

INSURANCE AS A TOOL FOR SUSTAINABLE AGRICULTURAL DEVELOPMENT

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Introduction. It is well known that agriculture is a risky business. Farmers face several types of risks, some of which can have catastrophic affects on their productivity. While most risk factors can be effectively eliminated through precautionary measurements, risk is an inevitable part of agriculture. Insurance can partially offset the damages by transferring the risk to third parties. Examples of agricultural insurance exist for a long time. Discrete events, which can be easily identified (such as hail), have a long insurance history. For such events, the definition of the risk is clear, which makes it easier to offer insurance. However, in cases where the risk definition is less clear, the insuring agents are hesitant to enter the market. This has been more or less the case for the Turkish agricultural insurance market when it comes to covering drought-related losses.

Agricultural insurance in Turkey has a relatively short history. However, thanks to the government subsidies and awareness programs, the market is growing very fast. The current system offers only traditional insurance against non-systematic risks. The Ministry of Agricultural and Rural Affairs employs several hundred loss-adjusters to estimate the losses after realization of an insured risk. In its current form, offering coverage for systematic risks such as drought is not feasible. An event as such can have large-scale distortions in productions, which are almost impossible to estimate on an individual basis. Loss-adjusters will need to investigate and calculate farmer's losses on a case-by-case basis, which will create substantial overhead costs.

One solution we propose is to enhance the current scheme with index-based insurance against drought-related risks. The proposed model can also be applied other systematic risks where a large number of farmers are affected over time.

Main part

Current Insurance System in Turkey

Turkey is an emerging economy, where 65% of GDP is derived from service sector. Industrial activities constitute 26% of the GDP. While only 9% of GDP is derived from agriculture, this sector employs about 30% of the labor force. Food processing is one of the top agricultural exports. Agricultural insurance is a relatively new concept in Turkey. However, since the introduction of government-subsidized insurance schemes, this field is experiencing a rapid growth. Under the current system 50% of insurance premiums is supported by the state. The current system is based on collaboration between the government, the private sector, and non-profit organizations.

TARSIM is at the core of the insurance mechanism. [1] Known as the agricultural insurance pool, the premiums are collected in this pool. This organization engages in re-insurance agreements with global re-insurance companies. Local insurance agencies act as intermediaries between the farmers and TARSIM. Under the

current regime, crop insurance is the dominant sub-sector. Number of crop insurance policies is increasing at an annual rate of about 30%. The total premiums in crop insurance recently passed 100 million Turkish Liras (about 40 million Euros) and the total insured value reached almost 3 billion Turkish Liras. The subsidized-crop insurance is pretty popular among crop farmers, as the total number of policies reached 400,000 by 2011.

Index Insurance Possibilities

The current scheme offers protection against discrete events, which include frost, freeze, fire, flood, hurricane, ice-storm, and hail. There is demand from farmers to include coverage against drought, but this request is deemed to be unsustainable by the state. [2] Besides the budget costs, there are several technical issues that needs to be tackled before introducing drought coverage.

Recently, we organized a workshop on agricultural insurance which is supported by FAO-MDG Achievement Fund. Three main points were discussed in this workshop. First was to extend current coverage to include systematic risks such as drought or extended flood. Next was to reduce overhead costs. We also wanted to introduce insurance to small-scale farmers. These ideas received attention from industry representatives, who wanted to offer insurance to small farmers. However, under the current insurance mechanism, offering insurance to small-scale farmers is not feasible from actuarial perspective. Each time there is a risk realization, the total losses have to be checked, calculated, and adjusted on a case-by-case basis. Since systematic events such as drought can affect a large number of farmers at once, individual loss-checks can be quite costly and time consuming. Index insurance could fit well into this agenda. Using this innovative tool, we can introduce drought risk transfer mechanism to several small farmers for lower overhead costs.

Possible Indices

The plan is to create two indices. One of them would be the crop & farmer specific risk index for drought / sustained flood possibilities (long-period risks). The other one is to create a pseudo-external index threshold that can be used as a trigger for indemnity payments.

Since we can model both the regional and farmer-specific risk factors, the premiums could be differentiation for each farmer. For farmer i , located in region j , the premium would be as the formula (1) shows.

$$\text{Premium } (F_{ij}) = \{\text{Risk of } F_{ij} / \text{Risk of Region}_j\} + \text{Regional Risk} \quad (1)$$

Thus, the total premium paid includes both farmer-specific premium and regional premium, where the average risk index is a function of all farmers located in the same region.

For the external threshold index, we can define the yield in terms of farmer-specific (X1) & location-crop specific (X2) data, as well as an external threshold determinant (X3). Depending on the type of risk, the external threshold determinant can be defined as deviation from forecasted rain or forecasted temperature (formula 2).

$$\text{Yield} = F (X1, X2, X3) . \quad (2)$$

The differentiation of the yield with respect to X_3 , gives us the marginal affect of X_3 on the yield. The forecasts can be estimated using Winter smoothing [3].

Conclusions. In this paper, we proposed an index-based insurance coverage against drought risks faced by the farmers in Turkey. The index threshold is determined externally. However, the effect of the index measure on the farmer's productivity depends on the farmer's production function. The model is practically applicable as it utilizes already existing data for both premium and loss determination. It can also be extended to account for both regional and farm-crop specific yield deviations.

Even though the marginal affect of index measurements on productivity might be internally defined by the model, the individual farmers cannot manipulate their production function. Thus, the moral hazard would be kept at near zero level. However, collectively the farmers can change their production function in the long-term. There is also the issue of national subsidies in agricultural insurance, which might even put the entire national budget at the risk of default. [4] We believe this scenario is worth to investigate further.

References

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ПЕРСПЕКТИВЫ РАЗВИТИЯ СТРАХОВАНИЯ ИННОВАЦИОННЫХ РИСКОВ ПРЕДПРИЯТИЯ В РЕСПУБЛИКЕ БЕЛАРУСЬ

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Развитие мировой экономики на современном этапе характеризуется ускоренными темпами научно-технического прогресса, постоянным совершенствованием основных факторов производства. Интенсивное проведение исследований и разработка на их основе новейших технологий, выход с ними на мировые рынки и развертывание международной интеграции в научно-производственной сфере в рамках формирующейся глобальной экономики фактически уже стали стратегической моделью экономического роста для индустриально развитых стран.