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Current status of *Stylosanthes* seed production in southern India

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Abstract. India is a significant producer of *Stylosanthes* (stylo) seed (principally *S. hamata*). Most of this seed is produced by villagers and small farmers in the Anantapur district, Andhra Pradesh, southern India. This is one of the poorest regions in the State, with harsh climatic conditions, poor, zinc-deficient soils, and (in the stylo seed production area) farm sizes averaging less than 2 ha. Marketing is handled by an informal network of seed traders who distribute stylo seed within a 25-30 km radius and, via the next level of traders, to other parts of India. A survey of seed production in this area in 2002/03 indicated that stylo seed production in 2001 was about 800 t from more than 400 ha (Rao *et al.* 2004). A second survey, conducted in 2012, showed that the stylo seed production area had declined to 150 ha, and that annual seed production had declined to about 300 t. Most of the decline had occurred since 2007, when the purchase of seed for watershed rehabilitation in the States of Karnataka and Andhra Pradesh was discontinued. In addition to the loss of this major market, other factors influenced the reduction in stylo seed production. These included the low price of stylo seed compared with groundnut (the crop mainly competing for land use); sales of land for other purposes, and diversion of one area as a Special Economic Zone; reduced availability and increased costs of labour, particularly after the establishment in 2005 of the National Rural Employment Guarantee Agency (NREGA) which provided an attractive employment option for rural workers; lack of technical support; and, in one case, delays in payment. Poor seed quality is another issue constraining prices. Despite these challenges, many farmers in the region remain positive and would continue to produce stylo seed if profitability could be improved.

Keywords: Stylo seed crop, seed producers, area under stylo seeds, cost-benefit, Anantapur.

Introduction

Land degradation and associated poverty are major challenges in rural areas of India. Wastelands in India amount to 114.01 M ha or almost 36% of the land area (ICAR 2010). Various policies and programs have been devised, mainly through five-year plans, to address the issue. The significant boost for wastelands through watershed programs was given in the IX Plan (1997–98 to 2001–02). Watershed development as a poverty alleviation measure has been given a high priority in India as is evident in the 20-year Perspective Plan (2002–03 to 2021–22) for treating around 88.5 M ha land in the next 20 years with a total investment of INR 727.5 billions. India has 15% of the global livestock population with only 2% of the land area. Restoration of degraded lands is also aimed to meet grazing requirement of livestock and wild life in some areas (Ramesh *et al.* 1997).

Stylosanthes (stylo), a pioneering coloniser, establishes well on poor and severely eroded soils in dryland conditions. Its ability to improve soil bulk density, infiltration rate and water holding capacity makes it a useful species for the conservation, stabilisation and sustainable development of land and water resources (de Leeuw *et al.* 1994). There is a large demand in India for a seed of *Stylosanthes*, particularly *S. hamata* – a short lived perennial legume which has perceived perennality in this

part due to self seeding. Public sector operated centres for forage crops only produce enough seeds to meet a small part of this demand. Most of the demand is met by farmers of Anantapur district (13^o-14^o S, 76^o-77^o E) of Southern India who cultivate, sow the crop once in 3-4 years and produce seeds of *S. hamata*. Initially, beginning in the mid 1970s seed production of *S. hamata* by farmers in this region was aided by international pilot seed programs, in which seeds were produced by small and marginal farmers of this district. Some of these farmers later converted into producers-cum-traders. Eventually an informal network of seed producers and traders emerged and grew in scale and extent.

Stylo seeds produced in this region today reach even the remotest parts of the country. A survey in this area in 2002/03 indicated that stylo seed production (SSP), refers to seed production of *S. hamata*, in 2001 was about 800 t from more than 400 ha (Rao *et al.* 2004). A similar survey was taken after a decade (2012) to quantify current seed production and to examine the factors underlying the continuity of production of stylo seeds (or otherwise) by the farmers of the area.

Methods

Anantapur is one of the most economically backward districts of Andhra Pradesh province of India. The average



Figure 1. Map showing the study area

annual rainfall of the district is only 550 mm and, on average, one year in three years is a drought year. This district is divided into 3 revenue divisions, and most of the stylo seed is produced in the Penukonda division within the Gorantla, Somandapalli and Chilmathur revenue blocks (Figure 1), where stylo is extensively cultivated. The survey was undertaken in these revenue blocks. A preliminary list of villages where stylo seed is being produced at present was prepared by consulting with the field-level staff of the Animal Husbandry and Veterinary Services Department and, as in the previous (2002-03) survey, many such villages were in the Gorantla block and a few were in the Somandapalli and Chilmathur blocks. Our primary surveys therefore covered the Gorantla block extensively, and only a few villages in the other two blocks. In total, the study covered 17 villages of which 10 villages were common in the 2002-03 and 2012 surveys. The stylo seed crop is ready for harvest in January, and in that month

the farmers are relatively free from other *rabi*-season farm operations.

This study was therefore undertaken in January 2012. We carried out primary surveys, interviews and consultation with a cross section of people, and detailed discussions with the key informants and seed traders at two levels (village and revenue division level). Checklists were prepared to guide the discussions in the field separately for the seed growers and traders. Village surveys, however, formed an important part of the study to understand what was happening at the farmer and village levels.

Results

Estimated area under stylo seed crop in surveyed villages and reasons for decrease in the area.

In almost all the villages, the area under stylo had declined since the previous survey (Fig. 2). The area had declined drastically in some villages, where only a few larger farmers, who were growers as well as seed traders, had continued to cultivate the crop. Farmers indicated that the steep fall in the area under stylo had occurred only after 2007 when the demand for seed had decreased. This information from farmers was consistent with the banning of purchase of *Stylosanthes* seeds by Karnataka and Andhra Pradesh State Governments at that time. The large quantity of adulterated and impure seeds sold by the last level middlemen resulting in extremely low level of germination is the prime reason for these governments to decide so. Seed samples of *S.hamata* sent to IGFRI RRS Dharwad for purity test by the Watershed department of Karnataka in 2006 had nearly 90% inert material. The watershed officials literally failed to recognise the *S.hamata* seeds in the samples. Except in a few villages, the majority of the small and marginal farmers had replaced the crop with groundnuts, the traditional oilseed crop in this area. The landholdings of the farmers in this dry tract are very small, and hence in many cases complete replacement of the stylo crop was observed. The prices of agricultural commodities including groundnut in India had increased especially in this decade, and hence SSP farmers appeared to have reverted back to groundnut cultivation.

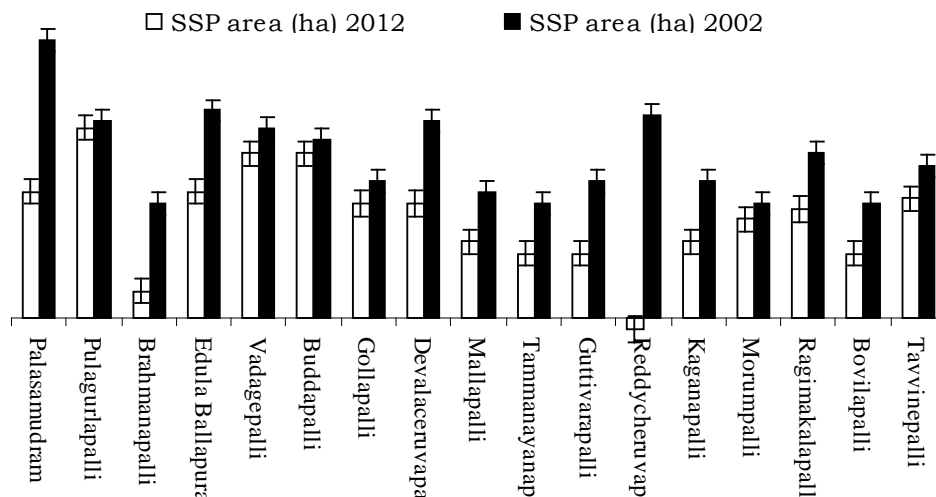


Figure 2. Area under SSP in surveyed villages (figure based on log transformed data)

Palasamudram, the village previously having the greatest area under stylo (160 ha), in 2012 had only 10 ha under SSP, and this area belonged to larger farmers who were also the traders of the stylo seed. Small and marginal farmers had discontinued stylo cultivation. The Government of Andhra Pradesh has earmarked land for a Special Economic Zone (SEZ) in this village. Of the 392 ha of land allotted for the SEZ, 153.75 ha or 39% was owned by the farmers who had previously cultivated stylo. This was a pioneering village for SSP, and some farmers from this village had been trained in SSP at government farms (Rao *et al.* 2004). Edula Ballapuram is another village where the area under stylo had been reduced remarkably, from 44 ha to 10 ha. The prime reason expressed by the farmers of this village for discontinuing SSP was undue delay in receipt of payment. This reason was very specific to this village: in other villages payment was not a problem. The village seed trader, when consulted, however, mentioned that the problem of non-availability of labour had affected the crop. This trader had a stylo seed stock of 150 kg. Interestingly in Guttivarapalli village during 2010 there was no stylo cultivation, whereas in 2011 some families had resumed the cultivation covering 3.24 ha.

However farmers said that they might revert back to cultivation of stylo if prices for seeds were increased and if it proved more profitable for cultivation than regular field crops. The labour wages had increased 3-fold since 2002 but the price of stylo seeds had remained constant. Non-availability of labour was another reason mentioned as the crop requires many labourers for collecting seeds and further processing. These operations have to be carried out in the months of January to March when the temperatures are high. Many labourers are reluctant to work under hot conditions; rather, they would prefer to work elsewhere, especially as work opportunities have increased in the last 10 years. Many of the villages (Pulagurlapalli, Brahmanapalli, Reddy-Cheruvapalli among others) are located adjacent to the Bangalore-Hyderabad national highway (NH-7). The completion of the Bangalore international airport at Devanahalli located less than 70 km away had increased the land prices and many small and marginal farmers had sold their lands. These reasons of increased land prices and selling land either to private buyers or to the government applied not only to those villages which are located next to the highway but also to some of the stylo growing villages located in the interior. In some of the interior villages, for example, Ragimakalapalli private seed companies had purchased large areas to establish their seed production centres and to market the seeds from Bangalore to other parts of the country.

Cost of cultivation of stylo crop

Cost-benefit analysis (Table 1) of stylo seed crop production indicated that input costs had increased substantially in the last ten years. The major share of the input costs was that of labour, and the wages of labour in a decade had almost tripled. There were many reasons for increased wages, the most important being the implementation of a National Rural Employment Guarantee scheme in 2005. Stylo seed yield, fodder yield and the selling price of the

Table 1. Cost-benefit analysis of Stylo seed production

Factors	Stylo seed crop 2002 (Rs./ha)	Stylo seed crop 2012 (Rs./ha)
Input variable cost		
Seed*	0	0
Human labour	6000	15000
Bullock labour/ Machine labour	1250	3250
Farm yard manure	1500	3000
Fertiliser	1437	2315
Interest on working expense	407	942
Fixed cost		
Land rent**	3750	7500
Land revenue	0	0
Total cost	14345	32007
Out put		
Seed yield (kg/ha) ***	2000	2000
Price of seed (Rs./kg)****	18	18
Fodder yield (kg/ha)	2250	2250
Price of fodder (Rs./kg)	2.50	5
Gross returns	41625	47250
Net returns	27280	15242
Input out put ratio	2.90	1.48

*Fallen seeds germinate and give good crop stands, so cost of seeds is considered zero.

Farmers do not spray any pesticide, so cost of pesticide is not included.

**Cost Imputed for owned land rent Rs. 7500/ha.

The Government of Andhra Pradesh does not levy any land revenue

*** Minimum seed yield as told by the farmers was considered and the maximum seed yield mentioned by them was about 4000 kg. However seed lot had high level (more than 50%) of inert material.

**** Price of the seed considered was relative price received by the farmers over last 4 years.

seed did not show similar increases, but instead remained almost constant for a decade. As a result, the returns from the cultivation of stylo were reduced drastically (the B:C ratio decreased from 2.90 to 1.48), making it less remunerative for the farmers.

Seed demand, price and purity

There is an informal seed market for stylo seed. It is largely operated by the vast network of middlemen. There is no specific method to fix the price or to check the seed quality. The demand for stylo seeds varies from year to year and also within a year. Lack of information on seed demand at the level of the village seed traders weakens their bargaining power on price except to agree to the price offered. This resulted in the selling of spurious seeds by the farmer and traders. Seed lots collected from different sources and places in the surveyed villages clearly indicated large scale admixtures, and average purity was only 28% (Table 2). Truthfully labelled stylo seed samples from public research farms have recorded 81% pure seed content (Table 2). There is no specific method in place to assess seed demand, to fix the price or to check the seed quality, thus favouring only the few big traders in the business. Rao *et al.* (2004) reported non-availability of data on the actual quantities of stylo seed purchased by various users.

Table 2. Pure seed analysis report of *S.hamata* seed samples collected from farmers and traders

Sl No	Name of the farmer/trader/village	Pure seed (%)	Inert material (%)
1	Rudrappa, Village Budapalli	33.20	66.80
2	Lakshman, village Tammanaayanapalli	28.04	71.96
3	Manjunath, Village Brahmanpalli	26.98	73.02
4	Chandrashekhar, Village Devalacheruvapalli	18.00	82.00
5	Hanumanthappa, Village Brahmanapalli	28.72	71.28
6	B Manjunath, Village Mallapalli	21.26	78.74
7	Narasimlu, Village Pulgurlapalli	22.74	77.26
7	Laxman, Village Brahmanpalli	48.31	51.69
8	Nagaraj, village Pulgurlapalli	32.40	67.60
9	Narshimappa, Village Guttuvarpalli	35.46	64.54
10	Satyanarayanareddy village Palasamudram	10.26	89.74
11	Ramanjayalu village Devalacheruvapalli	30.04	69.96
13	Cillage Village Idaballapuram,	30.28	69.72
	Average	28.13	71.87
14	Research centre IGFRI, SRRS Dharwad seed sample	81.25	18.75

Conclusion

The area under stylo has declined considerably in the region. Important reasons include non-availability of labour, increased labour wages and an almost constant price for stylo seeds during the last decade. Mechanisation of seed harvesting and processing in the area helps to reduce the dependence on labour. A system involving

trusted agencies in the area is required to assess seed demand and to check the quality of seeds in order to get a fair price for the seeds. A reduction in labour usage and a fair price for the seeds together could revive the ailing stylo seed production industry in the area, bringing greater stability to the livelihood of small and marginal farmers in this semi-arid dryland area.

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