Impact of Good Agricultural Practices (GAP) on Small Farm Development: Knowledge and Adoption levels of Farm Women of Rainfed Areas

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Paper Received on July 15, 2015, Accepted on October 09, 2015 and Published Online on October24, 2015

ABSTRACT

Good agricultural practices (GAP) concept initiated with the understanding that practices followed to produce food that is safe to eat and ecologically sustain resources. It is defined as optimization of technologies and resources for sustainable agriculture and food safety. GAP principle and standards that are required for production of quality produce are developed by FAO (2003). Technology transfer of GAP principles have been applied at farm level for soil fertility management, crop production, post harvest and animal production practices aspects, for three successive years from 2011-2014, in the study area of Rangareddy district of Telangana state. Small and marginal women farmers possessing 1-2 acres of land have fully benefitted from the GAP interventions in terms of knowledge and adoption. These women farmers were involved in on-farm demonstrations, farm field schools, training, field days, exposure visits and were also connected to ICT tools through SMS alerts. The GAP technologies included are soil test based fertilizers, application of biofertilizers like PSB and rhizobium, seed treatment of pulses, plastic mulching and stacking of tomatoes, zero tillage of maize and technologies for reducing post harvest losses and other animal production practices. In training the emphasis was placed on benefits of practicing green manuring, use of compost with crop residues and FYM, benefits of soil test based fertilizer application, benefits accrued with minimal tillage and less mechanical disturbances to soil, maintenance of clean and hygienic conditions at post harvest levels and providing clean drinking water and dry conditions for animals. Farm women benefited from GAP interventions in understanding the basic importance of of soil fertility management, crop production practices, post harvest technologies, and animal production practices. It was evident from significant differences in knowledge levels between beneficiaries and non beneficiaries that reflected from high mean scores. This change is however necessary to improve profitability and sustainability of small farms and its development.

Key words: *Agricultural practices, Small farm development, Rainfed, Sustainable agriculture, Knowledge, Adoption,*

Intensive agriculture based on adopting modern seed-fertilizer technology model seems to be unsustainable in terms of yield, maintaining soil health, contamination of food with pesticide residues, poor underground water quality, maintaining water reserves and pathogen infested food due to poor food storage methods and means of processing. Therefore, management of soil, water and food safety needs special attention for meeting high food production targets and at the same time promoting good food safety measures among the growing population and was found possible with practicing good agricultural practices usually termed as 'GAP' and that usually should begin with farm production (FAO, 2003). GAP has been envisaged to stand on three pillars namely social equity (empowering small holders and disadvantaged sections), sustainability and food security.

Women play significant role in agriculture and allied sectors: primarily crop production, livestock, horticulture, post harvest and agro-forestry systems. However, women farmers mostly adopt traditional methods resulting in low productivity. Given access to appropriate

improved technologies and resources can develop sustainable agricultural systems. Therefore, a transfer of technology program based on GAP has been envisaged in semi- arid areas of Andhra Pradesh and major cropping systems being cotton and maize.

The GAP technologies included are soil test based fertilizers, application of biofertilizers like PSB, rhizobium seed treatment of pulses, plastic mulching and stacking of tomatoes, zero tillage of maize and technologies for reducing post harvest losses and other animal production practices. In training emphasis was placed on benefits of practicing green manuring, use of compost with crop residues and FYM, benefits of soil test based fertilizer application, benefits accrued with minimal tillage and less mechanical disturbances to soil, maintenance of clean and hygienic conditions at post harvest levels and providing clean drinking water and dry conditions for animals.

A study, therefore, was undertaken to understand the impact of GAP interventions through demonstrations, training, and exposure visits to field visits and field days on level of knowledge and adoption practices of women farmers and beneficiaries of the program.

METHODOLOGY

Technology transfer of good agricultural practices was carried out in Rangareddy district of Telangana State to women farmers possessing 1-2 acres land. Fourty women farmers of 20 each of two villages: Kandlapally and Gangupally of Pudur mandal were imparted training and also involed in on-farm demonstrations on GAP principles related to soil fertility management, crop production practices, post harvest technologies and animal production practices. On-farm demonstrations and farm field schools on PSB application; a biofertilizer was tried in maize-pigeon pea intercropping systems; resistant wilt cultivar on pigeon pea; zero tillage maize and other soil fertility management programs with green manuring; application of neem seed kernel extract and other good agricultural practices were demonstrated and also regular training on the knowledge of importance in conservation of resources were thoroughly imparted to small farm holders of the the district. A schedule was developed to measure extent of knowledge and adoption of GAP principles and technologies followed by the small holders particularly by women beneficiaries and non beneficiaries constituting equal sample size.

RESULTS AND DISCUSSION

The study had revealed that majority of respondents had shown high mean knowledge scores on soil fertility management in terms of advantages accrued through intercropping systems with leguminous crop and of crop rotations, both attributed with equal means of 2.83 each, benefits of organic compost to soil (2.82), benefits of minimum tillage and least score recorded for application of green leaf manure (1.15) as given in Table-1. Crop rotations and intercropping systems might have been perceived as indigenous technical knowledge (age old practices) transferred through many generations and this might have reflected in high knowledge mean values in terms of benefits accrued to soil fertility and crop productivity. Farm women also possessed medium knowledge on need for soil water conservation practices, but low knowledge with regard to benefits of IPM and

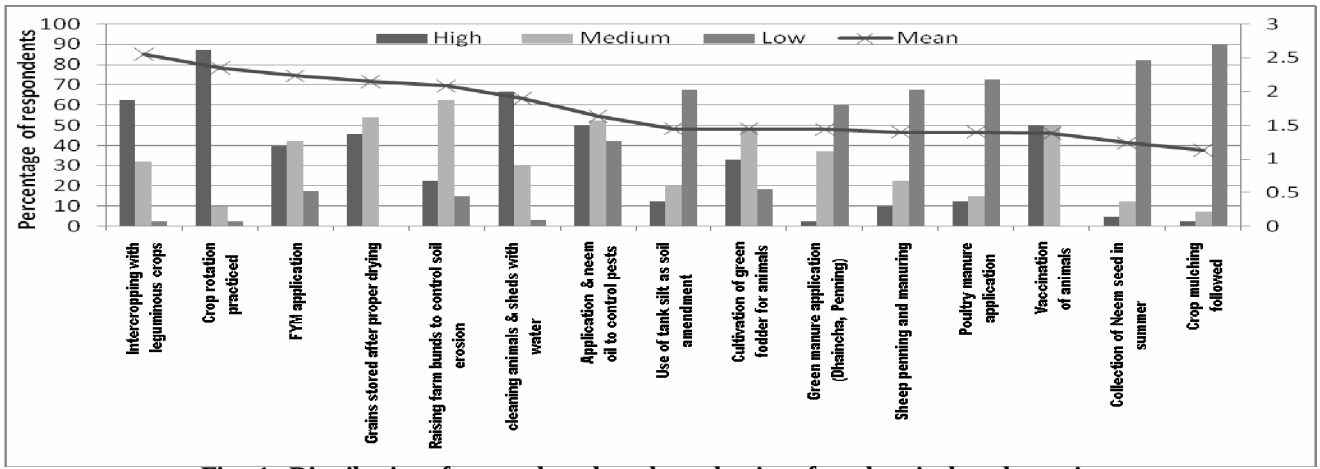

Fig.- 1 Distribution of respondents based on adoption of good agricultural practices.

Table 1. Level of knowledge on Good Agricultural Practices of Women Farmer Beneficiaries

Good Agricultural Practices	Beneficiaries			Non beneficiaries (Control group)			Mean (A)	Mean (NA)
	High	Medium	Low	High	Medium	Low		
Soil fertility management								
Advantage of crop rotation	33(82.5)	7(17.5)	-	3(7.14)	21(50)	18(42.5)	2.83	1.64
Need for intercropping with leguminous crops	33(82.5)	7(17.5)	-	2(4.76)	24(57.4)	16(38.09)	2.82	1.66
Regular addition of NPK fertilizers in soil	11(27.5)	28(70)	-	21(50)	18(42.85)	3(7.14)	2.25	2.42
Benefits of organic compost soil fertility	12(30)	20(50)	8(20)	7(16.66)	25(59.52	10(23.80)	2.10	1.92
Consequences of tank silt application	9(22.5)	11(27.5)	20(50)	21(50)	18(42.85)	3(7.14)	1.73	2.42
Benefits of minimum tillage option	2(5)	13(57.5)	15(37.5)	5(11.90)	16(38.09)	21(50)	1.53	1.61
Important of green leaf manures to soil	4(10)	18(45)	18(45)	1(2.38)	5(11.90)	36(85.71)	1.15	1.16
Crop production practices								
Crop rotation uses	34(85)	6(15)	-	2(4.76)	25(59.52)	15(35.71)	2.85	1.69
Cultivation of resistant verities	16(40)	23(57.5)	1(2.5)	0	3(7.14)	40(95.23)	2.38	1.09
Need for soil & water conservation methods, bunds, trenches and farm ponds	15(37.5)	24(60)	1(2.5)	1(2.38)	10(23.80)	31(73.80)	2.35	1.28
Presence of agricultural important insects	6(15)	29(72.5)	5(12.5)	2(4.76)	24(57.14)	16(38.09)	2.03	1.66
Dependence of integrated weed control	3(7.5)	30(7.5)	7(17.5)	26(61.9)	14(33.33)	2(4.76)	1.9	2.57
Benefits accrued from adopting spacing and thinning practices	4(10)	26(65)	10(25)	0	1(2.38)	41(97.61)	1.85	1.02
Can differentiate pests from friendly insects	6(15)	21(52.5)	13(32.5)	1(2.38)	3(42.00)	38(90.47)	1.83	1.11
Benefits of integrated pest management	2(5)	24(60)	14(35)	6(14.28)	18(42.85)	18(42.85)	1.7	1.71
Importance of mulching soil when crop standing period	-	3(7.5)	37(92.5)	0	0	42(100)	1.08	1.0
Post harvest technology								
Consequences of threshing on roads	-(2)	35(87.5)	5(12.5)	0	7(16.66)	35(83.33)	2.85	1.16
Storing food grain on elevated & ventilated place	18(45)	21(52.5)	1(2.5)	0	11(26.19)	31(73.80)	2.43	1.26
Washing hands while processing food	16(40)	24(60)	-	0	11(26.19)	31(73.80)	2.15	1.26
Need for reduction of moisture	18(45)	21(52.5)	1(2.5)	0	11(26.19)	31(73.80)	1.88	1.26
Benefits of food hygiene & safety	6(15)	34(85)	-	0	3(7.14)	39(92.85)	1.83	1.07
Animal production practices								
Feeding of mixture of leguminous with non leguminous	7(28)	17(68)	1(4)	0	0	5(11.90)	2.64	0.11
Regular vaccination to animals	15(60)	10(40)	-	0	2(4.76)	4(9.52)	2.64	0.19
Cleaning animal sheds	15(60)	10(40)	-	0	6(14.28)	0	2.43	0.28
Benefits of washing hands before milking	16(64)	9(36)	-	1(2.38)	2(4.76)	2(4.76)	2.4	0.21
Benefits of artificial insemination	20(80)	5(20)	-	0	0	5(11.90)	2.24	0.11

Figures in parenthesis indicated percentage,

Table 2. Level of knowledge of women beneficiaries and Non beneficiaries on GAP technologies and principles.

GAP Technologies	B	NB	t- value
Soil fertility management	2.059	1.83	.852^{NS}
Crop production practices	2.00	1.46	2.493**
Post harvest technology	2.23	1.20	5.424**
Animal production practices	2.47	0.18	27.528*

B=Beneficiaries NB=Non -Beneficiaries (Control)

crop mulching. This indicated that farm women require more outreach programs in IPM and crop mulching. This was confirmed with study from *Atry Samee et al, 2009, Jeyalakshmi and Santha Govind, 2008.*

For achieving sustainable rainfed agriculture, GAP principles on livestock management form important component of farming system. From the Fig -1, it has been clearly indicated that farm women possess high knowledge mean value on regular vaccination (2.6)

cleaning of animal sheds, benefits of washing hands before milking and benefits of artificial insemination. The reason might be that women's participation in animal production found to be high that reflected in high knowledge in good animal production practices. This was in line with findings of *Akand and Atul, 2010.*

There was significant difference in knowledge levels between beneficiaries and non beneficiaries in terms of knowledge in GAP principles on crop production, post harvest and animal production practices which might be due to availability and access to improved cultivar use, PSB biofertilizers and other inputs etc., In post harvest technologies there was significant knowledge gain on consequences of threshing on roads (2.85), storing food grains on elevated platforms (2.43), and washing hands before processing of food (Table - 2)' However, it was found to be non significant in soil fertility management aspects alone which might be due to the fact that most soil fertility management practices documented are related to sustainable practices and of indigenous technical knowledge (ITK) nature, and therefore, it was found that there was non significant relationship existing between the groups.

Adoption of GAP technologies: Adoption of good agricultural practices has been evaluated with farm women (Fig. 2). The highest mean adoption scores obtained on intercropping with leguminous crops (2.55) and crop rotations (2.35). Some of the least adopted technologies were attributed to vaccination of animals (1.38), cultivation of green fodder (1.45), sheep penning and manuring (1.43) and crop mulching (1.13). Some of the soil based practices mentioned are mostly represented ITK and have reported under high adoption category but some practices, for example related to animal vaccination mostly might depend on access to technical assistance that decides technology adoption. According to *Ajayi, 2007*, majority of the sustainable practices are found to be knowledge intensive in nature and poor adoption attributed to low availability of inputs like seed and in such cases the adoption of such practices depends on the extent of efforts put up by the extension organization. *Atry Samee et al (2009)* has reported that level of knowledge on sustainable practices play significant role in extent of adoption of IPM practices.

CONCLUSION

GAP practices related to soil fertility management, crop production practices are mostly sustainable practices and by nature have close relationship with indigenous technical knowledge (ITK) and in many instances it involves inputs which are non accessible and costly such as green leaf manure, poultry manure and crop mulching due to modernization of agriculture. Adoption of such practices require long term efforts from extension system through educational programs such as farmer field school for farmer experimentation and community action. Benchmarking of knowledge and adoption of good agricultural practices, sustainbale in nature, facilitates in design of extension programme for effective development of small farms.

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