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Characterization of technology needs in aquaculture and miscellaneous specialized homegardens

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Abstract
Specialised homegarden is a system that can overtire current limitations of time, space and capital that should be triangulated with effective extension interventions at ground level for the overall remunerativeness and sustainability of homegardens. They can accomplish sustainability in terms of appropriate technology need analysis and proper interventions with specialized components. The study was conducted in the Thiruvanathapuram district comprising five agro ecological units with sixty specialized homegarden systems. The results revealed farmers undertaking aquaculture (1.57) and miscellaneous specializations (1.75) perceived the need for more technologies compared to crop and animal husbandry components.

Keywords: Home gardens, specialized homegarden systems, technology need analysis, aquaculture

Introduction
Fresco and Westphal (2001) specify home gardens as a cropping system composed of soil, crops, weeds, pathogens and insects that converts resource inputs - solar energy, water, nutrients, labor, etc. - into food, feed, fuel, fiber and pharmaceuticals. Kumar and Nair (2004) [5], while acknowledging that there is no standard definition for 'a home garden', summarize the shared perception by referring to it as "an intimate, multi-story combinations of various trees and crops, sometimes in association with domestic animals, around homesteads', and add that home garden cultivation is fully or partially committed for vegetables, fruits, and herbs primarily for domestic consumption. Considering the potential benefits and technological potential of agricultural diversification, a better understanding of the factors controlling the diversification needs to be defined. Hoda (1979) [4] opined that technology enables man to live more comfortably and securely by application of science and knowledge to practical use.
Homegardens are traditional agroforestry systems characterized by the complexity of their structure and multiple functions. Homegardens can be defined as 'land use system involving deliberate management of multipurpose trees and shrubs in intimate association with annual and perennial agricultural crops and invariably livestock within the compounds of individual houses, the whole tree-crop animal unit being intensively managed by family labour' (Fernandes and Nair, 1986) [2]. The functional dynamics and the economic entities in the homegarden as a result of value addition or product diversification is shown by means of vertical diversification**.** Studies reveal that the diversity of crops that results in specialisations with primary homegarden components along with vegetation, livestock, fisheries and other specialised components enables continuous produces/products and reduces the production risks. Altieri and Anderson (1986) [1] revealed that for accelerating moderate to high level food production, indigenous technology should be integrated with technology development for resource poor families.

Materials and methods
'Ex-post-facto' and 'explorative' research designs were used for conducting this study. The study was conducted in the Thiruvanathapuram district comprising five agro ecological units where the specialized homegarden systems are in vogue. The agro ecological units were selected in consultation with Kerala Agricultural University and State Planning Board. It includes AEU-1, AEU-8, AEU-9, AEU-12 and AEU-14. From each AEU, one panchayat each was selected randomly in consultation with Agricultural Officers. The panchayats include Kazhakkuttam, Pallichal, Nedumangad, Amburi and Aryanad. From each panchayat 12 specialised homegardens were selected using Simple Random Sampling, thus making a total of 60 specialised homegardens.

The technology needs assessment were worked out using score/rank given below:

Score/Rank Criteria
0- Technology not available (most needed)
1-Technology available but not applicable
2-Technology available but not sustainable
3-Technology available, applicable and sustainable

The technology needs of farmers vary according to the specialisations they incorporate, the managerial levels in which they operate, the deficits in the demand and supply of the specialised components they raise with reference to the specificities of the land they engages for raising. Technology was assessed for each specialization *viz.* aquaculture and miscellaneous specializations. Thus technology needs scores for these specializations from 60 farmers of the Thiruvanathapuram district were tabulated and subjected to statistical analysis. The scores assigned being in ordinal scale, the non-parametric test of analysis of variance (chi-square test) was administered to assess the need disparities. The technology needs were further tabulated for analysis. Further mean technology need score was taken for each specialization. The parameter with minimum score was considered as most needed technology in specialized homegardens.

Results and discussions
Technology needs (gaps) for aquaculture as specialisation
The technology needs for aquaculture as specialisation – edible and non-edible fish is given in Table -1.

Table 1: Technology needs for aquaculture (edible and non-edible fish) as specialization

Aquaculture, N=7			
Category	**Frequency**	**Technology need Score for AEUs together**	**Expected score range**
Technology not available (0)	2	0	0-21
Technology available but not applicable (1)	0	0	
Technology available, but not sustainable(2)	4	8	
Technology available, applicable and sustainable(3)	1	3	

The frequency distribution and the corresponding score related to the aquaculture as specialization in reference to the technology needs (8) revealed that "technology was available but not sustainable'' was opined by majority of the respondents (4). This may be due to constraints such as lack of infrastructure and area required to start up the venture. Technology pertaining to aquaculture is also dependent on the species to be produced suiting the locality. But upgradation of locale specific technologies pertaining to fisheries may definitely create a new surge in the homegardens of Kerala.

Technology needs (gaps) for miscellaneous specialisations
The technology needs for apiary, mushroom, ornamentals, orchids, terrace garden and fruit trees is considered as miscellaneous specialisations and the result is presented in Table 2.

Table 2: Distribution of miscellaneous specialisations in terms of technology needs

Miscellaneous Specialisations, N=12			
Category	**Frequency**	**Technology need Score for AEUs together**	**Expected score range**
Technology not available (0)	3	0	0-36
Technology available but not applicable (1)	0	0	
Technology available, but notsustainable(2)	0	0	
Technology available, applicable and sustainable(3)	9	21	

The frequency distribution related to miscellaneous specialization pertaining to technology needs reveals "technology applicable, available & sustainable'' was preferred by majority of the respondents (9) in all AEUs taken together. Majority of the respondents revealed that "technology was available, applicable and sustainable'' and this may be due to the fact that farmers tend to study in depth about a particular specialization and then chose to deploy it in homegardens. Also the literacy state of the State is another underlying factor about the perceptions of technology related to different specialisations. Similarly specialisations like rubber is not new to Kerala homegarden farmers. It also shows the strength of the public extension system prevailing in the State for the welfare of farming community.
The technology needs were further tabulated for analyzing the requirement in each specialization. The parameter with minimum score were considered as most needed technology in specialized homegardens. The distribution of specialisations based on technology needs/gaps is presented in Table 3.
It was quite evident that from table 3 that farmers perceived the need for value addition technologies (1.93) were more when compared to production (2.58) and protection (2.23) in dominant crops. Similarly in animal husbandry components, technologies related to goat (2.00) were unavailable when compared to cow (2.67) and poultry (2.50). Farmers undertaking aquaculture (1.57) and miscellaneous specializations (1.75) perceived the need for more technologies compared to crop and animal husbandry components.

Table 3: Distribution of overall specialisations based on technology needs /gaps:

Technology needs related to overall Specializations-Dominant Crops, Animal Husbandry, Aquaculture and Other Specializations		Mean total score
Dominant crops	Production	2.58
	Protection	2.23
	Value addition	1.93
Animal Husbandry	Cow	2.67
	Goat	2.00
	Poultry	2.50
	Others	2.50
Aquaculture	Edible & Ornamental	1.57
Other Specialisations	Apiary, Ornamentals & Orchids, Mushroom, Terracegarden, Fruit trees	1.75

Also, special focus should also be given for value addition technologies that will aid to enhance the vertical diversification that was believed to improve the remunerativeness of specialized homegardens. However, a specialized homegarden farmer require technology that is of cost-effective, low input oriented and high productive nature.

Conclusion

The results revealed that farmers perceived the need for value addition technologies (1.93) were more when compared to production (2.58) and protection (2.23) in dominant crops. Similarly in animal husbandry components, technologies related to goat (2.00) were unavailable when compared to cow (2.67) and poultry (2.50). Farmers undertaking aquaculture (1.57) and miscellaneous specializations (1.75) perceived the need for more technologies compared to crop and animal husbandry components.

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