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### Participation level of rural women in vegetable cultivation activities in Iraq

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#### Abstract

Vegetables are cultivated all over the world, and women do represent an important part of labour force in vegetable production. This study identified the role of rural women in vegetables cultivation. One hundred and forty rural women participating in vegetable cultivation were randomly selected. A list of 3 aspects of vegetable cultivation activities: pre-sowing and sowing, post-sowing, and harvest and post-harvest, covering 20 activities was prepared. About half of the respondents had high participation in vegetable cultivation activities. Pre-sowing and sowing aspect ranked first. Land cleaning, seed treatment, sowing (and replanting) seeds, fertilization, hoeing, hand weeding, harvesting, sorting and grading, and seed storage were the activities in which rural women showed high level of participation. Age, educational level and number of family women who participated in vegetable cultivation were negatively and significantly related to participation, while, years of experience and cultivated area had positive relationship. There is need to increase expertise and skills of rural women in vegetable cultivation activities especially that showed highly participation through an appropriate extension strategy.

**Keywords:** Crop, labour, women involvement, Iraq.

#### 1. Introduction

Women produce 60-80% of the world's food (Doss *et al.*, 2018) [8], and account above 50% of the agricultural labour force in developing countries (Anonymous, 2019a). Vegetables are cultivated all over the world because their production is profitable. Smallholders account for almost all vegetable production; rural women represent an important part of labour force in vegetable production. The extent of participation of rural women in vegetable cultivation differs from region to region (Pagaria, 2012; Fartyal and Rathore, 2013; Zahoor *et al.*, 2013; Khatun *et al.*, 2014; Manjari, 2014; Baragali *et al.*, 2015; Kumari and Laxmikant, 2015; Olowa and Olowa, 2015; Tripathi *et al.*, 2015; Dossah *et al.*, 2016; Jahan and Khan, 2016) [19, 10, 13, 22, 14, 16, 7, 15, 18, 21, 9, 11].

Assessment of the role of women in vegetable production activities is therefore, important particularly for policy formulation and programs interventions for development of women (Islam *et al.*, 2018) [13], used in formulating future policies and strategies at the local level to empower women and make them beneficiaries of their labor (Abebe and Mulu, 2017) [1], through organize women-focused programs to enhance their skills and capacities in better and more profitable vegetables cultivation

In Iraq Vegetables are the third most harvested crops after grains and fodder crops, it wildly cultivated in all provinces, the most cultivated vegetable crops are: water melon, tomato, cucumber, melon, okra, green beans, eggplants, and onion (Anonymous, 2018) [4]. Vegetable cultivation suffers from some problems including competition from imported vegetables, low productivity, and water shortage. Males and

females participate in all vegetable production activities. But, because of unwillingness of Iraqi men to participate in agriculture, women constitute a high percentage of the agricultural labor force in Iraq. The World Bank argue that, in 2017, 43.7% of Iraqi women and 16.7% of Iraqi men were working in the agricultural sector. (Anonymous, 2019b) [6]. However, participation of Iraqi rural women in vegetable production activities has not been appreciated and monetized to its full capacity, and there have not been any study on the participation of rural women in vegetable cultivation activities in the study area. Considering this fact, the study was undertaken with the following objectives

- Objectives to determine extent of participation of rural women in vegetable cultivation activities,
- Determine the relationships between participation and socioeconomic characteristics of rural women.

#### 2. Material and Methods

The study was carried out in Babylon province, centre-south of Iraq, between 32° and 33.25° North latitude and 44° to 45° East longitude. Vegetables (winter and summer) cultivation spreads in the district. Farmers do cultivate: lettuce (*Lactuca sativa* L.), spinach (*Spinacia oleracea* L.), green onions (*Allium cepa* L.), okra (*Abelmoschus esculentus* L), eggplant (*Solanum melongena* L.), sweet pepper (*Capsicum annuum* L.), red onion (*Allium cepa* L.), cucumber (*Cucumis sativa* L.), and melon (*Cucumis melo* L.).

The population for this study consisted of 430 families cultivating vegetables in Al-Qassim district. One woman

was chosen from each family. From the 430 women, 140 were selected at random to provide data from 1-20 October, 2020. The instrument used was a 2-part questionnaire. The first part included socio-economic characteristics including marital status, age, education level, years of experience in vegetables cultivation, area cultivated with vegetable crops, and number of family women participating in vegetable cultivation. The second part listed 20 activities in vegetable cultivation grouped into pre-sowing and sowing (7activities), post-sowing (7), and harvest and post-harvest (6) aspects.

Content validity of the questionnaire was established by a panel of ten experts in the fields of agricultural extension and vegetable cultivation, four of them proposed an amendment, the instruments were revised based on their comments.

A pilot study on 10 women outside the sample was conducted to establish reliability of the instrument; a Cronbach’s alpha (a reliability coefficient) of 0.91 was established, that indicating the instrument used was reliable. Participation level in each activity was measured on a 3-point scale of high (H) (3), medium (M) (2), low (L) (1); in all-over activities, each respondent was given a score ranging from (20 to 60).

Based on mean (M) ±standard deviation (SD), respondents were assigned to categories as follows: low training needs (below M–SD), medium (M±SD), and high (above M+SD). Each activity was given a score ranging from (1 to 3), the 3 main aspects and 20 activities were categorized based on weighted arithmetic mean (WM) for level of participated in it, into: low (1-1.66), medium (1.67-2.33), and high (2.34-3) groups. Data were analysed using frequency, percent, mean, standard deviation (S.D.), weighted arithmetic mean (WM) [WM = (No. of H × 3) + (No. of M × 2) + (No. of L × 1)/Total respondents], and simple correlation.

**3. Results and Discussion**

**3.1. Overall participation**

The participation score of rural women in vegetable cultivation ranged from (20-60), with a mean of 45.2 and standard deviation of 10.2 which has been presented in Table 1. Analyzing the participation scores reveals that (50.7%) of respondents had high participation in vegetable cultivation activities, 34.3, 15% had medium and low participation respectively.

Results shown that (80%) of respondents had high to medium participation in vegetable cultivation activities, half of rural women in study area within high participation category, this indicate the large participation of rural women to vegetable cultivation. While Khatun *et al.*, 2014; [14] Manjari, 2014 [16], found that majority (60%) of rural women were within medium level category.

The average participation score of overall rural women is within medium category, this result is similar to Khatun *et al.*, 2014 [14].

**Table 1:** Extent of respondents’ participation in vegetable cultivation activities

| Participation Categories | %    | Mean  | S.D. |
|--------------------------|------|-------|------|
| Low(< 35)                | 15   | 29.33 | 3.68 |
| Medium(35– 55.4)         | 34.3 | 47.78 | 3.78 |
| High (> 55.4)            | 50.7 | 58.49 | 3.75 |
| Overall (20 – 60)        | 100  | 45.2  | 10.2 |

**3.2. Level of farm women’s participation**

Computed participation index of rural women against three aspects and twenty activities is given in Table 2. Pre-sowing and sowing aspect ranked first in term of rural women’s participation level (2.30), followed by harvest and post-harvest (2.29) and post-sowing (2.19). Participation levels of rural women in each aspect were within medium category.

For pre-sowing and sowing aspect, most respondents (47.8%) had high level of participation followed by (34.3%, 17.9%) within medium and low level respectively. Highest proportion of respondents (97.1%) had high level of participation in land cleaning, its ranked first (2.97) among this aspect activities. About (96.4%) of rural women highly participate in sowing (and replanting) seeds activity and ranked second (2.96). The majority (95%) of respondents highly participate in seed treatment and ranked third (2.94) among pre-sowing and sowing activities. About sixty-nine respondents show high participate in seed selecting and ranked fourth (2.56). In pre-sowing irrigation activity above half of respondents show medium participate and ranked fifth (2.29). Forming ridges and furrows ranked sixth (1.40), most respondents (70.7%) show low participation. Majority respondents (97.9%) lowly participate in plowing and ranked seventh (1.02) among pre-sowing and sowing activities. Although study results clearly indicated the high level of rural women’s participation to overall vegetable cultivation activities, participation level and the number of women participations varies from one activity to another. The reason for high participation in some activities is due to the fact that these activities do not require muscle effort.

Land cleaning as one of vegetable activities showed highly participate level among high majority of respondents, Kumari and Laxmikant, 2015 [15], found the same result. Sowing (and replanting) seeds of vegetable cultivated in study area done manually. Rural women showed highly participation in this activity, this is in line of results reported by Manjari, 2014 [16]; Kumari and Laxmikant, 2015 [15]; Tripathi *et al.*, 2015 [21]; Jahan and Khan, 2016 [11], which indicate that seed sowing activity mostly performed by farm women. Seed treatment is an essential process in vegetable cultivation. It is an activity that does not require muscle effort, so it is more suitable for women, and show highly participated in, this is similar with the findings of Pagaria, 2012 [19]; Fartyal and Rathore, 2013 [10]; Manjari, 2014 [16].

There are some farm activities traditionally consider only implemented by men, such as plowing, (Pal and Haldar, 2016) [20]. The high proportion (97.7%) of rural women in study area show low participation in plowing, Jahan and Khan, 2016 [11]; Kumari and Laxmikant, 2015 [15]; Manjari, 2014 [16]; Fartyal and Rathore, 2013 [11], pointed to low participation too. Plowing done by tractor, women’s participation will be through: rental the tractor, delivery of food to field workers at the time of plowing, driving the tractor.

As regard to harvest and post-harvest aspect, (45%) had high level of participation followed by 39.3, 15.7% within medium and low level respectively. Harvesting ranked first among this aspect activities (2.84), within highly participate of (84.3%) of respondents. Majority (82.1%) of rural women fell in high level participate in seed storage, its

ranked second (2.79). Sorting and grading activity ranked third (2.54), with highly participate of (62.1%) respondents, while Packing ranked fourth(2.22) among harvest and post-harvest activities, with highly participate of (40%) respondents. Low proportion (20.7%) of rural women highly participate in seed production and ranked fifth (1.97). Marketing showed less extent of rural women participation among harvest and post-harvest activities, (60.7%) lowly participate, and ranked sixth (1.39). Vegetable harvesting done manually two or three twice a week, the need for labor in this activity is more than the rest cultivation activities. Majority of respondents highly participate in harvesting, Manjari, 2014 [16]; Kumari and Laxmikant, 2015 [15]; Olowa and Olowa, 2015 [18]; Tripathi *et al.*, 2015 [21], also pointed to the same result. Sorting and grading of vegetable crops are mainly performed by women (Tripathi *et al.*, 2015) [21], it is an essential steps of packing and handling. Respondents show high participation in this activity, this finding agrees with that of Manjari, 2014 [16]; Jahan and Khan, 2016 [11]. Vegetable farmers are often packing their crops in plastic boxes or large nylon sacks. Level of rural women's participation in study area was in the medium category, this is in line of result reported by Hada and Bansal, 2017 [12]. Referring to post-sowing aspect, (42.8% of respondents had high level of participation followed by (33.6%, 23.6%) within medium and low level respectively. fertilization, as vegetable cultivation activity, showed highly participate among (73.6%) of rural women and ranked first. (63.6%) of rural women showed highly participation in hoeing which rank second (2.61). In hand weeding activity fifty-nine of

respondents had highly participate which ranked third (2.50).

In order to improve the quantity and quality of vegetable yields, farmers often use more amounts of fertilizer. Vegetable fertilization is done manually in two or three batches throughout the growing season, about three quarters of rural women in area study highly participated in this activity, Pagaria, 2012 [19]; Manjari, 2014 [16]; Kumari and Laxmikant, 2015 [15], pointed to highly women participate in this activity.

Hoeing is one of the important vegetable crop service operations aimed at get rid of weeds and soil aeration; it takes place several times, in the season, as needed. Near sixty-four respondents show highly participation, this is in line of results reported by Kumari and Laxmikant, 2015 [15]; Jahan and Khan, 2016 [11].

Weeds reduce vegetables yield and quantity, increase cost production. There is more than one way to resist the weeds. Hand (manual)weeding are the most commonly used and the most successful weeding methods(Kristiansen *et al.*,2007).In study area about (91%) from respondents show medium to high participate in, Fartyal and Rathore, 2013 [11]; Manjari, 2014 [16]; Kumari and Laxmikant, 2015 [15]; Jahan and Khan, 2016 [11], pointed to highly participation too.

Irrigation, pesticide and weedicide application, repair of irrigation channels and purchase fertilizers and pesticides, as post-sowing activities, showed less participation among rural women.

**Table 2:** Participation level for vegetable cultivation activities

| Aspect                   | Activity                            | Level of participant % |        |      | WM   |
|--------------------------|-------------------------------------|------------------------|--------|------|------|
|                          |                                     | low                    | Medium | High |      |
| Pre-sowing and sowing    | Land cleaning                       | 0.0                    | 2.9    | 97.1 | 2.97 |
|                          | Plowing                             | 97.9                   | 2.1    | 0.0  | 1.02 |
|                          | Forming ridges and furrows          | 70.7                   | 18.6   | 10.7 | 1.40 |
|                          | Seed selecting                      | 12.9                   | 17.9   | 69.2 | 2.56 |
|                          | Seed treatment                      | 0.7                    | 4.3    | 95.0 | 2.94 |
|                          | Pre-sowing irrigation               | 10.0                   | 50.7   | 39.3 | 2.29 |
|                          | Sowing (and replanting) seeds       | 0.0                    | 3.6    | 96.4 | 2.96 |
|                          | Allover(The aspect)                 | 23.6                   | 22.8   | 53.6 | 2.30 |
| Harvest and post-harvest | Harvesting                          | 0.0                    | 15.7   | 84.3 | 2.84 |
|                          | Sorting and grading                 | 7.9                    | 30.0   | 62.1 | 2.54 |
|                          | Packing                             | 17.9                   | 42.1   | 40.0 | 2.22 |
|                          | marketing                           | 60.7                   | 39.3   | 0.0  | 1.39 |
|                          | Seed production                     | 23.6                   | 55.7   | 20.7 | 1.97 |
|                          | Seed storage                        | 2.9                    | 15.0   | 82.1 | 2.79 |
|                          | Allover(The aspect)                 | 15.7                   | 39.3   | 45.0 | 2.29 |
| Post sowing              | Purchase fertilizers and pesticides | 54.3                   | 27.8   | 17.9 | 1.63 |
|                          | Irrigation                          | 26.4                   | 40.7   | 32.9 | 2.06 |
|                          | Fertilization                       | 5.0                    | 21.4   | 73.6 | 2.68 |
|                          | Hoeing                              | 2.1                    | 34.3   | 63.6 | 2.61 |
|                          | Hand weeding                        | 9.3                    | 31.4   | 59.3 | 2.50 |
|                          | Pesticide and weedicide application | 24.3                   | 50.0   | 25.7 | 2.01 |
|                          | Repair of field channels            | 30.7                   | 53.6   | 15.7 | 1.85 |
|                          | Allover(The aspect)                 | 23.6                   | 33.6   | 42.8 | 2.19 |

**3.3. Participation and respondents characteristics**

Relationships between socio-economic descriptors of respondents and participation varied (Table 3). There were no significant relationships between the overall participation score and women's marital status. Age, educational level

and number of family women participate in vegetable cultivation were negatively, and significantly, related to participation. Referring to the relationships between socio-economic descriptors of respondents and their participation in vegetable cultivation activities, results indicate that

increased age, education level, and number of family women decreased participation level. Increased age decreased women's physical strength that necessary to perform agriculture activities. Rural women with good education may work outside the home and their participation in agricultural activities will decrease, while (Munmun *et al.*, 2015) [17] said, the reason is due to that women having more education feel dishonour to participate in agricultural activities. Increased women family number involved in agricultural work leads to a reduction participation level of each of them. Years of experience in vegetable cultivation and amount of area cultivated with vegetable crops had positive, significant, relationships with participation. Rural women participation in vegetable cultivation activities increased by increasing years of experience, and cultivated area. As the years of experience increase, there is a growing need for women participation in agricultural activities for extension and supervision. While any increase in cultivated area needs more labor.

**Table 3:** Relationship between socioeconomic characteristics and participation

| characteristic    | Correlation coefficient |
|-------------------|-------------------------|
| Marital status    | 0.178 ns                |
| Age               | - 0.378*                |
| Educational level | - 0.424*                |
| Experience (year) | 0.572*                  |
| Cultivated area   | 0.625*                  |
| No. of women      | - 0.297*                |

\*P<0.05.

**4. Conclusion and Recommendations**

Half of rural women have a high level of participation in vegetable cultivation activities. Pre-sowing and sowing category had the high participate among rural women. land cleaning, seed treatment, sowing (and replanting) seeds, fertilisation, hoeing, hand weeding, harvesting, sorting and grading and seed storage are the activities in which rural women shown high level of participation. Age, educational level and number of family women participate in vegetable cultivation were negatively, and significantly, related to participation, while, years of experience and cultivated area had positive relationships. An appropriate extension strategy needed to increase knowledge of rural women's in activities shown highly participation.

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