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EXECUTIVE SUMMARY 2

RURAL INSURANCE AND ITS RELATIONSHIP WITH GOOD AGRICULTURAL PRACTICES: Institutionalisation, Evidence and Alternatives for Brazil

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Context

This document provides an executive summary of two studies developed by the authors:

- [RURAL INSURANCE IN THE WORLD AND ALTERNATIVES FOR BRAZIL: Different designs and dialogues with the adoption of good practices and technologies](#)
- [RELATIONSHIP BETWEEN RURAL INSURANCE AND GOOD AGRICULTURAL PRACTICES AND TECHNOLOGIES: Evidence from Soybean Growers in São Paulo State and Opportunities for the Insurance Market.](#)

The main results of the analyses on the relationship between rural insurance and adopting good agricultural practices and technologies are presented here with a literature review, the agenda's institutionalisation in nine analysed countries, possible alternatives for Brazil, and empirical evidence from soybean farmers in São Paulo State.

1. RURAL INSURANCE AND ITS RELATIONSHIP WITH ADOPTING GOOD AGRICULTURAL PRACTICES AND TECHNOLOGIES

Rural insurance, in addition to serving as a risk management tool in agriculture, can present positive and negative externalities in terms of sustainability. If it fosters adopting good agricultural practices and technologies (BPATs), rural insurance can be seen as an instrument that improves both resilience and productivity in agricultural activities.

Although little explored from a literature survey¹, three ways in which rural insurance and BPATs are related were found. The first one establishes a direct proportional relationship between BPATs and rural insurance. Sharing the risks with the insurance company opens space for insured producers to opt for more productive and riskier technologies, to the detriment of less productive and less risky technologies.

The second way in which rural insurance and BPATs can be related is by increasing moral hazard, characterised by producers' opportunistic behaviour. When covered by insurance, they may feel discouraged from adopting appropriate stewardship strategies - such as using less fertilisers or pesticides or reducing their irrigated area. Producers could ultimately seek compensation by sabotaging the activity.

The third way for relating rural insurance and BPATs is the complementarity or substitutability among risk management strategies. Once BPATs mitigate the risk of agricultural activity via natural resilience, rural producers can choose to adopt them combined with insurance or in an alternative way, depending on their budget constraint and risk pricing. That is, producers can mitigate a portion of their risk by adopting BPATs, while at the same time, contracting rural insurance to mitigate residual risk, or they can choose only one of the options, depending on their risk management strategy.

¹ The literature survey can be accessed as a summary in the publication [RELATIONSHIP BETWEEN RURAL INSURANCE AND GOOD AGRICULTURAL PRACTICES AND TECHNOLOGIES: Evidence from Soybean Growers in São Paulo State and Opportunities for the Insurance Market](#).

In the search for a healthier rural insurance system in the presented scenario, understanding rural insurance as an instrument that is capable of providing resilience by adopting BPATs is fundamental. Thus, it would be interesting to incorporate good agricultural practices and resilient technologies in pricing policies or in rural insurance premium subsidy policies, benefiting more resilient producers, while reducing adverse selection across the entire insurance system.

This work² sought to highlight this relationship between rural insurance and BPATs, as well as to present possible alternatives for Brazil. Finally, an econometric exercise was performed for demonstrating this relationship with farmers growing soybeans in São Paulo State using microdata from the Census Survey of Agricultural Production Units in São Paulo State, LUPA.

2. INSTITUTIONALISING THE GOOD PRACTICES AND TECHNOLOGY AGENDA IN RURAL INSURANCE

Including environmental aspects related to good agricultural practices and technologies in the context of insurance is fairly recent, but it has become a necessary innovation, since climate issues impose increasing risks, compromising long-term insurability of agricultural activities.

Explicit incentives in the premium and in subsidies for producers who are adept at technological packages and stewardship practices are still scarce and restricted to basic management conditions contained in the policies - in an attempt by insurers to reduce moral hazard and adverse selection – as well as in pilot or experimental projects.

² In addition, for a deeper assessment of the relationship between rural insurance and adopting good practices and technologies around the world, the study presents a table containing the analysis of 13 works in nine countries. The conclusions can be accessed in a summarised manner in the publication [RELATIONSHIP BETWEEN RURAL INSURANCE AND GOOD AGRICULTURAL PRACTICES AND TECHNOLOGIES: Evidence from Soybean Growers in São Paulo State and Opportunities for the Insurance Market](#).

The first effort to institutionalise good practices and technologies in the rural insurance market was in creating the Principles for Sustainable Insurance (PSI), launched at the UN Sustainability Conference in 2012 (Rio+20). The guide brings together basic principles for incorporating ESG (Environmental, Social, Governance) criteria in the context of insurance, and is currently used by insurers both in their governance and in insurance product practices.

In addition to risks, the PSI provides general examples of mitigation strategies and good practices, such as fostering soil and water resource stewardship strategies, performing social and environmental impact assessments, and certifications related to practices, reforestation areas and animal welfare, among other initiatives.

In this sense, strategies for encouraging the adoption of good practices via financial and non-regulatory instruments have great potential for impact in environmental terms, in addition to productivity.

As an example, two products were brought from the United States that address the stewardship issue in building insurance products and differentiating policies: insurance products intended for ground cover crops and insurance products intended for organic producers or in transition.

The first one is intended for producers who adopt cover crops for conserving and improving the soil, increasing water use efficiency, reducing pest incidence, and improving the crops' natural nutrient cycle. The programme encourages producers to adhere to this stewardship strategy in a consortium or after the main crop has been harvested. In some states, there is a cash crop insurance premium subsidy for those producers who use cover crops.

The second one, which refers to insurance products aligned with organic production, requires third-party certification of the production system. For properties in transition, the requirement for accessing the insurance product is to present the project for transition to the organic production system. Premium prices are defined differently between the two groups. There is also a pilot programme for protecting profitability, which encompasses all products in a single policy, which is also eligible for properties with organic production.

2.1 Institutionalisation in Brazil, limitations and first alternative

In Brazil, it is worth mentioning the Agricultural Zoning of Climate Risk (ZARC), a national programme that aims to improve the quality and availability of data and information on agro-climatic risks in the country, with an emphasis on providing support to formulating, improving and operationalising public programmes and management policies (via the federal government's own definition available [here](#)).

The study, which is easy to understand and adopt, is designed to minimise risks related to adverse weather phenomena and enables each municipality to identify the best time for planting crops, in different types of soil and cultivar cycles.

ZARC has been incorporating productive differentiation, developing a new soil classification system, a stewardship-level classification system - which will be discussed later on - and risk zoning for expected productivity levels (ZarcPro).

Programmes such as ZARC enable a better risk classification and a greater understanding of the relationship between the production system and the risks offered by it – which is information of great value for adequately pricing insurance policies.

However, initiatives like the previous ones come up against high asymmetry of information and moral hazard, which are the main limits for differentiating producers - the basis for better pricing insurance policies. This is because the stewardship strategies used by producers, which will feed their differentiation, are self-declared information and have a high monitoring and auditing cost.

An initiative that addresses asymmetry of information, which has been regulated by the Private Insurance Superintendence (SUSEP) is Open Insurance, which would allow producers to share their information and productive activity, with broad access by insurers or third parties.

There is also the expectation that Open Insurance will become part of the National Financial System (SFN), which will also be an Open Banking system. In an environment with producers, who are seen as holders of their data, actively sharing extensive information, the expectation is that there will be greater capacity for considering stewardship matters in rural insurance policy pricing.

3. ALTERNATIVES FOR BRAZIL: RURAL INSURANCE AS AN INDUCER OF GOOD PRACTICES AND TECHNOLOGIES IN THE FIELD

In the 2020/2021 crop year, a pilot project was deployed (target audience was family farmers producing soybeans, first-harvest corn, grapes, and apples) aiming to encourage transition of PROAGRO-covered producers to the PSR, offering a higher percentage of subsidies to the insurance premium. This pilot project, however, did not address stewardship and good practice subjects.

With the intention of evaluating their association with good practices, even in experimental or pilot mode, no such rural insurance products were found in Brazil. Therefore, it seems timely, especially during this transition from PROAGRO to PSR, to reflect on building this type of projects, in order to encourage adopting technologies and good practices in the context of insurance.

Another window of opportunity to explore aspects of sustainability and good practices in the context of rural insurance is via index insurance products fostered by MAPA as of the 2021/2022 harvest. By building an index scaled by some stewardship criterion, it would be possible to offer better policy conditions to those producers who adopt BPATs.

Still, the evaluation of how producers' decision-making takes place through the available risk mitigation strategies is another unexplored gap in Brazil. Census surveys, such as the Census Survey of São Paulo State Agricultural Production Units (LUPA), provide a variety of information by rural producer that can be used to assess which are the determinants for using technologies and whether contracting insurance contributes to this. Conclusions of the proposed study will be presented later.

As previously mentioned, the challenge for insurers in the country for offering initiatives based on producer differentiation comes up against information asymmetry and moral hazard, which limits them due to increasing transaction costs from audit and monitoring expenses.

The government also differentiated producers to target the premium subsidy policy for select municipalities and for organic agriculture, according to interviews with insurance companies. Likewise, the initiatives ran into information asymmetry and moral hazard, transferring the operations' burden to insurers.

In other words, it is necessary to create an intervention that is capable of reducing information asymmetry – thus reducing moral hazard – but does not increase transaction cost with auditing and monitoring.

An intervention alternative that is in the process of being implemented for the rural credit system is the green rural credit bureau, led by the Central Bank of Brazil in its BC#Sustentabilidade agenda, in addition to the Open Insurance initiative mentioned above.

The monetary authority plans to build a sustainability indicator (score) based on information contained in SICOR – Rural Credit and Proagro Operations System. The producers' entire credit history will be considered in the score, containing financed products, as well as the adopted technologies and systems.

By way of illustration, producers who take credit through Programa ABC or access financing for recovering degraded areas would have a higher score, since the initiatives have positive environmental externalities.

At the beginning of this implementation by the Central Bank, it is expected that the eligibility criteria will be defined in a binary manner. Producers who achieve minimum requirements (through pre-determined sustainability criteria) would be eligible to access certain incentives, such as a higher rural credit limit.

The expectation is that the continuous score will be formatted and SICOR will be operationalised in the open banking concept over time – with producers actively using their information for securing more favourable financing conditions.

The study proposes to include insurers in the rural credit green bureau debate because, although the score is exogenous to them, it has the potential to reduce information asymmetry in the insurance market, as the green bureau eligibility criteria are met and are used for differentiating the offered insurance policies.

In addition, the Central Bank's initiative opens space for joint action by the rural credit policy and the Rural Insurance Premium Subsidy Programme (PSR), using the green credit bureau's eligibility criteria.

Furthermore, in addition to reducing information asymmetry, moral hazard and transaction costs, the initiative would improve Brazil's image in environmental terms - since it has a direct environmental impact - and, ultimately, there would be greater competition in the insurance system, since in open banking and open insurance, producers own their information and, therefore, will have bargaining power with insurers in seeking better policy conditions.

Such policies have great potential to induce rural producers to adopt good practices and technologies as well as actions for mitigating financial, climatic, and/or other risks.

4. EVIDENCES FROM SOYBEAN GROWERS IN SÃO PAULO STATE AND OPPORTUNITIES FOR THE INSURANCE MARKET

Advancing in the idea of using census surveys to assess the determinants for using technologies and whether contracting insurance contributes to this, the Relationship between Rural Insurance and Good Agricultural Practices and Technologies: Evidence from Soybean Farmers in São Paulo and Opportunities for the Insurance Market study brings the construction of a model that is capable of evaluating the relationship between rural insurance and good agricultural practices and technologies (BPATs), based on microdata from the Census Survey of São Paulo State Agricultural Production Units (LUPA).

To perform the analysis, four BPATs were defined: no-tillage, improved seeds, irrigation, and crop diversification. In addition, institutional variables, and producer and property characteristics were used for estimating their propensity to contract insurance and to adopt any of the aforementioned practices. To evaluate the relationship between contracting rural insurance and adopting BPATs, a Bivariate Recursive Probit model was used.

In addition to highlighting the substitutability or complementarity relationship between insurance and BPATs, the exercise also provides some important results with regard to the factors that affect decision-making in taking out insurance and in adopting BPATs.

Factors such as access to information, access to credit, agricultural management, education levels and property characteristics, such as planted area and the number of workers, were incorporated. Results like these can help in formulating public policies for fostering insurance and BPATs.

Regarding the study's main interest, which is to evaluate the relationship between rural insurance and adopting good practices and technologies, the results pointed to a complementary relationship between rural insurance and no-till planting and irrigation - when producers who contract the service have greater probability of adopting

BPAT –, and substitutability between rural insurance and crop diversification – when producers who opt for insurance are less likely to adopt BPATs.

In detail, no-till provides UPAs (Agricultural Production Units) an important increase in terms of productivity and resilience, and its complementary relationship with rural insurance plays an important role, not only in disseminating the practice, but also in reducing adverse selection.

The complementarity relationship between rural insurance and irrigation was unexpected. It was expected that irrigation, which provides mitigation for drought risk, would be related in a substitutive way to rural insurance, but what was seen was the opposite.

In fact, rural producers protect themselves against risk of drought by adopting irrigation, while at the same time mitigating residual risks, such as hail or frost, by contracting rural insurance - another conclusion that points to a reduction of adverse

On the other hand, the high substitutability relationship between rural insurance and crop diversification, the most common risk mitigation strategy, suggests an intensification of adverse selection in this context.

Such a relationship can be explained by the insurance market's difficulty in offering products that consider a set of activities at the same time, as well as by producers' lower payment capacity – especially the small ones, who are increasingly adopting crop diversification.

The relationships mentioned above are little-explored in the rural insurance market practise, due to the insurers' aforementioned limitation in differentiating producers who invest in the natural resilience of agricultural activities.

In order to solve this limitation, opening a window of opportunity for intensifying the complementarity relations between insurance and BPATs and reducing, or even reversing, substitutability, the study points to incorporating rural producers' concerns with the natural resilience of their production into insurance policy pricing.

For this purpose, index insurance products stand out – characterised by the ability to reduce moral hazard and transaction costs and by agile indemnity payment – combined with information services for risk management, such as the “ZARC management levels” (Zarc NM), which would calibrate the insurance index according to the degree of BPAT adoption.

Zarc NM seeks to incorporate stewardship levels (soil cover, water infiltration rate and root depth) into its risk indicator, including measurable factors such as elapsed time with no soil disturbance, the number and type of crops in the same area over time, calcium content and aluminium saturation, and the soil’s structural quality index.

By scaling, depending on the degree of adoption of BPATs, policy premiums and ‘triggers’ for indemnity, these insurance products would be less exposed to moral hazard, reducing adverse selection and fostering BPAT adoption.

The rationale can be extended to any and all insurance products, as long as premium differentiation is accompanied by differentiation in claim criterion for indemnity payment.

The authors emphasise, however, that the results obtained in the study cannot be generalised to other crops, and that it was not possible to consider the properties’ specific risk factors, such as water supply or soil type, since the census survey that was used for the study does not contain this type of information.

Finally, the fact that the LUPA survey did not specify the type of insurance contracted by producers may be a source of bias.

Despite these potential limiting biases, it is possible to consider that the strategy adopted in the research in question is the best one available, in addition to being unprecedented in Brazil. Its conclusions feed incipient literature on the determinants of contracting risk management instruments and adopting good practices and technologies – which are essential to guide and improve public risk management policies and to foster technologies and good agricultural practices in the field.

5. FINAL CONSIDERATIONS

To ensure long-term insurability of agricultural activities, rural insurance must incorporate aspects of stewardship and good practices in the field. Encouraging producers who adopt BPATs to take out rural insurance reduces adverse selection, while at the same time increases the resilience of the activity and of the insurance industry as a whole.

Despite this, what is seen in practice is great difficulty for insurers to incorporate such aspects – a difficulty that arises especially from asymmetry of information and high transaction costs resulting from monitoring and auditing.

When rural producers define their risk management strategy, they can opt for a set of alternatives that involve BPATs that mitigate the impacts of adverse events, as well as rural insurance. This relationship, which can be either complementary or substitutable, directly impacts adverse selection in the insurers' portfolios, therefore deserving investigation.

Addressing this point, the present work identified, for soybean growers in São Paulo State, that BPATs such as no-till and irrigation are complementary with rural insurance, while crop diversification poses substitutability.

Understanding rural producers' risk management strategy, exploring the complementarities between BPATs and insurance and mitigating substitutability, has the potential to improve the health of the system as a whole and increase resilience and productivity in agricultural activities.

Despite the small number of initiatives in this direction, there are some important windows of opportunity for Brazil. Open finance, which promises to reduce information asymmetries, and Zarc NM, which consists of a robust methodology for differentiating risk according to stewardship levels, are short-term alternatives capable of generating an important transformation in the insurance industry. However, there are implementation challenges that need to be overcome.

This publication is an Executive Summary that encompasses the results of two Agroicone studies on the rural insurance market. They are: **“RURAL INSURANCE IN THE WORLD AND ALTERNATIVES FOR BRAZIL: Different designs and dialogues with the adoption of good practices and technologies”** (August/2021) and **“Relationship between rural insurance and good agricultural practices and technologies: Evidence from Soybean Growers in São Paulo State and Opportunities for the Insurance Market”** (January/2022).

About Agroicone

Agroicone is an organization that generates knowledge and solutions to transform Brazilian agriculture towards the global challenges of sustainable development. It operates in five strategic areas: i) international trade and global issues; ii) sustainability and territorial intelligence; iii) public policies; iv) business, markets, financing; v) technologies in agro chains. Agroicone has a multidisciplinary team with broad expertise in the economic, regulatory/legal, territorial, socio-environmental and communication areas. Additional information: www.agroicone.com.br

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