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A CRITICAL STUDY OF IRRIGATION PRACTICES FOR BETELVINE IN THE SELECTED AREA

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Abstract

The present study was conducted to focus irrigation practices applied for betelvine cultivation in the selected area. Betelvine required frequent but light supply of irrigation kept the land at moist constantly. Farmers who had sufficient water supply all around the year, preferred to grow betelvine crop. Surface irrigation was followed in most of the betelvine gardens. Some gardens were on drip system of irrigation. Betelvine in summer season required more water whereas in rainy season, it required less. In rainy season, proper surface drainage system was required. Now a day's some farmers face scarcity of water. To overcome this problem, some farmers constructed ponds in their farms. High quality poly thin papers were spread in the ponds to preserve water. In rainy season, there was excessive water which was stored in farm pond and it was used in summer season due to the scarcity of water. Excess irrigation and stagnation of water must be avoided. Betelvine grew under good supply of soil moisture humidity. It grew vigorously in areas where a required rainfall was assured. Betelvine was grown in open but conservative wind supply. The betelvine was grown strongly and healthy in the natural environment. If favorable conditions were not available, betelvine could not grow with appreciations. As was the case with other crops, climate and other environmental conditions considerably influenced the growth of betelvine. But, it was difficult to specify an ideal of the average climate for this plant. Sangli district held the best environments for commercial betelvine culture. The tropical rain forest provided cool shade, considerable humidity and adequate supply of moisture in the soil. Moderate and even temperature through the year was most favorable. Such conditions were favorably available in areas of Miraj and Walva tahsil of Sangli district. Cultivators of Sangli district acquainted with the required factors for the smooth growth of betelvine leaves. Although, betelvines favored tropical humidity, Sangli district cultivators grew in several places where irrigation facilities were made available. They provided cool shade; humidity and other feasible atmosphere were created for betel leaves cultivation.

Key Words: *Irrigation practices, surface irrigation, drip irrigation, cool shade and humidity*

1. Introduction:

The betelvine prospered under the tropical forest conditions with a cool shade, considerable humidity and good supply of soil moisture. Sangli district holds these features for its easy growth. Betelvine crop prospered in areas with a rainfall of 225-475 cm. The

climate of the Sangli district is moderate and mainly temperate which is suitable for betelvine cultivation. The average temperature ranges between 35^{o} Celsius and 9^{o} Celsius. There are mainly three season's viz. rainy, winter and summer seasons. The rainy season starts from June and continues up to the end of September. Winter season starts from October and lasts up to the end of January and summer commences its dry climate in February and continues up to end of May. The maximum rainfall is witnessed in the month of June and July. Generally rainfall is not uniform in Sangli district. The Western portion receives heavy rainfall. The central portion receives moderate or average rainfall while eastern zone suffers from scanty rainfall. Highest rainfall was in Shirala tahsil and lowest in Atpadi tahsil. Irrigation facilities helped to increase the agricultural productivity. Due to the uncertainty and inadequate rainfall irrigation facilities became a basic condition for increasing agricultural productivity. The river Krishna flows through the district acting as the main source of irrigation. In the Sangli district there are two large lift irrigation projects already started. Another one Tembu large lift irrigation project work has been started which will be beneficial to Sangli, Satara and Solapur districts. Arfal, Krishna and Warna cannel are benefiting to thirsty land. There are seven medium irrigation projects and 1428 small irrigation projects in the district. Some farmers have their private and co-operative lift irrigation schemes on Krishna and Warana rivers. The gross irrigated area was 1,53,642 hectors which accounted to 20 per cent of the gross cropped area. Similarly, the net irrigated area was18.23 per cent of the gross cropped area. The irrigated area of Mira and Tasman teasel was 35 per cent of the total irrigated area of the district. Irrigated area of Shirala and Jath teasels were 11 and 12 per cent of the total irrigated area of the district. The total irrigated area of Single district mainly based on well irrigation which was 72 percent and remaining 28 per cent on lift and cannel irrigation. Out of the, total irrigated area 45 per cent related to food grains crop, 37 per cent to sugarcane and remaining 18 per cent to fruits, vegetables, oilseeds and other crops.

2. Review of Literature:

2.1 Irrigation and Drainage of excess water

Balsubrammanyam and Chaurasia (1962) studied the comparative cost and efficiency of sprinkler system; wind mill system photovoltaic pump and low power portable pump set for irrigation to betelvine. If the Government subsidy was available, the establishment of wind mill system and photovoltaic pump costs Rs. 11,500 and Rs. 8,500 respectively was possible. In these two cases recurring cost of irrigation was almost negligible. In case of sprinkler system the cost of installation worked out Rs. 30,000/- per hectare. In case of low

power pump set, the capital cost was Rs. 5,000/- if the Government subsidy was available, the running cost was estimated at Rs. 240 per hectare for irrigation.

B. Dasgupta and others (1993) reported that the soil in the betelvine garden was constantly kept in moist to avoid water stagnation. Further they added that during rainy season, no water was supplied. In the winter season very light water was supplied at an interval of 10-25 days. During summer, water was supplied according to the needs. In West Bengal, water was supplied by small pump and rubber pipes.

2.2 Drip Irrigation

S. V. Waghe and others (1993) had undertaken field trial on drip irrigation and its effects on will incidence drip irrigation system for betelvine cultivation helped to save 70 percent to 80 percent water as compared with traditional bed irrigation. Their experiment revealed that the betel vine wilt was minimized to zero percent under drip irrigation but 20-80 percent and 18.60 percent within was observed during 1987-88 and 1988-89 respectively in channel irrigation. They also reported that during summer, the rate of shoot growth in six and seven liters water supply per day was more as compared with four and five liters water supply. They further observed the size of the betel leaves was increased according to the increase in the rate of water discharged through the drip irrigation system. Again, they revealed that the weight of hundred leaves in five liters water discharged was higher (433.70 and 427.09 gm.) followed by six liters of water supply (403.70 and 423.09 gm.) per day. In case of channel irrigation (control treatment) weight of hundred leaves was less (194.50 and 189.90 gm.) during 1987-88 and 1988-89 respectively. In short, they observed that the drip irrigation of five six and seven liters water per day gave higher shoot growth, better leaf size, higher weight of hundred betel leaves and least wilting percentage in Bangla variety in Akola region of Maharashtra.

In the annual report of All India Co-ordinated Research Project on Betelvine (2000-01) was given the results of application of drip irrigation on yield parameters at Mahatma Phule Agriculture University at Sangli center. The incidence of disease viz. foot rot was observed in surface irrigation treatment incidence of foot rot was 38.27 per cent while in drip irrigation foot rot was not observed. It also reported that among all irrigation treatment, significantly higher yield was observed under drip irrigation with 125 per cent evaporation replenishment rate was followed by 150 per cent evaporation replenishment and 100 percent evaporation replenishment rates respectively. Lowest yield was observed at 50 per cent evaporation replenishment treatment followed by 75 percent. The yield of these two treatments was less than even surface irrigation treatment. There was 32.60 percent to 66.80

percent saving of water under drip irrigation method as compared to surface irrigation method.

S. Maiti and K. S. Shivashankara (1981-1997) reported the results of drip irrigation on growth and leaf yield in the Betelvine Research Highlights. They suggested the application of drip irrigation to replenishment 100 percent and 150 percent of evaporation demand at Jawaharlal Nehru Krishi Vishwa Vidyalaya at Jabalpur and Mahatma Phule Agricultural University respectively gave maximum and significantly higher leaf yield and higher vine growth.

S. M. Patil (1990) suggested the following drip irrigation system for betelvine cultivation.

Table 1 Month-wise Daily Water Requirement for Betelvine

Sr. No.	Month	Daily Water (Liters)	Drip Period (Hours)
1	January	8	2.20
2	February	9	2.40
3	March	10	2.40
4	April	11	3.10
5	May	12	3.25
6	June	10	2.40
7	July	06	1.50
8	August	06	1.50
9	September	07	2.00
10	October	08	2.20
11	November	07	2.00
12	December	07	2.00

50 to 60 percent water saving were possible by applied of drip irrigation system. It also helped to increase by 30 to 40 percent in yield of betel leaves. It improved quality of leaves and protected the vine from foot rot disease.

3. Research Methodology:

3.1 Objectives of the study

i) To find out the i**rrigation practices for betelvine cultivation in the selected area**.

ii) To suggest best irrigation practices for betelvine cultivation.

3.2 Hypotheses of the Study

i) The major problems in betelvine cultivation were irrigation management was uniformly distributed.

ii) Availability of water restricts the area under betelvine cultivation in the selected area.

3.3 Research Design

3.3.1 Selection of Area and villages

The area under betel vine cultivation was increasing day by day in Sangli district therefore the researcher selected two tahsils for the intensive study. Five villages from two tahsils were selected purposely based on maximum area under the betel vine cultivation. 10 villages were selected with specific purpose.

3.3.2 Selection of Samples

Six betel vine cultivators were selected from each of the selected villages out of which two from small size of group, two from medium size of group and two from large size of group. Thus, total sample in two tahsils accounted to 60 betel vine cultivators.

3.3.3 Scope of the Study

The present research study was applicable to only Sangli district. Sixty farmers were selected and personal contacts, questionnaires were solicited. The study was mainly concentrated on problems of betel vine cultivation in Sangli district.

4. Result and Discussion:

4.1 Availability of Irrigation

Irrigation played an important role in enhancing betel leaves production. During summer season, there was always paucity of water and that created real problem to protect betelvine crop. Betelvine required the supply of water frequent water. During the summer season, cultivators supplied water to the betelvine crop twice in a week to control humidity in the betelvine garden. Betelvine cultivators arranged permanent irrigation facilities to protect, to increase the quality of betel leaves. Adequate water supply was supplied by respondents to the betelvine crop.

During the rainy and summer seasons, there was adequate water supply and therefore the quality of betel leaves was increased and quality was improved. But during summer season, adequate water was not supplied and therefore quality and quantity of betel leaves were affected.

Table 2 Classification of Respondents for the Supply of Adequate Water

Sr. No.	Size of Group	No. of Respondents	% to Size of Group
1	Small	19	95.00
2	Medium	19	95.00
3	Large	18	90.00

Source: Primary data

Table 2 indicated the adequacy of water supply to the betelvine crop. Out of small and medium size of groups, 95 per cent of respondents had adequate water availability during

all seasons. But 5 per cent respondents suffered from the inadequacy of water facilities during at the end of summer season.

In case of large-size group, 90 per cent respondents enjoyed full water supply to the betelvine crop in all seasons. But 10 per cent respondents faced the problem of inadequacy in only at the end of summer season.

To overcome from this inadequacy of water during at the end of summer season, cultivators construct farm-ponds which covered best quality plastic paper and to store water during rainy and summer seasons and during the time of inadequacy of water availability, cultivators used farm pond-water for their betelvine crop. Drip-irrigation system was operated by farmers during summer season.

4.2 Methods of Irrigation

Surface irrigation and drip irrigation methods were exercised to supply of water to betelvine. Surface irrigation was applied where much water was available. In the absence of adequacy of water availabilities, drip irrigation system was successful. Some betelvine cultivators used surface as well as drip irrigation to the betelvine crop. Application of irrigation method to betelvine crop was given in Table 5.30.

Table 3 Classification of Respondents According to the Method of Irrigation

Sr. No.	Method of Irrigation	No. of Respondents	% to Total
1	Surface–cannel Irrigation	34	56.67
2	Drip Irrigation	04	6.67
3	1 + 2	22	36.66
Total		60	100

Source: Primary data

Table 3 showed the classification of respondents according to method of irrigation applied to betelvine cultivation. Out of the total respondents, 34 respondents, 56.67 per cent, supplied surface irrigation to betelvine crop. 4 respondents, 6.67 per cent, used drip irrigation system. 22 respondents 36.66 per cent used drip irrigation system during rainy seasons and winter seasons. During these two seasons, water was required in quantity. But during the summer season these respondents supplied water by using drip irrigation and surface irrigation to maintain proper humidity.

5. Conclusions and Suggestions:

5.1 Conclusions

1. The climate and rainfall in Miraj and Walva tahsils were moderate according to the needs of betelvine crop. Area under betelvine crop in two tahsils, viz. Miraj and walva,

was more as compared to other tahsils of Sangli district. There was no single betelvine garden in Kadegaon, Khanapur, Atpadi and Tasgaon tahsils.

2. The major problems caused to restrict the use of more area for betelvine was non availability of irrigation.
3. Surface irrigation was the most suitable in betelvine cultivation which helped to control humidity in the summer season.

5.2 Suggestions

1. Application of modern and improved agricultural techniques in water management for quality betel leaves.
2. Betelvine cultivators should require a proper attention to humidity control by using irrigation management.
3. Apply drip irrigation system in rainy and winter seasons to supply water as required. The use of surface irrigation with drip irrigation in summer season to supply the water is essential to maintain proper humidity in the betelvine garden.

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