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Taming Occupational Stress among Farmers in Developing Nations

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Abstract

Agriculture is a major sector in most developing nations of the world. The world food poverty is on the rise, with almost one in seven people around the world who are chronically hungry and lacking enough food to be healthy and lead active lives. The race is on to explore agriculture to produce enough food to feed the rapidly growing population. Consequently, there has been a change in the dimensions of agricultural health risks among farm workers in most developing countries. Occupational health-related studies are very important, yet research outputs in these regions of the world are yet to target this area extensively to stimulate appropriate policy formulations. Farm workers therefore have low adaptive capacity to work-place stress-related issues. These peculiar constraints have exposed farmers to work-related stressors affecting their well-being. In this context, farm stress occurs as a result of adverse reaction farmers' faced including excessive pressure, seasonality, rural lifestyle, job demands or reactions to some uncertainty in their farming businesses. This chapter X-rayed the concept of farm stress in a developing nation context, providing empirical basis for the formulation of appropriate interventions to reduce farm stressors with particular focus on stress in the crop and poultry ventures.

Keywords: farmers, developing nations, occupational stress, stressors, well-being

1. Introduction

Agriculture is tipped to be the largest provider of jobs globally, as the sector's share of the global workforce stood at 32% in 2013 [1–3]. Asia and the Pacific (59%) are ranked first followed by Africa, which is ranked second (52%) as regards workforce share in agriculture. Globally, agricultural occupation has been described as one of the most hazard-prone occupations. This industry has one of the worst records for high incidence of occupational ill health, injuries and work-related fatalities after construction industry [4].

Agriculture plays a major role in Nigeria's economy. This sector has been described to be the primary rescue of the nation from economic recession. It has been documented that about 121 million of the 175 million Nigerian population are farmers out of which about 80% of this figure are smallholder farmers [5, 6]. These smallholder crop farmers are poor, typically not literate, have limited

infrastructure, solely depend on rainfed agriculture and have limited adaptive and coping capacity [7, 8]. On the other hand, poultry subsector is the most commercialised (capitalised) of all the subsectors of the Nigeria's agriculture [9]. This subsector contributes about 15% of the total annual protein intake with approximately 1.3 kg of poultry products consumed per head per annum in Nigeria [10].

Despite the role played by the agricultural industry in reducing poverty, agriculture has been described as a hazardous occupation exposing farm workers to several work-related risks including agricultural stressors [4, 11–16].

In spite of the documented hazards in agriculture, the agricultural sector in Nigeria has a culture of unwise risk-taking and is yet to appreciate the role a good health and safety management can play in attaining safe and sustainable agriculture. In Nigeria, agriculture is largely practiced as a way of life and usually not regulated as such, and the safety and health of the workers are yet to be prioritised [4, 17]. Incidence of injuries and illness in agriculture is high and may be directly linked to workplace stress [18]. Workplace stress may not be observed at the early stages in most cases. However, as it progresses, ill health makes an individual grasp that he/she is under stress.

Recent development in agriculture in most developing countries has increased the exposure of agricultural workers to agricultural risks and hazards in their workplaces. This high exposure may be due to increased need to meet food and monetary demands of farming households. Agricultural productivity has been very low in developing countries. This has been attributed in part to climate change effects and erratic rainfall pattern in recent times. These issues have further exposed farmers to work-related stressors. This in turn affects farmers' total well-being.

On the one hand, stress is described as the response, while stressor is the stimulus eliciting a need for adaption on the other. A publication by European Commission on the Guidance on Work-Related Stress defined work-related stress as a pattern of emotional, cognitive, behavioural and physiological reactions to adverse and harmful aspects of work. This includes work contents, the organisation and the workplace environment as the major sources of stress [19]. The United States National Institute for Occupational Health and Safety [NIOSH] defined work-related stress as the damaging physical and emotional responses that occur when the necessities of a job do not mat competence, resources and needs of a worker [20] and expresses the view that working conditions are a key factor while personal factors are also influential to stress.

The UK Health and Safety Executives (HSE) further classified work-related stress as a key occupational health crisis among workers [21]. Work-related stress is a major source of psychosocial hazards that has not been prioritised in the agricultural sector of most developing nations. The origin of stressors could be of physical, psychological or social. This is probably due to the intricate way agriculture is carried out in these developing nations [17].

Generally, agriculture includes many other associated activities, such as cropping, crop processing and packaging, irrigation, pest management, grain storage, animal husbandry and farm construction. Agriculture is usually demanding and time-consuming. There is no shortage of farm tasks to complete under constrained seasonal conditions. This can be stressful for most farm workers especially those who like to feel a sense of completion [22].

Stress in farm workplaces occurs when an individual response to unfavourable reaction from excessive pressure or other types of demand placed on them relates to their farming activities. This is often due to exposure of farm workers to workplace stressors that cause frustration or anxiety exerting pressure on the farmer. In addition, agricultural operations are mostly seasonal, mostly self-owned, and peasant in nature coupled with rural lifestyle, exposing farmers to numerous stressors.

The University of California report has revealed that younger farmers, especially those younger than 50 years, are more stressed compared to farmers of older age group. Farmers who practiced mixed farming (e.g. crop and livestock farming) self-reported higher stress intensity than those in crop farming only. Farmers who also engaged off-farm jobs apart from farming report more stress than full-time farm operators [22]. It was also reported that women working on farms experience additional stressors compared with those not engaged in farm works. It was also documented that working as a full partner in the farm business leads to many women taking sole responsibility for the home and family matters. A woman with an off-farm job faces more difficult demands in addition to being the traditional nurturer for the rest of the family [23].

The agricultural-based stressors affect farm workers' total well-being including physical and mental well-being [18]. Exposure to workplace stress causes ill health, affecting mental health and human body physiology leading to low labour productivity. The way an individual reacts to stress differs; some of the documented reactions to stress include gastrointestinal disorders, behavioural changes, exhaustion and sleep disorders. It also increases the danger of other diseases such as cardiovascular diseases and other psychological disorders [24].

Empirical evidences have provided information on agricultural workplace health issues such as farm chemical poisoning, ocular injuries, hearing loss and ergonomic injuries, but little is known about the psychosocial hazards such as stress in agricultural workplaces (see [25–37]). General workplace stressors have been identified from sources such as the National Institute for Occupational Safety and Health (USA) (NIOSH), the Health Safety Executive and the International Labour Organisation (ILO). The HSE identified workplace stressors including demand, relationship, role change, control and lack of support [20]. The NIOSH reported workplace stressors to include management style, design of tasks, interpersonal relationships, career concerns, work roles and environmental conditions [37].

The ILO reported job control, social support, out-of-a-job demands, physical environment, working time, work-life balance, recognition at work, job security, information and communication as workplace stressors [38]. Agriculture in most developing countries is practiced as a means of livelihood, social security and way of life. This underscores the importance of the sector in sustainable development effort. Investigating work-related stress in agriculture in Nigeria is important in understanding the mechanism underlying agricultural stressors in cropping and poultry operations. This will help in developing adequate coping (adapting to stress situations) strategies and making efforts at removing some of the identified stressors. This may in the long run enhance farmers' total health, agricultural productivity and food security. No doubt, studying agricultural stressors as it linked to agricultural sector productivity is important. However, little is known about stressors in crop and poultry production in developing countries like Nigeria. Studies in Nigeria on agricultural-related stressors especially crop production and poultry industry is rare. This present study intends to bridge this information gap and offers a pragmatic solution to these pertinent health risks and occupational stress in agriculture.

2. Materials and methods

2.1 Study area for the crop farmers

In addressing the stressors associated with crop farming, 70 crop farmers were sampled from Ekiti State, Nigeria. The state has 16 local government areas with coordinates 7° 40'N, 5°15'E. The total land area is 6353 km² and has a population of

2,237,186 people, with agriculture providing income and employment for more than 75% of the population [39, 40]. Ekiti State is also categorized by the Ekiti State Agricultural Development Project (EKADP) into Zones A, B and C based on agro-nomic and ecological considerations. These zone headquarters are situated at Aramoko, Ikere and Isan, respectively [40].

2.2 Study area for poultry farmers

For the poultry venture, a structured questionnaire was administered to 80 randomly selected poultry farmers in Ilorin Metropolis. Ilorin, is the state capital of Kwara State, North Central, Nigeria. The state lies between latitudes 7°45'N and 9°30'N and longitudes 2°30'E and 6°35'E and has an estimated population of about 2.37 million people [40]. The state has an annual rainfall range of 1000–1500 mm. The months of December and January coincide with the cold and dry harmattan period, while the annual rainfall pattern across the state extends between the months of April and October with minimum temperature ranging from 21.1 to 25°C and average maximum temperature varying between 30°C and 35°C.

2.3 Study type and instruments

The study engaged a descriptive survey to collect information on agricultural stressors among crop farmers in Ekiti State, Nigeria. Farmers who had farming as their major occupation across the farming communities in the state were approached for the study. About 85 farmers were informed about the purpose of the study, and 74 gave their consent via information letters. However, after data collection and cleaning, 70 of the questionnaires were found useful (N = 70). Similar approach was engaged in eliciting information from 80 poultry farmers in Kwara State, Nigeria. Information were elicited with the aid of a structured questionnaire and semi-structured interview. The questionnaires were designed to elicit information on socio-economics, agricultural stressors and their causes and perceived effects among the farming population as experienced by crop and poultry farmers. The instrument for crop farmers was taken through a test and retest method of 3-week interval to ensure the internal reliability of the instrument. The reliability index was found to be 0.73, while that of the poultry farmers was found to be 0.71. The instruments were augmented with a semi-structured interview to elicit qualitative information on the stressors associated with their occupation. The research instrument was developed based on the available information empirically (see [19, 20, 41, 42]). Various components of the instrument include the following: Section A, the socio-economic characteristics of the respondents; Section B, stressor identification and causes of farm stress on a four-point Likert scale [4 = strongly agree (SA), 3 = agree (A), 2 = disagree (D), 1 = strongly disagree (SD)]; and Section C, the ascribed effects of farm stressors and intensity of effects on a three-point Likert type [2 = mostly affected (MA), 1 = occasionally affected (OC) and 0 = not affected (NA)]. Authors sought the consent of the respondents via a consent form in which participants were informed of the purpose of the study and the confidentiality of the information provided. Respondents signed/thumb printed to show approval. The farmers were provided brief education on the concept of farm stress. This education included farm stress, sources and effects of farm stress using oral presentation. This was followed with a semi-structured interview using probing and prompting to elicit more information of farm stress-related issues from farmers. Authors are aware of the limitation of this method to include biased results leading to overestimation of stressor prevalence and effects. However, this was corrected

by cross-checking responses from the structured questionnaire and interview with the use of probing and prompting responses to check for internal validity and consistency.

2.4 Data analysis

Collected data were analysed using descriptive statistics such as frequency and percentage, means, standard deviation and range. Stressors were ranked from the Likert scale mean as reflected in Eq. 1:

$$X = \frac{\sum_{n=1}^N Fx}{N} \quad (1)$$

where X is the mean response to an item, Σ is the summation, F is the number of respondents choosing a particular scale point, x is the numerical value of a scale point and N is the total number of respondents to an item.

The mean response to a particular item was interpreted using the concept of real limit of numbers. The numerical values of the scale points and their respective real limits are as follows:

- SA = points with real limits of 3.50–4.0
- A = points with real limits of 2.50–3.49
- D = points with real limits of 1.50–2.49
- SD = points with real limits of 0.50–1.49

Mean values were calculated from the responses interpreted accordingly, e.g. a mean of range 0.5–1.49 is interpreted as SD. The intensity of effects was also computed using the above model real limits as follows: mostly affected = 1.5–2.0; occasionally affected = 0.6–1.50; and not affected = 0.00–0.50 accordingly.

We collected data from poultry farmers for this study which were analysed using descriptive statistics. In analysing the effects of stressors on poultry business, the following rating is used for the mean remark:

- Not affected (NF) = points with real limits of 0.50–1.49
- Fairly affected (FA) = points with real limits of 1.50–2.49
- Affected (AF) = points with real limits of 2.50–3.49
- Highly affected (HF) = points with real limits of 3.50–4.0

3. Results and discussion

Our findings showed that about 80% of the sampled farmers planted maize and cassava, while 10% of the farmers planted cassava and watermelon and solely cassava, respectively. We found that most (86%) of the sampled farmers had previous agriculture-related trainings, while about 14% had no previous agricultural training.

Further results from the study revealed that the mean age was 34 years, with about 38% of the respondents in the age class of 31–35 years and the age ranging between 20 and 50 years. The average schooling years was found to be 14 years, with about 43 and 33% having technical and degree qualifications accordingly. The average years of farming stood at 14 years, with about 43% in the class of 11–15 years. The average farm size among respondents was 9.3 hectare with household size median of five persons (see **Table 1**).

Our study revealed that about 98% of the respondents identified stressors that are related to their occupations. These stressors included unfavourable government policies, long hours of farm labour, labour scarcity, poor harvest anxiety, poor transport infrastructure, poor access to credit facilities, untimely access to farm inputs, poor market proximity and poor access to market information, among others (see **Table 2**). The study shows that about 80% perceived that farm stressors had affected them in a number of ways including extreme tiredness, intense headache, forgetfulness, back pain, insomnia (sleep disorder), loss of temper, relaxation problem and worry (see **Table 3**).

Our study further revealed in **Table 4** that most of the farmers were mostly affected by the identified farm stressors and they were able to perceive their effects accordingly. Ninety-eighth percent of the farmers were yet to develop structured coping strategies in dealing with the stressors (see **Table 5**).

The age distribution from our study showed that most of the respondents were under 40 years of age. This shows agility, activeness, vigour and the likelihood to take risks and adopt innovation. Education has been described as a tool for change. This implies that the level of education is related to the level of innovativeness of an individual. This study reported that the average educational years of respondents

| S/N | Characteristics | Value |
|-----|----------------------------|--------|
| 1 | Age (years) | |
| | Mean | 33.57 |
| | Standard deviation | 2.34 |
| | Coefficient of variation | 6.97% |
| 2 | Years spent in school | |
| | Mean | 13.97 |
| | Standard deviation | 1.17 |
| | Coefficient of variation | 8.38% |
| 3 | Farming experience (years) | |
| | Mean | 13.57 |
| | Standard deviation | 4.430 |
| | Coefficient of variation | 32.65% |
| 4 | Household size (persons) | |
| | Mean | 3.62 |
| | Standard deviation | 1.17 |
| | Coefficient of variation | 32.32% |
| 5 | Farm size (ha) | |
| | Mean | 9.30 |
| | Standard deviation | 4.94 |
| | Coefficient of variation | 53.12% |

Field Survey, 2015.

Table 1.
Socio-demographic characteristics of crop farmers (N = 70).

| S/N | Stress items (stressors) | Frequency SA | A | D | SD | Mean | Remark |
|-----|---|-----------------|-----------|-----------|-----------|------|--------|
| 1 | I am usually on farm for long hours, and I work myself out | 25 (35.7) | 25 (35.7) | 18 (25.7) | 2 (2.9) | 3.04 | A |
| 2 | I am usually disturbed about how to secure seeds, fertilisers and chemicals for my farm | 30 (42.9) | 20 (28.6) | 10 (14.3) | 10 (14.3) | 3.00 | A |
| 3 | I am usually frustrated on how to secure financial support for my farm | 42 (60) | 25 (35.7) | 3 (4.3) | 0 (0) | 3.55 | SA |
| 4 | I always get worried on where I am going to sell my farm produce | 32 (45.7) | 20 (28.6) | 11 (15.7) | 7 (10) | 3.10 | A |
| 5 | I am always disturbed on how to transport my produce to the market | 41 (58.6) | 23 (35.7) | 6 (8.6) | 0 (0) | 3.50 | SA |
| 6 | I get worried because I do not have access to market information on my produce | 28 (40) | 24 (34.3) | 8 (11.4) | 10 (14.3) | 3.00 | A |
| 7 | I get disturbed about the poor prices in market for my farm produce | 51 (72.9) | 19 (27.1) | 0 (0) | 0 (0) | 3.72 | SA |
| 8 | I get disturbed about weather-related issues as regards my crops: rains, floods, | 30 (42.9) | 27 (38.6) | 10 (14.3) | 3 (4.3) | 3.20 | A |
| 9 | I get worried about my crops; I am not going to have good harvest | 40 (57.1) | 20 (28.6) | 7 (10) | 3 (4.3) | 3.38 | A |
| 10 | I get disturbed because I do not see extension agents regularly to help me | 28 (40) | 20 (28.6) | 11 (15.7) | 11 (15.7) | 2.92 | A |
| 11 | I get worried because I do not have labour regularly for my farming activities | 30 (42.9) | 25 (35.7) | 10 (14.3) | 5 (7.1) | 3.14 | A |
| 12 | I am usually worried about my farm because this land does not belong to me | 25 (35.7) | 22 (31.4) | 17 (24.3) | 6 (8.6) | 2.94 | A |
| 13 | Usually, I am not happy being a farmer | 25 (35.7) | 22 (31.4) | 13 (18.6) | 10 (14.3) | 2.88 | A |
| 14 | Usually, I get worried that government policies do not favour farmers | 35 (50) | 15 (21.4) | 17 (24.3) | 3 (4.3) | 3.17 | A |
| 15 | Usually, I get worried about the future of my farming business | 25 (35.7) | 25 (35.7) | 10 (14.3) | 12 (17.1) | 2.96 | A |
| 16 | Usually, I get worried about the costs of inputs such as fertiliser, labour and chemicals | 49 (70) | 18 (25.7) | 3 (4.3) | 0 (0) | 3.66 | SA |
| 17 | Usually, I get worried about Fulani herdsmen intruding my farm | 38 (54.3) | 22 (31.4) | 10 (14.3) | 0 (0) | 3.40 | A |

Source: Field Survey, 2015. (Figures in brackets are the percentages of responses).

Table 2.
Identified agricultural stressors by crop farmers.

| For the identified stressors, in what ways have you been affected by these stressors? | | |
|---|-----------|------------|
| Perceived stressor effects | Frequency | Percentage |
| Headache | 66 | 94.0 |
| Extreme tiredness | 56 | 80.0 |
| Forgetfulness | 54 | 77.1 |
| Sleeping difficulty | 50 | 71.4 |
| Back pain | 48 | 68.6 |
| Loss of temper | 47 | 67.1 |
| Relaxation problem | 45 | 64.3 |
| Excessive worry | 43 | 61.3 |

Field Survey, 2015.

Table 3.
Perceived effects of stressors on crop farmers.

| Perceived stressor effects | Intensity of effects | | | Mean | Remark |
|----------------------------|----------------------|----------------------------|-------------------|------|--------|
| | Mostly affected (MA) | Occasionally affected (OA) | Not affected (NA) | | |
| Headache | 45 | 21 | 4 | 1.68 | MA |
| Extreme tiredness | 50 | 6 | 14 | 1.89 | MA |
| Forgetfulness | 42 | 12 | 16 | 1.78 | MA |
| Sleeping difficulty | 40 | 10 | 10 | 1.80 | MA |
| Back pain | 47 | 1 | 22 | 1.93 | MA |
| Loss of temper | 20 | 27 | 23 | 1.43 | OA |
| Relaxation problem | 30 | 15 | 25 | 1.67 | MA |
| Excessive worry | 37 | 6 | 27 | 1.86 | MA |

Field Survey, 2015.

Table 4.
Intensity of the perceived effects of stressors among crop farmers.

| Have you developed any planned coping strategies against the identified stressors? | | |
|--|-----------|------------|
| Item | Frequency | Percentage |
| Yes | 1 | 1.4 |
| No | 68 | 97.1 |
| Do not know | 1 | 1.4 |
| Total | 70 | 100 |

Field Survey, 2015.

Table 5.
Coping strategies adopted by crop farmers.

was 14 years. The 14 years average of schooling years reported in this study is an indication that most of the respondents had tertiary education. The educational status of respondents shows they are literate and could easily engage technology to

improve their work and source for relevant information. Years of farming were expected to influence skill acquisition and ability to adopt innovation in the production in agribusiness. The study showed that the average years of farming stood at 14 years, with a range of 4–20 years. The study showed that the average household size is four persons per household. The mean farm size among respondents was 9.3 hectares. This farm size is an indication that most of the farmers are small-holders.

The findings from the study as shown in **Table 2** showed about 98% identified occupational-related stressors such as labour scarcity, poor transport infrastructure, poor harvest anxiety, unfavourable government policies, uncertain future for Nigerian agriculture, poor access to credit facilities, poor market proximity, insufficient funds and poor access to market information, among others. The study also shows that most of the stressors are linked to insufficiency of resources.

Our research identified long hours of labour in farm workplace as a stressor. This finding corroborated an earlier study in England and Wales by Simkin et al.. The authors reported that about 70% of farmers worked more than 10 hours a day, a practice that is unhealthy and hazardous [43]. The research conducted in Europe by Katalin identified physical exhaustion leading to extreme tiredness as stressor. The respondents admitted that this had affected their health negatively [44]. From our own study, it could be implied that long hours of working on the farm will lead to physical exhaustion leading to excessive tiredness which was identified by farmers as one of the perceived effects of exposure to occupational stress. The study by Phelps in North Yorkshire showed that farmers' major stressors were government policies and legislation, financial problems and time pressures [45]. Our study corroborated these findings that poor credit access and unfavourable government policies as regards financial concerns were identified as stressors. Other studies had also suggested that financial concerns are a key source of stress to farmers. It was also reported that hazardous working conditions and geographical isolation are also significant concerns [46, 47].

A study in London by Hawton et al. reported that the majority of respondents worried about money. The researchers further noted that the unclear boundaries between farmers' home and working lives made it difficult to escape from occupational-related problems [48]. A study in North Yorkshire by Raine reported that farmers perceived their occupation as becoming even more stressful and that key factors in this were paperwork and finances [49]. The stressors for farmers identified in a study by Booth and Lloyd were new legislation, paperwork and media criticism of agricultural communities [50]. The results from a study in the UK by Deary et al. found that stress was linked to government legislation and increased bureaucracy [51]. Another study from the UK by the Health and Safety Executives (HSE) showed that workload intensity, the non-controllability of certain aspects of farming (such as disease and seasonality) and insecure futures and finances were farm stress factors [18]. The findings from our own study corroborated these findings by identifying poor harvest anxiety, unfavourable government policies and unpredictable weather conditions as stressors to crop farmers. Unpredictable weather conditions are attributed to climate change impact, to which Nigeria has been identified as being vulnerable since its economy is largely based on weather-sensitive agricultural production systems [52]. Evidence has earlier shown that climate change is already affecting crop yields in many countries [49, 53–55]. This climate change effect will affect farmers' holistic well-being.

Other farm workplace stressors identified in this study that may be common to developing nations due to their developmental stage include labour scarcity, uncertain future for the agricultural sector, poor agricultural extension services/contact, poor land availability, poor road infrastructure, unfavourable market prices, poor

access to credit facilities, poor access to market information, high cost of farm inputs, poor market for farm produce (in this case farmers produced but do not have buyers leading to postharvest losses) and poor public perception for the agricultural occupation (farmers are perceived to be poor and uneducated in the Nigeria since most farmers are peasants).

We found poor labour availability as a stressor to Nigerian crop farmers. This has been attributed to “push factors” such as poverty and unemployment, lack of farmland, poor infrastructures, crop failures, famine, insurgency and long work hours of farm work with lower wage than other employment opportunities such as motorcycle riding business, all leading to rural–urban migration labourers from rural areas.

Crop farmers identified uncertain future for their business as a stressor. This could be due to the neglect that the agricultural sector had suffered in recent times as a result of the nation’s overdependence on crude oil.

Inadequate access to agricultural extension services was identified as a source of stress. Earlier studies in Nigeria have revealed that non-provision of relevant agricultural information to farmers is a key factor limiting farmers’ productivity [6]. This has been attributed to insufficient number of extension agents. As revealed from the agricultural development programmes (ADP) in 27 states of Nigeria, an extension agent and farm family ratio of 1:826 was reported in Gombe State; this was reputed to be the highest in Nigeria, while Niger, Lagos and Ebonyi States’ extension agent to farm family ratio is in the neighbourhood of 1:5000 [56]. With this statistics, there will be poor agricultural extension contact leading to inefficient information dissemination to farmers.

Poor access to land for agricultural activities by farmers in Nigeria could be a stressor due to land grabbing challenges, the land use act of the nation and the land tenure-related challenges that farmers encounter in their farm operations. Poor road infrastructure is a major stressor for farmers as the road networks are bad and this has led to high transport cost. The poor road network has led to postharvest losses for farmers as such products attract unfavourable market prices. Crop farmers also identified poor market for agricultural produce as stressor. Due to their size of farms and financial capacity, these farmers are unable to add values to this product and as such are sceptical on where and how to sell their farm produce.

In Nigeria, an average farmer depicts neglect and poverty, even though these small-scale farmers produce the bulk of the food consumed in the country. Farmers are not respected, and as such poor public perception for the agricultural occupation was identified as a stressor to Nigerian crop farmers.

In recent time in Nigeria, Fulani herdsman intrusion to farmlands is a threat to the existence of crop farming especially peasants. These farmers lack the capacity to protect and secure their farmlands from herdsmen. This has recently contributed to farm stressor among Nigerian crop farmers. Empirical evidence has revealed that herdsman intrusion to farmland has contributed to crop yield reduction, poverty due to farmers’ income decline and farmers’ displacement from their farms [8, 57].

Farm stress affects farmers’ physical, social and mental well-being. Further findings from this study show that about 80% of respondents perceived that agricultural stressors had affected them in a number of ways including back problem, irregular sleep, relaxation problem, extreme tiredness, temper loss, excessive worry and headache. The UK HSE found that the common effects of farm stressors on farmers were back problems, lack of sleep, worrying about work, irritability and feeling down [18]. Smith et al. [18] found that 20% of the respondents were suffering from high levels of occupational stress, the effects of which were manifest in terms of health complaints, disrupted family life and elevated levels of sick leave and workplace accidents. Corroborating this, a study in Canada by Walker and

Walker found that farmers scored higher than nonfarmers on a range of stress-related symptoms, including chronic tiredness, forgetfulness, difficulty relaxing, loss of temper, poor concentration, sleep disruption and back pain [58].

Evidence from this study further documented effects of farm stress on well-being. Most of the respondents (about 98%) are yet to develop structured coping strategies to deal with the stressors. This finding could be due to poor access to stress management information among crop farmers in Nigeria.

Further findings from the study are shown in **Table 6**; the mean age was 49 years, with the age ranging between 25 and 65 years. This finding showed most of the poultry farmers are about 50 years. Education has been noted as a tool for change, and the level of education has been correlated to innovativeness of an individual. The Nigerian educational system is 9 years of education in the basic class, 3 years in the senior secondary and 4 years in tertiary totalling 16 years. The average years spent in school was 15 years, with about 34 and 55% having secondary education and degree qualifications accordingly. The 15 years average of schooling years reported in this study shows that most of the respondents possessed tertiary education. The educational status of respondents shows they are literate and could easily give accurate information on stress-related issues in their businesses and engage information technology in improving themselves on stress-related issues. Years of experience in poultry were expected to influence the acquisition of skills and capability to adopt technological innovation in poultry business. The average years of poultry experience was 6 years, with about 50% in the class of 1–5 years. The average of 6 years in poultry business is sufficient for farmers to give accurate information on stressors in poultry business. Households had a median of four persons, and the average farm size in terms of number of birds among respondents was 151 birds/farmer. This farm size is an indicator that most of the farmers have smallholdings for their birds. The average poultry income per cycle of production was N80,450 (\$224).

| S/N | Characteristics | Value |
|-----|----------------------------|----------------------|
| 1 | Age (years) | |
| | Mean | 49.20 |
| | Standard deviation | 3.20 |
| 2 | Years spent in school | |
| | Mean | 14.5 |
| | Standard deviation | 2.34 |
| 3 | Poultry experience (years) | |
| | Mean | 6.0 |
| | Standard deviation | 1.12 |
| 4 | Household size (persons) | |
| | Mean | 4.0 |
| | Standard deviation | 1.3 |
| 5 | Farm size (no. of birds) | |
| | Mean | 151 birds |
| | Standard deviation | 4.34 |
| 6 | Income per cycle | |
| | Mean | 80,450 naira (\$224) |
| | Standard deviation | 1200 |

Field Survey, 2015.

Table 6.
Socio-economic characteristics of poultry farmers (N = 80).

The findings revealed the classification of stress items. These items include climate change effects. Notable effects includes reduction in egg size, reduction in egg quality, reduction in egg shell thickness, continuous outbreak of diseases in poultry and high death rate among birds were found to fairly affect (FA) poultry farmers. The results of this study is similar to those obtained by [9] who submitted that climate change (such as low rainfall, high temperature and other climatic factors) affects the cost of poultry production and also the spread of poultry disease. This view was also shared by [10], who stated that variance in climatic variables can lead to variance in poultry egg production, feed intake and outbreak of poultry diseases.

Farmers were found to be affected (AF) by stressors that are financial based including poor credit access and high collateral demand. Farmers also reported that

| Stress items | Highly affected (HF) | | Affected (AF) | | Fairly affected (FA) | | Not affected (NF) | | Mean rating | |
|---|----------------------|------|---------------|------|----------------------|------|-------------------|------|-------------|-----------|
| | Freq | % | Freq | % | Freq | % | Freq | % | Total | |
| Climate change | | | | | | | | | | |
| a. Reduction in egg size | 09 | 11.2 | 21 | 26.2 | 32 | 40.0 | 18 | 22.5 | 182 | 2.28 (FA) |
| a. Reduction in egg quality | 06 | 7.5 | 18 | 22.5 | 31 | 38.7 | 25 | 31.3 | 165 | 2.06 (FA) |
| a. Reduction in eggshell thickness | 04 | 5.0 | 12 | 15.0 | 51 | 63.7 | 13 | 16.3 | 167 | 2.09 (FA) |
| a. Continuous outbreak of diseases in poultry | 06 | 7.5 | 11 | 13.7 | 38 | 47.5 | 25 | 31.3 | 158 | 1.97 (FA) |
| a. High death rate among birds | 04 | 5.0 | 15 | 18.8 | 27 | 33.7 | 34 | 42.5 | 149 | 1.86 (FA) |
| Financials | | | | | | | | | | |
| a. Poor credit access | 28 | 35.0 | 36 | 45.0 | 16 | 20.0 | 0 | 0 | 252 | 3.15 (AF) |
| a. High collateral demand | 21 | 26.3 | 32 | 40.0 | 27 | 33.7 | 0 | 0 | 234 | 2.92 (AF) |
| Health | | | | | | | | | | |
| a. Highly demanding and time-consuming | 41 | 51.3 | 21 | 26.3 | 18 | 22.5 | 0 | 0 | 263 | 3.28 (AF) |
| a. Highly stressful | 31 | 38.8 | 30 | 37.5 | 19 | 23.7 | 0 | 0 | 252 | 3.15 (AF) |
| Institutional | | | | | | | | | | |
| a. Poor government support | 54 | 67.5 | 36 | 45.0 | 0 | 0 | 0 | 0 | 324 | 4.0 (HF) |
| a. Poor policies | 63 | 78.7 | 17 | 21.3 | 0 | 0 | 0 | 0 | 303 | 3.79 (HF) |
| a. Poor market for product | 30 | 37.5 | 32 | 40.0 | 18 | 22.5 | 0 | 0 | 252 | 3.15 (AF) |
| a. Poor market prize | 32 | 40.0 | 33 | 41.2 | 15 | 18.8 | 0 | 0 | 194 | 2.42 (FA) |
| Business management | | | | | | | | | | |
| a. Inadequate access to relevant trainings | 14 | 17.5 | 27 | 33.7 | 11 | 13.8 | 18 | 22.5 | 177 | 2.21 (FA) |
| a. Inadequate access to inputs | 32 | 40.0 | 18 | 22.5 | 17 | 21.3 | 13 | 16.3 | 229 | 2.86(AF) |
| a. Inadequate access to farm labour | 08 | 10.0 | 08 | 10.0 | 28 | 35.0 | 36 | 45.0 | 148 | 1.85 (FA) |

| Stress items | Highly affected (HF) | | Affected (AF) | | Fairly affected (FA) | | Not affected (NF) | | Mean rating | |
|-------------------------------------|----------------------|------|---------------|------|----------------------|------|-------------------|------|-------------|-----------|
| | Freq | % | Freq | % | Freq | % | Freq | % | Total | |
| a. Inadequate access to clean water | 06 | 7.5 | 21 | 26.3 | 30 | 37.5 | 23 | 28.7 | 170 | 2.12 (FA) |
| a. Poultry waste disposal issues | 06 | 7.5 | 24 | 30.0 | 40 | 50.0 | 10 | 12.5 | 186 | 2.32 (FA) |
| a. Poor light and energy access | 18 | 22.5 | 34 | 42.5 | 15 | 18.8 | 13 | 16.2 | 217 | 2.71 (AF) |
| Field Survey, 2015. | | | | | | | | | | |

Table 7.
Poultry-related stressors and perceived effects (N = 80).

| S/N | Disease | Frequency | % | Remark |
|---------------------|------------------------|-----------|------|--------|
| 1 | Malaria | 21 | 26.3 | 3rd |
| 2 | Diarrhoea | 9 | 11.3 | 7th |
| 3 | Headache | 20 | 25 | 4th |
| 4 | Vomiting | 1 | 1.3 | 12th |
| 5 | Catarrh | 13 | 16.3 | 5th |
| 6 | Joint pain | 22 | 27.5 | 2nd |
| 7 | Abdominal pain | 1 | 1.3 | 12th |
| 8 | Respiratory difficulty | 2 | 2.6 | 11th |
| 9 | Skin irritation | 5 | 6.3 | 8th |
| 10 | Dizziness | 10 | 12.5 | 6th |
| 11 | Muscular weakness | 27 | 33.8 | 1st |
| 12 | Heart problem | 1 | 1.3 | 12th |
| 13 | Eye irritation | 4 | 5.0 | 10th |
| 14 | Loss of appetite | 5 | 6.3 | 8th |
| Field Survey, 2015. | | | | |

Table 8.
Self-reported health issues among poultry farmers (N = 80).

they are affected by health stressors including highly demanding, time-consuming and highly stressful. Farmers reported that their businesses were highly affected (HF) by poor government support and policies. Business management stressors were identified and affected by farmers including inadequate access to inputs and poor energy access/stability (see **Table 7**).

As shown in **Table 8**, the prominent health issues reported among poultry farmers in Nigeria include muscular weakness, joint pain, malaria, headache and catarrh accordingly. As seen in **Table 9**, about 63% were yet to come up with planned coping strategies to the stressors. However, 20% reported they have adopted coping strategies, and these include intensive and semi-intensive systems of poultry keeping where the birds are kept within a cage or in a poultry and the required warmth needed particularly in cold weather is generated artificially

| Have you developed any planned coping strategies against these stressors? | | |
|---|-----------|------------|
| Response | Frequency | Percentage |
| Yes | 20 | 25 |
| No | 50 | 63 |
| Do not know | 10 | 12 |
| Total | 80 | 100 |

Field Survey, 2015.

Table 9.
Response to stressor coping strategies (N = 80).

through the use of electricity. In coping with financial challenges, some of the poultry farmers resolved to self-financing, borrowing from family members and taking loans from cooperatives as well as banks. Some farmers cope with health challenges by observing adequate rest, while others maintain good hygiene and good housekeeping in the poultry to reduce the risk of infections, among others. Due to poor access energy supply, poultry farmers resolve to the use of generators, solar panels and inverters in providing energy particularly for the storage of poultry products.

4. Conclusion and recommendations

We concluded that exposure to work-related stress is common in the Nigerian crop and poultry workplaces in Nigeria. This finding could be linked to the composite nature of agricultural work and the way agriculture is practiced in Nigeria. Agricultural stressors affect farmers’ total well-being. The elimination of stressors removes stress. Identifying stress factors (stressors) is the first stage in designing efficient stress management plan. The identified stressors by farmers are developmental, economic, environmental, institutional, governmental, sociocultural and educational/information and business management based, among others. Most of the identified stressors are due to failure on the part of stakeholders of the industry in carrying out their responsibilities. These farmers were able to identify these stressors, engaging a stress management-oriented attitude which is the most excellent agricultural health practice that can improve agricultural stress management. Our recommendations include:

- i. Researchers should engage in field experiments using randomised control trials in the design of appropriate interventions to reduce stress among poultry and crop farmers.
- ii. Targeted agricultural enterprise insurance package should be developed with collaboration with farmers to help reduce stress among farmers.
- iii. The government, foreign development partners and the private sector have been the major stakeholders supporting agricultural productive activities in Nigeria. These stakeholders should embark on stress management campaign and surveillance among farmers to improve mental health.
- iv. These stakeholders should help farmers in their challenged areas including infrastructure provision, favourable agri-policies, credit facilities, input access, stock grazing reserves for herders and prompt extension services.

- v. Based on our findings from the intensity of the perceived effects of stress, there should be integration of mental health focused on agricultural health in primary health care by the Nigerian government.
- vi. Farmers should engage in the good use and management of their time as good time management practices and planning can reduce workplace stress.

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Conflict of interest

We have no conflict of interest to declare.

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