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# Malawi's Experience with Weather Index Insurance as Agricultural Risk Mitigation Strategy Against Extreme Drought Events

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Additional information is available at the end of the chapter

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## Abstract

Malawi continues to face unprecedented challenges imposed by extreme weather events—drought in particular. Because the economy is heavily dependent on climate-sensitive agriculture, Malawi is highly vulnerable to extreme drought events. Faced with a growing number of extreme drought events, the government of Malawi is determined to implement weather index insurance as part and parcel of its nationwide disaster risk mitigation strategy. This study seeks to interrogate and highlight the obstacles that have hampered successful implementation and development of weather index insurance in Malawi beyond the pilot phase. The study draws on a few examples to demonstrate other countries' successful experience with weather index insurance as a drought risk mitigation tool. The study concludes by highlighting important lessons that could help the government of Malawi to re-think the next phase of development of weather index insurance program as an effective risk protection strategy against extreme drought events.

**Keywords:** weather index insurance, extreme drought, smallholder farmers, agricultural insurance, climate change, insurance literacy, disaster risk reduction

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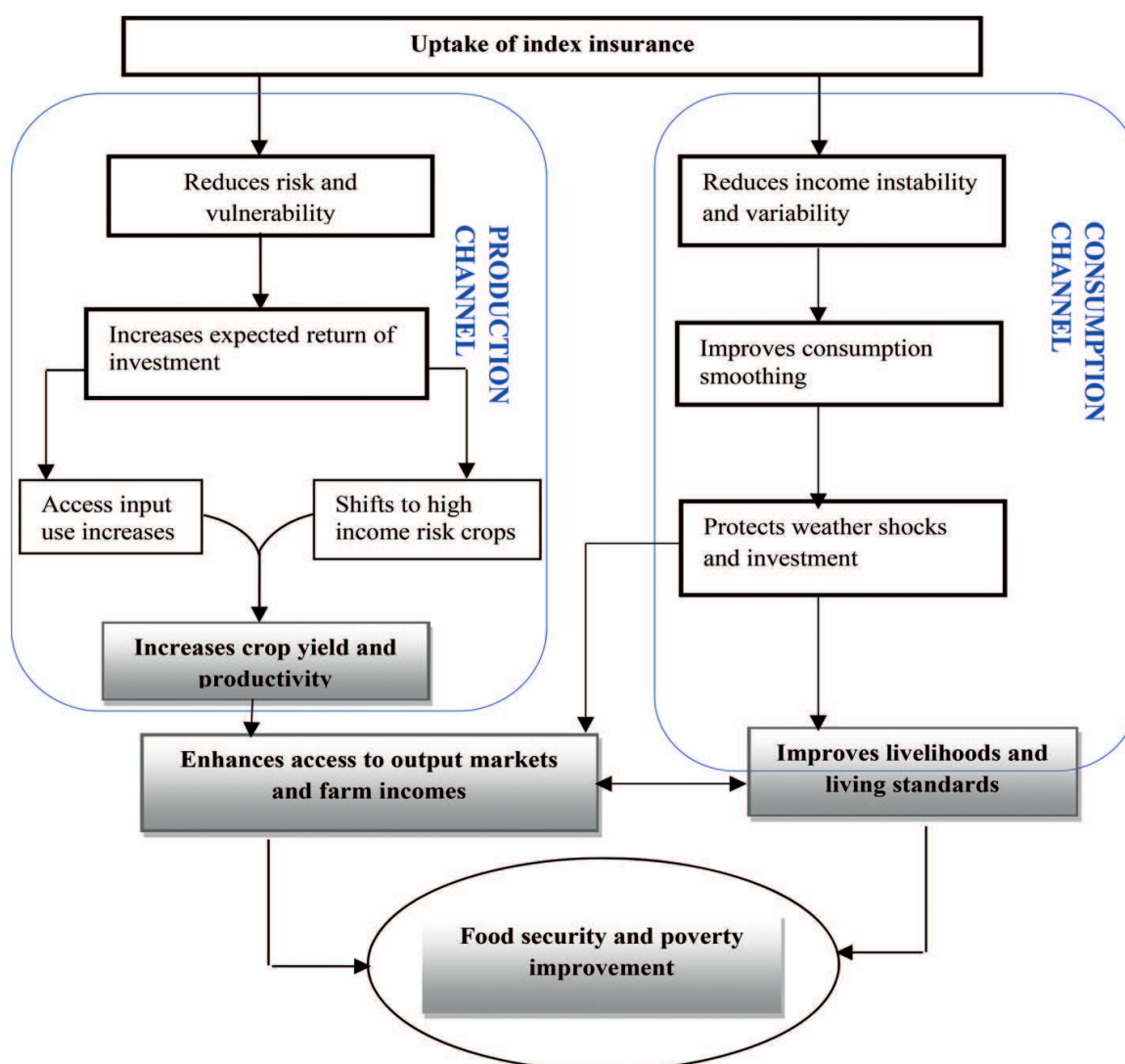
## 1. Background

Malawi, like many other countries in Africa, continues to face severe challenges imposed by extreme weather events particularly droughts. The upsurge of drought events in Malawi provides evidence to unprecedented challenges caused by climate change and climate variability. Because the economy is heavily dependent on climate-sensitive agriculture, Malawi's economy is highly vulnerable to extreme weather events especially drought. Pauw *et al.* [1]

estimated that on average Malawi loses 1.7% of GDP (equivalent to USD 41 million) every year due to an extreme drought event.

In response to severe challenges imposed by drought, the government of Malawi, in partnership with the World Bank and other development partners, initiated a weather index insurance (WII) scheme in 2005—the first of this kind in Southern Africa. The scheme was ‘celebrated’ as a potential breakthrough in the quest to offer sustainable market-based agricultural insurance to millions of smallholder farmers—a majority who practices dryland rain-fed agriculture.

Like other developing countries in African, Malawi’s interest in WII is justified on a number of factors: first, currently agricultural insurance markets are missing, fragmented or poorly developed. Because agriculture is the dominant source of livelihood to millions of smallholder farmers, WII has the potential to provide effective risk-protection mechanism against the often highly disruptive drought events. Second, because the economy is agro-based, agriculture is the most feasible strategy to promote economic growth in Malawi with knock-on effects on food security and poverty improvement. World Bank [2] assets that growth in agriculture is a more effective strategy at reducing poverty compared to



**Figure 1.** Rationale for uptake of WII by smallholder farmers. Source: Adapted from Cole et al. [5].



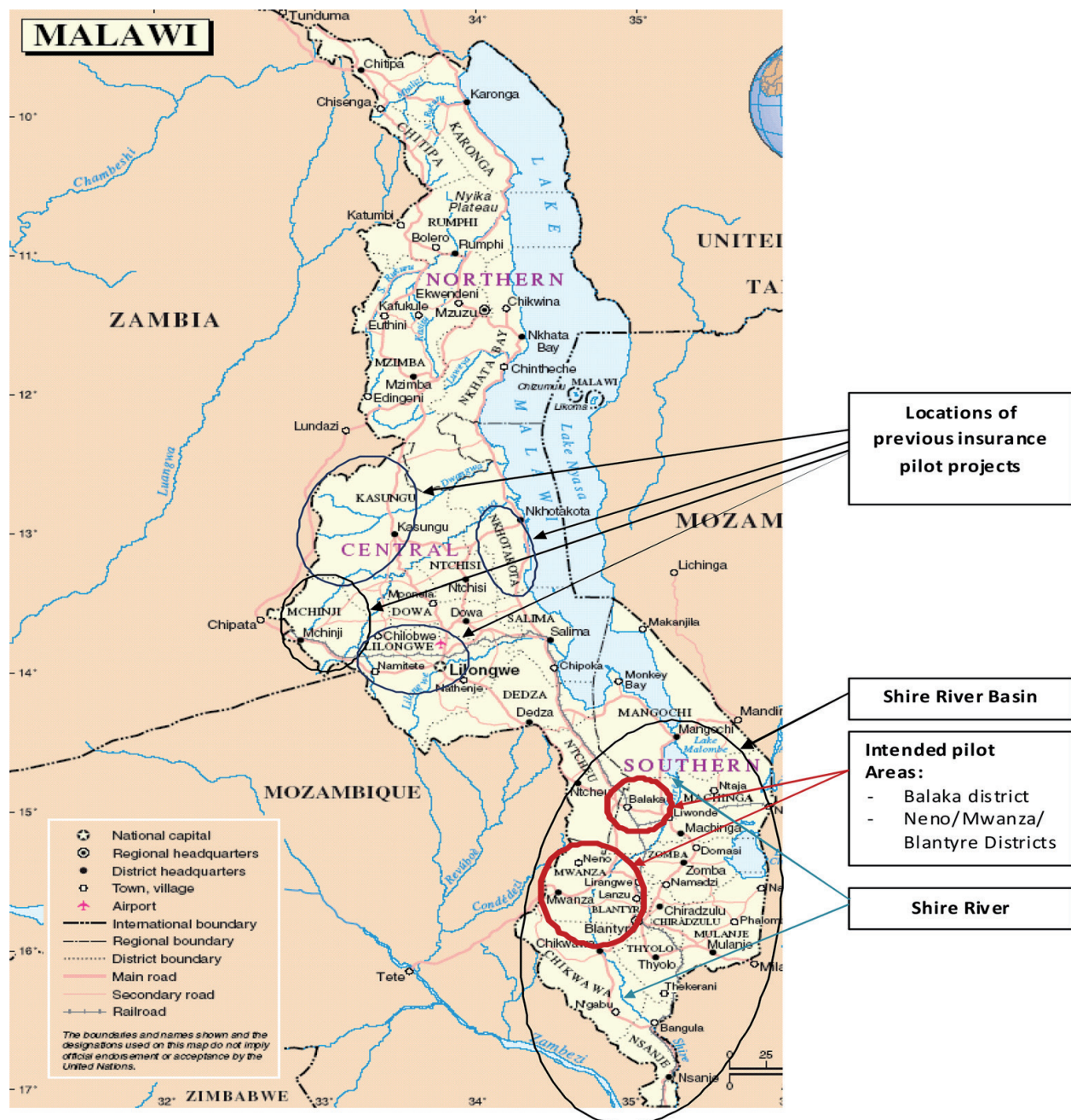


Figure 2. Selected districts of study visits.

industrial or non-agricultural sectors. Third, WII could provide realistic opportunities to commercialize and transform rural agriculture in ways that accelerate rural development in Malawi. Empirical studies suggest that WII can facilitate access to agricultural financial markets and improved farm inputs for smallholder farmers (e.g. fertilizers, high yield seed technologies, etc.). Often smallholder farmers fail to exploit the most profitable land uses and technologies due to the perceived risk and uncertainty. Farmers would rather prefer undertaking familiar and/or tested farm practices that guarantee low risk but yielding lower return and effectively limiting their potential income [3, 4]. **Figure 1** indicates the perceived rationale and justification for promoting uptake of WII as risk reduction strategy for smallholder farmers.

This paper is based on field visits, interviews and discussions with various stakeholders involved whether directly or indirectly with WII in Malawi that include government ministries, international development organizations, insurance companies, financial institutions, farmers' organizations, farmer representatives, etc. The paper discusses Malawi's experience with WII based upon on-ground observations, views and insights obtained during our interactive field visits and discussions with various organizations. Three districts of Balaka, Neno and Mwanza were selected as the main study areas—all based in Shire River Basin as shown in the map below (**Figure 2**). Other areas of study interests were districts involved in the early implementation of WII project and these included Kasungu, Lilongwe, Mchinji and Nkhhotakota.

## 2. Weather index insurance: A false start?

As discussed earlier, WII pilot project was initiated in Malawi in 2005 with the support of the World Bank and other development partners. The project kicked off on a high note with initial involvement of 900 small scale groundnut producers who received financial support from two locally based microfinance institutions - the Opportunity International Bank of Malawi and Malawi Rural Finance Company. Within a few years after inception, the project was expanded to include maize and tobacco crops. For instance, by 2008/09 about 2600 smallholder tobacco producers were insured for a total sum of US\$2.4 million, while 1700 growers (groundnuts and maize) were insured for a total sum insured of US\$310,000 [6].

In these early stages, WII scheme raised high hopes as it showed signs of potential success - but only to diminish and die off a few years later. By 2014 most of the lending institutions have discontinued any form of direct crop insurance coverage to smallholder farmers. A question warranting further interrogation is 'what went wrong with a seemingly promising initiative that generated "too much hype" (borrowing Binswanger's term, [7]) and immense interest amongst development organizations, policymakers, insurance practitioners, reinsurers, academics, development specialists, etc.?'

## 3. Experience with WII: interrogating the pitfalls

Malawi's effort to offer unsubsidized market-driven agricultural insurance to multitude of smallholder farmers—a majority who are poor—is a laudable goal. Not only is this viewed as a climate change adaptation and mitigation strategy but also importantly a safety net against food insecurity. However Malawi has failed to implement WII beyond the pilot phase. Malawi's experience with WII therefore deserves further interrogation as this is likely to provide important insights essential for setting future research priorities and policy discourse regarding index insurance. The discussion below, for exposition purposes, is divided into three non-mutually exclusive subcomponents that include consumer-related, institution-related and infrastructure-related hurdles [8].

## 4. Consumer-related hurdles

### 4.1. Low demand for WII

A stand-alone farmer-driven demand for WII (at micro-level) has failed to take roots because of low and unsustainable demand by smallholder farmers. During the discussions with Nico Insurance companies, the general manager remarked, *"give me the demand and will market WII for you"*. The general observation is that unless insurance premiums are heavily subsidized or bundled-up with key farm inputs or loans, demand for WII is too low and unsustainable. Reasonable explanations have been offered in literature to explain the observed low demand that include: liquidity constraints, lack of trust, lack of financial and insurance literacy, high price elasticity, misconceptions of how insurance works [7, 9, 10].

Many studies suggest that a more feasible approach to offer WII is to bundle it with key farm inputs such agricultural inputs such as fertilizers, seeds, loans, etc. Key agricultural institutions (e.g. agri-banks, input suppliers, farmers' organizations, etc.) acknowledge this as an attractive approach for good reasons: can reduce default risk, can be designed to cover portfolios, can lower transaction costs and can be a strategy to reach out more clients with potential to increase business volume.

This approach has not worked well in Malawi for the reason that although farmers showed interest participating in the WII program bundled with key inputs, their insurable interest remains unknown. Rather farmers maybe participating only to exploit the 'convenience' of accessing what otherwise would have been inaccessible financial credits and/or crucial farm inputs. Minus this incentive, it's most likely that farmers will not voluntarily participate in the WII program.

The situation seem to have been worsened with the presence of a farm-input subsidy program (FISP). For the past decade the government of Malawi has rolled-out a country-wide farm input subsidy program targeting millions of smallholder farmers. The scheme is credited to have increased access to improved farm inputs (e.g. seed technology, fertilizers, chemicals, etc.) that otherwise have been too expensive and unaffordable to many smallholder farmers. During the focus group meetings, farmers indicated that they have been beneficiaries of this program since its inception.

When asked whether they would participate in WII (bundled-up with key inputs) given the presence of FISP, farmers were non-committal. Some were quick to criticize the FISP, voice strong objection in the manner in which the scheme is administered, while others professed ignorance about the WII including its benefits and how it operates. However, because beneficiaries are receiving farm inputs at low prices (and in some cases even for free), it reasonable that farmers are unlikely to participate in the WII program where they are expected to meet premium payment for a program they hardly know and neither guaranteed of a 'return' on premium payments (see discussion below). The overall impact therefore is that FISP has negatively impacted the demand for WII as a result.



## 4.2. Basis risk has discouraged demand

The basis risk looms large as one of the factors that has discouraged the demand for WII. Basis risk arises due to imperfect correlation between the index and the risk being trekked [11]. This can arise due to differential microclimate effects, rainfall distribution asymmetries, localized damages, poor spatial distribution of weather stations, etc. [12, 13]. Idiosyncratic risks such as pests/locusts invasion, disease outbreak, fire destruction, etc. provide typical examples. For instance, an insured farmer or a group of farmers may lose his/their entire crop due to a localized risk that affects only a small part of the village or district. Because such losses are localized and not widespread across all the insured farmers this does not trigger the index to justify indemnity payments. To an insured farmer, this is possibly misconstrued as a 'double loss' — the farmer has paid a premium, suffers a loss and still receives no compensation. As a result, WII has stirred dissatisfaction amongst farmers resulting in withdrawal of many participants. Under circumstances of this nature, Binswanger [7] argues that the insured farmer is actually worse off with insurance than without.

## 4.3. 'Poor return' on investment

Many smallholder farmers in Malawi hold the mistaken view that insurance premiums is some form of investment for which they are entitled to a "return on investment". Farmers do not view premium payments as risk mitigation tool per se but rather as some form of investment with expected future return. As farmers make successive payments without return (i.e. compensation/indemnity payments), insurance therefore yield a 'negative return' — and clearly a poor investment instrument [14]. This contributed somehow to farmers' disillusionment and/or dissatisfaction with WII in Malawi.

Parallel financial models in the form of 'village banks' were demonstrated as ideal financial models during focus group meetings and discussions with farmers in rural communities. 'Village banks' are popular informal "savings club" administered by a committee of trusted local members. There is no formal paperwork involved to become a member but rather all based on mutual trust, stature and self-standing within the community. Members are expected to pay monthly premiums which he/she can draw against or leave in the bank to earn 'interest'.

In one group it was illustrated that members pay MK500 per month or MK100 per week as subscriptions. These payments are mandatory and failure to meet this obligation may result in termination of membership. These village banks are of paramount importance to local households involved in schemes as members can borrow to meet urgent financial needs such as payment of school fees, funeral costs, farm input purchases, supplementary food purchases, etc. Although formal financial institutions are available (e.g. Malawi Rural Financial Services), villagers prefer dealing with village banks for good reasons - no stringent requirements to become a member, terms are negotiable and favorable, convenient proximity, no transaction costs and favorable 'interest rates'.

## 4.4. Premiums are too costly and unaffordable

Many smallholder farmers in Malawi are poor and cannot afford meeting premium payments. For this good reason many are not likely to purchase WII. Although subject of further

research, farmers seem to prefer group-based compared to individual-based premium payments. This suggests that farmers prefer to participate in WII scheme as a group as opposed to individual households. National Smallholder Farmer's Association of Malawi (NASFAM), makes a similar observation when it noted high loan recovery rate (95–100%) payment by farmer groups as opposed to individual-owned.

There are advantages associated with the group-premium approach: administratively less cumbersome, provides peer-pressure amongst group members resulting in low default rates, provides lobbying and/or bargaining power, allow economies of size and scale which could result in cheaper interest rates or insurance premium. But the insurance contract needs to be transparent, easy to understand and with tangible benefits, so as to attract farmers participation.

**Table 1** below ‘confirms’ the view expressed by most households in rural areas that they prefer borrowing loans from friends and family members rather use formal financial channels. Many interviewed farmers were not familiar with insurance in general and how it works. Using examples of life and automobile insurance, a small fraction agreed they have heard about insurance but lacks explicit knowledge and experience. For WII to be successful therefore, not only must there be need for massive insurance literacy campaign but also benefits must tangible, attractive and comparable to village bank schemes.

4.5. Communication hardships and cultural hurdles

WII is a new concept unheard of to many farmers in Malawi. One school of thoughts that can be designed to help farmers understand better is to translate the WII concept into vernacular language. However the translation into local languages is not straightforward and often difficult as there may be no parallel terms. This makes it difficult to market WII in easy-to-understand terms particularly to a layman with little or no prior knowledge of insurance. Such communication hardships require extraordinary effort to market WII in Malawi.

For some societies in Malawi, it is just un-cultural and against norms to discuss about future catastrophes such as funerals, accidents, burglary and disasters [16]. Doing so may be interpreted as inviting bad omen unto one's life. Breaking and demystifying such cultural beliefs

Source of loan	% of loan respondents
Friends in the village	69
Relatives and family members	56
Microfinance/banks	15
NGOs	8
Farmers' organization & clubs	4

Source: [15].

**Table 1.** Proportion of respondents indicating preferred sources of loan.



and stigmas will require massive educational campaigns to raise awareness and enlighten farmers on what WII is and is not about.

## 5. Infrastructural hurdles

### 5.1. Limited number of automated weather stations

Malawi has a total of 78 weather stations for which only 26 stations are automated and 36 stations contain data spanning more than 30-year period [17]. Weather risk at a particular station is actuarially characterized based on the weather data and variables recorded at that station. The resultant insurance premium is purely determined based on the availability of data recorded at a particular station. An insured farmer faces the basis risk as measurements at meteorological station do not always perfectly match or correlate with events on the farmer's plot. The 20 km radius has become 'one-size-fits-all' for WII contracts [18]. However what is observed in practice is that the 20 km radius criterion is not the most ideal for WII purposes. Osgood [17], estimated that under this criterion, 65% of the rural population falls outside the 'insurable radius' in Malawi.

### 5.2. Weather stations ill-suited for index insurance

The Department of Meteorological Services (DMS) bemoans the lack of an expansive network of weather stations in Malawi especially in rural areas. The DMS indicated that currently there are 23 government-owned weather stations which have been upgraded and automated. A number of the available long-established weather stations were constructed solely for aviation purposes and hence located near airport. It is therefore not surprising that these weather stations are far located from the remote farming communities located in rural areas.

For instance, as indicated to us during field trips, only two automated weather stations are found in districts of Balaka and Mwanza, while in other districts (e.g. Neno and Blantyre) there is not a single automated station. Such a sparse network of automated weather stations renders implementation of WII impossible as this not only worsens the 'basis risk' but also escalates farmers' dissatisfaction.

Countries that have successfully implemented index insurance (e.g. Mexico and India) are known to have committed substantial investment upfront towards the development of modern weather station infrastructure. Hence, substantial investment in weather station infrastructure is required upfront for WII to be scaled beyond the pilot phase in Malawi.

### 5.3. Short historical data

WII relies on historical and current weather data. Historical data are used as the basis for data analysis in product design and pricing. Accurate and timely weather data are key to successful implementation of index insurance products. Private players in financial markets will not engage in WII market unless they can be sure that good data are available for pricing contracts and the data are reliable and timeously provided so to settle claims quickly. The

relatively high cost of private weather data services constrains the potential for scaling up insurance in many remote, rural areas with low levels of agricultural productivity, sparse populations and difficult terrain.

Unfortunately, both historical and current data are not always plentiful. The historical dataset is highly variable for different areas, particularly for daily data, which are needed for index design. In addition to poor spatial distribution, many stations do not have the long historical data, necessary for risk, hazard and exposure modeling and characterization. Some are stations are new and besides capturing precipitation, important meteorological variables (e.g. sunshine, wind speed, maximum and minimum temperatures) necessary for WII purposes are not recorded. In some instances, there data are not well archived and maintained for insurance rating and modeling purposes.

## 6. Institutional hurdles

### 6.1. Lack required expertise

Leading insurance companies acknowledge capacity constraints as the main hurdle hampering efforts to implement WII on sound footing. **Table 2** shows areas and lacking expertise as indicated by insurance companies during the field visits and discussion. Some companies have tried to utilize regional underwriting actuarial expertise from South Africa though without much success. The interviewed insurance companies expressed the view that WII is a new type of insurance that is totally different from the familiar traditional insurance (e.g. automobile insurance, life insurance, etc.). Hence for many firms it's still a "learning curve."

Banking institutions in particular, indicated WII as a costly failure in Malawi—justifying disinterest and abandonment of the program. The experience of Opportunity Bank which lost over \$1.1 million after providing insurance coverage to more than 1000 small scale groundnut growers (2005), was a commonly cited example. Many institutions pointed out reasons such as lack of collateral security by smallholder farmers, high transaction costs, low insurance literacy, high default risk, non-enabling legal and regulatory framework.

### 6.2. Cash versus food crops conflict

Empirical studies have so far has demonstrated that the financial institutions are willing to offer insurance coverage for cash crops as opposed to food crops. This stems from purely business rationale that offering insurance coverage to cash crops protects the bank portfolios more effectively than non-cash crops. Cash crops like cotton and tobacco have a well-defined and long-established market supply-value chain in existence for many decades.

This sharply contrasts the government vested interest in providing insurance coverage to food crops especially staple maize. The government interest is understandable as it seeks to enhance resilience to climate change risks and achieve national goals and priorities especially food security, income improvement, poverty alleviation, elimination of malnutrition and diseases.

Area	Expertise lacking
Product design	<ul style="list-style-type: none"><li>• Insurance products are often designed in other countries (e.g. South Africa) and adapted to the Malawian market. Insurance products are standardized rather than tailor-made.</li><li>• Insurance companies lack product design innovativeness; rather than develop and test own products, they copy products implemented and successful elsewhere</li><li>• Lack of skilled staff to design products and pricing structure</li><li>• Leading insurance companies has no actuarial in-house expertise</li></ul>
Product marketing	<ul style="list-style-type: none"><li>• No expertise within insurance sector to set up a marketing strategy for insurance products</li><li>• Insurance companies not present in rural market segments, potential rural customers face difficulties to get access to insurance services</li></ul>
Customer service	<ul style="list-style-type: none"><li>• Insurance companies (departments) are difficult to reach</li><li>• Claim settling takes a long time</li></ul>

Source: Authors' compilation.

Table 2. Area of lacking expertise.

7. Lessons from other developing countries

The past decade has witnessed serious attempts by developing countries in partnership with development organization (e.g. World Bank, DfID, IFAD, WFP, etc.) to develop agricultural insurance markets that currently are largely missing. Between 2007 and 2009 for instance, IFAD reports that 30 WII programmes in 19 countries were implemented, reaching more than 1.2 million beneficiaries predominantly smallholder farmers [19, 20]. Concerns for increasing uncertainty due to climate change and climate variability, have heightened interest in developing agricultural insurance markets particularly WII. This section shares in brief, lessons from other developing countries that have successfully implemented index insurance beyond the piloting phase.

7.1. Mainstream WII into nation-wide disaster risk reduction programs

For many countries that have successfully implemented WII, the program has been mainstreamed to become part and parcel of nation-wide climate change disaster risk management programs. Although WII is not a panacea, its effectiveness can be improved when combined with other risk management strategies (e.g. drought/flood early warning, seasonal forecasts, disaster-risk preparedness and etc.). It must not be viewed as a substitute for climate change adaptation but rather as an additional component of nation-wide disaster risk reduction strategies. For instance, the government of Mexico, institutionalized risk management by establishing the National Civil Protection System (SINAPROC) with a nation-wide mandate to mitigate the loss of lives and interruption of essential services caused by disaster [21]. To further strengthen its risk management strategy, the Mexican government established a National Fund for Natural

Disasters (FONDEN) in 1996 specifically intended to cater for the reconstruction of public infrastructure as well as offering compensation to low income smallholder producers.

7.2. WII must create value to farmers

WII must create value to farmers in tangible a manner as possible. Farmer will value WII as a credible risk management strategy if it can effectively lower vulnerability to climate change, improve farm income, alleviate food insecurity and poverty. According to Churchill [22], the concept of value includes: scope of coverage - the extent to which the farmers' actual risk is covered; affordability - the extent to which the products are financially accessible to the farmers; additional benefits - the extent to which the insurance gives access to any additional services that might make the farmers "better off." In other words, WII products are deemed valuable if they are accessible, appropriate and affordable enough to allow participation of low income farmers (Matul et al. 2013). **Table 3** provides the PACE model considered vital to enhance the value of index insurance in ways that positively impacts the demand for WII by farmers.

7.3. Build efficient product delivery channel premised on trust

Patt et al. [23] (cited in Matul et al., [24] suggests, as a best practice, that practitioners need to implement a three-pronged approach to building trust: 1) build trust in the product, 2) build trust in the insurer and other institutions involved in the delivery of the product, especially through use of trusted agents and messengers, and 3) leverage trust that already exists in communities. For instance it could be easy to build trust on products delivered with the involvement of extension officers who consistently work with farmers. What often makes it difficult is that most insurers normally do not have offices or business in rural areas. This means that product distribution is best handled through a party with extensive links with farmers or farmer groups (e.g. extension officers, banks, agro-processors, cooperatives or MFIs). For instance in Kenya, WII products are being promoted as bundled products with loan inputs and marketed via agro-input dealers.

Component	Description
Product	describes appropriateness by reviewing coverage, benefit level, eligibility criteria and availability of value-added services
Access	focuses on accessibility and simplicity by investigating choice, enrolment, information, education, premium payment method and proximity
Cost	measures both affordability and value for money, while looking at additional costs to keep down overall costs of delivery
Experience	assesses responsiveness and simplicity by looking at claims procedures and processing time, policy administration, product tangibility and customer care

Source: Matul et al. [24].

**Table 3.** Value of WII based on PACE model.



7.4. Provide smart subsidies necessary especially during early stages of WII

Smart subsidies may be necessary especially during early stages of WII. Both developed and developing countries that have succeeded in setting up strong crop insurance schemes (e.g. India, Mexico, China, etc.), show that this success has been due, in large part, to public support. These countries have provided support mostly through direct provision of premium subsidies and reinsurance.

Africa has seen very low levels of government subsidies and, consequently, very low levels of market development, particularly for small-scale farmers. Statistics on agricultural insurance show that only 220,000 households were covered by agricultural microinsurance in Africa by 2011, representing US\$6.61 million in premiums [25]. Malawi (likewise other African countries) need to learn especially from India and Mexico that developmental path of agricultural insurance market starts with heavy government support and only for the private sector to join after the WII programs have fully matured and passed the “market test.” Hazell et al. [26] argue there may be good reasons for subsidizing development-oriented WII for the very poor, especially if it displaces more costly types of safety nets.

However, subsidies are always controversial. They are costly and unsustainable and if not carefully considered, subsidies can form a huge fiscal drain on national budgets with far reaching distortions on insurance markets. As Sandmark et al. [25] emphasize, subsidy support has to be weighed against market efficiency and fiscal sustainability. Experience indicates that once established, subsidies may be difficult to eliminate. **Table 4** indicates the pros and cons of providing subsidies to WII programs.

Description	
Pros	<ul style="list-style-type: none"><li>• Can make insurance products affordable to the very poor</li><li>• Can provide incentives for WII uptake</li><li>• Can jump-start the market</li><li>• Can be designed so as decrease as uptake increases</li><li>• Subsidized services can decrease the need for other types of social safety nets</li></ul>
Cons	<ul style="list-style-type: none"><li>• Often provided indiscriminately for all clients, when some clients are able to pay full (or higher) premiums</li><li>• Can promote dependency culture and provide disincentives to purchase non-subsidized products</li><li>• Can depress the market</li><li>• Can crowd out private insurers that do not receive subsidies</li></ul>

Source: [7].

**Table 4.** The pros and cons of providing subsidies to WII.

## **7.5. Invest in national weather services and infrastructure**

One reason behind India's successful WII story is its massive investment in improving weather station infrastructure. According to Hazell et al. [26], historical data are only available from approximately 550 India Meteorological weather stations. These are far too few to adequately cover the 150 million hectares of arable land and rarely located in rural areas. It has been estimated that so far between 10,000–15,000 additional weather stations have been installed so as to offer meaningful insurance services to farmers. Of these, at least 5000 are automatic, each at a distance of approximately 10–20 km from insured land [26].

Beyond the investment in weather stations, there is a need to collect, maintain and archive data - making them available on real time in relation to insured events. World Meteorological Organization (WMO), private players, donors and governments—working closely with national meteorological services—can play a key role in improving and expanding the network of weather stations and the quality of data produced and available. Further, these actors can explore opportunities related to satellite-based indices that use remote sensing tools. Given the increasing unpredictability of weather patterns due to the changing climate, the benefits of investment in weather infrastructure will extend beyond the development of index insurance products [26].

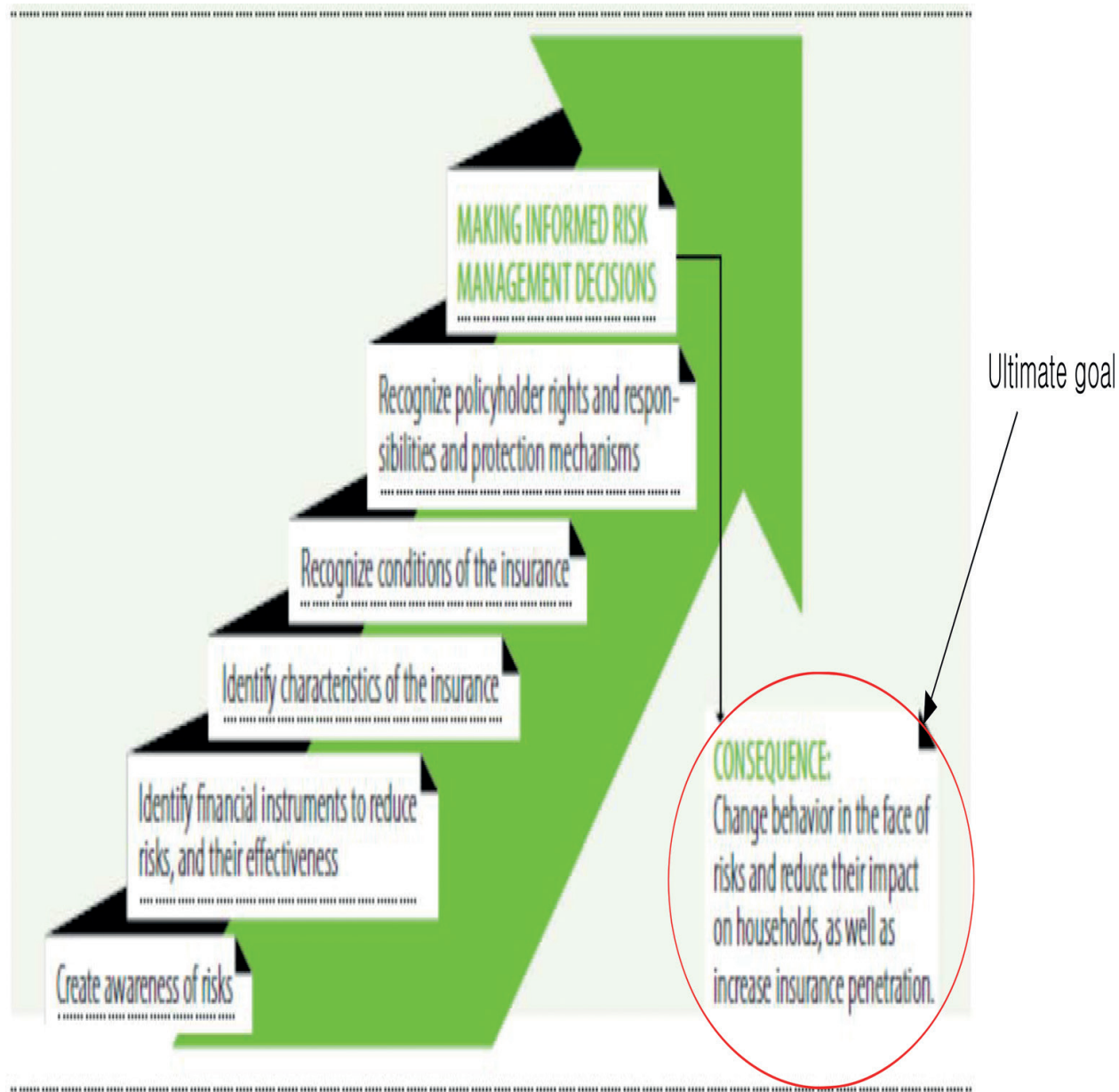
## **7.6. Intensify insurance literacy and financial education campaigns**

Many smallholder farmers have limited experience with formal insurance. Educating farmers on financial risk management is necessary to enhance insurance literacy [25]. Farmers require educational drills on agricultural insurance (e.g. WII) as a risk reduction, diversification and protection tool—all which will help farmers develop better expectations of WII.

Colombia's approach to financial education on insurance provides a good example. In 2009 the government made financial education on insurance mandatory for all microfinance institutions (MFIs). As a result, MFIs embarked on massive program to educate their clients through workshops, radio and television programs, leaflet distribution and internet campaigns. **Figure 3** shows the steps involved in financial literacy campaign in Colombia starting with "raising awareness" of risk to the final goal being to "change people's behaviour" towards risk, and allow them to make informed decision and ultimately reduce the impact of the risks.

## **7.7. Intensify the use of mobile phones and/or technology**

The use of mobile phones adds an exciting dimension to WII as this has the potential to lower administrative costs. Mexico, Brazil and Kenya provide good examples of how to use technology to improve distribution channels and increase outreach of insurance. Kenya, for instance, mobile technology called M-PESA is widely used in performing all paperless transactions including registration, premium payment and indemnity pay-out and has brought great benefits to the insurance industry (Bankable Frontier [27]). The M-PESA system has improved insurance penetration especially in rural areas as it reaches even those clients in remote parts.



**Figure 3.** Continuum of financial education on insurance in Colombia. Source: Vercla and Carlos, 2013.

Mobile technology is an important tool for WII as reduces the cost and increase the efficiency of the index insurance programs. One of the ways this is seen in practice is in distribution, where more efficient processes reduce the costs of distribution. Likewise, greater outreach may achieve a product scale that, in turn, drives down costs. But for technology to function effectively, it must meet the needs of the user and be adaptable to the environment in which it works.

8. Conclusion

WII holds promise as a one of the disaster risk reduction strategies in Malawi important for mitigating the impact of extreme weather events - droughts and floods in particular. Despite its potential, weather index insurance has failed to develop roots and grow beyond the pilot phase.

Based on field visits and discussions with key organizations involved in implementation of WII, this study has discussed some of the hardships that hampered successful development of WII in Malawi. The study also draw on a few illustrations (e.g. Mexico, India, Colombia and Kenya) to demonstrate successful experience and immense potential of WII as a risk protection strategy. Drawing from this review, the study identified some key lessons and best practice that could help the government of Malawi to re-visit, re-think and revise WII program as disaster risk reduction strategy against extreme weather events imposed by climate change and climate variability.

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