of all Committee members to reconsider an action on a bill, budget, or resolution.
6. Committee members, at all times, shall address the chair for permission to be heard. Witnesses before the Committee will address requests to testify to the chair and will be recognized only by the chair. When Chairman deems necessary, persons wishing to testify will be sworn in before testimony.
7. There will be no Committee action on bills or resolutions during a hearing. The Chairman shall be responsible for preparation of the Committee's agenda and will determine when final action is to be taken on bills and committee reports.
8. The secretary shall record the definite action of the Committee by roll call vote.
9. A minority report can be filed with the Chief Clerk at the same time the Committee action is reported. A minority report must be signed by all members of the Committee disagreeing with the Committee action who are present when the vote is taken. The members who desire to submit a minority report must so indicate in advance, to a quorum of the Committee.
10. Committee introduction requires concurrence of two-thirds (6) of the Committee and does not imply commitment to support favorable passage.

SUGGESTED RULES TO GOVERN COMMITTEE PROCEDURES

IN THE ASSEMBLY OF THE

NEVADA LEGISLATURE

(Validating a set of rules governing committee procedures would be accomplished by adopting a new standing rule; however, committee rules which deviate from procedures set forth in Mason's Manual would have to be authorized by a separate rule specifying the particular procedure. [See Assembly Standing Rule No. 1, re precedence of parliamentary authority.] Unless otherwise indicated, the citation following each suggested rule is a section in Mason's Manual which was used as a basis for the suggestion.)

DUTIES OF COMMITTEE CHAIRMEN

1. To convoke the committee at time and place provided, or at such time and places as to enable the committee to fulfill its functions.
2. To preside over meetings of the committee.
3. To maintain order and decide questions of order subject to appeal to the committee.
4. To supervise and direct any employee(s) of the committee.
5. To prepare reports of the committee and submit the same to the body (through the Chief Clerk).
6. To have custody of papers referred to the committee and transmit them to the Chief Clerk as appropriate.

(Sec. 611)

APPOINTMENT OF VICE CHAIRMAN

1. A committee has authority to elect a vice chairman or other officers.
2. A stenographer hired by the committee is responsible for maintaining minutes and other records and to perform any additional duties directed by the chairman or the committee.

(Sec. 612 [If the chairman is permitted to name the vice chairman, a special rule would be needed to supplement the standing rules.])

QUORUM OF COMMITTEES

1. The presence of a quorum is required in order for a committee to perform any action legally and officially. The quorum must meet formally in committee.

(Sec. 613)

2. The quorum of a committee is a majority of the members of the committee.

(Constitution of the State of Nevada, Article IV, Sec. 13.)

PROPOSING AMENDMENTS TO BILLS

1. A committee can only propose amendments to measures referred to it.
2. A committee should never alter a measure submitted to it, but should submit proposed amendments on a separate paper.
3. A committee may report back a bill with or without amendments or recommendation.
4. A committee may submit any number of amendments so long as they are germane to the original purpose of the measure.

(Sec. 616)

INTRODUCTION OF BILL BY COMMITTEE

Committees have authority to introduce bills on matters referred to them, and standing committees may introduce bills within their general scope.

(Sec. 618)

DISCIPLINE OF MEMBERS

1. Disciplinary action against a committee member is undertaken by the body upon report by the committee thereto.
2. When a committee member is involved with an inquiry undertaken by his committee, a special report must be made to Assembly, which may take action concerning said member or may give the committee special authority to investigate the member.

(Sec. 619)

PAPERS AND INFORMATION FOR COMMITTEES

1. Measures referred to a committee shall be delivered to the chairman, or, in his absence, to the vice chairman.
2. Materials necessary for use of a committee in the proper performance of its duties should be turned over to it by legislative officers upon request.
3. When a committee's work is completed, the chairman shall return to the Chief Clerk all documents or papers which were referred to it.

(Sec. 621)

WHEN COMMITTEES CAN ACT

1. A committee can act only at a meeting and not by separate consultation and consent.
2. Action formally taken cannot thereafter be altered except by further formal action by the committee.

(Sec. 625)

CALL FOR MEETINGS

1. Committees should meet at time and place officially set, although such time and place may be changed in extraordinary cases after consultation by the chairman with a majority of the members.

2. If the chairman fails to convoke the committee, as is his duty, it is the duty of the committee to meet upon call of two of its members.

3. Committees adjourning without provision for future meeting, do so subject to call of the chair.

(Sec. 626)

SPECIAL MEETINGS

1. When a special meeting is called to transact definite specified business, notice must be given to each member. (The press and public might be included where feasible.)

2. Business to be transacted at a special meeting must be set forth in the call and no other may be considered.

(Sec. 627)

COMMITTEE MEETINGS WHILE HOUSE IS IN SESSION

1. Except conference committees, consent of the Assembly via motion must be obtained for conducting a committee meeting while the house is in session.

2. Whenever the Assembly goes into session, it is the duty of a committee to discontinue its meeting and attend.

3. The Speaker may direct the sergeant-at-arms to call any committees that are meeting when the house is in session. When such instructions are announced to the committee meeting it is at once adjourned.

(Sec. 628)

ATTENDANCE OF LEGISLATORS AT COMMITTEE MEETINGS

1. Generally any member of the legislature may be present at committee meetings and express his opinion, but cannot vote and must give way to any member of the committee.

2. Unless authority for closed or secret sessions is expressly granted, committees should secure permission of the body when it desires to hold closed sessions.

(Sec. 629)

COMMITTEE PROCEDURE LESS FORMAL

1. So far as they apply to a committee, the standing rules of the Assembly govern procedure. However, rules limiting debate are relaxed, it is not necessary to rise on making a motion, the chairman does not rise to put questions, to speak or make motions, and members may speak more than once at the same stage of consideration of a question.

2. On points of order, appeal from the chairman's decision cannot be made to the Speaker.

(Sec. 632)

ORDER OF BUSINESS

1. Call to order
2. Reading of minutes of previous meeting (if desirable)
3. Reading of agenda for meeting at hand (i.e. old bills, new bills, resolutions, etc. to be considered at this time. Motions can be made for alterations in the order of these matters.)
4. Proceed with agenda and appropriate debate.
5. Complete such committee reports as are ready to be submitted to Chief Clerk (together with amendments, if any).
6. Plan agenda for next meeting (including any holdovers from this meeting's business).
7. Adjournment.

(A printed or typed schedule of the agenda for use of members, other legislators, press and public would be useful.)

(Sec. 633)

CONSIDERATION OF MEASURES

Unless agreed to by general consent, all questions must be put to a vote.

(Sec. 634)

RECONSIDERATION BY COMMITTEE

Subject to the same rules as in the body, a committee has a right to reconsider any action taken by it so long as the subject matter remains in its possession. Such reconsideration may be moved by any member, even though he was absent when the vote was taken.

(Sec. 635)

AUTHORITY OF COMMITTEE RE MEASURES BEFORE IT

1. The committee's sole authority is to recommend changes or action to be taken by the Assembly.

2. A committee opposed to a measure cannot reject it, but should report it back to the body, with or without recommendation.

(Sec. 636)

ADJOURNMENT

1. No committee meeting may be adjourned beyond the time for the next regularly scheduled meeting.
2. Upon completion of the business of the meeting, adjournment should be upon motion.

(Sec. 637)

COMMITTEE REPORTS

1. All measures should be reported from committee, with or without recommendation. (A time limit could be established for such reporting back.)
2. Every bill reported must be accompanied by a written report, though one report may refer to more than one measure.

3. When resolutions or amendments are required to effect the recommendations of a committee, such documents should accompany the written report.

4. Written reports should be made by the chairman of the committee, or, in his absence, the vice chairman. Such report must never be made without approval of the entire committee (or in the case of a split decision, a Majority Report and a Minority Report must each be signed by all persons comprising such majority and minority groups).

5. When a minority report is presented, a motion may be made to substitute it for the regular committee report; this being the only way a minority report can be brought before the body for consideration.

6. No person has a right to publish any portion of committee proceedings until they have been reported to the body.

(Chapter 64)

7. Amendments proposed by committees are considered ahead of amendments from the floor.

(Sec. 397)

JOINT MEETINGS OF STANDING COMMITTEES

Two standing committees may sit as one to consider pending legislation.

(Sec. 669)

COMPELLING WITNESSES TO APPEAR

A legislative body or a committee may, under certain conditions, summon and examine witnesses, and require production of books, records and papers. Failure of persons to comply may be penalized by legislative action.

(Sec. 802)

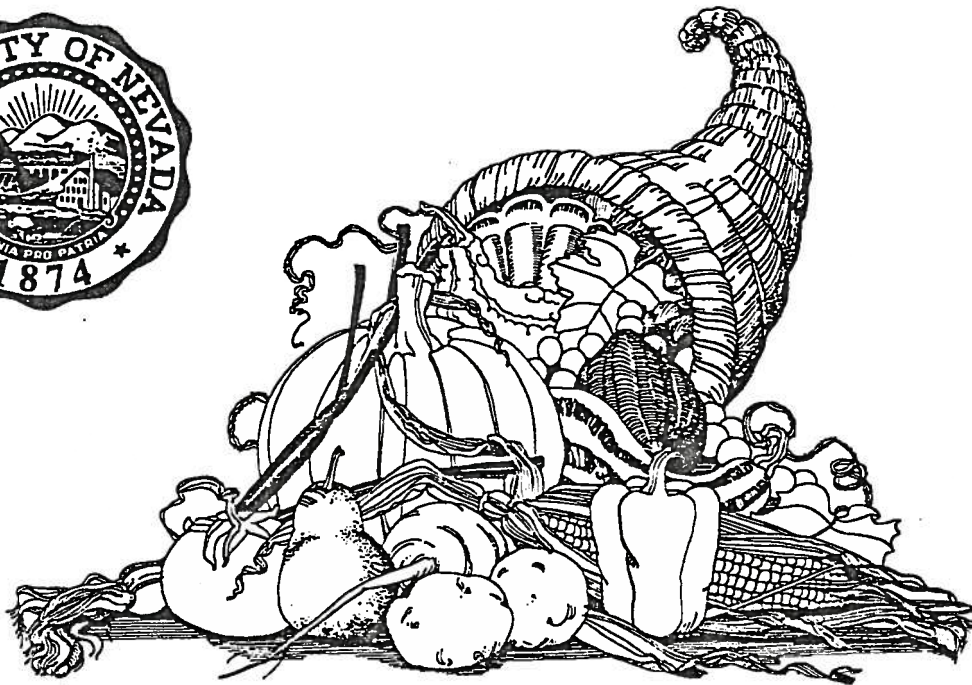
SUBCOMMITTEES

1. Any committee, except committee of the whole, can appoint a subcommittee, with such authority as may be delegated by the parent committee. The subcommittee reports to the committee and not to the house and can consist only of members of the committee from which derived.

2. A special investigation committee may not delegate its powers to any of its members, except as may be authorized by the Assembly.

(Sec. 660)

DRIP IRRIGATION



Prepared by:

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D. Peck
R. Hammond
G. Robison
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DRIP IRRIGATION

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Nevada also takes the plunge

Nevada is a prime candidate for drip irrigation research, having as it does, an abundance of land and a scarcity of water.

Western Grower & Shipper

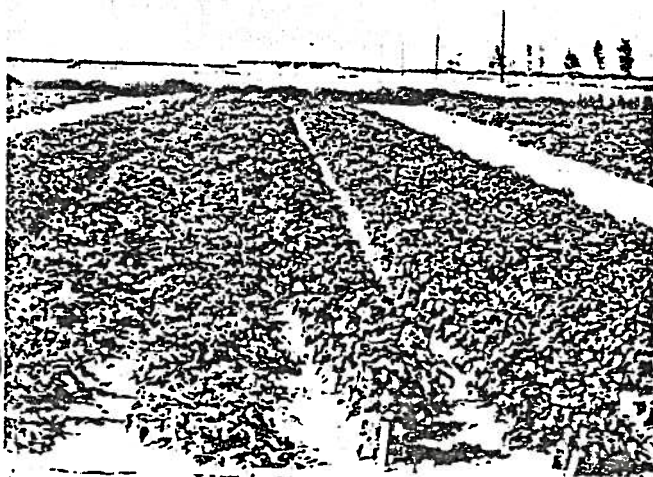
September 1979

Drip irrigation shows most promise where water is scarce and expensive and where crop values are high. Or where soil absorbs water either very slowly or very rapidly. Or where water is salty. Or where labor costs are high but there is good labor to monitor the system, detect and correct problems quickly.

Dr. Albert Marsh
USDA, retired

DRIP IRRIGATION DRIVES THE WASTE OUT OF WATERING CROPS & GARDENS

Widely used where water is scarce, drip irrigation is new to Nevada – but easily adapted to our climates and soil, College of Agriculture research is showing.



The 1979 Session of The Nevada State Legislature requested the College of Agriculture, University of Nevada Reno, to conduct feasibility studies on drip irrigation as a way to conserve the State's water and energy. A Project Coordinator and field research team was appointed in August, 1979, with a commercial size fall vegetable crop grown at both Pahrump and at Logandale, Nevada. Research plantings were made in both the spring and fall of 1980 at Pahrump, and Logandale. In addition, Christmas tree research plots were established at Panaca, and shrub plantings were set out at the University's S-Bar-S Ranch, near Wadsworth. Melon plantings were started at Fallon.

The goal has been to measure yield and market quality from commercial size plantings. Crops were chosen for their various observed needs for water. In melons, for example, market quality is much dependent on the grower's ability to manage water. Tomatoes seem less affected in market/eating quality, but yield is heavily influenced by the effect of water on rate of plant growth and thus the ability to mature within Nevada's marginal tomato season. Chili peppers were included because the "hotness" varies with soil moisture conditions. Fresh market green peppers respond well to the midsummer heat which is less acceptable to tomatoes and similar vegetables unable to pollinate well in a hot climate.

Project # 485 was initiated August 1, 1979 with the appointment of the Project Coordinator. He was joined by three initial cooperators for a two-day study tour in San Diego County, California with the County Farm Advisor, Barnarr Hall, to visit commercial vegetable growers using drip irrigation. San Diego County vegetable growers have switched almost 100% to drip irrigation because of the high cost of water, which is currently approaching \$200 an acre foot.

The first research plantings for Project #485 were made at Logandale and Pahrump in October, 1979, and an early-winter crop was harvested. In the Spring 1980 research, vegetables were again planted at Logandale, Pahrump, Tonopah and Fallon. A Christmas tree planting was made at Panaca and a flower display at Reno. Fall, 1980 vegetable plantings were made at Logandale and Pahrump.

WHY DRIP IRRIGATION CONSERVES WATER

More than 50% of the water applied thru spray irrigation can be lost by evaporation before it ever hits the ground. More than half of the water applied by furrow irrigation may pass on down thru the soil and be lost to the plants. But this is only the start.

Drip irrigation is not broadcast application like spray or furrow: drip is point application – a slow dripping immediately above the root zone. All that is moistened is an onion shaped "cone" of soil within which the roots grow. The size of the



Tomatoes under drip irrigation at Logandale, Nevada.

"onion" depends upon how long you keep the drip irrigation system turned on each time. The "onion" can be any desired size. It need not be large because the plant does not need a large, wide-ranging root system when it has free access to soil moisture at all times as it does under drip irrigation. This is because the daily or every other day application assures quick replacement of water used by the plant. There is no water stress to stunt plant growth. There is no need for growing a big root system except for mechanical support for tall crops (trees, etc.).

The chili pepper study was part of a project studying the feasibility of growing this crop in Nevada as a replacement for Iranian chili, currently the major source for the U.S. Drying trials at the Brady geothermal food drying operation indicates that it could process chili pepper/powder in the 2000-acre chili growing size that would be needed.

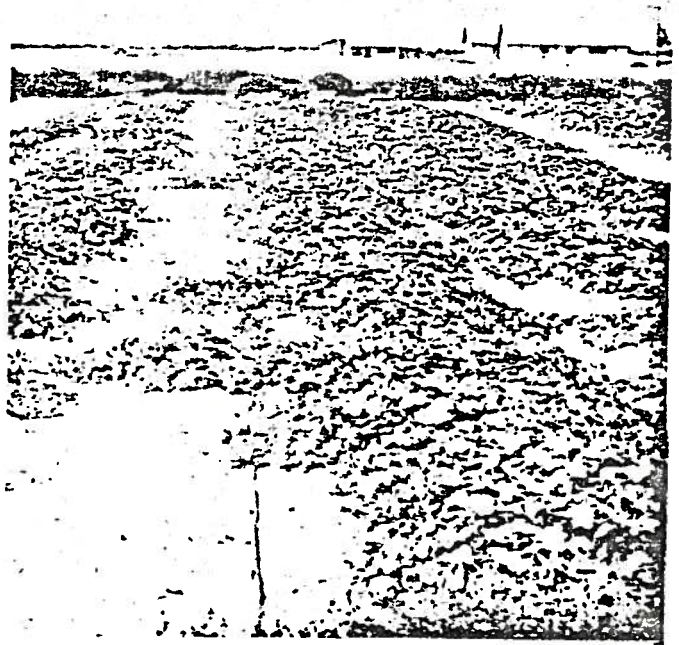
TWO TYPES OF DRIP IRRIGATION

Row crop vegetables are drip irrigated by proprietary "tapes" with precision-drilled holes at a choice of spacings. Or they -- also trees and shrubs -- are drip-irrigated by proprietary emitters inserted into standard plastic tubing at desired intervals.

The drip tapes are least expensive to buy, but last only one crop in practice, though occasional users carefully remove the residue of crop # 1 and replant as close to the original plants as possible without disturbing the drip tape.

Emitters come in all sizes -- and prices. Self-compensating pressure-regulated emitters can be counted on to operate for years. They cost 60-95 cents each. One per plant is enough for young shrubs or trees, two to three per sizable plant.

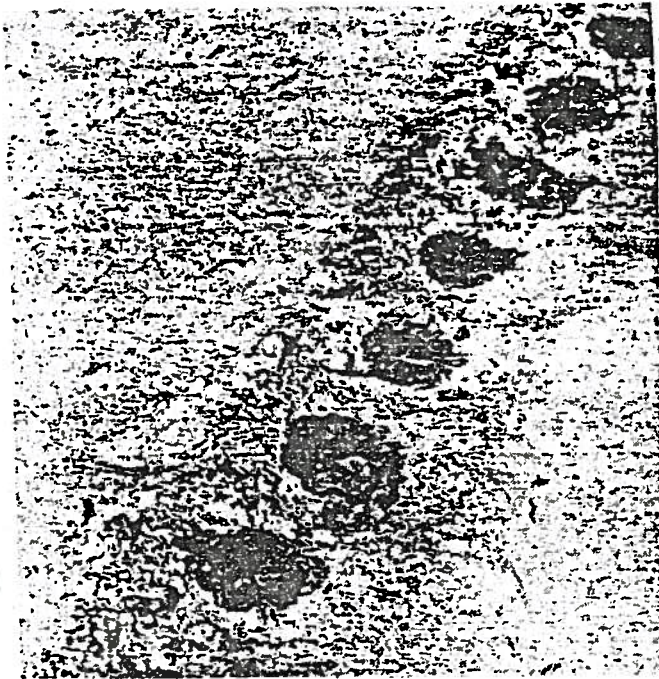
Because there are so many people getting into the drip tape and drip emitter business, look for a firm that has been around long enough to have field tested their products. Also, be sure they are likely to be in business next year when you need additional tape or emitters. The fallout rate for too optimistic investors is astounding, leaving thousands of orphaned systems. And mating different tapes or emitters rarely works. Unfortunately in the world of drip irrigation, orphans remain orphans.



Drip emitters are usually used for trees or shrubs but can be used for row crop (left two rows of melons) although drip tape (right two rows) is usually more successful for row crops.

Some growers prefer to plant melons, tomatoes, etc. 12-15 inches apart in the row, then use drip tape. Other growers prefer to plant these crops 3-4 feet apart in the row, then use emitters, 1 or 2 per plant.

Under drip irrigation, none of the soil between the rows or between the plants is wet, hence how much water you save is proportional



Typical wetting pattern from drip irrigation: the soil between the rows is allowed to dry.

to how thickly or thinly you plant. You save the most by drip watering trees and shrubs, the least for carrots or beets 3-4 inches apart in rows 1-foot apart.

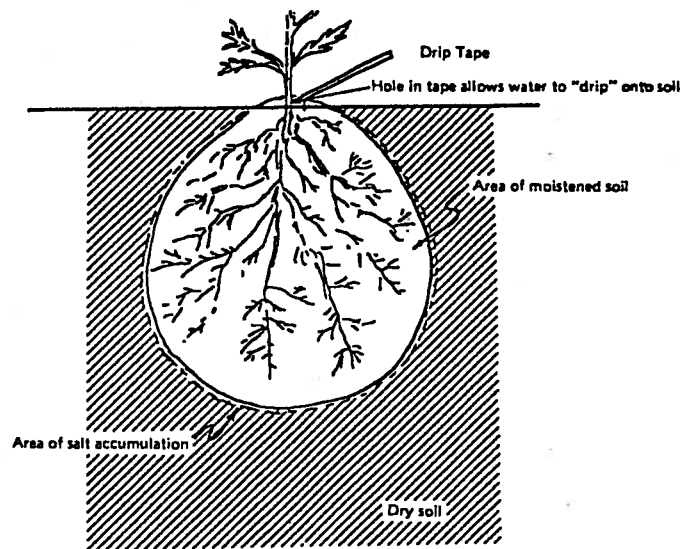
NO SPECIAL SKILL NEEDED TO DRIP IRRIGATE

Drip irrigation does not call for any of the skills or special grading equipment needed to level the land, as for furrow irrigation. Nor is there any need for constant adjustment of the water supply to avoid wasting water, as the wind shifts the sprayer's pattern. And surface runoff just doesn't occur under drip irrigation.

Crop yields are larger under drip irrigation because plant growth is continuous: there is no series of slowdowns occasioned by temporary water stress in the soil. Under drip irrigation,

the soil in the wetted "onion" containing the plant roots is kept at or near field capacity at all times. The plant thus is never stressed.

This absence of stress under drip irrigation is also the reason that the plant can tolerate water with a salt content unacceptable under conventional irrigation and its alternate wetting and drying stress on the plant.



Typical onion-shaped wetting pattern underground. Depth and width of onion depends upon how long application continues.

DRIP IRRIGATION PRODUCES A NEW ROOTING SYSTEM

Almost no roots develop close to the point where the drip emitter releases the water. Nor is there root growth into the dry soil between the plants or between the rows. The entire root system develops in the "onion" zone. Since this zone is usually kept quite small, the plant develops a much smaller root system than under conventional irrigation. This often worries beginning users of drip irrigation.

NOT JUST ANOTHER WAY TO WATER PLANTS

Drip irrigation is not just another way to water plants. Rather, it is a new approach to growing row crops, trees and shrubs under highly controlled conditions of soil moisture, salinity,

and pest control. Drip irrigation has a highly significant effect on crop response, time of harvest and quality of yield. It is not for everyone. Some who have tried it have gone back to conventional watering systems. These are people who just didn't like having to do things differently.

1. Since all salts in irrigation water now wind up under drip irrigation as an accumulation of salt at the outer edge of the wetted "onion," care must be taken to plant succeeding crops within the onion zone. This is easily done if the next crop is planted immediately adjacent to the prior crop, i.e. no extensive soil preparation. But this "messy look" offends people with pride in their "clean cropping" habits. Yet if you remove the stubble, it's tricky to be sure your new rows exactly match the previous rows.



Squash growing under drip irrigation at Fallon, Nevada.



Melons grown under drip irrigation and plastic mulch at Fallon, Nevada.

2. Rains obviously rewet the accumulated salts in the soil at the outer edge of the "onion" zones. To avoid having this salty solution move back into the onion and damage the plant roots, it is necessary under drip irrigation to turn the system on as soon as rain starts -- and to keep the drip system on until the rain stops. This is so contrary to all normal habits that some users find it too demanding of attention.

3. Some people are so indoctrinated with the idea that "you water deeply, then wait until the plants exhibit some sign of water stress." To these people, the concept of keeping the "onion" zone wet to field capacity at all times by daily replacement of the water that either evaporates or is used by the plants become difficult to accept. They often are further dismayed to discover that plants grown under drip irrigation produce such a small root system, not the deep, wide-ranging root system produced under conventional irrigation systems.
4. Since drip tape and emitters are relatively expensive, prudence calls for careful salvage and reuse for at least two crops. But this is not easy, because coiling up "miles" of tape or pipe, cleaning to prevent mud from clogging the drip holes, and then relaying is a sizeable chore.
5. Unlike furrow irrigation or sprinklers, drip irrigation requires continuous, close observation. The tiny emitter holes can plug, leaving the plant at that hole without water. Often the problem is not detected until the plant wilts and dies. Because the root system under drip irrigation is so small, the loss of

water can result in quick death.

6. No water is clean enough: even municipal water fit for drinking will clog the tiny drip irrigation holes. All water must be filtered – and filters checked and flushed often, a chore that users may not be ready to accept despite the water conservation and better crop yields produced by drip irrigation.



Peppers under drip irrigation, at Fallon, Nevada, 1980.

DRIP IRRIGATION WELL ADAPTED TO NEVADA

Initial feasibility studies (Project # 485) demonstrate that drip irrigation is a practical way to conserve water used for vegetable production in Nevada. Water consumption can be cut more than 50% because only the relatively small soil area occupied by the plant roots is kept moist. Crop yield could meet or exceed those obtained by the profligate use of furrow or sprinkler irrigation. Market quality also meets or exceeds the best produced under conventional irrigation.

Major crops grown in Project # 485: tomatoes, peppers, melons, watermelons, squash, zucchini and chili peppers. All are high value crops which are able to capitalize on the high light intensity of the Nevada climate. All proved well adapted to drip irrigation in commercial size plantings.

Both ditch water (Logandale and Fallon) and municipal water (Pahrump, Panaca, Tonopah, and Reno) were used successfully. Ditch water, of course, requires more constant attention to the filtering system, especially during periods of "dirty water."

Although the research plots were under manual control of the drip irrigation system, it can be completely automated at relatively low cost. Thus the ability to replace the daily water used by the plants need not be a burden. The benefit is continuous plant growth without any of the usual slowdowns from soil moisture stress.

RESEARCH GOALS FOR 1981

1. LOGANDALE & PAHRUMP:

Develop a home garden drip irrigation system that also provides fertilizer thru the drip tape for the range of vegetables commonly grown in Nevada home gardens.

Measure effect on yield and food quality of daily versus 2-4 day drip irrigation.

Develop simple system for home gardeners to determine how large a wetted "onion" is needed in Nevada for various commonly grown home garden vegetables.

2. TONOPAH:

Compare water usage between drip irrigated and sprinkler irrigated vegetable gardens at Senior Citizen Center garden. Also to compare earliness of harvest and keeping quality of crops.

3. PANACA:

Develop planting program for starting ornamental trees and shrubs under drip irrigation to cut the usual 40-70% loss of young plants experienced by homeowners relying on sprinkler irrigation.

4. S-BAR-S RANCH:

Study feasibility of drip irrigation for establishing windbreak plantings on Nevada desert entry lands.

5. FALLON:

Study economic feasibility of commercial

chili pepper production under drip irrigation as a new cash crop for Nevada and its geothermal food drying industry.

FUTURE STUDIES NEEDED:

The largest domestic use of water in Nevada is for lawn care. Not only is the acreage enormous, but the lack of standards for proper watering leads homeowners to overwater. Also, the waste thru flooding and runoff is unconscionable for a state needing to stretch its water supply.

Some recent California data indicate possible savings, at least for Southern Nevada lawns:

conventional watering	51.9 inches/yr
watered at 85% of BPI evaporation* (providing maximum green lawn continuously)	39.6
Tensiometer at 15 centibars (water providing "superior lawn")	30.5
Tensiometer at 40 centibars (water providing "very acceptable lawn")	25.0
Tensiometer at 65 centibars (water providing "acceptable lawn")	22.8

*Bureau of Plant Industry

Our goal would be to work out comparable data for Nevada, then publish WHEN TO WATER data in the local newspapers as supplied by the County Extension Offices from sample lawns in the area.

Simultaneously, research would seek a way to use drip irrigation for lawns to avoid the 50% or so waste of water now inherent in lawn watering by spray irrigation.

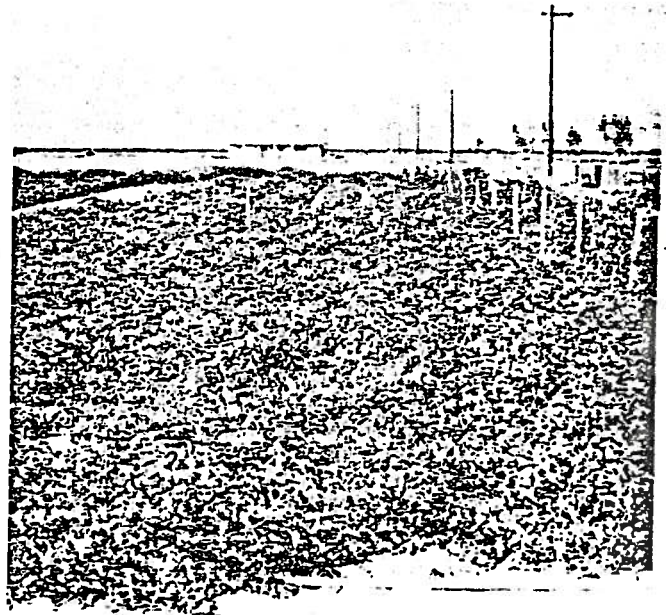
WHY DRIP IRRIGATION IN NEVADA?

Nevada must learn to stretch both its water supply for agriculture and the energy needed to supply that water. Drip irrigation offers a way to do both effectively. Water is placed only where it is needed and only in the amounts needed for plant growth by the crop. Wasting water -- and the energy needed to provide it -- is all but eliminated; no water is needed for the bare ground between

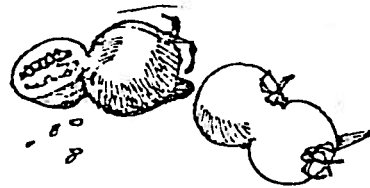
the crop plants or for weed growth.

Drip irrigation indeed is a tool for desert agriculture. Salts in the irrigation water accumulate at the outer edge of the wetted "onion" in the soil and remain there as dry salt. Under humid climate conditions, the salts would be dispersed throughout the root zone, injuring the crop plants. The humid climate farmer lacks the desert farmer's ability to manage watering: the desert farmer merely has to increase the drip irrigation rate temporarily when rain does occur. He flushes the salt further into the nonroot zone outside the "onion" containing the crop roots.

Widely spaced crops, such as Fallon's famous "Hearts of Gold," also tomatoes, peppers, squash, chili peppers, are ideal subjects for drip irrigation: apply only the water the plant needs, none to the bare soil areas between plants.



Tomatoes under drip irrigation at Pahrump, Nevada, 1980.



Early Harvest at Logandale, Nevada - Fall 1980

Average weight/melon

Melons	Section 1	Section 2	Section 3
Top Mark	3.51	3.42	3.00 lbs
Dixie Jumbo	3.77	3.89	3.65
PMR 45	2.80	2.89	3.00
Classic	2.86	3.41	3.42
Top Score	3.50	2.45	3.00

Lettuce lbs/300 ft row

4	52.5
6	95.4
1	97.5
3	97.5
2	109.8
5	114.3
9	120.0
10	172.5
7	228.3
8	251.4

WHERE YOU CAN INSPECT DRIP STUDIES

Southern Nevada:

Fenced field just west of Pahrump High
 Contact: Robert Hammond, Superintendent
 UNR Agr. Field Station: 702-727-5532

The Whipple Ranch, Logandale
 Contact: Don Peck, Agronomist
 UNR Agr. Field Station: 702-397-2604

The County Fair Grounds, Panaca
 Contact Darwin Bradfield, Agent-in-Charge
 Cooperative Extension Services:
 702-726-3101

Northern Nevada:

The Cunningham Melon Ranch, Fallon
 Contact: Joseph Howland, Horticulture Dept.
 Univ. of Nevada Reno: 702-784-6947

S-Bar-S Ranch, Fernley
 Contact: Michael Schoenfeld, Superintendent
 Reno Toll Station - S-Bar-S Ranch
 # 1 (Phone No. - ask operator)

The Gund Ranch, Austin
 Contact: Tony Lesperance, Superintendent
 Reno Toll Station - McCluskey Peak
 # 2 (Phone No. - ask operator)

The Senior Citizens' Community Garden,
 Tonopah
 Contact: Kenneth Hill, Agent-in-Charge
 Cooperative Extension Services:
 702-482-6794

Crop Yields at Logandale, Nevada -- Fall 1979

Broccoli U.S. average yield-5,140 lbs/acre

#6208H	9,202
#5320H	13,404
#6209H	13,939
#5231H	20,807

Brussel Sprouts: crop failed

Cabbage U.S. average yield-16,000 lbs/acre

Prebro	8,020
Preko	14,826
Baldura	22,770
Copenhagen	32,296

Cauliflower U.S. average yield-15,540 lbs/acre

Glacier	6,550
Snowball	6,660
Hormade	6,912

Lettuce U.S. average yield-12,600 lbs/acre

#57501	9,221
Great Lakes	10,371
#57406	13,649
#55902	13,838
Paris Island	16,720

Swiss Chard lbs/acre

White Ribbed	18,237
Fordhook Giant	18,586

Crop Yields at Logandale, Nevada -- Summer 1980

Melons: U.S. average yield-7,700 lbs/acre

Top Mark	7,582
Dixie Jumbo	7,865
PMR 45	10,338
Classic	12,213
Top Score	15,678

Tomatoes: U.S. average yield-10.0 tons/acre

Better Boy	4.3 oz/ave.	4.3*
Calypso	1.8	10.7
Big Set	3.3	15.0
Duke	3.6	16.5

* Unable to set fruit in hot weather

Peppers: U.S. average yield-2,000 lbs/acre

Cayenne-Peto	954
Ancho 101	1,027
Cayenne-Burpee	1,061
McCormick	1,242
Anaheim M	1,375
Anaheim TMR 23	2,431
PS 1012	2,932
PS 1013	3,100