



# Impact of Alimineti Madhava Reddy Lift Irrigation Scheme on Gender in Nalgonda District of Telangana, India

G. C. Mounica<sup>a++\*</sup>, K. Suhasini<sup>a#</sup>, M. D. Ali Baba<sup>a†</sup>,  
P. Radhika<sup>b‡</sup> and K. Supriya<sup>c‡</sup>

<sup>a</sup> Department of Agricultural Economics, College of Agriculture, Rajendranagar, Hyderabad-500030, India.

<sup>b</sup> SABM, College of Agriculture, Rajendranagar, Hyderabad-500030, India.

<sup>c</sup> Department of Statistics and Mathematics, College of Agriculture, Rajendranagar, Hyderabad- 500030, India.

## Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

## Article Information

DOI: 10.9734/IJECC/2022/v12i121548

## Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/95585>

Original Research Article

Received: 15/10/2022

Accepted: 28/12/2022

Published: 28/12/2022

## ABSTRACT

Access to water is a major concern and challenge for many rural households, whether for drinking and domestic use, irrigation, or livestock use. Women face various challenges and unequal opportunities when it comes to accessing and utilising irrigation technologies. The climatic factors like rainfall, temperature and groundwater influence the availability of water which is crucial factor in agricultural production. The present study analyses the impact of irrigation on gender. 700 households, 350 each from beneficiary and non-beneficiary households of Alimineti Madhava Reddy lift irrigation project in Telangana were selected using random sampling technique and data

<sup>++</sup> Ph. D Scholar;

<sup>#</sup> Sr. Professor & University Head;

<sup>†</sup> Associate Professor;

<sup>‡</sup> Professor and Head;

\*Corresponding author: E-mail: mounicagc94@gmail.com;

was collected specifically from women using pre-tested structured schedule. The results from the study revealed that the overall GILIT score of 41 represents that scheme approach to gender equity is good. It is also found that among beneficiaries percentage of decisions taken by women in the household in all the decisions such as production, marketing, social and economic decisions are higher compared to non-beneficiaries which can be accounted to the improvement of literacy rate of women, thereby empowering them which can be accounted to the raise in household income levels due to the additional productivity achieved by the intervention of lift irrigation project. Adequate consultations in future projects targeting a proactive approach towards men and women equally and trainings for women in managing inputs like water, livestock must be exclusively designed on production, value addition, health and money management aspects to impact of the project on socio economic development.

*Keywords: Gender; irrigation; GILIT score; socio economic development.*

## 1. INTRODUCTION

Access to water is a primary concern and challenge for many rural households, whether for drinking and domestic use, or irrigation and livestock use. With climate change driving changing rainfall patterns in many rural geographies, access to irrigation systems is becoming an increasingly important tool for reducing farm production risks and improving the well-being of small-scale farmers. But not all farmers are able to access the benefits these systems provide—women in particular are often left out of the picture. While women farm alongside men and share the same goals for improving their agricultural livelihoods and household well-being, the benefits of irrigation do not accrue equally to men and women, even when they are in the same household. Women face different challenges and unequal opportunities in accessing and benefiting from irrigation technologies [1,2].

To address these differences and ensure irrigation and water management programs and projects benefit women as well as men, those implementing development projects should consider approaches that take into account the differences in women's and men's agricultural roles, as well as context-appropriate channels for reaching women farmers. Unless constraints to women's ability to benefit from the introduction of small-scale irrigation technologies are addressed, women's empowerment is not a guaranteed outcome of irrigation [3,4].

In contrast, when irrigation technologies are designed with women's needs in mind and women are able to use and benefit from the technologies, women may have greater status in the household and community and have greater decision-making authorities in other aspects of their lives.

The impact of irrigation on gender is in many aspects: As irrigation is intervened, cropping pattern changes i.e., two crop seasons instead of one thereby household income increases [5], workload also increases, chances of education gets increased, participation in farm activities increases, exposure to extension services and trainings increases, participation in SHG's might increase [6,7], changes in other activities like seed storage, value addition, marketing, etc., decision making changes, participation in political organizations changes [8]. With this background the present study is undertaken to assess the impact of ARMP lift irrigation scheme on the gender.

## 2. MATERIALS AND METHODS

The study was conducted on Alimineti Madhava Reddy lift irrigation scheme in the year 2021. Command area of the project is spread in 15 mandals of Nalgonda district of Telangana. Among them, 7 mandals having higher ayacut area and 7 mandals under non ayacut area is chosen for the study. Samples of 50 farmers are chosen from each mandal using random sampling technique. Thus, a total sample of 700 farmers (350 beneficiaries and 350 non-beneficiaries) are considered. From the selected sample households women are specifically interviewed personally using pre-tested schedule in the year 2021. The collected data was analysed using descriptive analysis and Gender in Irrigation Learning and Improvement Tool (GILIT) developed by IWMI, Colombo.

### 2.1 Gender in Irrigation Learning and Improvement Tool (GILIT)

The Gender in Irrigation Learning and Improvement Tool (GILIT) [9] looks at the aspects of gender equity that can be influenced by the policies and operations of formal irrigation

schemes. The intention is that the tool can help to facilitate learning and improve gender equitability by supporting the scheme to consider gender equitable standards in relation to men's and women's involvement, needs and benefits. Three areas of measurement are chosen in relation to men and women which was conducted by giving a set of statements in the following aspects.

- i. Access to scheme resources (including information, such as in the design phase, land, water, and other inputs);
- ii. Participation in scheme membership, leadership, and decision-making; and
- iii. Access to scheme benefits, including access to market information, packaging, and payments from product sales or processing, depending on the location and crop.

In each of these three categories (access to scheme resources, access to decision-making, and access to benefits), a series of statements are suggested that describe conditions that would result from the implementation of gender-equitable policies and practices. The 350 beneficiary households of Alimineti Madhava Reddy lift irrigation scheme were considered for data collection. The framing of each statement acknowledges men's and women's different initial enabling conditions with respect to the assets needed to fully participate and/or benefit from the scheme. Scores are suggested for different levels of performance on the gender-equitable statements. Each statement was ranked on a scale of 1 to 3, where "1" indicates that the scheme does not or rarely matches the optimal condition or outcome and "3" indicates that the scheme often or always matches the optimal condition, state or outcome.

### 3. RESULTS AND DISCUSSION

#### 3.1 GILIT Scores for ARMP Lift Irrigation Scheme

Low score (8) as shown in Table 1. In case of access to scheme resources revealed that women are under-represented during the planning phase of the project. Scheme planners did not meet majority of the women stakeholders and also evident that only few women were contacted during the planning phase. But very few suggestions were sought from women on aspects like site location, design, or technologies. Only men were consulted during

discussions of land availability or land allocation. Also some more information was gathered from the few women involved at the planning stage, regarding domestic and agricultural water needs. Gender-based preferences were not sufficiently considered in scheme water management for domestic or household uses and production activities. Some men and women community members were consulted regarding site operation and maintenance and some suggestions considered. This section score reviews that association and scheme by-laws and other regulations did not give men and women equal access to resources such as land, water, labour, and technology. Men and women often have different initial levels of attributes, resources, and capacity and are not always equally able to meet association or scheme membership criteria, but the process of establishing the water user's association and the irrigation scheme should be inclusive and not discriminate on the basis of sex. Sometimes, there may be a need to provide special services to underrepresented or underserved groups, whether men or women, to achieve goals on equality.

It can be concluded that adequate consultations were not carried out by the scheme and suggests that in future projects a more inclusive participatory approach has to be designed targeting a proactive approach from the men and women equally.

The second set of statements was on information on participation by taking membership, taking leadership and decision making in the implementation phase. This will provide an opportunity to decide what is good to them and will address men's and women's opportunities to participate meaningfully in scheme governance, e.g., to join a scheme, to become members of a scheme's user association, and to hold positions of leadership within those associations. The score (18) provided an evidence that the scheme's approach became probably more sensitive towards gender equity as it progressed. Scheme or association by-laws explicitly state that both men and women are eligible for membership and some women are members who participated in meetings and contributed by conveying their opinion from time to time. In most cases, a woman may manage (or be the primary person responsible for decisions and labour on) a plot owned by her spouse but sometimes is not recognized as a member because rules only recognize plot 'owners'. For this tool, an owner is

the one formally or informally recognized as having primary user rights to the plot. A manager is the person that takes primary responsibility for inputs and labour on the plot. Scheme by-laws do not restrict membership to plot owners, but customs tend to favour plot owners. Nevertheless, scheme facilitated the participation of non member women and men in the meetings and trainings. On the other hand women who were the owners of land could become members and participate in the meetings and trainings. This disclosed that women participation was better both as member and non-member and more attention for inclusiveness was given in the later stages of the scheme than the former. Even though there is satisfactory participation from women but still has a lot of room for improvement. For a better decision making among the stakeholders including gender can be expected by repeated capacity building programmes.

The next probe was to know about the access to scheme benefits, marketing, packing etc. through the responses to different statements, that represent how well (or poorly) irrigation scheme management and/or an associated farmer/producer association offers to both men and women equally: Payments, marketing support, extension services, and other forms of assistance. The high score (20) in this section shows that both women and men are able to receive the amount of water they need. When water restrictions are put into place, decisions are made in ways that do not discriminate against women's or men's needs. Trainings are announced and held at convenient times and are held at convenient locations for both men and women to participate fully. Marketing support services and/or infrastructure presents a few restrictions that may create challenges for some women scheme members to access markets particularly small producers and those belong to poor sections of community.

Overall score of 41 represents that scheme approach to gender equity is good. Planning

stage requires attention and adjustment in future projects. Women are underrepresented as scheme participants and face some informal disadvantages to participation during the planning phase. But women and men access scheme services and benefit equally from the scheme. Monitoring is suggested to ensure continued gender equity on scheme.

### 3.2 Participation of Men and Women Involved in Different Farm Activities

The gender-segregated data was collected from both beneficiaries and non-beneficiaries of AMRP lift irrigation scheme using Focus Group Discussions and personal interviews with men and women in the households. This data is used to analyse the division of labour, participation in decision making from the gender perspective. The responses of all the sample farmers with reference to their participation in each of the farm activities is were gathered, sorted out for beneficiaries and non beneficiaries and results were presented in Table 2.

Threshing is reported by 76.00 percent of the beneficiaries to carried by both men and women together, followed by irrigation and harvesting done by both similar to this are reported by non beneficiary group. Among the beneficiaries fertiliser application and ploughing are reported by 56 percent and 47.14 percent of men. The activities shared by women are weeding and sowing as reported by 67.14 and 42 percent of beneficiaries respectively.

The above table shows the percentage of beneficiaries (men, women and both segregated) engaged in each of major farm activity under AMRP project. The figure shows that most of the works are done either jointly or female populace has a good percentage sharing. However, the percentage in marketing shows that women have a lower share of that activity.

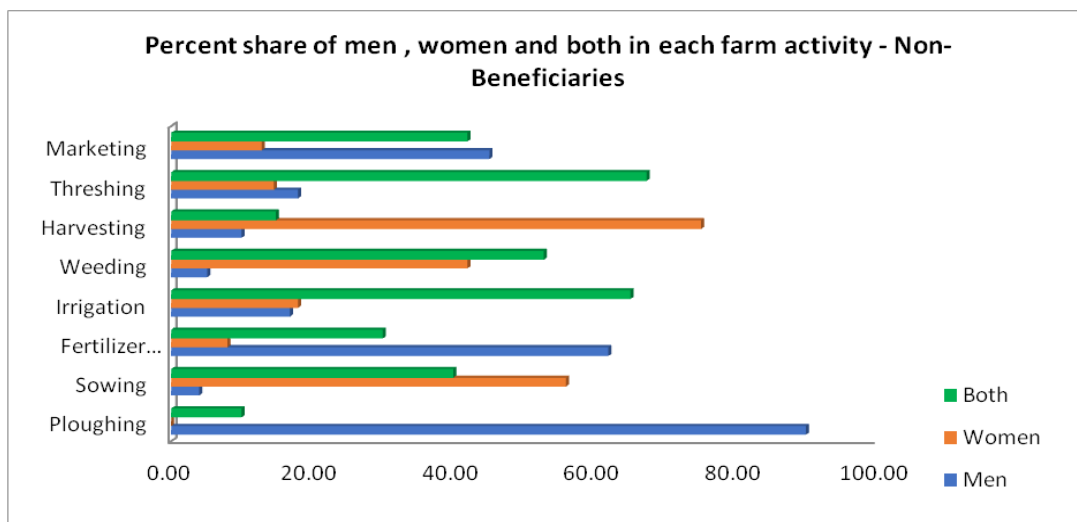
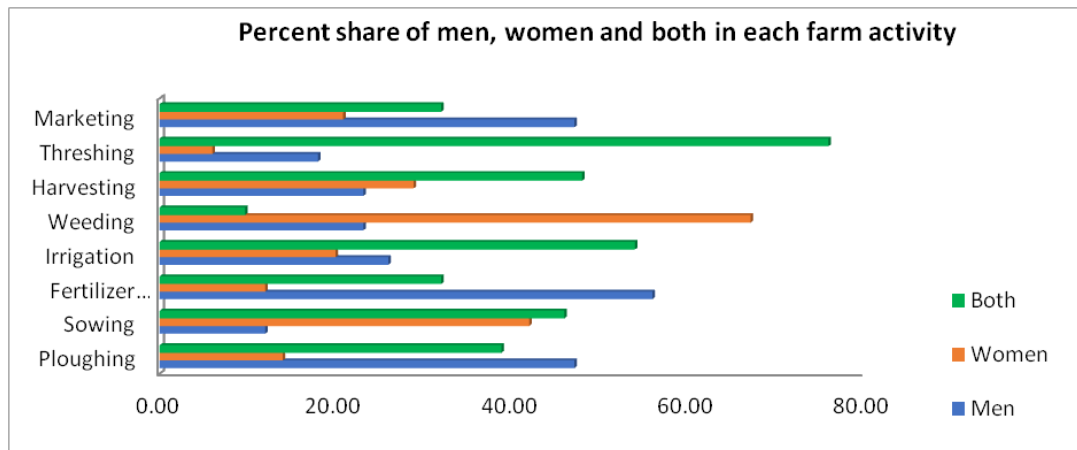
**Table 1. Scores obtained for AMRP lift irrigation scheme using GILIT (gender in irrigation learning and improvement tool)**

Name of the section	Score obtained
SECTION A - Access to scheme resources	8
SECTION B - Access to scheme membership, leadership opportunities and decision-making	13
SECTION C - Access to scheme benefits	20
<b>Total</b>	<b>41</b>

**Table 2. Share of men and women in each farm activity**

Farm activity	(700)							
	Men	Women	Both	Total	Men	Women	Both	Total
	Beneficiaries				Non Beneficiaries			
Ploughing	165 (47.14)	49 (14.00)	136 (38.86)	350 (100.00)	315 (90.00)	0 (0)	35 (10.00)	350 (100.00)
Sowing	42 (12.00)	147 (42.00)	161 (46.00)	350 (100.00)	14 (4.00)	196 (56.00)	140 (40.00)	350 (100.00)
Fertilizer application	196 (56.00)	42 (12.00)	112 (32.00)	350 (100.00)	217 (62.00)	28 (8.00)	105 (30.00)	350 (100.00)
Irrigation	91 (26.00)	70 (20.00)	189 (54.00)	350 (100.00)	59 (16.86)	63 (18.00)	228 (65.14)	350 (100.00)
Weeding	81 (23.14)	182 (52.00)	156 (44.57)	350 (100.00)	18 (5.14)	147 (42.00)	185 (52.86)	350 (100.00)
Harvesting	81 (23.14)	235 (67.14)	34 (9.71)	350 (100.00)	35 (10.00)	263 (75.14)	52 (14.86)	350 (100.00)
Threshing	63 (18.00)	21 (6.00)	266 (76.00)	350 (100.00)	63 (18.00)	51 (14.57)	236 (67.43)	350 (100.00)
Marketing	73 (20.86)	73 (20.86)	112 (32.00)	350 (100.00)	158 (45.14)	45 (12.86)	147 (42.00)	350 (100.00)

Note: Figures in parenthesis indicate the percent to corresponding row totals for beneficiaries and non beneficiaries



**Fig. 1. Men and women engaged in each farm activity among beneficiaries and non beneficiaries**

It is evident from Table and Fig. 1 that women are basically engaged in unskilled and labour intensive tasks whereas men are found performing technological and highly production augmenting functions i.e., taking up the productive roles among non-beneficiaries. Men's role is seen in ploughing, fertiliser application and marketing in non beneficiary groups reported by 90.00, 62.00 and 47.14 percent. Similarly women's role is more in harvesting (75.14 %), sowing (56.00 %) and weeding (42.00 %) which meant that due to mechanisation in the beneficiary group women are less contributing to weeding and harvesting, rather their participation is notable in marketing i.e; 20.86 percent as compared to 12.86 percent reported their counterparts. It is believed that the decision making is considered as more valid when it is about an economic decision such as marketing which is exhibited by the beneficiary group.

Moreover the beneficiary group reduced the physical work substituted by mechanisation.

### 3.3 Participation in Decision Making

Access to resources and individual ability will facilitate the individuals to exercise the decision as men or women. The decisions regarding four broadly categorised primary decisions namely; production, marketing, social and economic decisions were considered and the extent of improvement in decision making by the group of beneficiaries against the non beneficiary group is captured and presented in Table 3. The production decisions are related to farm activity management (including livestock) related, marketing decisions are regarding when and where to whom to sell at what price etc., social decision include decision on health education

and other social functions and economic decisions are about allocation of the consumption expenditure, production expenditure and investment etc.

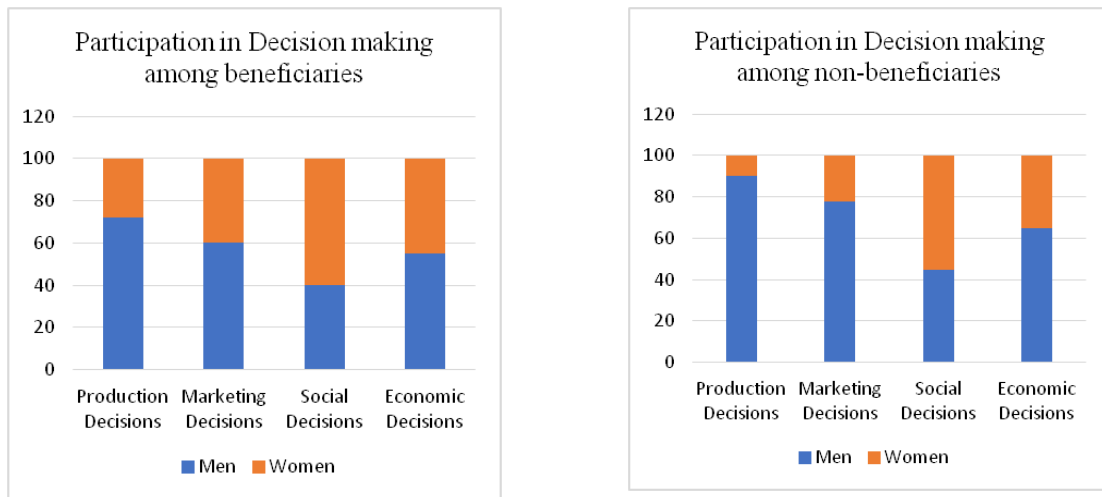
It is found that among beneficiaries percentage of decisions taken by women in the household in all the decisions such as production, marketing, social and economic decisions are higher compared to non-beneficiaries. Improvement in economic and social decision in both groups than other decisions, but beneficiary household women progressed by getting involved in decision making to the extent of 59.71 percent and 44.86 percent. The production decisions by women in beneficiaries were 28.29 percent as compared to 10.29 percent in non beneficiary group.

In non-command area, women's contribution is seemingly restricted to making social decisions involving upbringing of children, their education, their marriages, drinking water requirements and other social activities whereas men tend to decide upon production decisions like what crop to be cultivated, which variety of seed to be used, at what stage plant protection chemicals have to be given to the crop, etc and marketing decisions like where, when and how much to sell [10-12]. In command area, women have a slight edge over their counterparts in respect to the decisions regarding the above activities, but the overall trend suggests that women are given prominence while taking social and economic decisions. There is more scope for improving the situation by encouraging the land ownership to women as asset ownership and training them to become more confident have equal say in decision making.

**Table 3. Percent participation of men and women in decision making among beneficiaries and non-beneficiaries**

Nature of the decision	(Number)					
	Beneficiaries			Non-beneficiaries		
	Men	Women	Total	Men	Women	Total
<b>Production Decisions</b>	251 (71.71)	99 (28.29)	350 (100)	314 (89.71)	36 (10.29)	350 (100)
<b>Marketing Decisions</b>	211 (60.29)	139 (39.71)	350 (100)	272 (77.71)	78 (22.29)	350 (100)
<b>Social Decisions</b>	141 (40.29)	209 (59.71)	350 (100)	157 (44.86)	193 (55.14)	350 (100)
<b>Economic Decisions</b>	193 (55.14)	157 (44.86)	350 (100)	228 (65.14)	122 (34.86)	350 (100)

Note: Figures in parenthesis indicate the percent to respective total sample



**Fig. 2. Percent participation of men and women in decision making**

### 3.4 Women as Owners of Productive Assets

The data is collected regarding some indicators such as land ownership, ownership of assets and control, participation in political institutions, involvement in trainings, membership in SHGs and literacy and the results are presented in Table 4 which reveal the extent of economic and social empowerment. Among beneficiary households, 128 women have ownership of land on their names, 192 women have ownership and control over productive assets, and 56 women have participated in different political activities.

It can be observed that from the Table 4 that there is considerable contribution in terms of ownership, membership in SHGs, owning assets control, involvement in trainings and literacy by the beneficiary group whose participation was to the extent of 36.57, 52.86, 54.86, 58.56 and 64.86 percent respectively. Political participation was about 16.00 percent by the beneficiary women compared to 5.43 percent as reported by

the non beneficiary women. It can be concluded that the above indicators can be considered as key indicators that can bring gender equity and definitely the AMRP LIS has made a contribution to the gender equity in the project area.

### 3.5 Analysis on Gender Division of Labour

In addition to the above foregoing discussion the contribution of actual minute farm operations by men, women and both are included while data was collecting and the analysed results are presented in Table 5. It is evident from Table 5 that the men do most of the fieldwork, while women help in activities like sowing, weeding (when it is done by hand), harvesting, threshing and storing the product. Looking after the livestock, which include poultry, is the responsibility of women. Small animals are usually for home consumption. All the considered activities were assigned to only one category, men/ women or both depending on who takes the major responsibility in fulfilling the activity.

**Table 4. Indicators of social and economic empowerment among beneficiaries and non beneficiaries**

Indicators of economic and social empowerment	Beneficiaries (n=350)	Non-beneficiaries (n=350)	Pooled (n=700)
Land Ownership	128 (36.57)	83 (23.71)	211 (30.14)
Asset ownership & control	192 (54.86)	166(47.43)	358 (51.14)
Political participation	56 (16.00)	19 (5.43)	75 (51.14)
Involvement in institutional trainings	206 (58.56)	190 (54.29)	396 (56.57)
Membership in SHG's	185 (52.86)	163 (46.57)	348 (49.71)
Literacy	227 (64.86)	186 (53.14)	413 (59.00)

*Figures in parenthesis represents percent to respective totals*

**Table 5. Overall gender division of labour – pooled sample**

Categories of works undertaken	Activities	Women	Men	Both
<b>Agricultural activities</b>	Land preparation		✓	
	Ploughing		✓	
	Sowing	✓		
	Weeding by hand/ hoe	✓		
	Weeding by guntaka		✓	
	Fertilizing		✓	
	Harvesting			✓
	Irrigation		✓	
	Storing produce	✓		
	Seed storage for the next season	✓		
	Threshing			✓
	Sale of the produce		✓	
<b>Rearing poultry in the back yard</b>	Feeding	✓		
	Watering	✓		
	Collection of eggs	✓		
	Self consumption / Sale of eggs	✓		
<b>Rearing of livestock</b>	Milking			✓
	Watering	✓		
	Feeding	✓		
	Cleaning	✓		
	Forage gathering			✓
	Herding			✓
	home consumption/ Sale / distribution of milk	✓		
	Making the milk products /ghee/ curd/buttermilk etc	✓		
<b>Household activities</b>	Cooking	✓		
	Fetching water	✓		
	Cleaning	✓		
	Washing	✓		
	Child and old people caring	✓		

Women have the control of livestock and poultry enterprises and can decide to sell them in need of money. Men and women both are responsible for the care of livestock; but contribute more to feed, water, and preparation of value added products mostly for self consumption. Herding and milking are carried out by both. When there is excess milk after home consumption, women resort to sell part of the production and take control over the cash. Women are solely responsible for all the household activities like cooking, cleaning and taking care of children and old people. The trainings for them must be exclusively designed on production, value addition, health and money management aspects to have the complete impact of the project on socio economic development. This necessitates a gender friendly technology at a low cost in all the production and household activities to reduce the burden on women as the major responsibility to of livestock, poultry and household activities along with farm lies with the women of the household.

#### 4. CONCLUSION

The results from the study revealed that the overall GILIT score of 41 represents that scheme approach to gender equity is good however the low score (8) in case of access to scheme resources reveals that women are under-represented during the planning phase of the project. But both women and men access scheme services and benefit equally from the scheme and also find that most of the works (sowing, irrigation, weeding, harvesting and threshing) are done either jointly or female populace showing a good percentage sharing. However, the percentage in marketing shows that women have a lower share of that activity as in most of the households there still exists a prejudice against them and also due to burden of multiple roles at home and farm. It is found that among beneficiaries' percentage of decisions taken by women in the household in all the decisions such as production, marketing, social and economic decisions are higher compared to



non-beneficiaries. Looking after the livestock, which include poultry, is the responsibility of women. Women are solely responsible for all the household activities like cooking, cleaning and taking care of children and old people.

It is suggested that adequate consultations have to be carried out in future projects targeting a proactive approach from the men and women equally. The trainings for women in managing livestock must be exclusively designed on production, value addition, health and money management aspects to have the complete impact of the project on socio economic development.

### COMPETING INTERESTS

Authors have declared that no competing interests exist.

### REFERENCES

1. ADB. Gender mainstreaming in ADB projects: Report of the technical working group. February. Manila. Asian Development Bank; 2010.
2. Ahmed S. Changing gender roles in irrigation management: Sadguru's Lift Irrigation Co-operatives. Economic and Political Weekly. 1999;34(51):3596–3606.
3. Rubin D, Lefore N, Weight E. Gender equality and equity in irrigation scheme management: Performance learning and improvement tool. Discussion Paper; 2015.
4. Upadhyay B. Gender aspects of smallholder irrigation technology: Insights from Nepal. Journal of Applied Irrigation Science. 2004;39(2):315-327.
5. FAO (Food and Agriculture Organization of the United Nations). The State of Food Insecurity in the World 2011: How does international price volatility affect domestic economies and food security? ; 2011.
6. Van den Bold M, Quisumbing AR, Gillespie S. Women's empowerment and nutrition: An evidence review. IFPRI Discussion Paper 01294. SSRN Electronic Journal; 2013
7. Domenech L, Ringler C. The impact of irrigation on nutrition, health and gender: A review paper with insights for Africa South of the Sahara. IFPRI Discussion paper 01259. SSRN; 2014. Available: <https://doi.org/10.2139/ssrn.2343160>
8. Belainew Belete, Surafel. Impact of small-scale irrigation technology on women empowerment in Amhara national regional state of Ethiopia, Cogent Economics & Finance. 2020;8(1):1837440. DOI: 10.1080/23322039.2020.1837440
9. Lefore N, Weight E, Rubin D. Gender in irrigation learning and improvement tool. Colombo, Sri Lanka: International Water Management Institute (IWMI). CGIAR Research Program on Water, Land and Ecosystems (WLE). 2017;40. [http://www.iwmi.cgiar.org/Publications/Other/training\\_materials/gender\\_in\\_irrigation\\_learning\\_and\\_improvement\\_tool.pdf](http://www.iwmi.cgiar.org/Publications/Other/training_materials/gender_in_irrigation_learning_and_improvement_tool.pdf)
10. Van Koppen B. A gender performance indicator for irrigation: Concepts, tools and applications. Colombo, Sri Lanka: International Water Management Institute (IWMI). 42p. (IWMI Research Report 059); 2002.
11. World Bank; FAO (Food and Agriculture Organization of the United Nations); IFAD (International Fund for Agricultural Development). Gender in agriculture sourcebook. Agriculture and rural development. Washington, DC: The World Bank; 2009.
12. Zwarteveen, Margreet, Pranita Bhushan Udas and Juana Vera Delgado. Gendered dynamics of participation in water management in Nepal and Peru: Revisiting the linkages between membership and power. In Social Participation in Water Governance and Management: Critical and Global Perspective, edited by K. A. Berry and E. Mollard. London: Earthscan. 2010; 69-94

© 2022 Mounica et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:

<https://www.sdiarticle5.com/review-history/95585>