

NOTES on the I4 Scientific Committee meeting held at FAO on Jan 15th and 16th, 2010

Background

The Index Insurance Innovation Initiative (I4) was jointly promoted by FAO, BASIS, USAID, the Micro-Insurance Innovation Facility of ILO, and Oxfam America.

The initiative aims at designing and implementing innovative livelihood optimized index insurance contracts, and verifying the extent to which removing correlated risk can indeed reduce poverty and deepen financial markets in rural agricultural areas.

I4 was promoted in response to increasing evidence that uninsured risks are among the reasons which can drive people into poverty and destitution. Risk can cause people to shy away from high-return activities or pursue defensive savings strategies that cut off sustained accumulation of productive assets. Risk also inhibits the development of rural financial market, which reinforces risk's negative impacts.

Index insurance pilot will be promoted by I4 across Africa, Asia and Latin America, in collaboration with the private sector, and facilitate the scaling-up at the regional level. Based on the pilots, the initiative will synthesize lessons learned, and create a set of global best practices for the design and implementation of index insurance.

Within this context, a meeting of the Scientific Committee of I4 was hosted by FAO – EST in Rome, on January 15th and 16th. The meeting was organized in four sessions, along two working days. The first was devoted to theoretical presentations and discussions, while the second proposed a review of pilots and practical experiences.

First day

The committee discussed four themes: the economics of linking credit with insurance; insurance, inter-temporal incentives and poverty traps; contractual innovation and design; and agro-ecological and institutional constraints to agricultural index insurance.

Carter, President of I4, introduced the first presentation, titled “Searching for a New Ending to the Same Old Story on Risk and Poverty: The I4 Agenda”. He pointed out that while there is a wealth of information on what is feasible from the supply side with agricultural index insurance, there is a need to improve knowledge on the link between insurance and economic growth opportunities. While being valuable to help households in smoothing income fluctuations, the greatest value of insurance —and the key to its sustainability—is in its possible linkage with emerging opportunities. This happens, for instance when insurance helps farmers accessing credit that was previously unavailable; or adopting technologies that increase yields. Hence a priority is identifying where index insurances can effectively address poverty traps.

The paper presented by **Barrett** on “The Performance of Index Based Livestock Insurance: Ex Ante Assessment in the Presence of a Poverty Trap” started by cautioning that insurances should be considered as only one part of a more general risk management strategy, which involves a variety of instruments. He also warned on the limitation of *ex-ante* model simulations - such as the one he was presenting – in judging the ability to address poverty traps. Results were presented on an indexed insurance contract which targeted to herders. Outcomes were compared in terms of welfare, with and without insurance for 15 stylized households, whose risk attitude was estimated. The exercise was repeated for different herd sizes over a time series of weather observations from 1982. The described contract would be

on sale from the subsequent week. Two main points were highlighted among the results. Firstly, insurance proved to be effective mostly for households located just above the poverty trap threshold. And, secondly, benefits were proportional to the herd size. In fact, large herders would be relatively more familiar with insurances and its functioning.

The presentation by Barrett generated a lively discussion. On the more technical side, it was argued that there are several limitations in the expected utility framework employed; rather, prospect theory might have been used. It was also observed that the analysis is mostly static, and did not take into account interactive effects. Potential endogeneity problems were also highlighted: would prices be affected by the existence of the simulated insurance? The model, it was observed, only allows for two options (insure or not); but herders may be willing to insure a share of the herd. Finally, it was questioned how premium collection and payments are assumed to work in the simulation, given that herders normally migrate over large areas.

More in general, it was noted that if the poor are hardly affected, this is not the right insurance; and that purchasing the insurance itself may push households into a poverty trap, if they are located just above the threshold. The contract was designed for herders; but isn't livestock itself kept sometimes for insurance purposes? Maybe formal insurance could reduce the number of livestock kept, and lead to de-stocking? Was there any evidence on how herders would respond to risk, independently from the insurance scheme? Diversification would be expected to be the main response, more than insurance. Moreover, Government policies often play the role of reducing risk.

The simulation work looks impressive in terms of details and information included. However, so does also the amount of assumptions embedded. It would be interesting to see some more in terms of sensitivity of the results to assumptions. *Ex-ante* model simulations are useful; but the effectiveness of an index would need to be observed over a relatively long period of time and variety of conditions, to validate its sustainability.

The second paper was presented by **Carter and Sarris**, on “The Economics of Linking Credit with Insurance”. Indexed insurance was proposed mainly as a tool to overcome constraints to the adoption of technology. Farmers are not only constrained by lack of credit, but also by their inability to accept the risk embedded in holding debts. This generates a risk rationing - discussed more extensively in a paper by Boucher, Carter and Guirkingier – which calls for credit and insurance to be bundled. The possibility of linking credit and insurance should be analyzed more in depth, the paper argued, from the demand side.

On this point, the subsequent discussion showed that while credit is something which a bank or other financial institution has to concede, insurances require that farmers decide to purchase the contract. This asymmetry is important, as it implies that constraints in accessing credit are mostly on the supply side; while those affecting insurance use are mostly on the demand side. Microcredit attempts to change the supply side of the credit market. But for insurance, how can the demand side be modified? There are of course also supply side issues in insurance; but these, as mentioned, have been studied more extensively to date. There are reported cases in which insurance lenders don't want to bundle their products with credit; for instance, the BASIX insurance in India. [There is probably also a sequence between credit and insurance. ILO case studies showed that insurance demand emerges frequently from micro-credit schemes, specifically from the need of collective institutions to insure against individual defaults.](#)

The presentation by **Dercon** on “Hybrid Contract Design” discussed transaction costs and incentives, as well as how to avoid disrupting existing *de facto* insurance mechanisms. Transaction and other costs decrease along a *continuum* that goes from indemnity-based agricultural insurances, to yield or area-based insurances, to indexed insurance. Basis risk

increases along this same *continuum*, and there's a tradeoff between the two. Hybrid contracts allows for some benefits of traditional products to be retained. Experimental games show that there is high willingness to pay for indexes with no or low basis risk. A standard argument is that informal insurance should cover for idiosyncratic risks, whereas indexes should cover for covariate risks. Hence in principle there should be no crowding-out of informal insurance mechanisms. But this only holds if it is assumed that supplying an additional (new) insurance doesn't change the set of options available to individual farmers ("outside options"); which is usually not the case. Collective index insurance contracts, the paper argued, may be an improvement in this respect, given that basis risks may be mutualised, and it is easier to enforce deductibles. Hence collective contract results in a higher transaction cost threshold which makes hybrid products desirable. Deductibles also encourages self-insurance and crowding in of formal insurance, as the formal insurance becomes the re-insurer of the group, covering for risks that the group cannot insure on its own.

The discussion indicated that several other surveys would show: i) that basis risk is indeed an important concern on the demand side, even where contracts were sold like lottery-type tickets; and ii) that group contracts may be effective in reducing transaction costs, at least because it is easier to deal with few group leaders rather than with individual farmers. Understanding how groups are formed, however, is important, also to verify whether collective contracts are feasible. Hybrids contracts may also be designed in terms of weather and area-yields. Groups could be also established among far-away communities or individuals willing to pool basis risk, and not only on a geographical basis. The problem was also highlighted of how to share premiums and payoffs in groups, as well as the conditions under which there may be crowding-in: if idiosyncratic risks are uncorrelated with covariate risks, why should there be crowding-in within the group? In other words, why should the group use the mutualisation of basis risk to subscribe the collective contract?

The following paper, presented by **Gine** on "Barriers to Household Risk Management: Evidence from India", dealt with constraints to households participation in the formal insurance market in Andra Pradesh, looking specifically at the case of a weather derivative. Loading¹ on the contract studied was high, around 60 to 70 percent. This means either that unforeseeable events are significant; or that the insurance industry is not competitive. Sensitivity to prices appeared to be significant in the case at hand: with a discount on the policy, the willingness to pay seemed to increase. Another important aspect was trust: a sub-sample of visits to households was made through BASIX agents, who were familiar to the villagers. This made a significant difference in terms of willingness to purchase contracts. The same was reported to happen with education and religious identity. Advertising, instead, had uncertain effects. Gine remarked that surveys were conducted in areas where the Government doesn't provide subsidies.

In the discussion it was observed that evidence presented on liquidity constraints could be flawed: under all conditions, a windfall payment offered in association with the contract is likely to make insurance be considered as a luxury. Hence households would purchase it just because of the windfall attached. Rather, more evidence is required on the effect of basis risk in constraining households' willingness to purchase; as well as on cognitive failures, especially for tail risks. It was also underlined the importance for subscribers to accumulate their own experience: how many of them would be willing to renew polices after the first subscription? The importance of Government policies was stressed once more. Farmers involved in the experiment presented, like most farmers in India, receive support from the Government under different forms, including subsidized insurance, credit and production-

¹ This is, what insurance companies charge beyond the - time-series-based - actuarial calculation of risk pooling.

based subsidies for certain products. Specific support varies by State and farm size, but on average large-size operations receive more. This affects the risk profile and the willingness to purchase insurances.

The results presented appeared to be rather predictable, and much in line with previous surveys. Transaction costs, information, cost of premium, liquidity constraints are preventing farmers from purchasing.

On policies, the OECD “holistic approach” is an effective filter to analyze specific experiences. In this case, it applies to discussions on crowding-out from subsidies and on policies that can help crowd-in insurances. Also from the demand side, the entire decision-making problem of farmers should be considered in order to conclude what is appropriate to manage risks of unexpected events.

The paper presented by **Lybbert** on “Explaining Index Insurance with Financial Education Games” reported results from experiments aimed at eliciting risk attitudes in farmers. Simulations were conducted through games on the adoption of seeds entailing different outcome distributions depending on rainfall. Farmers were confronted with a variety of conditions, from low-output-low-risk; to average-output and risks; to high-output-high-risk. Dynamic games are employed to simulate outcomes for several years in little time. This, it was argued, facilitates understanding of indexed insurance.

Part of the discussion dwelled upon the validity of games as a tool to study the potential interest of farmers in purchasing contracts. Many argued that they may be useful to familiarize farmers with complex concepts related to insurances; but understanding the behavior of potential buyers is far more difficult. In order to be effective, games should be kept simple and realistic, and avoid trying to test academic hypotheses. It was also argued that there may be systematic biases in results, leading to assume a higher potential uptake compared to what is subsequently observed in fact. Probably games can be used after being validated with other methods. It was also noticed that games should simulate different types of insurance, to generate more internal variation in outcomes, and that the typical non-linear dynamic - entailing thresholds beyond which farmers would purchase – may not be the right functional form. Even if thresholds exist, it may be difficult to observe them.

The discussion also dealt with risk-aversion. Cross-sectional measures of risk aversion do not seem to explain contract uptake. If risk-averse farmers don't buy insurance, whereas less risk-averse people do, doesn't this simply mean that the former don't trust insurance?

More in general, practical experience indicates that extension agents play a key role in raising farmers' interest in contracts. They have to be knowledgeable and convinced of the functioning of contracts, as well as of their limitations, particularly those arising from basis risk. Despite having direct incentives in increasing uptake, insurance sales agents can be ineffective, as they may identify wrong targets. In any case, the design of contracts should be based on a sound understanding of risk management mechanisms existing in targeted communities.

Second day

During the second working day, as mentioned, the I4 meeting reviewed existing pilots and case studies. The related discussion was aimed at defining partners' priorities in the I4, identifying funding opportunities, and receiving proposals to set up an agenda for future actions.

The first session in the morning dealt with three case-studies. The first one, introduced by **Guirkinger**, was titled on “Intelligent Design of Index Insurance Contracts: Insured Credit for Mali Cotton Farmers”. Results were reported of a feasibility study for a collective insurance contract sold by a Malian company, re-insured with Swiss re. A set of microfinance institutions would sign contracts, which would prompt intervention beyond a minimum scale of damage. The presentation described alternative technologies for data collection: satellite imagery on vegetation cover vis-à-vis weather station-based indexes. The index computed was a hybrid. Data collected from experimental stations would explain about 70 percent of yield variability. The contract was ready to be launched in the market; but local involved parties had apparently withdrawn at the last minute.

Another case study was introduced by **Boucher**, on “Challenges of Demand for Individual Insurance: Area-based Yield Insurance in Peru” The project, also known as Pisco Valley project, aimed at insuring volumes of river water, whose availability affects yield in the valley. Due to low data quality it was necessary to switch to a yield insurance, which imposed higher cost for the required annual surveys. The project proposed the index approach, and experimental games were conducted to familiarize stakeholders with the concept. In order to limit yields underreporting, both insured and non-insured farmers were surveyed. A Bank and an insurance company “La Positiva” – acted as intermediaries, and added large loadings. Also in this case there was low uptake: very few contract were sold, despite efforts to improve on policies and procedures after the first year.

A third experiences was described by **Victor**, who presented a paper entitled “A Role for Microinsurance in Community-based Climate Change Adaptation”. A crop model - correlating yields and incomes - was employed in Ethiopia to build an indexed insurance on rainfall. The contract was distributed over the last two years through the Productive Safety Net Programme (PSNP), which is the umbrella farmer’s safety net in the country. Participants in the PSNP could pay premiums in kind with labor; this seems to be a powerful incentive to purchase, especially for female-headed households. Subscribers were mostly female, young, and PSNP members. Sales preceded by extensive and highly participatory capacity building on the relations between rainfall and outcomes, and basis risk. Trust in Oxfam was a key element in the choice of participants. Non-purchasers were either unaware of the program, or did not understand the insurance mechanism.

The discussion which followed the three presentations dealt extensively with the reasons for the low uptake, reported by two out of three of them. The Ethiopian case, it was observed, showed that the linkage with social protection is useful, along with the trick of asking premium payments in kind rather than cash. Conversely, in the case of Peru some comments pointed to the fact that the pilot was run in a period in which cotton production was unfavorable in the country; while others argued that there may be more fundamental problems in terms of lack of trust, information, and relation with public support. The structure of the value chain was also mentioned as an important determinant. In Malawi, for instance, tobacco farmers purchased insurances whereas groundnut farmers did not, due to a different structure of the value chain

Perhaps there are policy related disincentives even in absence of subsidies. Farmers may expect that purchasing a private insurance may hamper their ability to command public support in case of extreme events. Also in successful cases, however, results should be seen through time: the sustainability of the Ethiopian experience would be better judged in five years time, and beyond the presence of Oxfam.

The following session was a roundtable consisting of three more presentations reporting experiences with bundling insurance and credit. This first one, introduced by **Muiruri**, was on

the Equity Bank in Kenya. It stressed complementarities between insurance and credit, as well as the importance of easing credit constraints and smoothing incomes for pastoralists. While logistics may be complicated by the nomadic habit of this population group, benefits may be substantive. The second presentation, by **Eherete**, concerned Nyala Insurance in Ethiopia, which offers a variety of products, from traditional multi-peril policies to pilot indexes schemes against drought affecting cereals and horticultural products. The importance was highlighted of delivering contracts through extension agents, Unions and co-operatives; as well as the system for collecting premiums. Nyala charges premiums directly in favorable years, while deducts them from compensations in unfavorable years. This scheme is re-insured abroad, and benefits from contribution from the Ministry of Agriculture and the World Food Programme. Finally **Patankar** introduced the experience of the Centre for Insurance and Risk Management of India, which supplies a service package including some price guarantee – a sort of put option – and weather index insurance to support inputs purchase. The presentation stressed the importance of identifying target farmers. While larger farmers are more likely to purchase contracts, smaller farmers may gain a higher marginal benefit.

During the subsequent discussion it was highlighted the usefulness of gathering academics and practitioners, which the I4 initiative pursues. Academics, it was argued, should not design contracts, but rather evaluate them and contribute ideas. Insurance companies should partner with farmers and other service providers, and help developing trust. Extension agents are to privileged partners to deliver contracts. Public participation, in this respect, seems to be important, and probably underemphasized. More examples were made of strategies to deliver contracts; for instance, it was described the case of a Kenyan input seller who provides a cell phone and an insurance as a gratuities upon certain purchases.

The issue was also raised of how insurance companies compute loadings. Eherete observed that Nyala has used the FAO water index, evapotranspiration data, and focus group discussions to elicit the effects of drought on farmers' operations. However, premiums are never fully loaded; rather prices are kept to an identified break-even point, with the expectation of profiting more in the long run.

The presentation by **Bucher** on “Encouragement Designs and Essential Heterogeneity” dealt with difference among farmers with respect to the characteristics which make them purchase insurances. Encouragement is defined as a randomized distribution of incentives to subscribe a contract - for instance discount coupons - employed in pilots schemes to assess the differential effect of insuring versus non-insuring. This is alternative to drawing random samples of participants. Basis risk determines the choice of purchasing versus non-purchasing. A threshold parameter needs to be identified based on an econometric estimate of the difference in expected utility between insured and non-insured farmers. Experiments with coupons allow identifying subsidy levels which imply overuse of insurance.

The subsequent discussion praised the paper for its quality and its highly technical nature, while noting the high specificity of the problem addressed. The idea was also put forward that the design of insurance contracts could be parametrized on farmers' characteristics. Moreover, a discussion took place around the idea that insurance can benefit farmer even if they don't have direct contact with it, as far as banks purchase contracts allowing them to supply more credit. This, it was argued, could indirectly benefit farmers.

Assuming that insurances cannot pass the extra cost to farmers, this look viable only if banks can still profit from expanding their business after having paid insurance premiums; or, alternatively, if Governments subsidizes the insurance, Otherwise, what would be the incentive for banks to subscribe insurances?

During the last session, representatives of the three main institutions involved in the I4 offered concluding remarks, along with indications on priorities for future research and field work.

Matul, from ILO, indicated that his institution has been studying micro-insurance facilities, with support from the Gates Foundation. So far, they have been engaged only to a very limited extent in agricultural insurances, for about 10 percent of their portfolio, but would welcome being more involved in this area. He praised the approach of the I4, and remarked that academics can indeed help practitioners, especially in contract design and *ex-ante* evaluations. He also stressed that risk management should be considered along value chains, and that non-agricultural risks should be taken into account, as it can affect agriculture to a significant extent. **Very important point: insurance is not sectoral. Farmers interviewed within the AAACP considered purchasing agricultural and other insurances - typically health or life insurance - as one single problem. It is probably necessary to avoid considering agricultural insurance in isolation, especially from the demand side.**

In her remarks, **Heron** from USAID pointed out that over the next years food security-related activities will be upscaled in her agency. Projects on agricultural insurance seems to be successful, hence there may be good opportunities for further initiatives. She also indicated the importance of choosing the right partners, since projects should bring together researchers, practitioners and development agencies. She also called for further exploration of the link between insurance and safety nets, and for developing really practical contracts. **This seems to be a really pressing need, given the results of several cases studies presented: well-designed contracts seem not to be successful in the field, and the low uptake from interested parties is still partly unexplained.**

On behalf of FAO, **Sarris** highlighted that while it is clear that risk is a primary determinant of poverty, it needs to be assessed properly before proposing insurance as a solution. Insurance may be viable where there are covariate risks, sufficient technical information to design an index; access to credit; and enough critical mass, that is, enough persons potentially affected by the risks. Hence future research agendas should start from the assessment of uninsured risks and the demand side for insurance; and then proceed to define robust insurance design. In so doing, informal insurance should be considered, as well as the possibility to link markets through value chain finance.

Finally, **Carter** closed the meeting, indicating that the discussion had been highly productive, and had encouraged him pursuing more work in the same direction. He recalled the importance of partnership which is fostered by open forums like the I4; and reminded that proposals for new projects will follow.