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Agricultural insurance access and acceptability: examining the case of smallholder farmers in Ghana

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Abstract

Background: Weather-related risks thwart agricultural productivity gains especially in the face of climate change. Agricultural insurance serves as a reliable risk mitigation instrument for coping with climate-related hazards. This notwithstanding, agricultural insurance penetration among smallholder farmers in the global south remains low. This study investigated the access and acceptability of agricultural insurance among smallholder food crop farmers in Ghana.

Method: The study employed a mixed-methods approach involving both quantitative and qualitative approaches. The study was carried out in the Northern, Volta and Western regions involving 7 communities in 5 districts. A total of 200 farmers were sampled through a multi-stage purposive sampling and interviewed. A cross-sectional survey involved 100 respondents under the quantitative approach whilst the qualitative study engaged additional 100 farmers.

Results: The results show that smallholder farmers' access and acceptability of agricultural insurance is low (14%) and scarce but ironically considered useful by many (90%) as an effective tool to deal with agricultural risks. Inadequate knowledge about agricultural insurance products constituted the most stated reason (64%) for the scarce adoption rate, followed (23%) by the unavailability of insurance products in areas needed but absent. A few (5%) reported insurance to be expensive. Acceptability and accessibility of agricultural insurance are further influenced by gender, educational level, low knowledge, information asymmetry and wrong perception concerning agricultural insurance products. Sense of security and reduced impact of climate variabilities constituted important benefits guaranteed by agricultural insurance.

Conclusions: Agricultural insurance access and acceptability is constrained by limited knowledge of agricultural insurance products. It is recommended that more insurance companies be incentivized to augment already existing efforts by Ghana Agricultural Insurance Pool (GAIP) to enroll more smallholder farmers. The government can consider bundling existing insurance products with credit or inputs under the Planting for Food and Jobs Programme (PFJ) to improve uptake and accessibility of agricultural insurance.

Keywords: Smallholder farmers, Climate change, Agricultural insurance, Food crop farmers, Ghana

Background

Rising population growth is expected to go in tandem with increased agricultural production. Developed countries have few farmers participating in agricultural production in meeting global food demands. Conversely,

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a prominent trend in developing countries is domination by smallholder farmers in meeting food demands. In developing economies, few economic opportunities exist outside urban areas which oblige most rural dwellers to engage in agriculture. Agriculture's contribution to the economies in the global south remains phenomenal [1]. The smallholder farmer, however, appears to be less sophisticated and vulnerable to various risks in agricultural production including production and weather risks. These risks are due to unforeseen weather, disease, pest infestations and market conditions causing wide variations in yields and commodity prices [2]. The type and severity of risks vary by crop, farming system, agro-ecological conditions and policy and institutional settings [3]. However, production risk due to weather uncertainties and variabilities, particularly those associated with deficient rainfall remains pervasive. Weather shocks pose a major challenge to increasing productivity among smallholder farmers in developing countries [4] particularly so in the face of climate change [5].

Weather is an important factor of production in agriculture, but remains unpredictable [6]. Climate change and variability lead to changes in rainfall patterns and extreme events such as drought and floods. Several farm families consequently are faced with the prospects of tragic crop failure, livestock mortality, food insecurity, dispossession and migration [6, 7]. Climate-related hazards constraints economic prospects derived from agriculture thus disrupt rural economies [8]. This is particularly important given broader sector policy documents such as Agenda 2063, Comprehensive African Agriculture Development Programme (CADEP), and Sustainable Development Goals (SDGs) meant to promote food security and ensure zero hunger (SD-2). In Ghana, government flagship programs such as Planting for Food and Jobs (PFJ), Planting for Export and Rural Development (PERD) and Rearing for Food and Jobs (RFJ) potential gains can be completely thwarted through climate-related hazards. It is therefore imperative to have novel ways of mitigating agricultural risks.

A myriad of strategies exists to mitigate agricultural risks. These include investments in infrastructure (e.g., irrigation facilities), technological innovations (e.g., drought-tolerant cultivars), crop management practices (e.g., changes to the timing of production activities), and financial instruments (e.g., credit or insurance). Unfortunately, most of these strategies are often either not available or not feasible for many resourced constrained farmers in developing countries. Consequently, droughts often result in lower crop productivity, while the risk of drought dis-incentivizes otherwise optimal investments in new technologies and modern farm inputs. Though these various management decisions may reduce both

the level and variability of income or consumption in the short run, they do so at the expense of constrained long-run economic growth [3].

Agricultural insurance has been identified to be a very important tool in assisting farmers, herders and governments lessen some negative financial impact of adverse natural events [9]. Apparently, insurance has been used by many countries to help manage agricultural risks [3, 4, 10]. Obviously, the usefulness of agricultural insurance in risk mitigation is not in question. In Africa, various studies have been undertaken on agricultural insurance covering Eastern Africa [11], West Africa, Central and Southern Africa [11]. Belissa, Bulte [12] examined the effectiveness of agricultural insurance uptake in Ethiopia when farmers were allowed delayed payment of insurance premiums. Bulte, Cecchi [13] studied whether insurance uptake improved when bundled with inputs in Kenya. Ndegwa, Shee [14] examined the effectiveness of insurance uptake when bundled with credit in Kenya. Ntukamazina, Onwonga [15] examined challenges, potentials and opportunities with insurance uptake of index-based insurance in sub-Saharan Africa.

Although agricultural insurance has been discussed for more than 3 decades, with various studies covering accessibility [3, 11, 16], acceptability [12, 17] and willingness to pay for agricultural insurance [18–20], the dedicated literature on agricultural insurance covering the global south and particularly Ghana remains scanty. Even with the few studies that focused on Ghana, they remained largely skewed towards northern Ghana [18, 21]. Choudhary and D'Alessandro [22] indicated the most studies focused on Northern Ghana because it constitutes a region that is most prone to climate variability (floods, droughts, intense sunlight). Commercial insurance schemes were initially piloted in the northern region by Innovation for Poverty Action (IPA) in an action research program in 2009 [23]. Consequently, limited studies [17, 20, 24] have focused on southern Ghana. Among the few existing studies on Ghana, the majority [24–27] have focused on cash crops (cocoa, cashew) with scanty studies [17, 19, 28] on food crops. Addey, Jatoo [20] argued that food crops constitute major staples cultivated in southern Ghana that warrant studies on agricultural insurance. Zinnanti, Schimmenti [29] and Gunathilaka, Smart [30] argued that differential decision-making exists among perennial and annual crop farmers, hence different factors account for subscription or non-subscription of agricultural insurance. Another plausible reason is the fact that perennial crop farmers are considered to be economically empowered than annual crops.

In Ghana, despite insurance advocacy and usage in contemporary times as an important tool in mitigating agricultural risks, insurance access and acceptability

has been sluggish [3, 31]. This contrasts with the high levels of insurance coverage in the global north. Reasons attributed to the low uptake include low awareness and knowledge of agricultural insurance, information asymmetry and poor understanding of insurance by rural farmers [31]. Few studies [19, 23, 28, 32, 33] in Ghana have focused on examining the trends in insurance acceptability as well as farmers perceived relevance of agricultural insurance. Lence [34] underscores the need for the reasons accounting for low insurance access and acceptability to be identified and addressed. This study bridges this gap in knowledge in two ways. First, we anticipate that our empirical findings from Ghana will adduce a balanced understanding of agricultural insurance access and acceptability, particularly for annual crops in presenting a holistic view by contrasting northern and southern Ghana which have been largely neglected in the wider literature on agricultural insurance. This remains useful because the extant literature on Ghana remains skewed towards northern Ghana.

Secondly, the article gives a better understanding of underlying reasons why uptake of agricultural insurance among smallholder farmers is low in the global south. The study, therefore, aims at understanding drivers affecting accessibility and acceptability of agricultural insurance among smallholder food crop farmers in Ghana.

The rest of the paper is structured as follows: the next section presents the methodology employed by the study. This is followed by results and discussion. There is a final section that draws the study's conclusion and policy recommendations.

Research methodology

Context and overall study design

This study employed a mixed-method (quantitative and qualitative) approach to elicit responses on how smallholder farmers perceived, accessed and related to agricultural insurance products in Ghana. The quantitative approach involved a cross-sectional survey (questionnaires) administered to farmers. The qualitative approaches involved Key Informant Interviews (KIIs) with key stakeholders, archival research which relied on administrative records and documents as principal sources of data and focus group discussions (FGDs).

Method of data collection

Questionnaire administration

Both primary and secondary data were used. Primary data were administered to 100 farmers through the use of a questionnaire which consisted of structured questions with closed and open-ended questions. This data gathered information on farmers demographics, farmers' perception, knowledge levels, willingness to pay for

agricultural insurance, types of crops cultivated, area cultivated, benefits derived from crop insurance, insurance products, premium paid, challenges encountered with agricultural insurance subscription, farm risks not captured by Ghana Agricultural Insurance Pool (GAIP), the extent to which agricultural insurance helped improved farm profit and attitude towards agricultural insurance in Ghana. Information was obtained directly from farmers through interviews using interviewer-administered structured questionnaires. The data collection first started with questionnaire administration and synthesis of secondary documents and based on issues that emanated from questionnaires administered. Clarity and in-depth understanding were sought through the FGDs and KIIs. Secondary data on types of insurance products, insurance coverage, premia paid for various insurance products, total area insured, types of crops insured and trends in subscriptions (adoption) of policies by smallholder farmers were obtained from the office of GAIP and analyzed.

Focus group discussions (FGDs)

During the FGDs participants discussed issues about farmers' knowledge levels about agricultural insurance, willingness to pay for agricultural insurance, benefits derived from crop insurance, insurance products, premia paid, challenges/problems encountered with agricultural insurance subscription, farm risks not captured by GAIP, extent to which agricultural insurance helped improve farm profit and attitude towards agricultural insurance.

Participants were reminded by facilitators to be cognitive of issues about their respective communities without limiting themselves solely to individual experiences. Consensus on insurance access and acceptability was attained in all communities where FGDs were held. Towards the end of each FGD, a facilitator summarized issues that emanated and presented summaries of discussions as understood by the team.

New participants aside from those covered in the survey were purposively identified and selected in all study communities. In all, a total of 64 individuals were engaged in FGDs. These individuals represented segments of communities where interviews were conducted. Communities were put into quadrants with respondents drawn to represent various segments of existing quadrants in study communities. Please see Table 1 for a summary of the qualitative study.

The FGDs were made up of an average of twelve (12) participants (male and females) who were engaged in extensive interviews investigating access and acceptability of agricultural insurance schemes. This was done to additionally investigate the reasons behind some responses provided in the questionnaire. It also allowed

Table 1 Summary of qualitative interviews. Source: Fieldwork, 2019

Qualitative methods	Number of participants		
	Male	Females	Total
Focus group discussions	44	20	64
Key informant interviews	24	12	36
Total			100

the researchers the opportunity to gain a deeper understanding of the issues raised. Seawright [35] explained that a purely quantitative study dwells on the cognitive ability of enumerators, which presents some difficulties in understanding the questionnaire, thus limiting responses to questions posed.

Key informant interviews (KIIs)

Key informants were identified in study communities based on issues that warranted specific individuals with knowledge on the subject matter. This is in line with Ouma, Dione [36] who indicated that key informant interviews are useful in investigating complex issues with knowledgeable individuals. A total of 36 key informants made up of 24 males and 12 females were identified and interviewed. The participants included six (10) AEAs, two (6) Progressive farmers, 6 early adopters, 6 late majorities, 6 laggards and 2 individuals from GAIP. There was a deliberate decision to select some key informants based on the categorization of levels of adopters (innovators, early adopters, early majority, late majority and laggards). This permitted an understanding of adoption by different categories of adopters. The key informants were selected because of their depth of knowledge on issues concerning access and acceptability of agricultural insurance. An interview guide was designed for KIIs that facilitated discussions among participants. A deliberate effort was made to ensure a fair representation of individuals from communities where interviews were conducted. Issues bothering the understanding of smallholder farmers' knowledge level, access, acceptance, subscription, re-purchase, willingness to pay for agricultural insurance were captured in the interview guides.

Respondent sampling procedures

Preliminary key informant interviews conducted with staff of GAIP showed that agricultural insurance policy sales (especially Weather Index Insurance—WII) are structured according to the crop farming seasonal pattern or agro-ecological zones in Ghana. The uni-modal zone covering mostly the northern parts of Ghana (Northern Region, Savanna Region, North East Region, Upper East Region and Upper West Region) and the

bi-modal zones, cover the remaining parts of the country, usually the southern belt. Sales of policies especially to smallholder farmers are concentrated in northern Ghana with only a few successful attempts in the south (Volta Region). Other successful attempts in the southern parts of the country included the sale of policies to corporate and commercial farms.

To properly capture the situation in both zones, a multi-stage purposive sampling was adopted. Farmers were sampled from 3 administrative regions of the country (Northern Region, Volta Region and Western Region) for various reasons. The Northern Region was selected because it constitutes a zone where sales of insurance policies are concentrated, there was an intention to capture the views of current or past policy subscribers. The Volta Region was selected because of a successful piloted sale of agricultural insurance to smallholder farmers. The Western Region was selected because there was no information on sales of insurance to smallholder farmers in the region. The intention for the region was mainly to assess the perception of farmers about the agricultural insurance policy and the potential for insurance uptake. In all three regions, there were 10 districts. Two districts were purposively selected in Northern and Volta regions with one district selected in Western Region. The districts selected typified vibrant commercial activities by smallholder farmers in cereals. The cultivation of cereals allowed for comparison across districts. In all, 100 farmers were interviewed from 5 districts: 2 districts from the Volta region (North Tongu and Ketu North); 2 districts from the Northern region (Kumbungu and Nanton districts) and a district from the Western Region (Ellembelle district).

Apart from the respondents from Aveyime in the North Tongu district who were members of Farmer Based Organizations (FBOs), all the other respondents in addition to 3 GAIP officials were interviewed.

Analytical techniques

The analytical approach for the qualitative interviews employed a hybridization of inductive and deductive content analysis as proposed by [37]. Primary data solicited through the questionnaires administered were entered into the Statistical Package for Social Sciences (SPSS) version 24 and analyzed mainly through descriptive and inferential statistics. Raw data received from the GAIP was entered in SPSS and analyzed descriptively. This covered close to 8,000 farmers. This included annual reports which were subjected to thematic analysis.

The qualitative data were further subjected to content analysis. Neuendorf and Kumar [38] defined content analysis as a process of making valid and reliable inferences from either qualitative or quantitative data. All

FGDs and KIIs were audio-recorded, translated into English and transcribed.

The qualitative interviews were coded and entered into NVivo software. All FGDs and KIIs conducted were analyzed across summaries of transcripts. This was after a preliminary review of transcripts by researchers to familiarize themselves with the data. Consequently, major and sub-themes were identified. Content and thematic analysis were employed to analyze major and sub-themes that emerged. The thematic analysis conducted was based on a realist framework of causality and effects [39]. Theme saturation was achieved in the absence of new themes emerging after a review of all information categorized under major and sub-themes. Annual reports and general reports from GAIP were subjected to thematic analysis. Direct statements illustrative of various thematic areas were cited in the main text. Care was taken not to reveal the identities of participants based on confidentiality.

Farmers' risk attitudes and risk management coping mechanisms

Smallholder farmers were made to identify and rank production and marketing risks encountered. Wossen and Berger [40] indicated that these two risks are the main risks that confront farmers. Farmers were made to indicate their opinion on how these two risks affected them on a five-point Likert scale ranging from highly agree—1 B, agree—2 C, neutral—3 D, disagree—4 E, highly disagree—5. Farmers' in a similar vein undertook the same task on how they cope with climate-related risks. Farmers' knowledge and attitude towards agricultural insurance subscriptions were assessed. Farmers' knowledge about agricultural insurance was measured through a series of questions about what they knew about existing insurance schemes. This is in line with Ghazanfar, Wen [41] on the measurement of farmers' knowledge of insurance. The responses required a "Yes" or "No" or the selection of the right answer from a multiple response choice. Additional questions were adapted from the GAIP sensitization training questions used to train Agricultural Extension Agents (AEAs) in 2012. Some of the adapted questions included, types of risks covered under WII, farmers' satisfaction on WII, farmers' attitudes towards WII. Each statement, had farmers indicating their level of agreement on a Likert scale. This is consistent with the data gathering approach for assessing attitudes towards agricultural insurance [42–44].

Results and discussion

Demographic characteristics of respondents

The majority (76%) of respondents were males. The ages of the respondents ranged between 22–76 years, with a mean age of 39 years. About 30% were between 21 and

30 years, 39% between 31 and 40 years, 16% between 41 and 50 years, 7% between 51 and 60 years, and 8% above 60 years. The average age gives an indication of respondents' maturity and their ability to provide relevant responses to questions asked. The wider age range also indicates broad views of persons captured in the study. This is relevant in eliminating bias from a particular age grouping into more representative findings with higher credibility.

Respondents' marital status shows few (25%) respondents being single, a majority (72%) married and only 3% divorced. The female composition was 3% among the single, 18% among the married and 2% among the divorced (see Table 2).

The level of farmer education is used to measure the ability to read and positively relate to insurance uptake. The results also showed that few (16%) respondents had no formal education. Of the remaining, (26%) had only up to primary school education, 21% had up to Middle/Junior Secondary/ Junior High School level of education and about 24% had Senior High School education. Approximately 37% of the respondents had a formal

Table 2 Demographics of respondents Source: Field survey, 2019

	No. of farmers	Percent (%)
Age group		
21–30	28	28
31–40	37	37
41–50	15	15
51–60	12	12
>60	8	8
Total	100	100
Mean age 39, Min 22, Max 76, Std. Dev. 12		
Educational level		
Middle school/JHS	21	21
SHS/O–A level	24	24
Tertiary	13	13
None	16	16
Primary	26	26
Total	100	100
Gender		
Sex		
Female	24	24
Male	76	76
Total	100	100
Marital status		
Divorced/separated	4	4
Married/consensual union	72	72
Single/never married	24	24
Total	98	100

education of Senior High School level and above, implying a high educational level among the respondents.

Table 3 shows the descriptive summary of multiple responses for cereal crops cultivated by respondents. Three cereal crops were cultivated among the respondents (maize, rice and millet) with farmers practicing mixed cropping. The result shows that maize was the most common crop constituting half (50%) followed by rice (49%) and millet (1%). An a priori expectation will be that more maize farmers will sign up for insurance. Awondo, Kostandini [11] gave further insight that insurance uptake depends on maize variety and the environment. Rice cultivation was more prominent among farmers from the Volta Region contributing 34% of the 49% rice growers, maize was more popular among the respondents from the Northern and Western regions. The producers of these cereals constitute potential subscribers to an agricultural insurance policy.

Ghana's agricultural insurance products scope

Ghana Agricultural Insurance Pool (GAIP) is Ghana's premier agricultural insurance service provider. GAIP has four (4) agricultural insurance products. These include weather (drought) index insurance, area yield index insurance, multi-peril crop insurance, and an insurance product for poultry.

Crop weather (drought) index insurance (WII): this targets smallholder farmers and uses either a validated data from a ground weather station or satellite as the determinant point for payouts. Akter, Krupnik [45] indicated that WII is prominent among smallholder farmers. The ground stations or satellite records the amount of rains and their spread within the vicinity of the farm on a 20 m by 20 m radius or 10 m by 10 m radius as the reflective result for all the farms that fall within this designated perimeter. The results from Ghana Metrological Agency or satellite operator are

sent directly to buyers of insurance on a daily basis. The drought index is suitable for crops such as maize, sorghum, groundnut, millet and vegetables. This product is operated mostly in six regions of northern Ghana and limited parts of the southern belt. Akter, Krupnik [45] summarizes that in WII scheme, payouts are made conditioned on specific weather threshold indicators being surpassed. Farmers perceived WII to be a good insurance policy and it constitutes the dominant product on the market. In the Western Region, where an agricultural insurance scheme is non-existent, farmers expressed interest in WII.

Area yield index insurance (AYII) is under research and trials. Some initial trials had been carried out in the Jirapa area of the Upper West Region of Ghana. Full rollout is anticipated soon. AYII is expected to function well on reliable crop yield data of a district/area. Payouts are made where the insured's (farmer) yield falls below the district/area average. Ye, Hu [46] indicated the AYII is radically used in developed countries. It is therefore interesting to observe why it is on trial in Ghana.

Multiple peril crop insurance (MPCI) is designed for commercial farmers with a minimum farm size of 50 acres/20 hectares, and other investors within the agro-value chain including banks, off-takers, processors, input dealers and aggregators. Many perils can be insured and farm visits are used to generate reports on-farm situations and measures adopted to minimize losses. Long-term average yield (LTAY) of a minimum of 5-year data is required to assess production performance. Data from closer good farms are used as benchmarks for start-ups. Barnett [47] indicated that MPCI is less prominent in developing countries because it requires large subsidies in premium from government to incentivize acceptability. Particularly in Ghana, the government is unwilling to take up a subsidy of the premium. Thus limited to only commercial farms (20 hectares) in Ghana.

Table 3 Cereal crops cultivated by farmers Source: Field survey, 2019

	District					Total
	North Tongu	Ketu North	Kumbungu	Nanton	Elemebe	
Maize	7 5.1%	24 17.5%	10 7.3%	11 8.0%	17 12.4%	69 50.4%
Rice	9 6.6%	38 27.7%	9 6.6%	9 6.6%	2 1.5%	67 48.9%
Millet	0 0.0%	0 0.0%	0 0.0%	1 0.7%	0 0.0%	1 0.7%
Total	16 11.7%	62 45.3%	19 13.9%	21 15.3%	19 13.9%	137 100.0%

Percentages and totals are based on responses

Poultry insurance (PI) This is indemnity insurance applicable to all manner of birds including exotic and local breeds reared under an intensive method of production. The farm to be insured is required to have a veterinary service, bio-safety measures in place, and proper farm records properly. The minimum number of birds required to qualify to be insured is five thousand (5000). The insurance may cover any risk to the business such as diseases (excluding avian influenza), pests, excessive rains, flooding, thunder damages and theft. The premium paid is 3–5% of input cost (see Table 4).

GAIP, therefore, has three commercially available insurance products on the market (drought Weather Index Insurance (WII) product for smallholder farmers; multi-peril crop insurance (MPCI) for commercial farmers; multi-peril insurance for poultry (MPIP) for commercial farmers); same as reported by Wehnert (2018). The scaling performance of the agricultural insurance market remains low with few products. In the qualitative study, most key informants preferred up-scaling of WII in comparison to the others. They indicated reasons such as weather indicators being easy to verify. The WII ranks first among the three products available.

Trends of agricultural insurance in Ghana

The result in Fig. 1 below represents trends in the acquisition of agricultural insurance products in Ghana. It presents information on the number of insurance policies sold, total area insured (ha), and total claims paid out to farmers since 2011. The combined insured area and cover offered by the insurance schemes and insured value gives a sufficient understanding of insurance penetration among farmers in a country [20].

Figure 1 shows that enrollment grew by 36% from 2011–2016, 65% from 2011–2018 and 46% from 2016–2018. Insured area increased by 90% from 201–2016, and 84% from 2011–2018. The insured area dropped by 55% from 2016–2018. Poor performance in 2012 and 2013 led to a drop in overall enrollment by 84% and 86%, respectively. The result is similar to what was reported by Wehnert (2018); which covered between 2011–2016. The author suggested that growth in uptake of insurance has not been robust; similar to what was reported by [31]. [48] attributed the challenge to the complexity of insurance products, financial illiteracy and aversion towards new risk management approaches. Prominent claim payouts were in 2015 and 2017, and 2018 which averaged at GH¢ 49, GH¢780 and GH¢57 per insured farmer, respectively. Key informant interviews with representatives of GAIP showed that more men are subscribed to insurance schemes than women, eventually, more men benefit from insurance claims. This is consistent with our study that showed more (76%) men in our sample. This

finding was collaborated widely in all FGDs conducted across the three regions. This finding is consistent with [49] who showed gendered adoption and access to insurance products. A plausible reason could be what [50] attributed to gendered access to productive resources (land, labor and capital) in their study on southern Ghana.

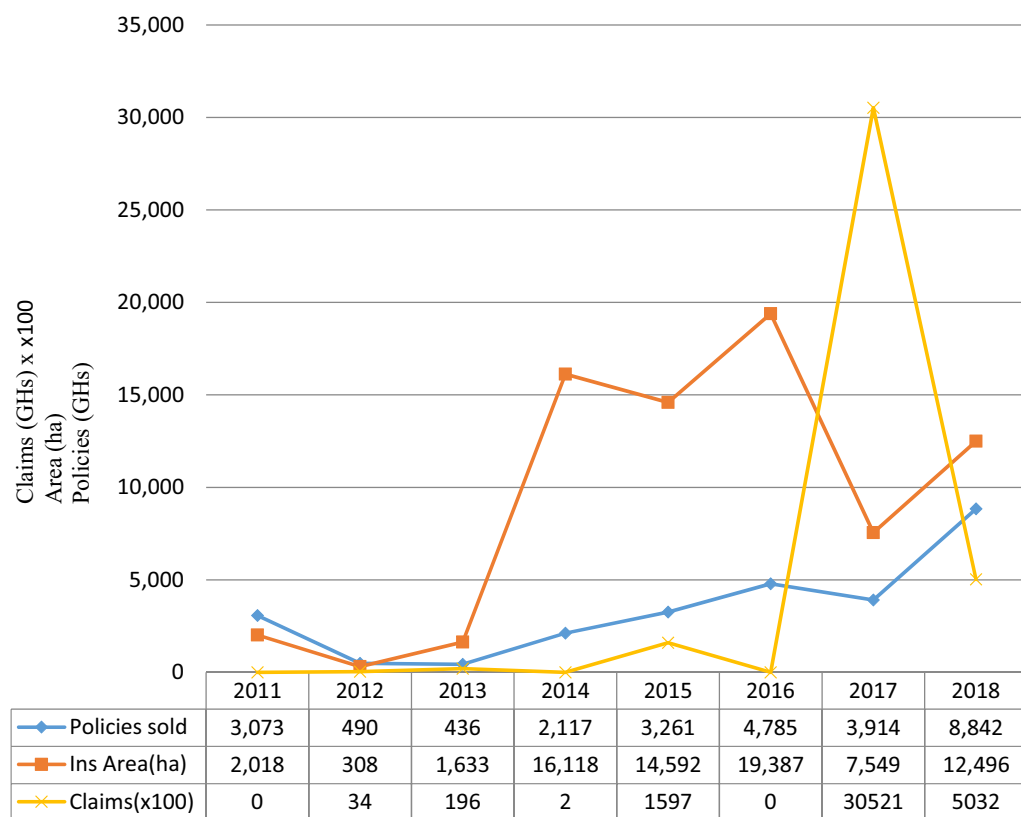
Perceived relevance of agricultural insurance

The study probed whether respondents had ever acquired agricultural insurance in their farm operations and how relevant they found agricultural insurance policies. The number of farmers that have ever experienced agricultural insurance remained very low (14%). A counter-finding showed that a high proportion (90%) of both insured and un-insured smallholder farmers' indicated that agricultural insurance products remained relevant. A majority (76%) of un-insured smallholder farmers' agreed that it remained relevant (see Table 5). This is similar to a finding involving cash crops where Afriyie-Kraft, Zabel [24] indicated that 90% of cocoa farmers indicated that indexed-based insurance held merits for farmers. About 10% of the respondents who perceived agricultural insurance to be non-relevant, never purchased agricultural insurance. Indeed, Afriyie-Kraft, Zabel [24] indicated that wrong perception about agricultural insurance contributes to low insurance uptake. [51] also confirmed that risk perception and exposure affects insurance acceptability and access. This was confirmed in focus group discussions conducted in all three regions. In a focus group discussion in Volta Region, participants unanimously indicated that:

"Insurance is just a way of taking people's money to be used by the privileged and educated in society. Educated people just use it as a way of enriching themselves. How many times do unexpected calamities happen in a year? We have engaged in farming for a long time without insurance and we are still surviving, why the need?" (FGD/Volta/July/2019).

This assertion was further confirmed in most Key Informant Interviews conducted across the three regions. A key informant working with the Department of Agriculture in the Western Region indicated that:

"Even for me as an educated person, If I take the case of vehicle insurance, if it had not been the fact that it is mandatory I will not have insured my vehicle, why pay for insurance when the likelihood of having an accident or calamity is very slim? There is no way I will insure my crops under cultivation" (KII/male/Western/July/2019).



Source: Data from GAIP, 2019.

Fig. 1 Estimated crop insurance penetration in Ghana (2011 – 2018). Source: data from GAIP, 2019

Table 5 Farmer agricultural insurance subscription experience and relevance of agricultural insurance. Source: Field Survey, 2019

		Relevance of agricultural insurance		Total
		No	Yes	
Insurance experience	No	10 10.5%	72 75.8%	82 86.3%
	Yes	0 0.0%	13 13.7%	13 13.7%
Total		10 10.5%	85 89.5%	95 100.0%

Synthesis from annual reports from GAIP indicated wrong perception concerning agricultural insurance as a common theme existing among many smallholder farmers. Thus leading to reluctance to subscribe to agricultural insurance. Indeed, Mensah, Fialor [26] confirmed that wrong perception and poor understanding of

agricultural insurance led to low uptake in their study in Ghana. The wrong perception about agricultural insurance was more prominent in Northern and Volta regions where schemes were implemented. A plausible reason could be the poor education of non-subscribers to already existing schemes in communities where schemes are implemented. The implication is that the level of uptake can stagnate and lead to exit by farmers already subscribed due to misconceptions put forth by non-subscribers. We observed no differences in perception concerning agricultural insurance subscriptions among insured and un-insured farmers. Our sample shows more (26%) farmers with primary education and only 13% with tertiary education. Peer-to-peer exchange of information remains dominant among farmers given the deficit of agricultural extension officers—thus influence from peer farmers cannot be considered trivial. Indeed, [52] showed in their study that peer-to-peer exchange of information compensated for extension delivery among underserved farmers in southern Ghana. [53] in a study in Italy showed that direct experience with agricultural insurance encouraged participation among medium and large-scale

farms, conversely, indirect experience affects smallholder farmers. An indirect experience by un-insured farmers through contacts with insured farmers was observed to contribute to reluctance by a few farmers to subscribe to agricultural insurance. Most rural communities have in place communal living arrangements hence, insured farmers spread negative experiences and expectations that constraint insurance acceptability.

Table 6 shows the reasons for the non-purchase of agricultural insurance policies by un-insured farmers. Inadequate knowledge about agricultural insurance constitutes the main reason (64%) for non-subscription. This is confirmed by findings by [20, 26] that showed low knowledge about insurance hindered uptake. In FGDs and KIIs conducted, we observed that gender and education contributed to low insurance uptake. Women generally had low uptake of Weather Indexed Insurance (WII). This is because of low financial literacy and education. In the Northern Region, we observed a striking difference in a gender gap that discriminates against women. Delavalade, Dizon [49] in their finding observed low uptake of WII among female farmers. They attributed this to low financial literacy and high illiteracy. Cole, Giné [54] supported this finding. Indeed, Fletschner and Kenney [55] argued that WII is designed for patriarch societies that neglect specific gender needs and constraints. It became apparent in our qualitative study, that the needs of women received little attention in existing insurance schemes. This was widespread in all FGDs and KIIs conducted. Table 2 shows few (13%) tertiary graduates and more Senior High School graduates in our sample. This implies that most of our respondents possess secondary level education and perhaps had ramifications for the adoption of insurance products. Education does not necessarily lead to insurance adoption but better facilitates the adoption process and shortens the lag phase in decision-making. We observed that among educated farmers, insurance penetration was better than uneducated

farmers in all three regions. In a Key Informant Interview with a GAIP official, it was reported that:

“In my work with farmers, I have observed that educated farmers generally embrace agricultural insurance well than uneducated or farmers with low education. I think that education affords individuals exposure beyond the classroom to better understand wider issues. Education also make individuals the ability to gather relevant information to make informed decisions” (KII/Greater Accra Region/June/2019).

Additionally, given the levels of adopters in our sample, we observed that most of the innovators and early adopters possessed at least senior high school and tertiary level education. Qualitative interviews with farmers further confirmed that educated farmers enrolled faster onto insurance schemes than uneducated farmers. Generally, risk aversion is a driver for insurance subscription. [51] showed in their study in Europe that risk preferences remain dynamic and affect agricultural insurance. Therefore, farmer risk attitude, perception and exposure constitute important factors that remain non-trivial in agricultural insurance acceptability and accessibility [56]. indicated that overcoming asymmetric information on agricultural insurance requires an advantageous selection that comes from multiple sources (Farmer Based Organizations, religious groups, civic organizations).

Availability of insurance products (23%) was next widely reported. In regions (Northern and Volta) with and without (Western Region) insurance, it was widely reported that preferred insurance products remained unavailable (Table 6). The lack of insurance products in southern Ghana was widely reported in the study even though few farmers expressed interest to enroll. This contributes to low insurance access. In some instances, advocacy about insurance policies was done yet sales remain low consequently affecting farmers’ interest to make purchases. In other instances, farmers who knew of agricultural insurance, could not make purchases due to a lack of insurance offices in their operational areas. In FGDs conducted, farmers’ indicated that:

“We sometimes hear about agricultural insurance on radio and mainly through family advice, and on few occasions when we wanted to purchase insurance policies, we did not get outlets in our communities to do so” (FGD/Volta/July/2019).

A key informant interview with a representative at GAIP indicated that they are constrained to establish more officers due to financial constraints and economies of scale. Establishing new offices in several communities

Table 6 Reasons for non-purchase of agricultural insurance policies. Source: Fieldwork, 2019

Reasons	Responses	
	N	Percent (%)
Expensive	4	4.6%
Not available even though needed	20	23.0%
Don't know about it	56	64.4%
Others	7	8.0%
Lack of funds		
Lack of understanding of how insurance policy works		
Total	87	100.0%

appears financially non-viable and leads to high operating costs.

Few (5%) farmers perceived agricultural insurance to be expensive. Literature [16, 57] supported the finding that the high cost of WII limited smallholder uptake. Another 8% indicated other reasons such as lack of funds and a good understanding of how agricultural policy works. Education is a principal factor that influences insurance uptake. Farmers were unanimous in FGDs that given a higher level of education they can make informed decisions about accessing and accepting agricultural insurance. We observed that educated farmers easily enrolled in agricultural insurance schemes. This was also confirmed in the synthesis of GAIP reports. Literature further [20, 21] supports the finding that education influences insurance uptake. There is however no homogeneity in insurance uptake among educated farmers. This is because there are variations even among educated farmers. Thus some educated farmers have reservations about insurance subscriptions. Generally, however, educated farmers have an affinity for subscribing to agricultural insurance. Particularly in northern Ghana, where educational gaps exist between men and women, we find out that more educated men subscribe to agricultural insurance. In both the Northern and Volta regions, we observed that educated farmers were mostly enrolled in agricultural insurance schemes.

We observed that knowledge about agricultural insurance products is important but it does not guarantee subscription. A deeper understanding of how the specific insurance products work in addition to knowledge about the product is more likely to complement and encourage farmers to subscribe. In most focus groups discussions, farmers indicated that:

“Education about agricultural insurance products is generally good but beyond just education, we want to see farmers who have had experience and benefited from an agricultural insurance package in a time of adversity. Most often it sounds good listening to all the good talks on agricultural insurance education, but practically there can be a variation in what agricultural insurance is proposed to do and what it actually does” (FGD/Northern Region/June/2019).

The qualitative study further revealed that the lack or low knowledge about agricultural insurance products was more prominent among the adult sample (51–above 60 years) in our study. We observed that knowledge about agricultural insurance improved among the youthful age category (21–30 years) as compared to the adults in all the study regions. In a focus group discussion in the Western Region, respondents indicated that:

“We agree that the young population are more ICT compliant and tend to have information about agricultural insurance compared to the aged (over 50 years). You do not expect a 50-year old farmer to be following up on agricultural insurance at such an age, at least the young ones have more economic time and it is rational for them to get signed up onto an insurance scheme” (FGD/Western Region/June/2019).

In another FGD in the Volta Region, farmers indicated that:

“Generally young people are vibrant and tend to have access to current information, it is therefore not surprising that the young ones tend to have improved knowledge agricultural insurance compared to us the elderly. When we started farming, insurance subscription was not part of the farm culture. Even if we are presented with such information, it simply does not interest us” (FGD/Volta Region/June/2019).

It should be ensured that efforts made to educate farmers should not just end in providing knowledge but providing a good understanding about how insurance products work in addition to using innovative farmers who are already subscribed to agricultural insurance. This is because a misunderstanding of insurance products encourages farmers to choose alternative measures for managing weather risks [48]. We observed that bundling agricultural insurance with inputs or agricultural credit provides a way of improving the accessibility and acceptability of agricultural insurance. This was made manifest in the FGDs and KIIs conducted with farmers and representatives of GAIP.

On the issue of “lack of funds” to support the purchase of agricultural insurance policies, a participant indicated at Gumo (Kumbungu District) during a focus group discussion that:

“At the beginning of the season, the focus of every farmer is usually about how to secure money to invest in our farms. Almost all our money is invested in our farming business which in most cases remains inadequate. It is therefore difficult to find or save money for insurance policy” (FGD/Northern Region/June 2019).

The assertion by this participant was widely shared by other farmers across other focus group discussions. In this regard, farmers must be encouraged to see agricultural insurance as part of or additional investment into their farms that presents “protection” for other already existing investments. We observed that a general lack of knowledge and understanding of agricultural insurance

Table 7 Farmer expectations concerning agricultural insurance. Source: Fieldwork, 2019

	Test value = 2					
	t	df	Sig. (2-tailed)	Mean Dif	95% confidence interval of the difference	
					Lower	Upper
Reduce climate effect	− 0.265	90	0.792	− 0.03297	− 0.2803	0.2143
Feeling secure	0.675	90	0.502	0.07692	− 0.1496	0.3034
Reduce crop losses	− 0.702	90	0.485	− 0.07692	− 0.2948	0.1409
Improve food security	− 1.604	90	0.112	− 0.16484	− 0.3690	0.0394
Improve farm profit	− 2.131	90	0.036	− 0.25275	− 0.4884	− 0.0171

as indicated by the majority (at least 64%) of respondents (see Table 5), particularly the nature and types of insurance policies and the processes involved in making claims. Perhaps, this might have contributed to some potential insurance policy subscribers “holding-on” their purchase decision. If farmers are properly educated on insurance policies, it can enhance the uptake of insurance policies. [56] confirmed in their study asymmetric information on agricultural insurance as a hindrance in their study on Philippine farmers.

Table 7 shows a one-sample t-test results on farmer expectations concerning agricultural insurance products. To determine key expectations of farmers, respondents were made to confirm their expectations on a five-point Likert scale (0=no, 1=little, 2=some, 3=much, 4=so much). The set of expectations included: reduction of the effect of climate change; secured feeling; reduction of crop losses; improvement of food security; and improvement in farm profit.

From the T-test results in Table 7, with an assumed test value of “2”, *feeling secure* with a mean difference of 0.077 was the most important benefit expected by respondents; followed by the expectation of *reduced climate effect* (i.e., impact of climate change on general livelihoods). Indeed, [51] indicated the risk preferences remain dynamic and influence insurance access and acceptability. The least benefit expected by respondents from agricultural insurance was improved farm profit. A plausible reason is that farm profit is a benefit that could not be read off linearly but appears indirect usually in the instance when there is a weather or production risk. The P-Values of the variables suggests that all mean values of all variables are not significantly different from the assumed mean (2=some benefit) except for an improvement in farm profit. Hence, it could be assumed that the level of expectation by the respondents on those variables is “some”. Expectations about agricultural insurance is an important factor usually relegated to the background. We observed in the qualitative study that farmers have their own expectations that need to align with insurance products to improve access and acceptability.

Conclusion

Agricultural insurance is a useful tool for managing agricultural risks and it extends as a good mitigation strategy of risks in almost all fields of human endeavors. The study found out that GAIP is a leading agricultural insurance service provider with three dominant insurance products on the Ghanaian market (weather/drought index insurance (WII) for smallholder farmers; Multi-Peril Crop Insurance (MPCI) for commercial farmers; Multi-Peril Insurance for Poultry (MPIP) for commercial farmers Farmers). A fourth product (Area Yield Index Insurance (AYII) is currently under trial. Agricultural insurance enrollment grew by 65% from 2011 to 2018 and insured area increased by 84–90% from 2011–2018 and dropped by 55% from 2016 to 2018.

The findings showed that the majority (90%) of respondents perceive agricultural insurance to be good, yet only 14% had ever acquired insurance. This signals a gap between acceptability and accessibility of insurance products. Additionally, it implies a lack of trust and financial literacy among insurance subscribers. Lack of knowledge about agricultural insurance products is the most stated reason (64%) for non-subscription, followed (23%) by the unavailability of insurance products in areas where it is needed. Only a few (5%) reported insurance to be expensive. Acceptability and accessibility of agricultural insurance are further influenced by gender, educational level, low knowledge, information asymmetry and wrong perception concerning agricultural insurance products.

Policy recommendations

1. The study recommends that more insurance companies be incentivized to augment the efforts put in by GAIP to ensure improved access and acceptability of agricultural insurance products in southern Ghana.
2. The study recommends that smallholder farmers in other parts of Ghana, especially southern Ghana (Brong Ahafo, Ahafo North, Oti, Eastern, Western)

be educated and sensitized about existing agricultural policies and their attributes to encourage potential subscription, uptake and reduction in the negative effects of climate-related hazards.

- The government can consider bundling insurance products with credit or inputs under the Planting for Food and Jobs Programme (PFJ) to improve access and acceptability of agricultural insurance.

Abbreviations

GAIP: Ghana Agricultural Insurance Pool; CAADP: Comprehensive Africa Agriculture Development Programme; SDGs: Sustainable Development Goals; PFJ: Planting for Food and Jobs; PERD: Planting For Export and Rural Development; RFJ: Rearing for Food and Jobs; WI: Weather/drought index insurance; MPCl: Multi-peril crop insurance; MPiP: Multi-peril insurance for poultry; AYil: Area yield index insurance.

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Authors' contributions

Conceptualization, methodology, writing original draft, reviewing and editing was done by all authors. All authors read and approved the final manuscript.

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All respondents agreed to participate in the focus group discussion and survey.

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