

AN EXAMINATION OF THE LINK BETWEEN PARTICIPATION OF PERSONS WITH DISABILITY IN AGRICULTURE AND FOOD SECURITY: THE CASE OF DISABLED FARMERS IN SAVELUGU/NANTON MUNICIPAL *

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ABSTRACT

Persons with Disabilities (PWDs) can be productive members of their communities if societal and institutional barriers limiting their participation in decent work are removed. However, there is limited information on the participation of PWDs in agriculture and its effect on food security among disabled farmers in Ghana. This paper presents findings of a study conducted to examine the participation of PWDs in agriculture and its effect on household food security situation among disabled farmers in Savelugu/Nanton Municipal of the Northern Region of Ghana. Descriptive survey design was employed in collecting mainly primary data from disabled farmers across the Municipality. From the list of PWDs in the Municipality, a multi-stage sampling technique was employed in selecting 156 disabled farmers. Descriptive and inferential statistics were employed in analysing the primary data collected. Household food security situation of PWDs was measured using Household Food Insecurity Access Scale (HFIAS). Findings of the study established two main forms of participation of PWDs in agriculture; 'participation through labour contribution' and 'participation through decision-making'. Analysis of the HFIAS score reveals high level of food insecurity among PWDs. Many (43%) of the disabled farmers surveyed were found to be food insecure, while the remaining were either moderately food secure (32%) or food secure (25%). The study found significant relationship between form of participation in agriculture and household food security situation of disabled farmers. Disabled farmers who participate both in taking decisions and production activities are more likely to be food secure than those who participate only through labour contribution. It is recommended that the Ministry of Food and Agriculture (MoFA) empower disabled farmers by providing tailored extension and agricultural information services to meet the specific needs of PWDs.

Keywords: Participation; Agriculture; Persons with disability; Food security; Disabled farmer; Household

*Savelugu/Nanton Municipal has now been divided into Savelugu Municipal and Nanton District

INTRODUCTION

Throughout recorded history, Persons with Disabilities (PWDs) have often been marginalized and discriminated against in terms of access to economic and political resources and have been treated as silent recipients of assistance (Ghosh, n.d.). The Convention on the Right of Persons with Disabilities, which was adopted by the United Nations in 2006, has drawn global attention to the need to integrate disability issues in development planning processes of member states (UNCRPD, 2006). In the specific case of Ghana, about 7 to 10 percent of the population is disabled (UNDP, 2007). The Ghana Statistical Service however, estimated in the 2010 Population and Housing Census that there are 737,743 persons with some form of disability, representing 3% of the total population (GSS, 2012). According to the Ministry of Health, there is a growing trend in the number of PWDs in Ghana (MOH/PPME, 2007).

Agriculture is a key sector of Ghana's economy, accounting for about 20% of the national GDP in 2016 (Bagbara, 2017; GoG, 2017). Although it is reported that about 60% of sub-Saharan Africans are engaged in agriculture and 35% globally, PWDs are often excluded from agricultural employment opportunities (FAO, 2013). The World Food Summit organized by the FAO in 1996, acknowledged the fundamental contribution to global food security by disabled farmers, noting that a large proportion of disabled persons were farmers with responsibility for the food security of their households (FAO, 2006). Again, the causes of disability are often directly related to food insecurity, resulting in malnutrition (FAO, 2013). Nutrition and disability are critical human rights issues based on the Universal Declaration of Human Rights (Article 25) and the General Comment on the Right to Food, which specifically spells out the rights of PWDs to have physical access to adequate food (Groce et. al., 2013).

In most societies in Africa however, growing space, land tenure and capital to invest in agriculture such as tools and seeds, may be limited to only persons without disabilities (WHO, 2011). In addition, agriculture extension and financial services such as microcredit might not be accessible to PWDs to enable them engage in agricultural production (New Agriculturist, 2013). Studies have shown that disabled persons can contribute meaningfully to the food security of their households (Bruijin, 2014; FAO, 2006; New Agriculturist, 2013). The active participation of disabled farmers in agriculture enables them to realize their aspirations, improve their living conditions and participate more actively in society (New Agriculturist, 2013).

It however appears that the fundamental and crucial contributions of disabled farmers to food security have not been acknowledged in Ghana. This could be due to the fact that little is known about their participation in agriculture. Another factor could be that, not much research has been done in Ghana to highlight the role of PWDs in contributing to food

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security of their households and communities. This paper presents findings of an empirical study on the link between the participation of PWDs in agriculture and food security among disabled farmers in the Savelugu/Nanton Municipality of the Northern Region of Ghana.

CONCEPTUAL FRAMEWORK

Disabled farmers operate within certain limitations such as type of disability, gender, household status among others, and the general stress and shocks in agricultural production such as climate variability, market failures and price fluctuations. For PWDs to be actively engaged in agriculture, they will need certain assets or agricultural inputs. An individual's ability to access these inputs or assets will determine whether he or she can actively engage in agriculture. An individual's ability to access land (a natural capital according to the DFID sustainable livelihood framework), microcredit (financial capital), machinery, tools and equipment (physical capital), labour (human capital) and the ability to leverage on relationships and networks to be able to carry out agricultural activities (social capital) determines his or her participation in agricultural production. Thus, levels of access to the different capital assets will interact to determine an individual's ability to productively engage in agriculture and this will have implications on their household food security situation. This is illustrated in Figure 1.

Transforming structures and processes (policies, institutions etc), as indicated in Figure 1, take into consideration the larger agricultural policy and implementation frameworks of the country. The transforming structures seek to find answers to questions such as:

1. How is the nation's agricultural framework, and how is it amendable to the circumstance of PWDs?
2. How is relationship and authority, relating to input in agriculture organized in the country?
3. Who has ownership rights and control over land?
4. How does the agricultural inputs market operate and how does it affect PWDs?

The transforming structures also include the socio-cultural issues as they relate to disability. Thus all these issues will transform the ability of PWDs to engage in agriculture. The process through which PWDs move through these institutions and transforming structures to be able to engage effectively in agriculture is modelled in the framework as 'process'. This looks at how the institutional structures facilitate or impede PWDs' ability to productively utilize agricultural resources to engage in meaningful agricultural production. These transforming structures and processes will be effectively utilized if the

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disabled farmer effectively participates in agriculture by having control of agricultural production and decision-making.

METHODOLOGY

The study was conducted in the Savelugu-Nanton Municipal of the Northern Region of Ghana. The Municipality has about 149 communities with a population of 139,283, representing 5.1% of the region's total population. Males constitute 48.5% and females 51.5% and 60% of the population is rural (GSS, 2014). The Municipal has a total land area of about 2,022.6 sq. km. with a population density of 68.9 persons per sq. km (GSS, 2014).

The Association of Persons with Disabilities in the Municipal has a well-documented database of PWDs and this made the Savelugu/Nanton Municipal an ideal place to conduct this research. The Association of Persons with Disabilities in the Municipal conducted an extensive census, the results of which indicated that there are 779 PWDs across the six administrative zones in the Municipal.

Descriptive survey design was employed in carrying out the study. A mixed (qualitative and quantitative) method of data collection was used in gathering data. The target population was all disabled farmers in the Municipal. Information about persons with disability was obtained from stakeholders including staff of the Municipal Assembly and executives of the Association of Persons with Disabilities.

A multi-stage sampling procedure was employed in the study. The list of PWDs from the Association of Persons with Disabilities constituted the population and the sampling frame of the study. Stratified random sampling was used to stratify PWDs according to the type of disability (physical disability and sensory disability) and according to sex to obtain the sampled persons. This was done to ensure that the final sample will reflect type of disability as well as gender and thus be representative of the population.

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Conceptual Framework

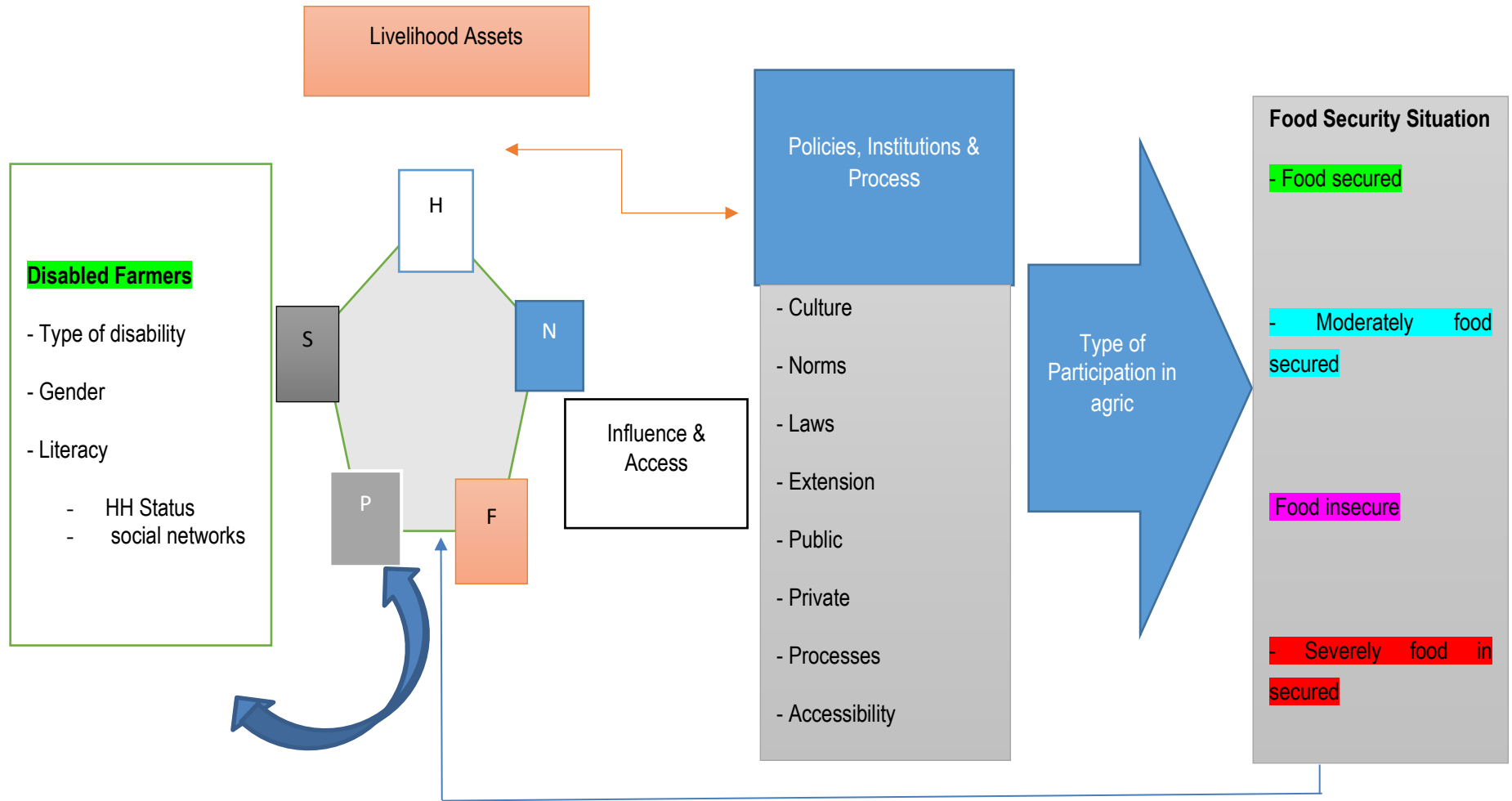


Figure 1: Conceptual framework

Source: Adapted from DIFD sustainable livelihood framework (DFID, 2000)

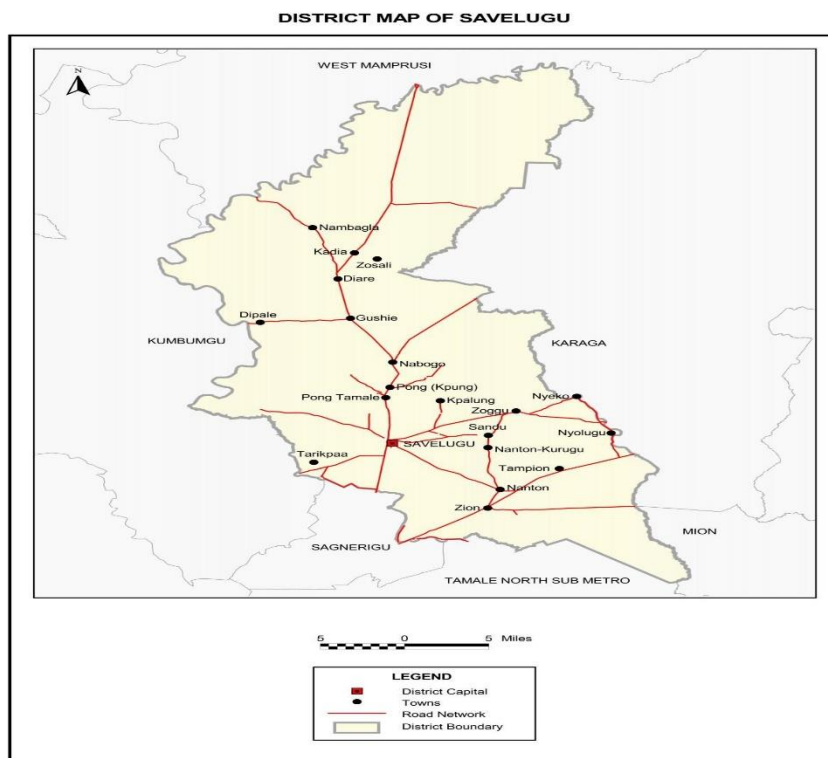


Figure 2: Map of Savelugu-Nanton Municipal

Source: Ghana Statistical Service, GIS (sourced from GSS, 2014)

The total number of persons with disability engaged in agriculture in the Municipal was 263 and a sample size of 156 persons was obtained by using the Krejcie and Morgan (1970) methodology. Respondents were then selected by random sampling with proportional representation to size.

The computation of the sample size by the Krejcie and Morgan (1970) formula is as follows:

$$S = \frac{X^2 NP(1-P)}{d^2(N-1) + X^2 P(1-P)}$$

Where:

s = Required Sample Size

X = Z value (1.96 for 95% confidence level)

N = Population Size

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P = Population Proportion (0.5)

d = Degree of accuracy (0.5)

Thus the required sample size for persons with disability engaged in agriculture was:

$$S = \frac{(1.96)^2 263 * 0.5 (1-0.5)}{0.05^2 (263-1) + (1.96)^2 * 0.5 (1-0.5)}$$

= 156.36 rounded off to 156 persons with disability engaged in agriculture.

Table 1 presents population and sample distribution of PWDs surveyed for the study by sex and type of disability. As shown in the table, out of 49 physically disabled female farmers in the Municipal, 29 were sampled while 22 sensory disabled female farmers were sampled from the 37 sensory disabled farmers in the Municipal. Similarly, 53 physically disabled male farmers were sampled from the 89 physically disabled male farmers in the Municipal while 52 sensory disabled farmers were sampled from the 88 sensory disabled male farmers in the Municipal.

TABLE 1: NUMBER OF RESPONDENTS SAMPLED

Category of PWDs	Total Number	Number Sampled for study
Females with physical disability engaged in agriculture	49	29
Males with physical disability engaged in agriculture	89	53
Females with sensory disability engaged in agriculture	37	22
Males with sensory disability engaged in agriculture	88	52
Persons with disability not engaged in agriculture	516	NA
Total	779	156

Source: Field survey, 2017

The study made use of both primary and secondary data. Primary data was collected from the PWDs engaged in agriculture as well as the stakeholders. This was done using personal interviews guided by semi-structured questionnaires, observations, key informant interviews and focus group discussions. In addition, secondary data was collected from records of the Municipal Department of Agriculture, the Association of Persons with Disability and the Municipal Assembly.

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Both descriptive and inferential statistics were employed in analysing the data gathered. Household Food Insecurity Access Scale (HFIAS) was used in the analysis of the food insecurity situation of PWDs' households. The HFIAS method consists of use of 18 questions, comprising 9 'occurrence' questions and 9 'frequency of occurrence' questions. The questions represent worldwide spheres of the household food insecurity (access) experience and can be used to assign households and populations along a continuum of severity, ranging from food secure to severely food insecure (Coate et al., 2007). Each of the questions is asked with a recall period of four weeks. The respondent is first asked whether the condition in the question happened at all in the past four weeks, to be replied with a "yes" or "no". If the respondent answers "yes" to an occurrence question, a frequency-of-occurrence question is then asked to determine whether the condition happened rarely (once or twice), sometimes (three to ten times) or often (more than ten times) in the past four weeks, (Coates et al., 2007). That provided good information with respect to the food security statuses of the PWDs. In addition, the Kruskal – Wallis test was used to assess the relationship between forms of participation of disabled farmers in agriculture and their household food security situation.

RESULTS AND DISCUSSION

Sex and Type of Disability

According to Groce et al., (2011) women with disabilities often experience double discrimination due to the intersection of gender and disability. For women with disabilities in developing countries, the situation is more complicated, given the intersection of disability, gender, poverty, cultural beliefs and negative perceptions about their capabilities (Banks & Polack, 2013). As such the study assessed type of disability and sex of respondents and the results are presented in Table 2. Table 2 indicates that about half (50.5%) of the male respondents were physically disabled while the remaining half were sensory disabled. Similarly, more than half (56.9%) of the female respondents surveyed were physically disabled with about 43% of them being sensory disabled.

TABLE 2: RELATIONSHIP BETWEEN SEX AND TYPE OF DISABILITY

Type of Disability		Sex		Total
		Male	Female	
Physical disability	Count	53	29	82
	% within Sex	50.5%	56.9%	52.6%
Sensory disability	Count	52	22	74
	% within Sex	49.5%	43.1%	47.4%
Total	Count	105	51	156
	% within Sex	100.0%	100.0%	100.0%

Source: Field survey, 2017

Type of Agricultural Activities PWDs Engage in

Figure 3 shows that all disabled farmers who engaged in agriculture and were sampled for the study undertook food crop production. They did so to ensure that their households had enough food to eat. Also, about 51% of the sampled disabled farmers undertook livestock rearing. This was done to supplement the income from the cultivation of crops. Majority of the respondents explained that they sell their livestock to buy grains as a means of mitigating food shortage in their households. Only about 14% of the respondents undertook cash crop cultivation and this could be attributed to the fact that PWDs are deprived in terms of access to productive resources and agricultural information to enable them engage in high – value cash crop production. At the various focus group discussions, disabled farmers lamented their general lack of access to and control over land and as such they find it difficult to engage in crop enterprises of their choice. This situation seems to agree with the assertions by the World Health Organization that in most societies in Africa, growing space, land tenure and capital to invest in agriculture such as tools and seeds, may be limited to only persons without disabilities (WHO, 2011). The results also show that only a few PWDs undertook agro-processing and agro-marketing activities. The obvious lack of assistance to PWDs is evident in the fact that they lack the resources and necessary equipment to enable them undertake agro-processing activities. These findings are in line with studies conducted in several countries in Asia, the Pacific, Africa and the Americas that showed that people with disabilities are actively engaged in agricultural activities such as, gardening, growing fruit trees and livestock keeping (New Agriculturist, 2013).

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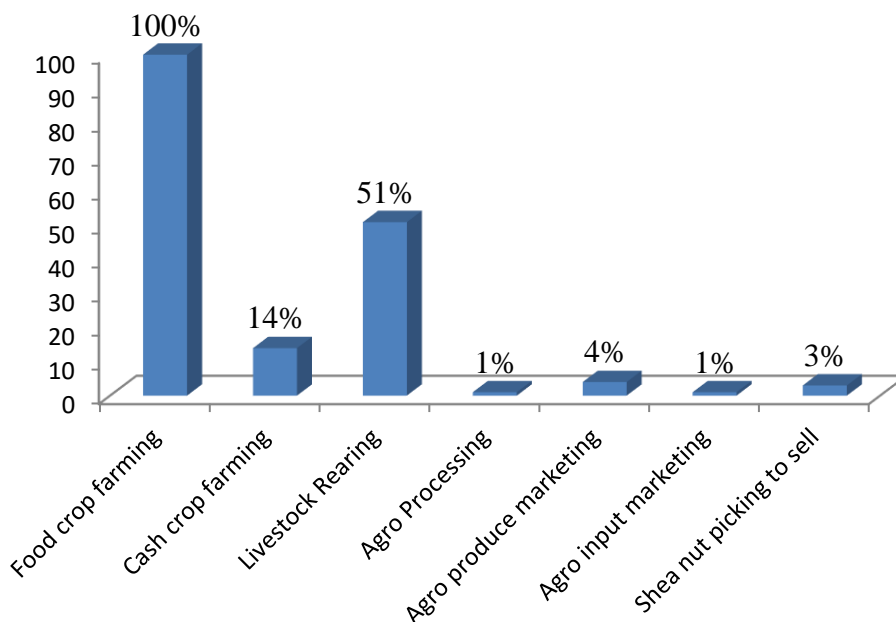


Figure 3: Agricultural activities engaged in by PWDs

Source: Field Survey, 2017

PWDs and Rearing of Livestock

Data on type, stock numbers and unit prices of livestock owned by the 156 disabled farmers surveyed was collected. Table 3 shows the average stock numbers and value of all types of livestock kept by the disabled farmers. As shown in the table, many (46.1%) of the disabled farmers kept local fowls with an average stock of 15 birds, yielding an average stock value of GH¢52.33 per farmer. They were quite experienced in rearing local poultry, with average of 33 years' experience. It is evident that, although fowls were the most reared animals among the disabled farmers, they tended to yield the least incomes (Table 3). This can be attributed to the fact that mortality has been high. Majority of the respondents lamented that their fowls die in large numbers during the harmattan season, mainly due to lack of access to veterinary services. They are unable to vaccinate their fowls nor obtain other veterinary services. About 17% of the respondents reared guinea fowls with an average stock of 13 birds and average stock value of GH¢118.00 per respondent. They have an average of 16 years' experience in the rearing of guinea fowls. Although few PWDs reared guinea fowls, their average value is higher than that of local fowls. This is indicative of the high market value of guinea fowls as compared to fowls.

TABLE 3: LIVESTOCK REARED BY PWDS

Livestock	Do you keep this livestock		Descriptive statistics		
	Yes (%)	No (%)	Average Stock*	Average Stock Value*	Experience
Goat	27.60	72.40	5.65	209.79	30.65
Sheep	25.60	74.40	8.23	283.33	11.32
Cattle	6.40	93.60	16.11	2,775.00	14.38
Pig	1.30	98.70	14.00	1,550.00	13.50
Fowls	46.10	53.80	14.65	52.33	33.37
Guinea Fowls	16.70	83.30	13.19	118.00	16.23

*The averages given are with respect to only those PWDs that rear livestock and/or poultry.

Source: Field survey, 2017

With regards to the rearing of small ruminants, about 28% and 26% of the disabled farmers interviewed indicated that they reared goats and sheep respectively. The average stock holding of goats and sheep per respondent, as at the time of the field survey, was about 6 and 8 respectively. The average stock values of the goats and sheep were GH¢209.79 and GH¢283.33 per respondent respectively.

With regards to large ruminants (cattle), very few (6.4%) of the disabled farmers interviewed reared cattle with average stock of 16 cows, yielding an average stock value of GH¢2,775.00 per respondent. Despite the fact that few disabled farmers interviewed owned cattle, information gathered from the focus group discussions, revealed that there is no taboo in the Municipal barring PWDs from rearing cattle or any other livestock. The 10 disabled farmers who were found to keep cattle were regarded in their communities as rich. At one of the focus group discussions, a participant observed that "those disabled farmers who have cattle are respected because they are rich... they (disabled farmer who have cattle) even hire people to take care their cattle for them"¹. Pigs were found to be rarely kept by disabled farmers in the study area. Only two farmers (representing 1.3%) indicated that they reared pigs, with average stock holding of 14 pigs and average stock value of GH¢1,550.00 per respondent. This could be attributed to the fact that the Savelugu/Nanton Municipality is Muslim-dominated.

¹ Verbatim comment of a participant at a focus group discussion

PWDs Participation in Agriculture

The paper identified three main forms of participation in agriculture by PWDs:

- 1) Participation through labour contribution; in which the disabled persons only contribute their labour in carrying out their household farming activities. They exert no control over production and marketing decisions.
- 2) Participation through decision making; in which PWDs participate in agriculture by having control over or participating in deciding what to produce, how to produce, when to sell and how to use the produce. By virtue of their disabilities or other reasons those in this category are unable to participate in productive activities but actively participate in taking decisions with respect to production and marketing.
- 3) Participation by both physical activities as well as decision making; in which they physically participate in production activities and also have some level of control over production and marketing decisions.

As given in Figure 4, about a third (33%) of the 156 PWDs surveyed, participated in agriculture by labour contribution. They were involved in carrying out agricultural production activities such as land preparation, sowing, weeding, harvesting among others on farms owned by other members of their households, mainly the heads of their households. Women and young PWDs were found to belong to this category. Because women with disabilities face multiple discriminations and constraints, their participation in agriculture was found to be limited to using their labour to undertake unpaid agricultural activities, with very few of them receiving rewards and payment for that. About 28% of the 156 PWDs, were found to participate in agriculture by decision only. This category mainly comprised of the elderly who were usually the heads of households and as such have control over production decisions but because of their age they do not physically take part in production activities. They take decisions on what to produce and how the income should be utilized. Most of the visually impaired respondents were found to belong to this category, even though some of them actually take part in production activities despite their visual limitations. Finally, about 39% of the respondents participate in agriculture by both production activities and decision making (Figure 4). Due to their much younger age, they actively take part in production activities, notwithstanding their disabilities, and also own farms and as such have control over production and marketing decision. This active labour force is the main contributor to food security needs of the PWD households.

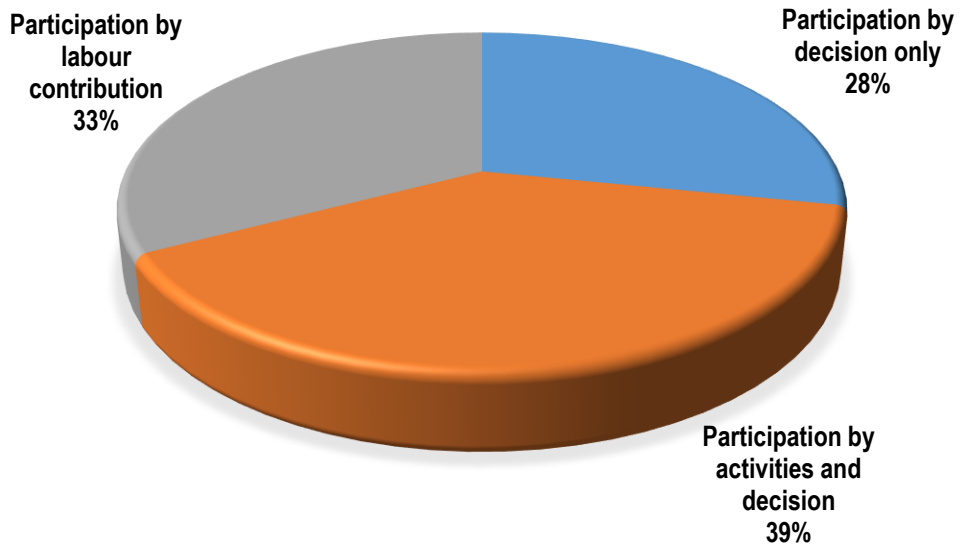


Figure 4: Categories of Participation of PWD

Source: Field survey, 2017

Relationship between Type of Disability and Forms of Participation in Agriculture

The study assessed type of disability (physical or sensory) and the relationship to the type of participation of the PWD farmers in agriculture. The result is as given in Table 4.

TABLE 4: RELATIONSHIP BETWEEN TYPE OF DISABILITY AND FORM PARTICIPATION IN AGRICULTURE

Type of Participation			Type of Disability		Total
			Physical disability	Sensory disability	
Participation decision only	by	Count	20	24	44
	% within Disability	Type of	24.4%	32.4%	28.2%
Participation activities and decision	by	Count	36	25	61
	% within Disability	Type of	43.9%	33.8%	39.1%
Participation by labour contribution only	by	Count	26	25	51
	% within Disability	Type of	31.7%	33.8%	32.7%
Total	by	Count	82	74	156
	% within Disability	Type of	100.0%	100.0%	100.0%

χ^2 (df = 2) = 1.962 and P = 0.375

Source Field survey, 2017

The computed chi-square value indicates that there is no significant relationship (at the 5% level) between type of disability and form of participation of PWD farmers in agriculture. Thus, both physically disabled farmers and sensory disabled farmers are equally likely to participate in agriculture either by labour contribution only or through decision making. However, as given in the table, about 44% of the physically disabled farmers surveyed were participating in taking farming decisions in their households as well as engaging in farming activities, while about a third (33.8%) of the sensory disabled farmers were participating in both decision making and farming activities. Also 24.4% of physically disabled farmers surveyed participated in agriculture by decision making only compared with about a third (32.4%) of the sensory disabled farmers who did so. Similarly, 31.7% and 33.8% respectively of the physically and sensory disabled farmers engaged in agriculture by only labour contribution.

PWDs Household Food Security Situation

The fundamental contribution to food security by disabled farmers was highlighted in the World Food Summit organized by FAO in 1996. It was made known that a large proportion of the disabled people were farmers with responsibility for the food security of their households (FAO, 2006). According to FAO (2008), “food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life”. Estimates from FAO suggest that one in eight people in the world (870 million) suffered from chronic undernourishment between 2010 and 2012 (FAO, 2012 cited in FAO, 2013). In order to build political will, design effective policies, and target the allocation of resource to agriculture, information regarding the distribution and severity of hunger and food insecurity in the population and the characteristics, circumstances, and location of those most affected needs to be obtained. The Household Food Insecurity and Access Scale (HFIAS) methodology, used in this study, is based on the idea that the experience of food insecurity (access) causes predictable reactions and responses that can be captured and quantified through a survey and summarized in a scale (Coates, Swindale, & Bilinsky, 2007).

As explained in earlier sections, the HFIAS methodology is based on responses to a set of nine questions with respect to “occurrence” and “frequency of occurrence”. Table 5 gives the frequency distribution of responses to the HFIAS questions by the PWD farmers. Majority (69.9 %) of them indicated that they often eat a limited variety of food due to limited resources (Table 5). This has resulted in the situation where the disabled persons and their households have to eat one particular variety of food for several months in a year. A respondent lamented that, “... we have no option than to eat T.Z all the time. Sometimes I crave for other foods like rice and beans but due to poverty, I cannot get it to eat.” Also, more than two-third (69%) of respondents were unable to eat the foods that they preferred due to a lack of resources and about 62% of PWDs responded that there were instances that they were compelled to eat some foods that they really did not want to eat because they lack resources to obtain the preferred food (Table 5).

TABLE 5: FREQUENCY DISTRIBUTION OF RESPONSES TO HFIAS QUESTIONS BY PWDS

Question	Response		How often does it happen		
	Yes	No	Rare ly	Sometim es	Ofte n
	%	%	%	%	%
In the past four weeks, did you worry that your household would not have enough to eat?	54.50	45.50	23.00	43.70	33.30
In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of lack of resources?	69.20	30.80	25.50	42.70	31.80
In the past four weeks, did you or any household member have to eat a limited variety of foods due to lack of resources?	69.90	30.10	24.80	46.80	28.40
In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of lack of resources to obtain food?	61.50	38.50	35.10	42.30	22.70
In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	58.30	41.70	29.00	37.60	32.30
In the past four weeks, did you or any household member have to eat fewer meals in a day because there was not enough food?	41.00	59.00	45.30	28.10	26.60
In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	19.90	78.80	46.90	53.10	0.00
In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	7.10	91.70	50.00	41.70	8.30
In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	3.80	95.50	14.30	85.70	0.00

Source: Field survey, 2017

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It can be deduced from the results that, PWDs in the Municipality have considerable challenges with regards to their access to variety of foods to supplement their regular meals. They face limited choices in the type of food that household members eat and that means they are food insecure according to the domains of food insecurity (Coates et al, 2007).

Being able to eat sufficient quantity of food is a source of worry among households of PWDs surveyed. Table 5 reveals that, more than half (58.3%) of PWDs interviewed have to eat smaller meals than they felt was needed due to insufficient food. This is closely followed by 54.5% of PWDs who responded that they were worried that their households would not have enough food to eat. One household head lamented, "... I worry a lot about our food situation. It is the first thing on my mind when I wake up in the morning and the last thing I think about when I go to sleep at night". In addition, 41% of PWDs stated that they had to eat fewer meals in a day due to lack of resources to get food. Thus some household members eat nothing in the afternoon to make provision for the regular evening meals. Some households also experience complete unavailability of food during some parts of the year (Table 5) and require food aid from whatever source to survive.

Categorization of HFIAS and Food Security Situation among PWDs

Table 6 gives the computed HFIASs. They have been computed from the responses in Table 5. As stated in the Methodology section, respondents whose households did not experience any of the incidences of food insecurity captured by the set of nine questions were recorded "no" to all the questions. A "no" response to any question on the set of nine questions indicates that no member of the household experienced the incident of food insecurity and a "yes" indicates that at least a member of the household experienced that incidence of food insecurity. The responses (1 for yes and 0 for no) for all the nine questions are summed for each respondent to find the number of food insecurity incidences being experienced by a given household. The sum figure represents the respondents' HFIAS. Thus the higher the score the greater the food insecurity of the household. Those computed values (HFIASs) are what have been presented in Table 6. It shows that about a quarter (25.5%) of disabled farmers interviewed are food secure (40 out of the sample size of 156). It implies that one out of every four households of disabled farmers interviewed never experienced any of the household food insecurity incidences captured by the set of nine questions.

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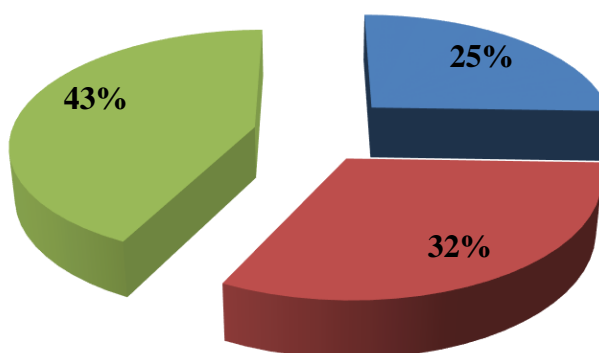
TABLE 6: HOUSEHOLD FOOD INSECURITY AND ACCESS SCORE OF PWDS

HFIAS	Frequency	Percent (%)	Cumulative %
0.00	40	25.50	25.5
1.00	4	2.60	28.1
2.00	4	2.60	30.7
3.00	13	8.30	39
4.00	12	7.70	46.7
5.00	33	21.20	67.9
6.00	26	16.70	84.6
7.00	15	9.60	94.2
8.00	5	3.20	97.4
9.00	4	2.60	100
Total	156	100.0	

Source: Feld survey, 2017

However, four (2.6%) of the households experience severe food insecurity. They experience food insecurity incidence captured by all the nine HFIAS questions. By way of overall classification, respondents who obtain zero HFIAS are food secure, those with HFIAS of 1 to 5 are moderately food secure while those with HFIAS of above 5 are food insecure (Coates et, al. 2007). The pie chart (Figure 5), presents the food security situation of disabled farmers surveyed in the Savelugu/Nanton Municipal.

■ Food secure ■ Moderately food secure ■ Food insecure

**Figure 5: Pie Chart Showing Household Food Security Situation of PWDS****Source: Field survey, 2017**

Majority of the 156 disabled farmers interviewed were from households with incidence of food insecurity (43%) or moderately food secured (32%) with only 25% being food secured. Thus the incidence of food insecurity is wide spread and quite severe among PWDs in the Municipality. The farmers surveyed have to adopt various means to mitigate the effect of food shortage in their households. At a focus group discussion, one farmer in Nambagla community said;

“whenever the food in my house gets finished, I sell my livestock to buy corn for us to feed on”. One other disabled farmer also lamented that; “anytime our corn starts to finish, I worry a lot. I cannot sleep at night because I have no means of getting food when my harvest gets finished. It is only the help of God and some benevolent people that we are able to survive”.

Effects of PWDs Participation in Agriculture on Food Security

One of the objectives of the study was to distinguish between the food security statuses of the different categories of PWDs with regards to the three (3) forms of participation in agriculture. The average HFIASs were computed for the three forms (participation through labour contribution, participation by decision making and participation by physical activities and decision making) and Kruskal-Wallis test was conducted to assess if there exists significant differences in the mean score among the three forms. As such the following hypotheses were tested:

1. H_0 : There is no significant difference in the average score of HFIAS between the three forms of participation of PWDs in agriculture
2. H_a : There is significant difference in the average score of HFIAS between the three forms of participation of PWDs in agriculture.

Disabled farmers who participated in agriculture by taking part in major decisions and activities scored a mean rank score of 37.06 HFIAS compared with 105.28 and 82.23 of those who participated by labour contribution only and by decision only respectively (Table 7a). By analysis of variance (ANOVA) and with Kruskal – Wallis (KW) test (measured by Chi-square value) of 59.986 (df = 2) at the $\alpha = 0.05$ level of significance (Table 7b), it is concluded that there is significant difference in the mean HFIASs among the three forms of participation in agriculture by PWDs surveyed. That implies that disabled farmers who participated in agriculture through decision and production activities are more likely to be food secure than those who participated in either labour contribution only or taking part in major decision only.

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However, those who participated in their households' agriculture by taking part in major decisions scored lower mean rank (mean rank = 82.23) compared with those who only participated through labour contribution (mean rank = 105.28). This implies that those who participated in agriculture by taking part in major production decisions are more likely to be food secure than those who participated only by labour contribution.

Table 7a: Result of ANOVA

Form of participation of PWDs in agriculture	N	Mean Rank
Participation in both decision and activities	44	37.06
Participation by labour	61	105.28
Participation by decision only	51	82.23
Total	156	

TABLE 7B: TEST STATISTICS

Test Statistics	HFIAS
Chi-Square	59.986
Df	2
Asymp. Sig.	.000

Source: Field survey, 2017

CONCLUSION AND RECOMMENDATION

Majority of the households of disabled farmers surveyed are either food insecure or moderately food secured. They are faced with various incidents of food insecurity ranging from eating insufficient quantities of food to skipping meals because of lack of resource to purchase food. They have to adopt various means to mitigate the effect of food shortage in their households. Form of participation of disabled farmers in agriculture has significant relationship with their household food security situation. Disabled farmers who participate in agriculture by taking part in major production decisions are more likely to be food secure than those who only contribute their labour in undertaking agricultural activities.

The main recommendation is that disabled farmers' food security situation can be improved if the Ministry of Food and Agriculture (MOFA) and other organizations working to improve agriculture could mainstream disability concerns in implementing their activities. This will help

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to improve disabled farmers' access to agricultural information and their ability to take part in agricultural production decisions of their households.

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