

Cultivation of Medicinal Plant Success Stories of Two Farmers

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Cultivation of medicinal plant is gaining ground because of the sky rocketing prices of allopathic medicines which also have side effects. Cultivation of medicinal plants is economically very attractive. Success stories of two farmers, one cultivating Aloe vera and other cultivating drumsticks, are mentioned in this paper. Fertiliser use in aloe vera is low, but the profit is quite high which could be ploughed back to cultivate some other high value high fertiliser requiring crop which in future would help in fertiliser marketing. Fertiliser use by the farmer in case of drumstick is quite high. Some suggested lines of work for future is also mentioned.

THE NATIONAL COMMISSION ON Agriculture (NCA), reincarnated as the National Commission on Farmers (NCF), implies that farmers are the center of our agriculture. Their success is our success, the success of the nation. This aspect was highly valued by the second Prime Minister of India which found expression in the famous slogan "Jai Jawan, Jai Kisan". Attempts to highlight the success stories of our farmers are rare. Therefore, it was felt that success stories of our practicing farmer find a regular place in FAI publications. Success stories of some farmers have been highlighted earlier (1,2). This paper projects the success stories of two farmers, (aloe vera and drumstick farmers).

Aloevera Cultivation

Aloevera (*Aloe barbadensis*) is a popular medicinal plant. It belongs to liliaceae family. It is a perennial plant, growing to the height of 1½ - 2½ ft. Its leaves are long and thick, juicy with a wheel like phyllotaxy. The two sides of the leaves have thorny structure with a thorny tip. The inner substance of the leaves is jelly like, with bad odour and bitter in taste. The length of the leaves ranges from 25-30 cm., while the breadth ranges from 3-5 cm. Normally it flowers during October to January and the long inflorescence has a large number of small pink flowers all around. Fruits are developed during February to April. It is

normally not propagated through seeds. Vegetative propagation is easy and convenient. Of late, because of sky rocketing price of allopathic medicines with its known side effects, medicinal plants and ayurvedic medicines are becoming popular. World trade worth about 80 million US\$ dollars exists now and this is likely to increase by 35-40 percent within 5 years. USA dominates the market (65%) while India and China have a share of 10 percent each which could be enhanced by its commercial cultivation.

Soil and Climate

Aloe vera is found to grow in hot humid and high rainfall conditions. It is grown in all kind of soils but well drained soil with high organic matter, is most suitable. It grows well in bright sun light. Shady conditions results in disease infestation It is highly sensitive to water stagnation. Therefore, well drained high land should be selected for its cultivation. A rainfall ranging from 1000 – 1200 mm is ideal for aloevera cultivation.

Seedling Preparation and Planting

Since it is difficult to grow aloevera from seeds, seedlings are normally raised from roots of the plants. Sucker itself can be used as seedlings as in Banana. Rainy season is ideal for sucker plantation. A spacing of 1.5 x 1 ft, 1 ft x 2 ft or 2 ft x 2 ft is followed.

Land Preparation

About 2-3 ploughings and laddering are done to make the soil weed free and friable. Land leveling is then followed. Along the slope, 15-20 ft apart drainage are made.

Application of Plant Nutrients

Before land preparation, about 8-10 tonnes FYM/ ha is applied. Before the last ploughing, 35 kg N, 70 kg P₂O₅, and 70 kg K₂O/ha are added. For controlling termites problem, 350-400 kg Neem Cake / ha may be applied. In September – October about 35-40 kg N as top dressing may be applied. If the soil is rich in organic matter, N dose can be reduced.

Irrigation and Interculture

After 40 days or so weeding and earthing up are done. Earthing up is also practised after top dressing of fertiliser. Aloe vera is slightly tolerant to drought, but very sensitive to water stagnation. Therefore, proper drainage is more important than irrigation. As per need light irrigation during drought is enough.

Plant Protection

Aloe vera is infested by various insects and pests. Special care is needed for their control in medicinal plants like aloevera where the juice of the leaves are directly

taken as medicine. Clean cultivation, interculture operation, regular and need based irrigation, application of adequate organic manure, treatment of suker before planting, and cultivation of aloevera in sunny conditions are conducive for healthy growth of the aloe vera crop. Use of organic source of plant protection materials like raw garlic juice, neem oil (10,000 ppm) 2-3 ml / lit, tobacco extractant 20 ml / lit gave reasonably good result.

Yield

Harvesting of leaves starts after 7-8 months of planting. Sharp knife is used for harvesting. Care has to be taken to reduce the loss of juice from the cut portion. If harvesting is done once in a year, October – November are the best period for harvesting. Second year gives maximum yield and for about 4-5 years good yield could be harvested. After harvesting leaves are dried in shade and then in sun before storages. Flowers are collected in December – January and preserved after proper drying. Yearly 100 – 115 quintals raw leaves and 350 – 400 kg flowers / ha are obtained. (3)

Medicinal Quality

Both the juice of leaves and flowers are used as medicine, but medicines are prepared from leaves. Intake of juice of leave, improves hunger, and helps in digestion. Juice when mixed with sugar cures cough and cold. Besides these, it also cures nervous weakness, asthma, Jaundice, etc. The leaf flesh (about 7-8g) mixed with honey, taken in morning and evening cures constipation. Besides, it is good medicine for many other diseases.

It contains various organic compounds which cures diseases. Of these, the main use is aloine. Besides, these it contains 12 types of vitamin, 20 kinds of amino acids, 20 kinds of minerals, 200 different types of polysaccharides, and various kinds of glycol- protein which are used for human health. Aloine A, and Aloine B, are principles of the ayurvedic medicine. (3)

Economics

Expenditure to be incurred for Aloe vera cultivation normally amounts to about Rs.1,10,000 / ha. The expected income with a yield of about 110 – 115 quintal would be about Rs. 340,000/ha. The net profit would be about Rs.230,000 /ha/year. In addition to monetary benefit, social benefit would be enormous. Better management can results in much higher income and net profit.

Success Story of an Aloe vera Farmer

Jakir Hussain of village Seoraderiya, block Amta 2, Post Office, Barda, district Howrah, Pin 711 401. (Mobile 09732449555) is a progressive farmer of his locality. He has three brothers and 22 bighas of land (2.93 ha) in a joint family. Traditionally he grows rice, potato and other vegetables. With the help of the local ADO office, he has participated in many training programmes, workshops organized by the state department of agriculture and other agencies. To meet the crop needs he also used organic manures / vermi compost etc. prepared by him. (7)

When he was convinced about the profitability of aloevera cultivation, he decided to grow this crop. He collected the suckers of aloevera from Narendrapur Ram Krishna Mission in the South 24 Parganas and Sriniketan (district Birbhum) Visva-Bharati, West Bengal. After a year of cultivation, he could get a good amount of profit. The produce is purchased by the Centre for Rural Development, (CRD) of Jadarpur university which provides technological advise for the cultivation of medicinal plants and their agro-processing. He harvests the crop at two months interval. Since produce is purchased by the university, he has virtually no problem of marketing.

He plans to start a agro-processing unit of his own in future. For the benefit of the readers the method of cultivation adopted by him is mentioned here.

Techniques Adopted

1. Land Preparation.
2. Application of about 8 tonnes vermi compost / ha during last plough.
3. No fertiliser or chemical was applied.
4. The application of ½ kg vermi compost / sucker was applied after establishment of the sucker. The application was again repeated.
5. Hand weeding was followed.
6. Proper drainage facility was provided.
7. Irrigations (except during raining season) were provided as and when needed.
8. Number of plants / ha were 2625.
9. Harvesting started after 8 months of planting.
10. In first year three cuttings were given.
11. Yield / ha was 39.4 tonnes of leaves.
12. From 2nd year on ward 5 cutting were expected.
13. In three years 13 cuttings are expected
14. In three years 170.62 tonnes of yield per ha is estimated.

Estimated income is mentioned in **Table 1.**

Item	Cost (Rs / ha)
1. First year expenditure	2,25,000.00
2. 2 nd year cost	75,000.00
3. 3 rd year cost	75,000.00
Total cost in 3 years	3,75,000.00
Estimated income (in 3 years) (Price Rs.15/kg)	25,59,000.00
Profit at the end of 3 years (estimated)	21,84,300.00
4. Profit / year / ha (average)	719,766.00
Source : (7)	

In addition, 5-7 suckers are obtained from each plant every year. Therefore, in 3 years about 15 suckers are normally obtained. The sale of sucker (Rs. 5/ sucker) per year / amounts to Rs.65,625/-.

Marketing of medicinal plants is very important. Food crop has universal demand. The same is not true with medicinal plant. In case of Mr. Hussain, the university is purchasing, so he has not to face any problem. Mr. Hussain has not used any fertiliser, but organic manure has been used. Therefore, directly it may not an increased the fertiliser demand, but the higher income generated may be ploughed back in the cultivation of some other crop like vegetable needing higher doses of fertiliser and higher credit. Therefore, indirectly this is also likely to increase fertiliser consumption.

Drumstick Cultivation

Drumstick cultivation is easy, less time consuming and paying as well. Therefore, interested farmers may go in for such endeavour.

Utility of Drumstick (DS)

Every parts of drumstick is useful. Tender leaves and sticks have high amount of Protein, Carbohydrates, Vitamin A, Vitamin C and Minerals. Each part is used as medicine. The data presented in **Table 2** provides very useful information regarding drumstick. In addition to sticks and leaves flowers of DS (drumstick) are valued ingredients of food which are not only tasty but nutritive too, Its juice is useful as a protection from bacterial diseases.

Soil and Climate

It can be grown in variety of soils, but loamy, sandy loam soils are better suited. Sodic soils and also dry conditions are quite ok.

Sl.No.	Parameter	Names of Vegetables						
		Drum stick leaves	Drum stick	Spinach	Carrot	Tomato	Frenchbean	Lettua
1	Water (%)	75.9	86.9	86.4	86.0	93.1	91.4	93.0
2	Protein (%)	6.9	2.9	3.4	0.9	1.9	1.7	2.1
3	Fat (%)	1.7	0.1	0.8	0.2	0.1	0.1	0.0
4	Carbohydrates (%)	12.5	3.7	6.5	10.6	3.6	4.5	2.5
5	Fibre (%)	0.9	4.8	0.7	1.2	0.7	1.8	0.5
6	Mineral (%)	2.3	2.0	2.2	1.1	0.6	0.5	1.2
7	Calcium (mg/100g)	440	30	380	80	20	50	50.0
8	Phosphours (mg/100g)	70	110	30	30	36	28	28
9	Iron (mg/100g)	7	3.3	16.2	-	1.8	1.7	2.4
10	Vitamin A (IU)	11,300	184	5,862	3,157	320	221	1,650
11	Vitamin B (mg/100g)	0.210	-	4.12	0.4	0.07	0.04	0.09
12	Vitamin C (mg/100g)	22.0	12.0	70.0	3.0	31.0	14.0	10.0
13	Energy (cal)	92.0	26.0	46.0	47.0	20.0	26.0	22.0

Source : (4)

Variety

Generally DS provides flower once in a year, but a variety called Najne gives flower throughout the year. Fruit of Najne is thick and short. "Tatanagar" is a high yielding Najne variety. its fruits are long and it flowers profusely and gives high yields.

Name and qualities of some important varieties are mentioned below:

Name of the varieties	Characterics
1. Jafna, Jalpanam	Provide fruits once in a year, fruits are about one meter long
2. Kodical	Fruits are 15-20 cm long, tasty and juicy
3. Mulanur	Fruits are 3-45 cm long
4. P.K.M 1 Hybrid (PKM-2)	These flower within 4 months of planting and fruits are ready after 6 months of planting. It gives about 200 sticks per plant.

Raising Seedlings

Seedlings raising is easy. It can be propagated from seed and also from branches. About 15 cm x 7 cm polythene bag is most suited. May – June is the best time. During May – June, Soil and organic manure in 2:1 ratio has to be put in poly packets two seeds are to be put in each packets and kept under shade and watered regularly. Germination takes place after 8-10 days. After 30-35 days seedlings, are ready for planting in main land. About 800 gms seeds / ha is enough.

Vegetative Propagation

One to two metre long branch is cut from the mother plant and planted in soil with adequate moisture and the cut portion of the head is covered with a lump of soil.

Land Preparation and Planting

Deep ploughing is done for DS cultivation. Pits measuring 1ft x 1ft x 1ft at a distance of 2.5 m. is prepared during summer months. Pits are filled with 2 kg FYM and soil. On the onset of monsoon, the seedlings are planted in the pits.

About 1500 plants are needed for a ha of land. Seedlings prepared by vegetative propagation also can be planted in the pits after filling with the manures. The banks of ponds and waste lands can be conveniently used for DS planting. (5)

Interculture Operation

Timely and proper weeding at the initial stage of growth is needed. Seedlings raised from seeds need to be pruned, when plants reach a height of about 3 ft. This helps in the branching of the plants and many fruits could be had from lower height.

Fertiliser Application

After 3 months of planting, 50 g N, 20 g P₂O₅ and 25 g of K₂O are added per pits. In addition, about 5 kg FYM / vermi compost is to be added per plant.

Irrigation

During dry season irrigation helps for better growth of DS plants.

Plant Protection Measures

DS is highly susceptible to various insects. Cater pillar, hairy cater pillar etc. are some of the common insects. Hairy cater pillars feed on leaves and buds and during day time stay at the base of the plants. This could be conveniently controlled by soap solution application during day time when they gather together at the base of the plants.

Harvesting

After 6 months of planting, harvesting can be done. On average 200 fruits could be obtained. After harvesting, pruning of plants is done to get more branches and fruits in the next season.

From the vegetative propagation tall plants are obtained. Therefore, after harvesting, branches have to be axed. Initially about 90 fruits per plants are obtained but with the passage of times

about 800 – 1000 DS are obtained / plant.

Success Story of a Maharashtra Farmer

Santosh Sambhaji Kalane, of Village Balwant Station, Taluka : Sri Gonda, district Ahmednagar, Maharashtra, (Mobile No.09960611855) has created a record in the production of Drumstick. (6)

Techniques Adopted

The techniques adopted by him is mentioned herein :

1. Land preparation in the month of May 2008
2. Variety used was CO- I
3. Treatment of seed with Tricoderma VDT
4. Sowing of seeds in June 2008
5. Spacing used was 10 ft x 10 ft and two seeds were planted in each pit
6. After 15 days of seeding, 125 kg urea / ha was applied through ring method
7. 1 kg organic manure per pit was used after 15 days of seeding.
8. The same manure was used in 45 days interval several time.
9. After two months of seeding, 125 kg DAP, 125 kg NPK 10 : 26 : 26 were mixed and applied in ring
10. In January 2009, cow urine was applied through drip
11. A mixture of 250 kg urea + 125 kg NPK 10 : 26 : 26 + 125 kg DAP + 30 kg Plants high plant growth regulator was applied / ha
12. Needed interculture was done, but no irrigation was applied during rainy season. From December (2008) onward irrigation was applied at an interval of 4 days through drip, but during dry season, he also irrigated through furrow
13. Pruning of branches were resorted to, after 15 days of seeding

14. As a result, lateral branching increased

15. After a month of 1st pruning, medium height branches were pruned at a height of 6 ft.

16. Third time, pruning was done at a height of 9 ft. As a result, branching was profused and afterwards plants become fruit bearing.

17. After harvesting, a bundle of 10-12 kg is made and sent to Pune and Mumbai.

18. All necessary measures of plant protection were undertaken.

19. Regular field visits was carried out..

20. Stem borers, if located, were immediately destroyed with a peg and a mixture of Kerosine and microtophos were applied in the holes and then was closed with mud

21. After a month of seeding, Cypermethyne (5%) and Chloropyriphos mixture was prepared and used @ 2 ml / 1lit when fruiting started

22. A mixture of dichlorophos 76% EC (2 ml / lit) and thiophunate methyl 70% WP (0.5g / lit) was sprayed.

23. To control powdery mildew (disease), Microbutanyl 10 WP (0.5 g / lit) was sprayed

24. A Pheromon trap was installed for 20 plants each.

Drumstick is a perennial plant. Therefore one harvesting does not stop the necessary operation. For higher yield, after the first harvesting proper management is essential. After the last harvest in May, the pruning of branches is resorted to and borduex mixture is used in the cut portion of the plant. Then 20 kg FYM + 800 g SSP per Plant was added. After 3 months of this, 250 kg NPK 10 : 26 : 26 + 250 kg DAP + 125 kg urea / ha were used. It is expected to get higher yield in the second year. In the first year, a yield of 25 t / ha was obtained. The economics of 1st year cultivation is mentioned in **Table 3**. The

Continued on page 20..

Cultivation of Medicinal Plant : Success Stories of Two Farmers (Continued from page 4)

Table 3 – Economics of DS cultivation (Rs. / ha)			
Month	Yield tonnes	Price (Rs / ha)	Income (Rs)
February '09	2.5	25	62,500.00
March '09	7.5	17	127,500.00
April '09	12.5	10	125,000.00
May '09	2.5	9	22,500.00
Total	25	-	337,500.00
Cost			65,000.00
Profit			2,72,500.00
<i>Source (6)</i>			

profit is likely to increase in second year on wards.

CONCLUSION

ALOE VERA IS A FAMOUS MEDICINAL PLANT, but drumstick (DS) is a well known vegetable and medicinal plant as well. Successful cultivation of these crops is economically attractive provided marketing is not a problem. Aloevera cultivation demands skill and it is also very labour intensive, while DS cultivation is relatively easy. The cultivation of these crops needs encouragement to generate employment and income by the farming communities. The income thus generated could be used for purchasing valued input like fertiliser needed for the cultivation of high fertiliser requiring crops like

vegetables, sugarcane, grapes, banana etc. Credit availability can create miracle even in the poorest of the poor society as demonstrated in Bangladesh by the work of Prof. M. Yunus, the winner of Nobel Prize. (8)

FUTURE LINES OF WORK

1. Cultivation of medicinal plants generates employment and income. These need encouragement at the right place.
2. In case of marketing of the economic product like medicinal plants, organized marketing facilities is to be provided.
3. The agronomy of these crops are not well known among the farmers, this needs urgent attention.
4. Agro-processing of medicinal plants like Aloevera is to be perfected and

popularized among the needy. This would help in enhancing employment and income of the rural people.

5. Work on balanced use of plant nutrients in improving yield and quality of medicinal plants is lacking. Therefore, this kind of work needs urgent attention.

6. Availability of rural credit at right place by right method can create miracles which has been demonstrated by Nobel Prize winner, Prof. Yunus through his Gramin Bank. The wealth creation through higher production and profit has to be encouraged by the cultivation of economically attractive crops like medicinal plants (aloevera and DS)

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Statement about ownership and other particulars about FERTILISER MARKETING NEWS to be published in the first issue every year after last day of February – FORM IV SEE RULE 8	
1. Place of publication	New Delhi
2. Periodicity	Monthly
3. Printer's Name (Whether Citizen of India) (If foreigner, state the country of origin) Address	R. A. BALASUBRAMANIAN Yes No The Fertiliser Association of India 10, Shaheed Jit Singh Marg, New Delhi - 110067
4. Publisher's Name (Whether Citizen of India) (If foreigner, state the country of origin) Address	R. A. BALASUBRAMANIAN Yes No as above
5. Editor's Name (Whether citizen of India) (If foreigner, state the country of origin) Address	SATISH CHANDER Yes No as above
6. Names and Addresses of individuals who own the newspaper and partners or shareholders holding more than one per cent of the total capital	The Fertiliser Association of India a Company limited by guarantee
I, R. A. BALASUBRAMANIAN, hereby declare that the particulars given above are true to the best of my knowledge and belief.	
Dated : March 1, 2010	Signature of Publisher