

# ADOPTION OF WATER MANAGEMENT TECHNIQUES AND ENVIRONMENTAL DETERMINISM: A CASE STUDY OF THE GROUND REALITIES

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**ABSTRACT:** Effectiveness of a development project depends largely upon the participation and inclusion of the local perceptions, approaches and practices. Indigenous knowledge is strictly developed around the social, ecological, economic, political opportunities and constraints and thus is truly representative of that particular niche. The gap between the two i.e. modern notion of development and indigenous knowledge, hence leads to ineffective and failed projects. The study intended to reveal the effectiveness of development projects in diffusion and adoption of modern farming technologies that are developed upon the top-down approach and puts light on the role of environmental determinism behind non-adoption. The study locale included the villages; Ghora Gali and Arukas that were also the sites for the project initiated by (WRRI) and (NARC) that was studied. The sample size had 200 sampling units selected through mixed sampling techniques (cluster+convenience sampling). The result of the study shows, those environmental constraints wholly decide the farming behaviors, decision making and adoption. 1) A stark difference between the projects produced data and the original ground realities. 2) The "alleged adopters" according to the project assessment report were merely participants portraying to be future adopter, in order to receive project assets. 3) The project assets were not delivered equally; instead, authorities were hijacked by locale influential. 4) After receiving the project assets, the learnt techniques were shunned, and the extension system did not take account of the matter. 5) The gap between the project and the locales was identified; i.e. project's inability to understand the extent of the water shortage problem, failure to inculcate the locale's suggestions to create a high efficiency irrigation system instead of small scale water harvesting methods like roof top harvesting and tanks.

**Key words:** Water Management Techniques, Kitchen Gardening, GhoraGali, Arukas, Adoption of Technology.

## INTRODUCTION

Among the various recommended water management and modern farming techniques introduced by the project "Management of Rawal Watershed under Changing Land Use" to be diffused and adopted included kitchen gardening and roof top harvesting. Kitchen gardening has been reflected as a major contributor in increasing household food security. It is anticipated to decrease poverty and malnutrition as it provides direct access to food which can be prepared with minimal resources. Minimum "land, economic resources, planting material and manure" are required while "live fencing and indigenous methods of pest control" can be used to produce food that is healthy and has high nutritive value. Hence, home gardening at some level is a production system that the poor can easily enter [1].

Moreover, it is added that even though the first year of kitchen gardening is expensive as various inputs have to be accumulated however, it is believed that with time the "food produced in a kitchen garden usually does save money and tends to taste better than grocery store purchased fruit and vegetables [2]. Kitchen gardening has continuously been highlighted as a practical choice to prevent malnutrition and preserve health. Thus, home gardens are an integral part of "agriculture and food production systems in many developing countries and are widely used as a remedy to alleviate hunger and malnutrition in the face of a global food crisis" [3]. Production of food using indigenous knowledge "on small plots adjacent to human settlements is the oldest and most enduring form of cultivation" [4]. Kitchen gardening is hence "classified as mixed, kitchen, backyard, farmyard, compound or homestead garden [5].

## MATERIALS AND METHODS

The study locale included the villages; Ghora Gali and Arukas which were the two project sites of a collaborative project under Water Resources Research Institute (WRRI) and National Agriculture Research Council (NARC) which initiated the project under the title of "Management of Rawal Watershed under Changing Land Use". The sample size included 200 sampling units, selected through mixed sampling method. Ghora Gali and Arukas were treated as two separate clusters, from which 100 units each were selected as per convenience. The tools included socio-economic census form, structured interview guides, formal interviews and focus group discussions that helped reveal the gaps between development projects and in ground realities.

## RESULTS AND DISCUSSION

The project initiated by WRRI and NARC, concentrated on watershed management and bringing change in the indigenous agricultural techniques bending them towards modernization to eventually make the community sustainable and self-supportive.

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| ➤ The cultivated crops majorly included wheat and maize, while vegetable cultivation formed a minor share of the total production.                           |
| ➤ The indigenous cultivation techniques and methods were used that represented the ecological constraints.   |
| ➤ The crops produced were low yield.   |
| ➤ The food produced was used either for domestic consumption or as fodder.   |
| ➤ Minimum input techniques were preferred due to minimum natural and economic resources.   |
| ➤ Gender analysis showed that only males were involved in farming activities. While, women were limited to the minor amount of home gardening that was done. |

In light of the features of farming practices identified the outcome of the project in terms of participation, adoption and the shortcomings can easily be understood. The analysis of the farming methods and techniques revealed the various social, economic and ecological constraints that uniquely developed the indigenous farming practices. It was these very constraints which were unidentified, ignored during project development and implementation that became a hurdle in the path of adoption of a project introduced techniques. "The allegedly participatory, sustainable techniques were un-contextualized because of omitted local involvement and thus were neither socially, ecologically nor economically compatible" [6]. For the project to be successful and development be sustainable it should have been "molded according to the frame of indigenous resources, knowledge, practices and beliefs"[7].

**Table.1: Adoption of the Project Introduced Techniques**

Are You An Active Adopter	Frequency	Percent
Yes	45	22.5
No	148	74
Participated actively and then left	7	3.5
Total	200	100

The data in table 1 reveals that the project introduced techniques were learnt, practiced and adopted by only 22.5 percent of the total sample size interviewed. 3.5 percent of the participants actively became a part of the project, but then left due to the lack of projects support. While 74 percent of the respondents had either not participated in the project meetings and trainings by choice or were completely unaware about the presence of a project working in the area.

The following table 2, further shows the various types of techniques introduced into the project sites, and enlists the frequency of the community members who received various project assets and trainings. The table shows the highest frequency of the adopted technique which was "Kitchen Gardening" that was consequently attached with "Roof Top Harvesting".

**Table.2: Techniques Learnt and Assets Acquired**

Techniques Learnt and Assets Acquired.	Frequency	Percent
Dug Well	1	0.7
Roof Top Harvesting	11	7.3
Wheat and Maize Harvesting	9	6
Kitchen Gardening	21	13.9
Tunnel Farming	5	3.3
Multiple Techniques Adopted	9	6
None	95	62.9
Total	151	100

Indigenously the practice of home gardening among the females of *Arukas* was common, but quiet alien in *Ghora Gali*. The cultivation in the areas could be characterized by the following features: The paper focuses upon one of these interventions i.e. Roof Top Harvesting System and Water

Tanks combined to conserve water and fulfill the water requirements for "kitchen gardening".

**Table.3: Cross Tabulation**

CROSS TABULATION	Adoption of The Project Introduced Techniques			
	Yes	No	Participated and then left	Total
Techniques participated and Assets Acquired				
Dug Well	0	1	0	1
Roof Top Harvesting	6	2	3	11
Wheat and Maize Harvesting	7	1	1	9
Kitchen Gardening	16	5	0	21
Tunnel Farming	5	0	0	5
Multiple Tech. Adopted	9	0	0	9
None	2	139	3	144
Total	45	148	7	200

The cross tabulation is basically an attempt to reveal the major flaw and shortcoming in the project design and implementation. All the participants that had received the project assets to facilitate their adoption of techniques were not adopters.

In case of Roof top Harvesting and Kitchen Gardening, the project extension system was not vigilant enough to notice that the distribution of assets was accumulated only in a few hands. Further, those who had received the project assets did not wholly use it for adopting the techniques taught. The project had provided few of the community members with "tankies" for water conservation and to overcome the problem of water shortage in the area thus to promote kitchen gardening. The project assessment report stated that, "Economically, kitchen gardening improved the livelihood of the local community after starting kitchen gardening in the targeted area." [8] However the ground realities contradicted with the alleged reports. The participation in the project by the community members was solely driven by asset acquirement. People attended trainings, showed support only to receive "tankies" that instead of being used for roof top harvesting and kitchen gardening were used for storing water for household chores.

"There were some constraints and shortcoming of kitchen gardening given by the respondents i.e. Water shortage for kitchen gardening, pest attacks & less awareness, which were tried to compensate through roof top water harvesting system, water tanks and capacity building of the trainees" [9].

#### CONCLUSION:

The paper concludes that development interventions are accepted and adopted only when they are in accordance of the environment where they are introduced.

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