Digital AGRO

Mr Daniel Qi of **Allianz SE Reinsurance Asia Pacific** shares the latest technologies used in agriculture today to increase farming efficiency and yields. These technologies also help agriculture and livestock insurers to underwrite, monitor, investigate and assess claims sustainably and accurately.

"Digital Agro" describes the utilisation of technology and data to enhance farming efficiency, yields, sustainability and profitability. The improving standard of living of the likewise growing global population and competition for inputs create increasing demand for agricultural productivity which requires better farming practices and increasing technology transfer.

Many farmers can only make the necessary investments using external sources of capital. This can lead to severe financial stress in the event of yield losses or commodity price falls.

Challenges faced by farmers

The agricultural sector faces challenges that would make many other industries question their involvement.

Seasonal or annual variances in volume of production of +/- 25%, due to factors outside the farmers' control, are common. Additionally, farmers in many countries are price takers and must make investment decisions with little or no guarantee of market prices which are often more influenced by global rather than local factors. Yet, consumers will often react quite passionately when faced with volatile supply or price of food.

Safety net provided by agriculture insurance

Agriculture insurance plays a vital part in the food supply chain. The safety net provided by insurance allows for investment in new technologies that sustain and improve yields and/or production efficiencies.

In this context, it is understandable that in many countries, agricultural insurance receives support from central and local governments via premium subsidies or capital protection, as well as development support from the public sector in the establishment of public private partnerships (PPP).

Even with government support, many insurers are reluctant to offer agriculture insurance due to the systemic nature of the perils. Insurers have to handle geographically diverse portfolios of small value policies mostly without location-based "insurable" data.

Administering the sales, underwriting and claims under these conditions induce high costs. Government support through premium subsidies and capital protection may address the cost part of the insurance transaction. However, the administrative cost and complexity of loss assessment on a location by location basis may make the product prohibitively expensive.
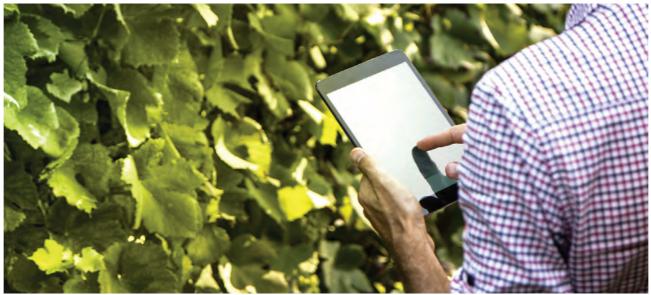
Remote sensing technology and Allianz Re's digital agriculture project

Allianz Re's Center of Excellence in Agricultural Insurance has been exploring opportunities to monitor crop development via satellite imagery since 2008.

Currently, it is running a project to investigate how to implement remote sensing technology in agricultural insurance. Radar-based remote sensing, also known as Synthetic Aperture Radar (SAR), collects information from the earth's surface by measuring the amount of radiation reflected from the target. In comparison to optical remote sensing, SAR has the advantage that clouds do not obstruct data acquisition, which can be a significant issue in tropical regions.

Application of Geographic Information System in crop insurance

In 2014, China was ranked the 2nd largest agriculture in-

insurers' head offices from the underwriting acceptance stage through to loss assessment.

This technology allows the farmers and insurers to transmit data quickly via 3G/4G mobile networks, linking plot information with policy information, carry out precise loss investigation as well as access the actual crop areas and losses (or deaths of livestock).

With the use of GIS location tags on photographs, underwriters and claims staff can obtain geo-located pictures of the impacted area that can be accurately related back to the underwritten fields/locations.

This real-time communication does not only help to improve the underwriting and claims processes, it also allows immediate claims settlements.

surance market by premium value and largest by number of farmers insured. This is based on a premium volume of CNY32.57 billion (US$5.1 billion) with CNY1.66 trillion in sums insured, servicing 247 million households. As agricultural insurance continues to accelerate, the demand for precision underwriting management and claims process will increase.

In China, Geographic Information Systems (GIS) are used to prepare and manage agriculture data as well as build 3-D snapshots of cropland. Such technology successfully estimates crop planted areas, marking and measuring the insured areas as well as accurately locating areas of loss.

GIS and Remote Sensing technologies are often used together in both underwriting, survey and loss assessment. The method of remote-sensing based crop plot extraction technology allows the user to independently compare crop planted area, planting date (approximate) and crop establishment with underwriting (policy) information.

For example, in Henan, China, remote-sensing technology was used to establish crop seedling stage in November 2014, followed by overwinter stage in February 2015 and reviving stage in late March 2015. These stages were then compared by filtering the Normalised Differential Vegetation Index or NDVI value of the crops in order to estimate the planted area and quality of crop establishment and survival. This supported farmers' planning for the cropping season, decisions on alternate crops in poor areas and the use of input to manage better areas.

Remote-sensing technology has been successfully applied in large loss investigations of drought, floods, diseases and insect plagues, freezing, hailstorms and forest fires in recent years. It provides an overview of the loss situation, identifies severe loss areas, and estimates resources for further loss assessment and claims settlement. At the same time, it helps to monitor the progressive perils to be used as reference for loss protection and prevention.

During the Liaoning drought of 2014, the loss assessment investigations were conducted using remote-sensing technology which helped to assess the loss situation and contributed to rapid drought relief. It benefited not only agricultural growth but also set a successful path for China in agricultural insurance.

3G/4G technology

Another digital application is the use of cellular mobile networks to transfer data between farmers, field staff and

Application of Radio Frequency Identification (RFID) in livestock insurance

Radio Frequency Identification (RFID) involves electronic chips inserted into insured animals (usually at or near to the ear) to accurately track them.

Each chip contains a unique text and number code used to identify the animal for management and ownership purposes, which is read by a handheld unit that can be linked to a local or remote database. This assists in underwriting as well as loss surveys and prevention of claims fraud.

In India, many farmers draw their income from milk sold to producer co-operatives. Livestock insurance has played a vital role in reducing the financial impact of animals' death on the farmer. However, while governments have been promoting livestock insurance for over three decades, the risk of false claims has kept premiums high and limited the availability of affordable coverage.

In April 2012, an insurance company launched a project to test RFID on over 25,000 farmers in several states in India. As a result, the insurer successfully insured 28,136 cattle with gross written premium of $496,000.

With the reduction of claims fraud, the technology has improved the business viability of livestock insurance products and the client value proposition. As transactions from enrolment through claims processing are being done at the insured's door steps, livestock farmers are now more aware of the benefits of RFID technology and how insurance can protect and hence improve their livelihoods.

Allianz Re's Center of Competence Agricultural Insurance

Allianz Re is the Group Centre of Competence (CoC) for Agricultural Insurance within the Allianz Group. Its mission is to foster the development of agriculture insurance markets and product evolution for our business partners incorporating the use of technology where it provides a benefit to the operation, efficiency and cost of the products.

Examples include the Digital Agro Project (DAP), the project on Remote sensing-based Information and Insurance for Crops in Emerging Economies (RIICE), index-based and pet insurance. The CoC Agriculture continues to explore new opportunities and invest in new technology.▲

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