

Micro-Insurance: The Risk Reward Spectrum in India

by

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Abstract:

The objective of this paper is to explore and discuss the nascent but growing industry of micro-insurance in India. It will delve into both the risks and rewards of implementing insurance on a micro level within India, focusing a majority of the attention to social barriers and ultimately benefits that can be attained with its implementation. Being a burgeoning industry within the country, little data can be used to support arguments empirically. Theoretically, however, there is evidence which shows the social benefit to those who are poverty stricken and utilize micro-insurance. Further, there has been no academic literature linking the extreme issue of farmer suicide in India and how micro-insurance can alleviate the problem. Using statistics on farmer suicide and rainfall in India, I found a correlation between the two. This not only shows that there is an issue involving both rainfall, or lack thereof, and farmer suicide, but also that there is grounds for a solution. This paper focuses on indexed rain insurance, a subset within the micro-insurance industry, and discusses how this particular type of insurance can help alleviate the issue of farmer suicide. Being compensated for lost crops due to less rainfall than expected will not further a farmer's indebtedness and will discourage them from committing suicide. This paper aims to make that connection more concrete through logical discussions and thorough research.

Table of Contents

Executive Summary	4
A Primer on Micro-Insurance	7
Why Micro-Insurance is Important	13
Farmer Suicide in India	16
Micro-Insurance and its Existence in India	19
The Challenges of Implementing Micro-Insurance.....	21
How to Overcome Challenges	23
The Implementation of Micro-Insurance.....	28
Indexed Rain Insurance	33
The Relation of Farmer Suicide to Rainfall	35
Measuring Social Impact	42
Conclusion.....	46
Appendices.....	48
Works Cited.....	54

Executive Summary

This paper's goal is to study the effects of micro-insurance, and show there is a significant social benefit to be gained by implementing it in India. It will reference several sources on the emerging market of micro-insurance, while simultaneously drawing parallels to what is now a fairly saturated microfinance market. Micro-insurance, which is a subset of microfinance, can be defined as a financial product which mitigates risks by charging relatively low premiums from a large poor population while funding larger payouts when risky disasters occur. The fascinating aspect of micro-insurance is its large breadth of possibilities but a stunning apprehension from microfinance institutions (MFIs) to enter the market. The following summary will outline the main points of the paper, and make clear the argument for the social benefits of micro-insurance in India. Particularly, it will focus on the large issue of farmer suicide in India, and how a certain type of micro-insurance can help alleviate it.

The idea of insurance, as opposed to savings, is to mitigate damages of an unpredictable and infrequent accident or disaster that may occur. Savings, on the other hand, are for those expenses which are much less of a financial burden, predictable, and frequent. An example of this is a child's education in which payments can be foreseen and are much more frequent than the repairs on a house caused by an earthquake. Insurance has many different facets based on the type of policy. This can include, but is not limited to, life, property and casualty, typhoon, accidental death or dismemberment, health, agricultural, and livestock insurance.

Although micro-insurance exists on the platform of many MFIs, it has not worked its way around the world to truly penetrate the market. As of right now, only 5 % of the world's poor is covered by micro-insurance. It is believed that now is the perfect time to begin a strong push in selling these products to low-income individuals. Microfinance, in terms of savings products and

micro-loans, has significantly made its way around the world. Millions of low-income individuals have access to micro-credit, and utilize it to sustain or create a business and with it a source of income. Micro-insurance, now, has the chance to help these individuals sustain their initial success and buildup of capital, by mitigating any risks they may face. For example, a family could have saved up enough money to afford their children's education, but if a flood damages their entire home, these savings will be wiped out and they will have to start from scratch. It is therefore essential to offer micro-insurance products to these individuals in order for them to climb their way out of poverty.

There are several challenges when implementing micro-insurance, the largest of which are the cultural barriers which stem from distrust of large corporations and the lack of financial education to understand the basic function of micro-insurance. Therefore MFIs must invest a significant amount of finances and time to educate the masses about micro-insurance, and create products that they will culturally understand and accept. There are also several risks associated with offering financial products to this particular population. These risks range from moral hazard to fraudulent claims. The latter seems to be a large hurdle the micro-insurance industry is trying to overcome. Many times it is unrealistic if not impossible to check on each and every claim made by an individual utilizing micro-insurance. If these events become too frequent, it may run an MFI right out of the village if not business.

My proposed solution to these issues is to instate indexed rain insurance. Based on the rain and crop insurance precedent in the United States, it has been proven to be a possible insurance policy. This methodology has become an innovate technique to overcome many of the issues traditional agricultural insurance faces. As mentioned previously, fraudulent claims are a large problem for many micro-insurers, especially agricultural and livestock faulty claims.

However, rain insurance measures mathematically the amount of rainfall in a given area. It then assesses whether a farmer—whom are the primary candidates of this type of insurance—has been able to gather a comparable harvest. If there has been a significant deviation from the normal harvest, all based on customized rates and yields of what a significant deviation is based on the location and crop, the farmer will be compensated for this loss. This type of insurance will remove the issue of fraudulent claims as no claims are needed in the process. The insurer, based on rain indices and crop statistics, compensates the farmer when rain is insignificant on its own.

I believe this particular type of micro-insurance can have a significant social impact in India particularly. Farmer suicides in India have become a large issue and cause unrest in many areas of the country. Whether these farmers commit suicide individually or in mass, their outcry is that of discouraging over-indebtedness. In many instances, farmers take on loans from private sources that can charge 100-200% interest. When they suffer natural disasters such as drought and cannot harvest as much produce as they need, they fall further into indebtedness. This helplessness in many cases, leads to suicide amongst Indian farmers. My research and data collection proves that there is a significant correlation between farmer suicide and rainfall. In the paper, one section outlines a statistically significant regression which shows when there is drought, or less than normal rainfall, more farmers commit suicide. Therefore, my proposed solution is to instate rain insurance in many rural areas within India. This insurance, as described above, will compensate the farmers if drought persists during their rain season, preventing further indebtedness which they otherwise would have incurred. Ultimately, resulting in fewer farmer suicides around the country.

A significant portion of this paper is also dedicated to the impracticability and unresolved issue of measuring social impact accurately. Quantitatively, there are many issues and

controversies over any given metric used to measure the social impact caused by microfinance or micro-insurance. Given there is still no agreed upon standard to measure social benefit for microfinance, we are quite some time away from finding suitable metrics to measure the impact on micro-insurance. However, logically and theoretically, this paper proves that there is a positive impact to be gained from micro-insurance. Although there are many challenges which need to be overcome in the industry, micro-insurance has the potential to be both socially and financially successful to the MFI and global poor population. This nascent but growing industry has yet a large market to be penetrated, and those who are the first movers will reap significant social and financial benefits.

A Primer on Micro-Insurance

Mary Ellen Iskenderian, President and CEO of Women's World Banking put it best in her keynote speech during NYU Stern's New Challenges in Microfinance Leadership & Ethics Conference. She made it clear that in order for microfinance to succeed, credit cannot be the only service offered to those distinguished by poverty. Microfinance must encompass financial services, not just one service. That is, banking, insurance, savings, as well as credit. This paper aims to focus on micro-insurance and its application to those individuals who cannot attain insurance through traditional, commercial means.

Micro-insurance, a subset of microfinance, can be defined as “a financial product that pools risk by collecting relatively small premiums from a large population and funding relatively large payouts to the small population that suffers losses from a specified risky event.”¹ The overarching goal of micro-insurance is to provide insurance designed for low-income individuals

¹ Bamako 2000, Innovations in Microfinance: Insurance as a Microfinance Product, 2001. Page 1.

within low-income countries. The idea of insurance is to protect an individual, household, or business against unforeseen or unlikely occurrences. In other words, when the probability of an event occurring is low, but the financial impact is high. As opposed to savings, where the probability of it occurring is high—such as a child’s educational fees—while the financial burden isn’t as great. The following chart shows the impact of different risks and how drastic the circumstances can be without micro-insurance²:



² Churchill, Craig (Ed.) Protecting the Poor: A Microinsurance Compendium. 2006. Page 28.

Micro-insurance has many facets depending which depend on the type offered. This can include but is not limited to: life, property and casualty, typhoon, accident death or dismemberment, health, and crop insurance.

There are few households and businesses in poverty stricken countries that have access to the formalized insurance that most industrialized nations have. These individuals struggle to protect themselves against risks and vulnerabilities that affect their day-to-day lives. If these events were to occur, leaving their land, livestock, or even lives destroyed, many of these households and businesses would not be able to sustain the devastation financially, and would fall deeper into poverty and ill-health.

Micro-insurance, in many instances, is related to risk-sharing by pooling risks to redistribute the costs of risky events within the pool: much like micro-finance lending. Here, individuals are incentivized to take care of what is insured, be it crops, land, livestock, or life, as other individuals in the community finance the arrangements. The premium that individual households or businesses pay for the insurance is returned to the pool and when a call-to-action is required because of devastation, the household or business is reinsured from said pool.

These products are becoming increasingly available, especially in third world countries. However, micro-insurance is still a new field, and is classified in its experimental stage.³ Many microfinance institutions (MFIs) are beginning to delve into these products to diversify their offerings to their low-income client base, as well as diversify their portfolio of investments. In many instances, micro-insurance products are provided by MFIs partnering with third party insurance companies to create customized products and gain access to the market. Also, MFIs

³ CGAP. "Microinsurance Overview." << [9](http://www.microfinancegateway.org/p/site/m/template.rc/1.11.48248/>>.</p></div><div data-bbox=)

have begun setting up cooperative or community-based insurance organizations as a way for poor households and business to access insurance, in most cases, for their land and livestock.

Many development experts believe that now is an ideal time for micro-insurance to thrive alongside MFIs and their existing protocols. “People work themselves out of poverty using micro-lending, micro-insurance helps prevent them from falling back into it,” Dr. Reinhard, vice chairman of the Munich Re Foundation.⁴ However, even still, micro-insurance has been slow to pick up in most developing countries around the world. Many believe it is due to the fact that micro-insurance has so far followed along the same lines as micro-lending. Innovation is what can save micro-insurance and make it both “socially and economically viable.”⁵

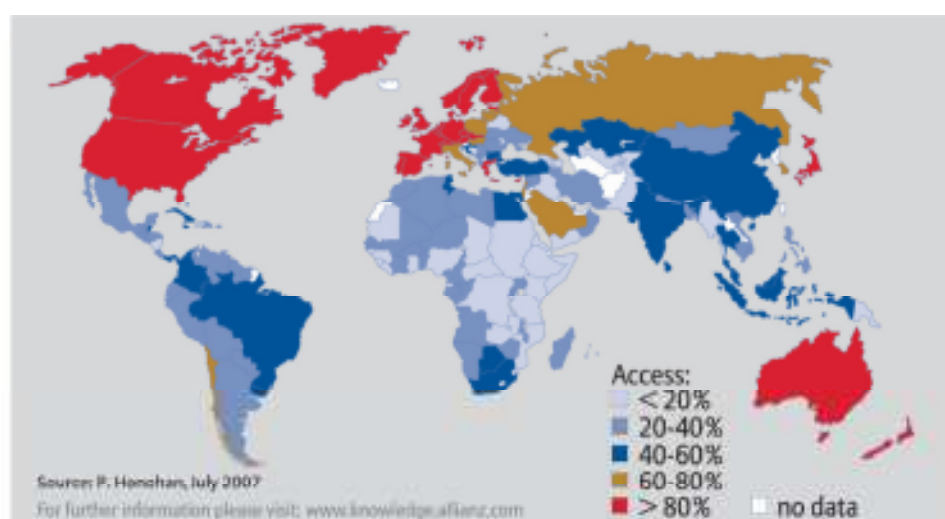
A question that arises when discussing micro-insurance as a formal financial service for low-income individuals is the existence of informal insurance and financing. This issue can be addressed by analyzing the means by which the informal sector in these economies is sustained. Many times, the informal financial services offered to low-income individuals are insufficient to fully protect them from the financial hazards and realities of their daily lives. In these informal schemes, the risk management strategy is to spread financial and human resources across many different income-generating activities, which results in low returns. Because of these low returns, the informal insurance sector can only partially cover the cost of damage that an individual may experience, leaving the rest of the community to become a support system for that individual, many times forgoing their own savings. Finally, this informal protection does not stand up well against a series of misfortunes, which has a likelihood of occurring. The poor barely have recovered from one crisis and are forced to stand up to another. Therefore, a formal micro-

⁴ Knowledge@Wharton. “Micro-Insurance: A Safety Net with Too Many Holes.” *Forbes*.
<<<http://www.forbes.com/2009/10/10/micro-insurance-bangladesh-entrepreneurs-finance-wharton.html>
>>

⁵ Ibid

insurance industry in these poverty-stricken areas can help alleviate the risks associated with recovery, and gives a verifiable and concrete contract which the company and individual must abide by.⁶

Further, in terms of geographical breadth, micro-insurance has a large market to penetrate. The map below depicts access to financial services as a percentage of households by country⁷:

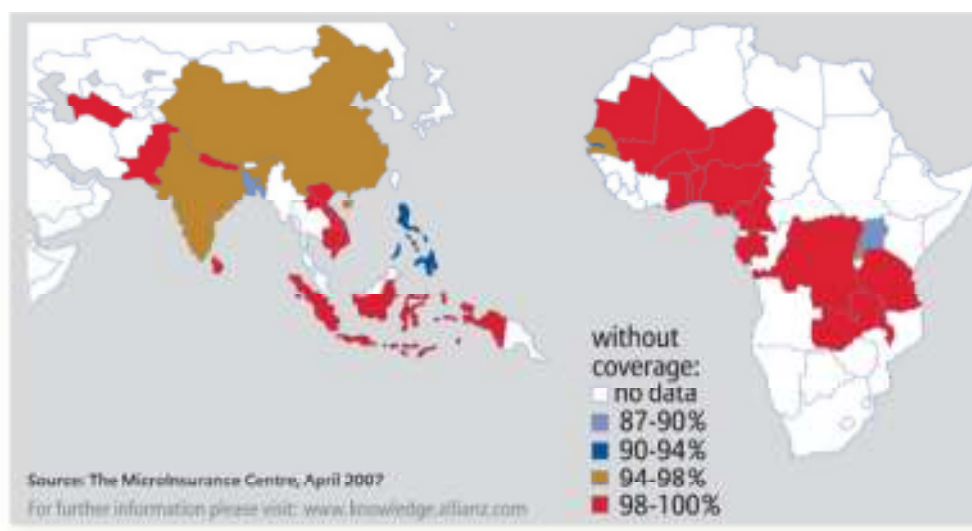


It is obvious that those industrialized countries, such as those located in North America, Western Europe and Australia have approximately 100% access to financial services, which we witness and experience in everyday life. However, it is important to note that only 60% or less of the households across the world have access to financial services of any sort. What's more striking is in the following map where becomes obvious that the poor in Africa and Southern Asia have

⁶ Churchill, Craig (Ed.), Protecting the Poor: A Microinsurance Compendium. 2006. Page 21.

⁷ P. Honohan. July 2007. <<www.knowledge.allianz.com>>

little or no insurance coverage. Many of these places do not even have adequate data to draw a conclusion⁸:



This map, although unnerving, portrays an important fact. The market for micro-insurance is nascent, needed, and penetrable. In fact, in November of 2009, a report produced by Lloyd’s 360 Risk Insight and the Micro-insurance Centre, *Insurance in Developing Countries* explored micro-insurance opportunities throughout different countries around the world. The report estimated the size of the market to be between 1.5 billion and 3 billion policies, “with significant demand for a range of products including health, life, agriculture, and property insurance.”⁹ Also, the report outlined that about 135 million individuals are covered by micro-insurance, meaning 95% of the potential market awaits. Being a first mover in this industry has the potential to lead to sustained growth, reputational advantages amongst the poor, and strong business prospect in the future.

⁸ The Microinsurance Center. April 2007. <<www.knowledge.allianz.com>>

⁹ Microfinance Focus. “Microinsurance potential market between 1.5 and 3 billion policies: Lloyd’s report.” November 22, 2009. << <http://www.microfinancefocus.com/news/2009/11/22/microinsurance-potential-market-between-1-5-and-3-billion-policies-lloyd%E2%80%99s-report/>>>

Why Micro-Insurance is Important

Risk Management

Micro-insurance is important because it can play an important part in risk management, poverty alleviation, and women empowerment (much like microfinance). Insurance is the ability to transfer risks to another party in a predictable and organized way in order for individuals to live their lives with more certainty.¹⁰ Low-income individuals, households, and businesses are susceptible to the most common risks associated with their well-being, such as death, illness, injury, natural disasters, and theft. These risks' effect is twofold: the monetary burden of recovery, and the uncertainty of when a damaging event may or may not occur. We can classify these risks into six categories. These risks are much like any individual, including low-income individuals, face. However we can assess the magnitude of monetary loss as well as their probability of occurring by focusing on low-income individuals.

Firstly, life cycle risk, such as education, are those which are more probable and are six risks that low-income individuals face, much like any other individual, but the financial cost to a household is not as devastating as other types of events. Secondly, death risks are an important part of risk management. Death is more unpredictable than education, but the cost to a household is even more uncertain. For example, if it is from the bread-winner of the family, the costs may be large and continuous. Thirdly, property risk, or the case where the quality of one's assets is affected. This is even more uncertain than the previous two because both the timing and certainty of it occurring are unpredictable. Fourth, health risks. These risks are uncertain although they may be frequent—for example hazardous working conditions. Disability risks are also a

¹⁰ Insuring in Developing Countries: Exploring Opportunities in Micro-Insurance. Lloyd's 360 Risk Insight. November 2009. Page 6.

classification, unlike health risks where the timing is more predictable. These risks are usually ongoing and therefore can be more detrimental to personal income. Finally, mass risks, meaning those risks that are associated with natural disasters or major events that cause damage to the population at large.¹¹

The aforementioned risks can be mitigated by providing micro-insurance suitable for low-income individuals, households, and businesses. Micro-insurance can provide a greater degree of protection as risk-sharing, or risk-pooling classifies the industry. The risks are pooled over a greater number of people, for instance, an entire community by collecting premiums from each household. Thereby, reducing the cost per person for protection by the pool, whilst simultaneously providing more protection as the community is, in an essence, financing the probability of an event occurring to one or more households.

Social Protection

It has been argued that access to social protection is a fundamental human right.¹² This protection has become recognized in the global debate as “indispensable components of poverty reduction, sustainable economic development, fair globalization and decent work.”⁷ By this regard, the World Commission on the Social Dimension of Globalization emphasizes that there must be a minimum amount of social protection integrated into any given society in order to be part of the socio-economic base of the global economy. Therefore, social protection is used as a tool to eliminate poverty and inequality. It should be viewed as more than a risk management technique, but a social necessity for absolute poverty alleviation. Unfortunately, over half of the

¹¹ Bamako 2000, Innovations in Microfinance: Insurance as a Microfinance Product, 2001. Page 2.
& Please see Appendix A

¹² Churchill, Craig (Ed.), Protecting the Poor: A Microinsurance Compendium. 2006. Page 20.

world's population lacks healthcare, income security, social services, or any type of social protection.

Social protection, defined by the International Labour Organization, is “the protection which society provides for its members through a series of public measures,” including the compensation of loss of income resulting from unforeseen and unavoidable circumstances, healthcare, and benefits for families.¹³ This protection acts as an important and active mechanism to reduce poverty and increase equality across nations around the world. Having what should be a universal right only levels the playing field in one facet for these already struggling countries, and should be employed as a social standard across the world.

In order to give the poor citizens of the world a chance to climb out of poverty, social protection mechanisms must be in place. Some social protection involves a transfer of funds to the poorest of the poor, which at least temporarily, alleviates poverty. Further, social protection results in positive economic performance. For example, it can help individuals finance and deal with risks that they face on day to day basis, especially relating to loss of income. By doing so, it maintains productivity of existing employees. Unemployment insurance creates security amongst workers and “encourages individuals to undertake riskier initiatives that may result in a higher return for them and the economy.”¹⁴ Finally, social protection can stabilize economies by preventing an overheating or a recession due to decreasing confidence in the market. Unemployment benefits and social security, as seen in the United States, helps maintain the purchasing power of individuals in the economy.

¹³ Garcia, A Bonilla and Gruat, J.V. Social Protection. *International Labour Office*. November 2003. <<
<http://www.ilo.org/public/english/protection/download/lifecycl/lifecycle.pdf>>>

¹⁴ Churchill, Craig (Ed.), Protecting the Poor: A Microinsurance Compendium. 2006. Page 48.

It is obvious that there is both a large economic benefit and social benefit that can be attained through social protection via micro-insurance. Because social protection is not initiated or widespread throughout a governing body in these countries, micro-insurance has the ability to fill the void to a certain extent through the private sector. Micro-insurance is needed because the areas that do not have any social protection mechanisms built into their economies are those with a large poor population. These individuals need insurance on a micro-level, as they are unable to gain insurance through traditional, conventional means.

Farmer Suicide in India

Up until now, we have focused on micro-insurance as a whole, without specific attention to India. However, it is a well-known fact that suicide amongst Indian farmers is a large if not growing problem, and one that gets exacerbated in times of devastation—such as wild fires or droughts. From 1997-2008, there have been nearly two hundred thousand farmer suicides in India, 67% of which were in only five states.¹⁵ These suicides do not occur all year round, but mostly in April-May when farmers search for excess credit to overcome indebtedness due to crop failure and borrowing, in January-February when these farmers try to sell their produce and receive inadequate prices to cover their costs, and September-October when these farmers must use pesticides on their crops. In May of 2009, there were 1,500 farmers who committed suicide in mass. Their motive has been attributed to their crippling debt compounded with drought and crop failure.¹⁶

¹⁵ “Farmer suicides—Karnataka in the top 5 states, says Sainath.” *The Times of India*. February 2, 2010. <<
<http://timesofindia.indiatimes.com/city/bangalore/Farmer-suicides--Karnataka-in-top-5-states-says-Sainath/articleshow/5525519.cms.>>>

¹⁶ “1,500 Farmers Commit Suicide in Mass in India.” *The Independent*. April 15, 2009. <<
[>>](http://www.independent.co.uk/news/world/asia/1500-farmers-commit-mass-suicide-in-india-1669018.html)

Without insurance, or access to credit, these farmers feel as though they have nowhere else to turn to, and suicide seems as though a better option. As one farmer put it, “banks don’t give us loans, they use one pretext or another. We are forced to take money from money lenders, who charge 100 to 200 per cent interest on the principal amount. We end up selling our land and belongings to repay the money lenders.”¹⁷ It is evident that this lack of credit, or insurance, aggravates the issue. What’s worse is the weak rainfall many states have been receiving in the last few years, adding insult to injury. Farmers take on increasing amounts of debt hoping the next year their crops will yield fruitful harvest, but have been continually disappointed. Farm suicides have increased at an annual compounded growth rate of 2.5 percent per annum from 1997-2006.¹⁸

The majority of these suicides are male, and in most cases males run the household, leaving the family in an even worse condition than what they were in before his suicide. Some psychologists believe that it is this distress of failure to support one’s family economically that motivates these male farmers to commit suicide, while the “acute agrarian crisis in the country [is the ultimate] basis for this distress.”¹⁹ In the analysis done by K. Nagaraj, we can observe how severe the problem is in specific regions of India²⁰:

¹⁷ Andrabhi, Jalees. “Indian Farmers Threaten Mass Suicide.” July 9, 2009. <<
<http://www.thenational.ae/article/20090709/FOREIGN/707089830/1103/NEWS>>>

¹⁸ Nagaraj, K. Farmer Suicides in India: Magnitudes, Trends, and Spatial Patterns. Madras Institute of Development Studies. March 2008.

¹⁹ Ibid

²⁰ Ibid

**Number and Rate of Suicides for the General Population and Farmers
in Different Groups of States, 2001**

Group of States	Number of suicides		Farmers' suicides as a percent of all suicides	Suicide Rate (per 100,000 members)		
	Among farmers	Among all population		In general Population	Among Farmers With all cultivators considered	With only main cultivators considered
1) <i>Group – I</i> States (Maharashtra, Karnataka, Andhra Pradesh, Chhattisgarh & Madhya Pradesh)	10374 (63.2)	47906 (44.2)	21.7	15.6	24.8	28.7
2) <i>Group – II</i> States (Kerala, Tamil Nadu, Goa, Pondicherry, West Bengal & Tripura)	3416 (20.8)	36191 (33.4)	9.4	20.1	28.8	33.6
3) <i>Group – III</i> States (Assam, Gujarat, Haryana, Orissa)	1162 (7.1)	13497 (12.4)	8.6	10.0	6.9	8.9
4) <i>Group – IV</i> States (Bihar, Jharkhand, Himachal Pradesh, Jammu & Kashmir, Punjab, Rajasthan, Uttar Pradesh & Uttarakhand)	1384 (8.4)	8983 (8.3)	15.4	2.4	2.6	3.3
All-India	16415 (100.0)	108506 (100.0)	15.2	10.6	12.9	15.8

Here it is obvious that the states of Maharashtra, Karnataka, Andhra Pradesh, Chhattisgarh, and Madhya Pradesh have the largest amount of farmer suicides. By making the claim that solely indebtedness, which could potentially be solved by microfinance credit lending, is the causation for farmer suicide, would be inadequate. These states are adjacent to one another and are within a semi-arid zone within the south and central parts of India. They have witnessed severe agrarian crises due to their terrain, and it is their vulnerability to extreme weather conditions, persistent weather crises, as well as their loss of livelihood opportunities when these crises persist, that intensify farmer suicide and demoralization.

Therefore, I believe micro-insurance is a solution to the acute issues that states such as the aforementioned face throughout the years. Not only must there be a MFI implemented to

reduce the issue of farmer suicides within India, but an intervention including micro-insurance. This is further analyzed later in the paper.

Micro-Insurance and its Existence in India

The total global insurance market, estimated at about USD 3.5 billion, with India's share approximately 0.73%. This statistic clearly shows that there is large growth for insurance in general within India, and micro-insurance to cover the vast population which is not insured, or 90% of the population amounting to about 950 million individuals, mostly in rural areas.²¹ The present outreach of micro-insurance "is around 5.2 million people, covering only two percent of the poor in the country."²² Further, about one third of the Indian population earns less than one dollar a day, and about half of the population earns less than two dollars a day. Therefore a scalable and effective micro-insurance scheme can have a huge effect on this area of the pyramid (also referenced as the bottom of the pyramid [BoP]).²³

Because most individuals who are uninsured belong to poorer, rural areas, micro-insurance began to evolve. Rural micro-insurance was encouraged by financing institutions in order to diversify risk by offering products to different clientele. Because of this focus, rather than the focus of alleviating poverty, insurance products offered by the larger companies only somewhat addressed the needs of the poor. Most larger institutions focused on insuring expensive farm equipment, such as tractors, which many farmers in poverty-stricken areas do not own. Further, the combination of a traditional mindset where the poor are assumed to be less of a business opportunity and the adjustments that need to be made to insurance products to make

²¹ Building Security for the Poor: Potential and Prospects for Microinsurance in India. Human Development Report Unit. 2007. Page 30.

²² Ibid

²³ Please see Appendix B

them attractive resulted many times in the lack of motivation to create products and a lack of breadth of insurance products.

Micro-insurance with social-motivation, does to a certain degree, exist in India.²⁴ There are a few case studies that we can reference for the purposes of this paper such as the Max Life initiative. Max Life is a joint venture between New Delhi-based Max India Ltd and New York Life Insurance, and has been extremely successful. Using cultural elicitations, simple requirements, and flexible pay structures, Max Life has been able to issue itself through diverse distribution centers and channels. However, it is important to note that life insurance is the easiest of the types of micro-insurance to homogenize and scale, unlike agricultural, livestock, or property insurance.

The Allianz Group, a successful multi-national insurer originally from Berlin, Germany, has recently delved into the area of micro-insurance within India. Partnering with Bajaj Group, the two created an alliance and support what is the face of their venture “CARE India,” allowing Allianz to penetrate the market alongside the trusted name of Bajaj. One of their most successful offerings is their tsunami response program. The mission of this program is to “facilitate insurance services to the disadvantaged communities in coastal districts... [and] to help communities access formal insurance services in the form of micro-insurance.”²⁵

Although there are initiatives in place for micro-insurance in India, most poor individuals remain uninsured. This is due to a number of factors, later discussed in detail, including cultural barriers, lack of insurance initiatives, and undue risk insurance companies face when offering these products to the poor.

²⁴ Please see Appendix C

²⁵ “Insure Lives & Livelihoods.” Bajaj-Allianz Care Initiative Pamphlet. Please also see Appendix D.

Challenges of Implementing Micro-Insurance

As with any new initiative, there are challenges that must be overcome in order for it to succeed. Unfortunately, micro-insurance, as well as microfinance, has several obstacles it must cross not only to succeed financially, but to be functional in practice. The following section outlines many of the challenges micro-insurance faces, specifically in India.

Education

One of the largest challenges MFIs face is educating the masses as to what financial services are, how they work, and how they can benefit from them. In many societies, the idea of insurance is fundamentally not understood. A safety-net of protection has never been provided for low-income households, and the idea of expecting disasters is seen as backwards. Further, many are “skeptical about paying premiums for an intangible product with future benefits that may never be claimed—and they are often not too trusting of insurance companies.”²⁶ The preliminary step of sheer awareness is a large hurdle for MFIs, and a costly one at that—both financially and time-wise.

Trust

Along with education, trust is a large barrier when trying to sell insurance to low-income and poorly educated individuals. An instinctive response to the learning of insurance and being persuaded to purchase it is the risk that the insurer will not provide the coverage they are promising upfront. With micro-lending or micro-credit, the provider finances the loan and hopes the lender will pay the institution or individual back. However, in micro-insurance, the policyholder pays the premium, and hopes that the insurer will finance the aftermath of the event

²⁶ Churchill, Craig (Ed.), Protecting the Poor: A Microinsurance Compendium. Page 20.

if it occurs. For many societies and economies, this sense of trust is not natural, and understanding and accepting its use is a large leap of faith. “Insurance is either seen as a luxury product or mistrusted—why should you pay money for something that you can’t see, touch or feel?”²⁷ Additionally, many societies have been susceptible to fraudulent schemes by the informal sector, which heightens fear of investing in insurance products.

Moral Hazard and Adverse Selection

In an insurance scheme, be it for low-income clients or any other clients, the issue of moral hazard arises. Moral hazard can be defined as instances where people who are insured take undue risks or use more services than they normally would, because they are aware that in the event a disaster occurs, their insurance company will cover all costs incurred by the occurrence. Micro-insurance lends itself to the same type of risk. Many times, low-income individuals may utilize more health insurance services, such as medical visits to hospitals or procedures that would normally cost them a substantial portion of their salary because they are aware that these costs will be covered by their insurance agent.

Another related risk that MFIs must deal with when offering insurance is adverse selection. Here, those who are insured have a riskier profile than what the general population has, or what the average risk profile for individuals within the country or community should have. In the context of health insurance, many times individuals who are sickly come together and form a group to gain formalized health insurance. These individuals are unhealthier than the rest of the population, and unknowingly the insurance company can issue insurance to them. Later, it is

²⁷ Insurance in Developing Countries: Exploring Opportunities in Micro-Insurance. Lloyd’s 360 Risk Insight. November 2009. Page 4

revealed that they created a group because they would benefit the most from the insurer's resources and financial commitment.

Fraudulent Claims

Probably one of the largest risks micro-insurers have issues with is fraudulent claims. Be it health insurance, crop insurance, or livestock insurance, fraudulent claims are prevalent throughout these communities. Paul Breloff, current Policy Advisory Consultant at CGAP, spoke about how in Gujarat, India, farmers whose primary livelihood was raising cattle would purchase livestock insurance and consistently file claims for their supposedly deceased cow. Because of the large number of claims, many insurance agencies attached radio (RFID) ear tags to the insured cows, which could monitor the health of the cow.²⁸ However, once this technology became prevalent in the livestock insurance industry, farmers in Gujarat began cutting the ears off of their cows so insurance claimers could not decipher whether the cow was alive or dead without physically visiting the farm. These numbers became so large that in Gujarat the claims for deceased cows were about 13-14% of all claims in the state while no other state had more than 3%.²⁹

How to Overcome Challenges

There are a number of ways to hurdle the many challenges outlined above. In summary, clients at the BoP do not fully understand what may be perceived as advanced financial products, such as micro-insurance. Additionally they are not educated to the level of financial literacy that may be necessary to apply the appropriate knowledge when making financial decisions, such as

²⁸ Shukla, Shubhlakshmi. "Radio ear tags for cattle in tribal Sabarkantha." *Indian Express*. December 26, 2009. <<
[>>](http://www.indianexpress.com/news/radio-ear-tags-for-cattle-in-tribal-sabarkantha/559352/0)

²⁹ Paul Breloff, Policy Advisory Consultant, CGAP. Microfinance Guest Lecture – Professor James Carlson, New York University. March 30, 2010.

purchasing insurance or taking a loan from a micro-lender. Finally, low-income individuals in many of poverty-stricken countries, like India, do not trust large corporations, and insurance companies are no different.

Educating the masses to understand the basics of insurance is vital to the success of a micro-insurance company. They can do this in many simple ways, from sending a translator to hold short weekly seminars, or by performing skits or songs that outline the importance of insurance.³⁰ The Bajaj-Allianz Care initiative has implemented a program called the “Mass Awareness and Enrollment Campaign,” which is about an hour with many different segments. The reason for the short segments, such as a ten minute felicitation by an Allianz representative, is to keep the attention of the crowd while simultaneously increasing the anticipation and interest of the theme of the show, micro-insurance. This particular program includes a prayer, song, an experience sharing segment, and a skit. The interactive nature allows for low-income individuals to not only learn about the product, but also engage and participate in the process.

The Bajaj-Allianz Care initiative also creates flyers in the local language which explain the benefits of insurance through words and pictures. For example, the flyer below on the left side depicts what would happen to a family without insurance³¹.

³⁰ Please see Appendix E

³¹ Bajaj-Allianz Care Initiative flyer.



கேர் இந்தியா

ஆயுள் மற்றும் வாழ்வாதார கம்பீடு திட்டம்
கீழ் கேர் மற்றும் சிஎஸ்சிஎன்ஐன் கூட்டு முயற்சி

கம்பீடுற்ற குடும்பம்	கம்பீடு செய்த குடும்பம்
 <p>காங்கீடு சொல்வத குதம்பல் ஸைலீஸல் துழுவை பதல் சீதலீல் ஈட்டீல் ஈட்டலல். ஸைல் ஸ்தலல் ஸைலீஸல் ஸெதலீஸல் ஸ்தலீஸல்.</p>	 <p>காங்கீடு சொல்வத குதம்பல் சீதலீஸல் ஸ்தலீஸல் ஈட்டீல் ஈட்டலல். ஸைல் ஸ்தலல் ஸைலீஸல் ஸெதலீஸல் ஸ்தலீஸல்.</p>
 <p>காங்கீடு சொல்வத குதம்பல் ஸ்தலீஸல் ஸைலீஸல் ஸெதலீஸல் ஸ்தலீஸல். ஸைல் ஸ்தலல் ஸைலீஸல் ஸெதலீஸல் ஸ்தலீஸல்.</p>	 <p>காங்கீடு சொல்வத குதம்பல் ஸ்தலீஸல் ஸைலீஸல் ஸெதலீஸல் ஸ்தலீஸல். ஸைல் ஸ்தலல் ஸைலீஸல் ஸெதலீஸல் ஸ்தலீஸல்.</p>
 <p>ஸைலீஸல் ஸ்தலல் ஸைலீஸல் ஸெதலீஸல் ஸ்தலீஸல். ஸைல் ஸ்தலல் ஸைலீஸல் ஸெதலீஸல் ஸ்தலீஸல்.</p>	 <p>ஸைலீஸல் ஸ்தலல் ஸைலீஸல் ஸெதலீஸல் ஸ்தலீஸல். ஸைல் ஸ்தலல் ஸைலீஸல் ஸெதலீஸல் ஸ்தலீஸல்.</p>
 <p>சீதலீஸல் ஸ்தலல், சீதலீஸல் சீதலீஸல் ஸ்தலல் ஸைலீஸல் ஸெதலீஸல் ஸ்தலீஸல். ஸைல் ஸ்தலல் ஸைலீஸல் ஸெதலீஸல் ஸ்தலீஸல்.</p>	 <p>பதல் ஸைல் ஸ்தலல் சீதலீஸல் ஸ்தலல், சீதலீஸல் சீதலீஸல் ஸ்தலல் ஸைலீஸல் ஸெதலீஸல் ஸ்தலீஸல்.</p>
 <p>சீதலீஸல் ஸ்தலல், ஸைல் ஸ்தலல் ஸைலீஸல் ஸெதலீஸல் ஸ்தலீஸல். ஸைல் ஸ்தலல் ஸைலீஸல் ஸெதலீஸல் ஸ்தலீஸல்.</p>	 <p>ஸைல் ஸ்தலல் ஸைலீஸல் ஸெதலீஸல் ஸ்தலீஸல். ஸைல் ஸ்தலல் ஸைலீஸல் ஸெதலீஸல் ஸ்தலீஸல்.</p>
 <p>ஸைல் ஸ்தலல் ஸைலீஸல் ஸெதலீஸல் ஸ்தலீஸல். ஸைல் ஸ்தலல் ஸைலீஸல் ஸெதலீஸல் ஸ்தலீஸல்.</p>	 <p>காங்கீடு சொல்வத ஸ்தலல், ஸைல் ஸ்தலல் ஸைலீஸல் ஸெதலீஸல் ஸ்தலீஸல்.</p>

வழங்கியுள்ளது

<p>தலைமை அலுவலகம் தமிழ்நாடு கேர் இந்தியா - சென்னை 48, 2-வது முக்கிய சாலை கலைமகள் நகர், ராக்காடுநாயக்கல் சென்னை - 600 097.</p>	<p>தலைமை அலுவலகங்கள்</p> <table style="width: 100%;"> <tr> <td>கூடலூர்</td> <td>04142 - 294435</td> </tr> <tr> <td>நாகப்பட்டினம் & காணாக்கால்</td> <td>04368 - 266225</td> </tr> <tr> <td>நாகர்கோவில்</td> <td>04652 - 656637</td> </tr> </table>	கூடலூர்	04142 - 294435	நாகப்பட்டினம் & காணாக்கால்	04368 - 266225	நாகர்கோவில்	04652 - 656637
கூடலூர்	04142 - 294435						
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நாகர்கோவில்	04652 - 656637						



One of the images shows a home caught on fire, and the family in complete disarray and confusion on how to handle the disaster and the uncertainty of where they will stay and what has happened to their belongings. The right side shows the situation if the family had insurance. In this instance, an insurance representative comes to the site where the family's home is destroyed. They are comforted and reassured that they will recover. Simple educational materials such as

25

these provide a strong foundation for understanding how insurance works, and the benefits received from investing in it. However, the issue of cultural barriers is two-fold. Micro-insurance necessitates a cultural shift in mindset for both parties. Insurers too, need to understand the risks the poor face and their needs and desires. They cannot solely depend on the poor to understand the implications of micro-insurance and accept it. Micro-insurers need to shift their own cultural standards to meet the poor halfway in their struggle to understand them.

A powerful method of overcoming the large distrust issue many poor citizens may have is to create a joint venture with a trusted and well respected domestic company. For example, when AIG tried to penetrate the micro-insurance market in India, it started a joint venture with the Tata Group, an extremely well respected company to Indians. Using the Tata brand, AIG was able to sell micro-insurance to rural citizens who believed the product would deliver what it promised because of the name associated with it.³² Now the venture offers both life insurance and savings products through partner NGOs. “In its micro-agent model, Tata-AIG obtains recommendations from NGOs on members of the community who could be good agents for micro-insurance...then [the NGOs] assists the agents with training and administrative support.”³³ Further, as referenced throughout this paper, Allianz, the German insurer partnered successfully with Bajaj, a local Indian company, to create the Care initiative which has seen wide success measured by the depth of recipients and the array of products offered. Another way to challenge this hurdle is to have respected politicians or admired celebrities to speak out about insurance and how it has shaped their lives.

³² Churchill, Craig (Ed.), Protecting the Poor: A Microinsurance Compendium. 2006. Page 181.

³³ Churchill, Craig (Ed.), Protecting the Poor: A Microinsurance Compendium. 2006. Page 615.

Bob Annibale, Global Director of Microfinance at Citi Group, spoke about the key to success with regards to microfinance—“locality.”³⁴ By this he means the way to gain trust and create products that are effective for the low-income clientele, every operation of the business must be local—the language, employees, partner company, currency, and law. From a grassroots level, the MFI should be able to relate to the client and create products that they feel comfortable with. This also allows for an increase in awareness of secure and locally driven funds, without foreign exchange risk. Being close to the client, both geographically and socially is an important aspect in gaining trust and ultimately selling a financial product such as insurance.

Finally, one can mitigate the trust issue by creating tailored and customized products depending on the region, religion, and community of a particular village. “Experience has revealed the need for customized products reflecting the needs of women and children, particularly girls.”³⁵ Using this experience and empirical evidence, while molding insurance policies and products that would address the needs of women—such as the life-cycle of women and health risks that affect women—micro-insurers can create products that are more competitive and more likely to be purchased. Further, there are no two emerging countries which are similar in their day-to-day risks. For example, Bangladesh deals with flooding while Kenya drought. A customized approach is therefore necessary to be successful in this space.³⁶

³⁴ Bob Annibale, Global Director of Microfinance, Citi Group. New Challenges in Microfinance Conference. March 5, 2010.

³⁵ Churchill, Craig (Ed.), Protecting the Poor: A Microinsurance Compendium. 2006. Page 144.

³⁶ Insuring in Developing Countries: Exploring Opportunities in Micro-Insurance. Lloyd’s 360 Risk Insight. November 2009. Page 5.

The Implementation of Micro-Insurance

As discussed, micro-insurance can overcome many of the obstacles that at first blush discourage its existence, as well as create a social benefit and positive externalities if implemented correctly. This section aims to discuss the most prudent ways to implement micro-insurance in terms of the more granular details that need to be addressed such as pricing, technology, scale, and education.

As with any financial instrument designed for the poor, such as savings products or micro-loans, the product must be price sensitive as the BoP can be viewed as a very elastic market. A slight price change will modify the amount demanded or required from the target segment. One can adjust the price of a micro-insurance product by testing the waters on the ground to see what individuals are willing to pay for a product they are just beginning to understand. However, it is important to note that these poor individuals may not be so forthcoming with their finances and their threshold for prices. “If a stranger were to walk into your house and start asking nosy questions about your money, would you be honest?”³⁷ Therefore, it would take time and research to come up with insurance plans for each household and business. This is where customization comes into play. Most families within a village will probably have similar price sensitivities especially if other families are accepting the offers, but across villages and countries it is unlikely the same price would work throughout.

The poor cannot afford the high premiums that industrialized countries’ clients can, and therefore their premiums must be reduced. Once comfortable, a micro-insurer may be able to but increase the frequency, as in many cases it has been proven that the poor have better budgeting

³⁷Collins, Daryl and Morduch, Jonathan and Rutherford, Stuart and Ruthven, Orlanda. Portfolios of the Poor. 2009. New Jersey: Princeton University Press. Page 100.

habits than those with more wealth.³⁸ It is also important to understand the relationship between the price of a product, and the expected performance. It may be conventional to believe the lower the price, the lower the quality should be. However, when dealing with the BoP, it can be argued that even though the price is lower than what it would be if selling to a market with more income, the quality should be at par if not better. This is because of the many trust issues outlined earlier. Giving faulty products, or in this case late responses to disasters if a family has purchased insurance, will only exacerbate the high level of distrust, and ultimately lead to the demise of the micro-insurer. As it is, these individuals would be taking a leap of faith.

Microfinance requires the existence and decently advanced capabilities of technology. In many cases, pure organization of the filings and contracts that were promised before, such as with the informal market, require the microfinancer to invest in technology initially. Also, beginning a microfinance initiative in a rural area of another country without proper technology can be a recipe for disaster. Sometimes, MFIs feel the need to have a return on capital before this initial investment, but find themselves highly disorganized by the time they get their feet off of the ground.³⁹ Micro-insurance is no different. The basic institutional technologies should be implemented before the micro-insurer begins the journey of sales. Or at least, the capabilities should be there even if the scale is not initially.

Because the premiums expected on micro-insurance are small, scale of operation is the key to success for this branch of micro-finance. This is a challenge given the nature of micro-insurance and the fact that many of the products will need to be customized. However, customization is mainly in the form of pricing. For example, most individuals will grasp the idea

³⁸ Jonathan Morduch, Professor at NYU, [New Challenges in Microfinance Conference](#). March 5, 2010.

³⁹ Tony Singleton. Microfinance Guest Lecture – Professor James Carlson. New York University. February 2, 2010.

of life insurance but may not have the same willingness to pay. Therefore, although a challenge, it is possible and necessary for micro-insurers to scale their operations across regions and even countries. The more diverse their geographical breadth, the larger their profit will be, and the more social benefit they can produce given a larger bottom line. This return also attracts shareholders to the MFI and continues to expand the business. “This attribute is a perfect fit for insurance and the Law of Large Numbers, whereby actual claims experience should run much closer to the project claims when the risk pool is larger. When projections can be estimated with a high degree of confidence...the product pricing does not have...a large margin for error, making it more affordable for the poor.”⁴⁰ Using this logic, scalability is not only required for the MFI to be successful, it is a great opportunity to better the business for its clients as well.

Like different prices for different clients, the MFI must also be able to distinguish the functionality differences between BoP clients and traditional clients. For example, the values of a traditional market may vary greatly than that of a poorer target market. The latter may value face time and interactive educational sessions, rather than an electronic pamphlet outlining all pertinent information via e-mail. Or, they may prefer in-kind benefits, such as groceries, funeral services, wedding services, etc. rather than a lump sum of cash delivered to their door when expecting a payment from their insurance agent.⁴¹ Or, they may desire cash but want it over a period of time so they can better ration their own spending and budget. Understanding the client is a key step in the success of a microfinance institution. Knowing how the poor would like their products to be structured can be difficult, but is essential to formulate a product which they trust and has the appropriate functionality in their eyes.

⁴⁰ Churchill, Craig (Ed.), Protecting the Poor: A Microinsurance Compendium. 2006. Page 17.

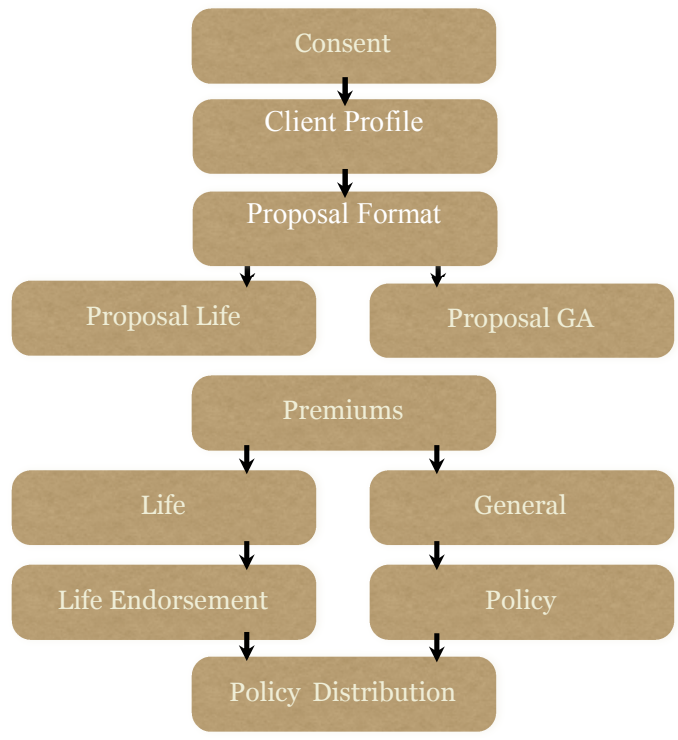
⁴¹ Churchill, Craig (Ed.), Protecting the Poor: A Microinsurance Compendium. 2006. Page 18.

As mentioned earlier, educating the poor about products is a fundamental requirement for micro-insurers. Raising awareness of what insurance is, the capabilities, the breadth, and the benefits is essential for both the MFI financially and for it to accomplish its goal of social improvement. C.K. Prahalad, in his book, The Fortunate at the Bottom of the Pyramid, outlines the importance of investing in educational materials and sessions. He goes as far to say that innovative methodologies should be used to intrigue the poor and elicit excitement in them about the possibilities of risk reduction in their day to day lives.⁴²

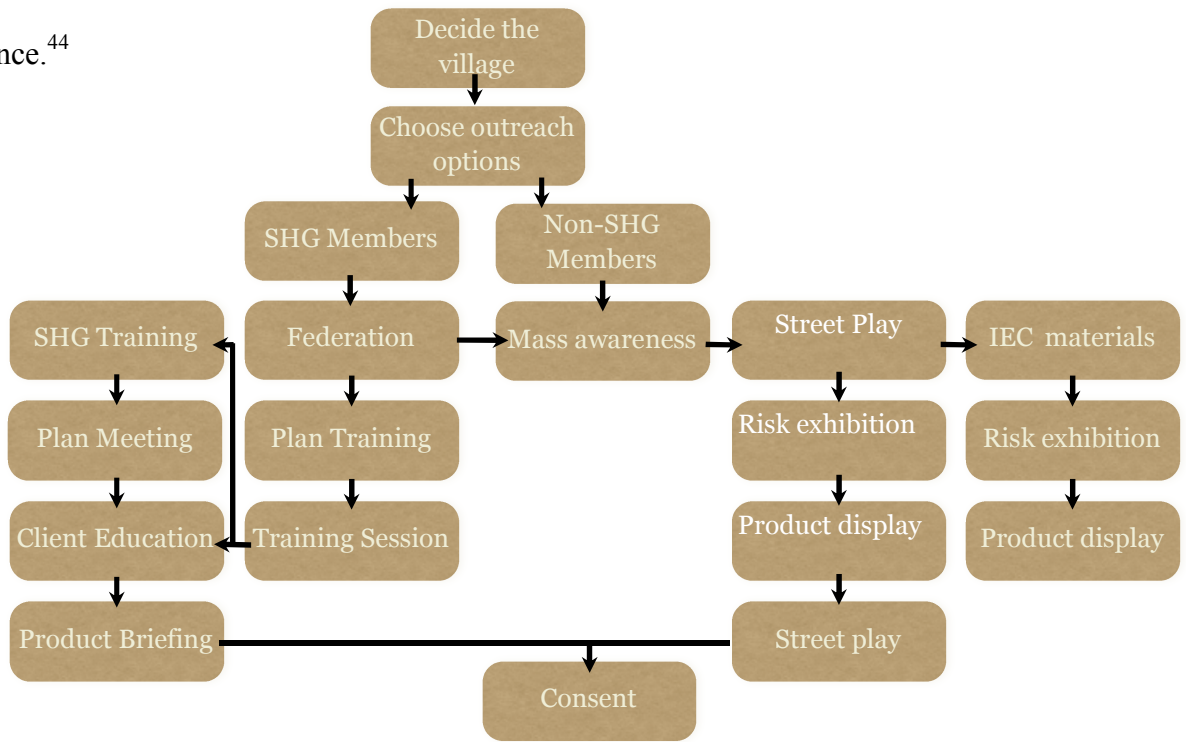
In conclusion, there needs to be a significant shift in mindset for the micro-insurer from traditional customers to those at the BoP. Individuals at the BoP are different in cultural norms, educational awareness, financial needs, financial wants, quality assurance, and price sensitivity—all of which must be consulted when constructing products for them. How to deliver products and what to project as a company image are very important factors too, which is why many MFIs partner with already trusted local companies. In terms of outreach, micro-insurers need to understand the complexity that is involved and how it deviates from traditional means. The chart below outlines a traditional insurance model⁴³:

⁴² Churchill, Craig (Ed.), Protecting the Poor: A Microinsurance Compendium. 2006. Page 18.

⁴³ Walter, Ingo. Insuring the Poor: Bajaj Allianz Microinsurance Initiatives in India. 2009. Page 9.



However, for micro-insurance, many steps must be taken even before the client gives his/her consent for the contract. From choosing the village to the types of educational materials the MFI should provide, many decisions and steps must be taken. Below is a chart of all the different possibilities and steps that are necessary for micro-insurance to be thorough and accurately marketed, and it is also the plan the Bajaj-Allianz initiative undergoes when issuing micro-insurance.⁴⁴



⁴⁴ Walter, Ingo. Insuring the Poor: Bajaj Allianz Microinsurance Initiatives in India. 2009. Page 9.

Indexed Rain Insurance

Agricultural insurance is a sect of insurance that many MFIs have not delved into. Only about 9 million of the 135 million who are covered have property insurance (the larger umbrella of agricultural insurance).⁴⁵ The United States has a model of crop insurance that has been very successful. I believe by using this model and “micro-tizing” it, rain insurance—a sect within crop insurance—can be very effective in high poverty areas, such as India. Further, agricultural products are now in demand in emerging economies because of the threat of food scarcity.⁴⁶ Currently, the United States has two forms of crop insurance, revenue insurance based, and yield based. The former, such as the adjusted gross revenue plan, insure the revenue of the farm rather than a specific crop by guaranteeing a percentage of average gross farm revenue. Crop revenue coverage, under the umbrella of revenue insurance, protects revenue based on the price and yield expectations by “paying for losses below the guarantee at the higher of an early-season price or harvest price.”⁴⁷ Further, the United States offers catastrophic coverage, which is paid by the Federal Government. Here, the coverage pays about 55% of the established price of the commodity on crop losses in excess of 50%. Therefore, there is a role for the federal government, too, to protect crops and farmers across the nation, not just private insurance companies.

Yield based insurance insures based on the amount a farm yields of a certain crop, or of many crops, however many the farm is insured for. The farmer is only covered in the event of a natural disaster, such as drought, frost, insects, and so on. S/he also chooses the amount of the farm s/he would like to insure, such as 50-100% of the pasture. If the harvest is less than what

⁴⁵ Please see Appendix F

⁴⁶ Insuring in Developing Countries: Exploring Opportunities in Micro-Insurance. Lloyd’s 360 Risk Insight. November 2009. Page 5.

⁴⁷ “Crop Policies and Pilots.” *United States Department of Agriculture*. << <http://www.rma.usda.gov/policies/>>>

was expected, the farmer is “paid an indemnity based on the difference...calculated by multiplying this difference by the insured percentage of the established price selected when crop insurance was purchased.”⁴⁸

Another methodology used in yield based crop insurance, is a rainfall index. This is collected by the NOAA’s Climate Prediction Center in the United States. Based on the rainfall, experts can assess if the crops received as much water as they need for an acceptable harvest. And, on the contrary, if crops received too much water, which would have devastating effects based on the crop in question. This, known as index insurance in the micro-insurance world, has become an innovative technique to overcome many of the issues with traditional agricultural insurance. With agricultural risks, fraudulent claims are a large risk as farmers will claim they lost crops due to inclement weather, but in actuality, rainfall during the season was adequate. Index insurance is compatible with insuring against natural disasters such as earthquakes, floods, and droughts. “For a holder of an index policy, payments do not depend on his or her individual losses but on an objective index such as rainfall level or earthquake magnitude. Once an index is calibrated and correlates well with actual losses, underwriting and claims verification costs for the insurer are minimal and moral hazard and fraud are virtually eliminated.”⁴⁹

Using a combination of these models, I believe rain insurance is a suitable and viable option for those who need micro-insurance in India. Farmers who purchase the insurance can do so knowing their crops will be insured if a drought does persist in their area. Further, faulty claims are reduced as actual rainfall measurement determines the value of the crops, and whether an individual will be compensated for crop damage.

⁴⁸ “Crop Policies and Pilots.” *United States Department of Agriculture*. << <http://www.rma.usda.gov/policies/>>>

⁴⁹ Insuring in Developing Countries: Exploring Opportunities in Micro-Insurance. Lloyd’s 360 Risk Insight. November 2009. Page 16.

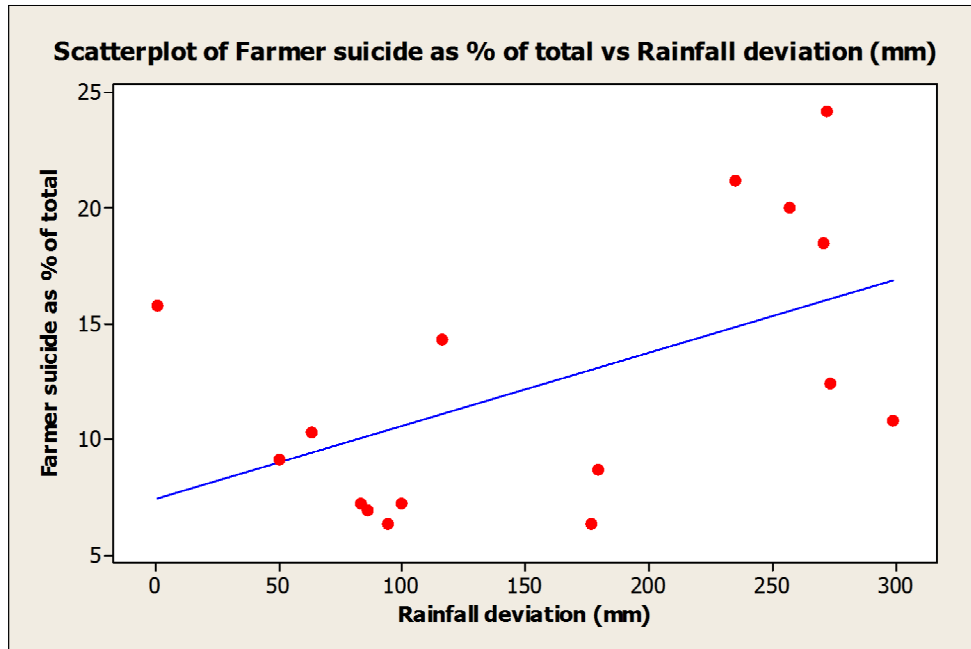
The Relation of Farmer Suicides to Rainfall

There has been no previous academic research outlining the connection between farmer suicides and rain, and that to micro-insurance. Qualitatively and intuitively, it makes sense to correlate the two. The less rain a farmer receives, the fewer crops s/he will be able to yield, the more indebted s/he may become, the more likely s/he may commit suicide. Although I have not been on the ground through several seasons of both the monsoon and non-monsoon seasons, I am attempting to make that connection based on data I have researched from several sources. IndiaStat, a website with data on many different economic metrics was one source I found useful in terms of suicide rates and rainfall. Using the actual rainfall, and the rainfall that is expected for each state, I was able to calculate the disparity between the two and use that as a proxy for how much rainfall, in millimeters, each state was short. To verify the farmer suicide rates, I used one of the only well-known studies on the subject, by K.Ngaraj from the Madras Institute of Development Studies, written in March of 2008.⁵⁰ Using this data, I was able to construct a regression which I will explain in detail throughout this section.

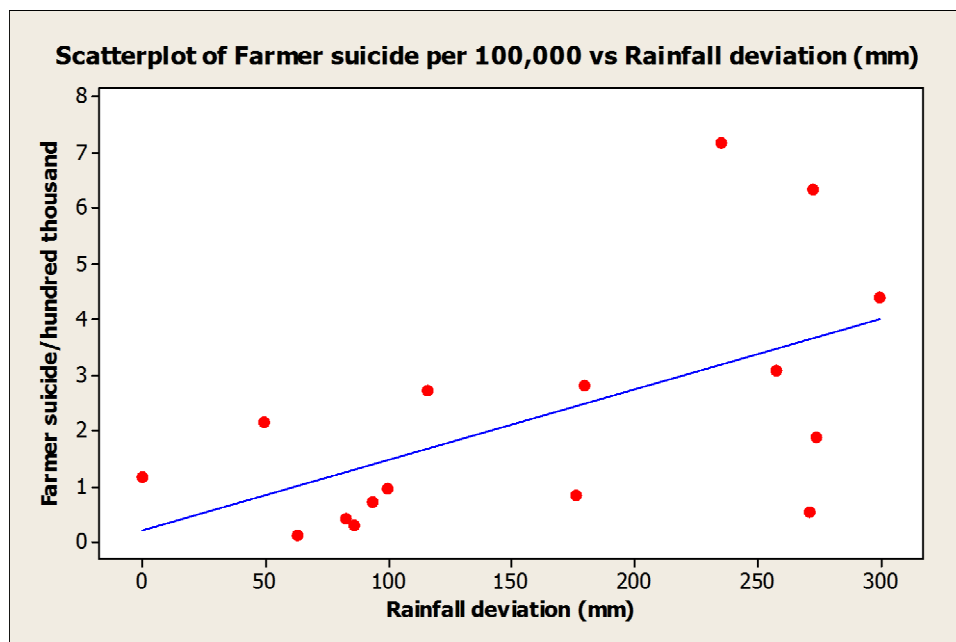
The predictor variable in this case is the deviation of actual rainfall to normal rainfall, and the response variable is farmer suicides in India. The scatterplots below shows a correlation between the lack of rain, or drought, that many states face and farmer suicide rates during that year. The first graph shows farmer suicides as a percentage of total suicides in the state versus the rainfall deviation that year⁵¹:

⁵⁰ Nagaraj, K. Farmer Suicides in India: Magnitudes, Trends, and Spatial Patterns. Madras Institute of Development Studies. March 2008.

⁵¹ Please see Appendix G.



As is obvious, there is a positive relationship between the two variables. As mentioned earlier, this intuitively makes sense. The following scatterplot shows farmer suicide per one hundred thousand individuals in terms of rural population against the rainfall deviation that year. We will be focusing on this graph and its respective regression to explain the statistical significance.



This scatterplot, too, shows a positive relationship, with no clear presence of any outliers or high leverage points that would tarnish the quality of the data. This model's equation is:

$$\text{Farmer suicides per one hundred thousand of the rural population} = \beta_0 \text{ (a constant)} + \beta_1 \text{ (the rain differential between actual and normal)}$$

The regression output, below, verifies the strength of the model.

Regression Analysis: Farmer suicide per hundred thousand versus Rainfall differential

The regression equation is
 suicide per hundred thousand = - 0.110 + 0.0158 Difference

Predictor	Coef	SE Coef	T	P
Constant	-0.1096	0.7576	-0.14	0.887
Difference	0.015842	0.004373	3.62	0.003

S = 1.59495 R-Sq = 48.4% R-Sq(adj) = 44.7%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	33.385	33.385	13.12	0.003
Residual Error	14	35.614	2.544		
Total	15	69.000			

Unusual Observations

Obs	Difference	suicide per hundred thousand	Fit	SE Fit	Residual	St Resid
2	235	7.180	3.613	0.553	3.567	2.38R

R denotes an observation with a large standardized residual.

The model predicts that:

$$\text{Farmer suicides per one hundred thousand of the rural population} = -.110 + 0.158(\text{Rainfall deviation})$$

The intercept, which is meaningful here, says that given that the difference in normal and actual rainfall is zero, the estimated expected rate of farmer suicides is -.110 per one hundred

thousand of the rural population. Obviously, a negative number of suicides is impossible, but we will discuss that point further in the section. The slope coefficient shows that a one percentage point change in the difference in rainfall is associated with an estimated expected 0.16 percentage point increase in farmer suicides. This shows the magnitude of reliance on rain related to farmer suicides.

The regression output has mixed results as to the effectiveness of the model, however we can confidently assess that there is a relationship between the two variables. By looking at the R-squared value, which measures the strength of an observed relationship by measuring the proportion of variability in y accounted for by the regression, we can determine how much of the variability in farmer suicides is accounted for the rainfall differential. In this case, 48.4% of the variability in farmer suicides is attributed to the rainfall differential. Further, we can test whether there is a significant relationship between x and y . The F-statistic of 13.12 is not exceptionally high, but it is about the threshold level of (1,14) degrees of freedom, or 4.6.⁵² This means that it is statistically significant and we can reject the null hypothesis that B_1 is not different from zero. Or, in other words, that the coefficient in front of the rainfall differential variable is different from zero.

The t-test attempts to prove that there is a relationship between the two variables. For the slope coefficient, a t-value of 3.62 is above the threshold level of 14 degrees of freedom, or 1.76.⁴² The p-value for the slope coefficient is far less than 0.5, showing that the variable has significant predictive capability. However, the t-statistic of the constant is not statistically significant. This means we cannot reject the null hypothesis that this coefficient is different than

⁵² "Distribution Tables." *StatSoft*. <<<http://www.statsoft.com/textbook/distribution-tables/#f05>>>

zero. Therefore, we cannot assume that there is some constant amount of farmer suicide given a zero differential in actual and normal rainfall, and the negative coefficient (-0.110), can be ignored. This too, makes sense. If there is no differential between normal rainfall and actual rainfall, we can assume now that the constant amount of farmer suicides is essentially, zero.

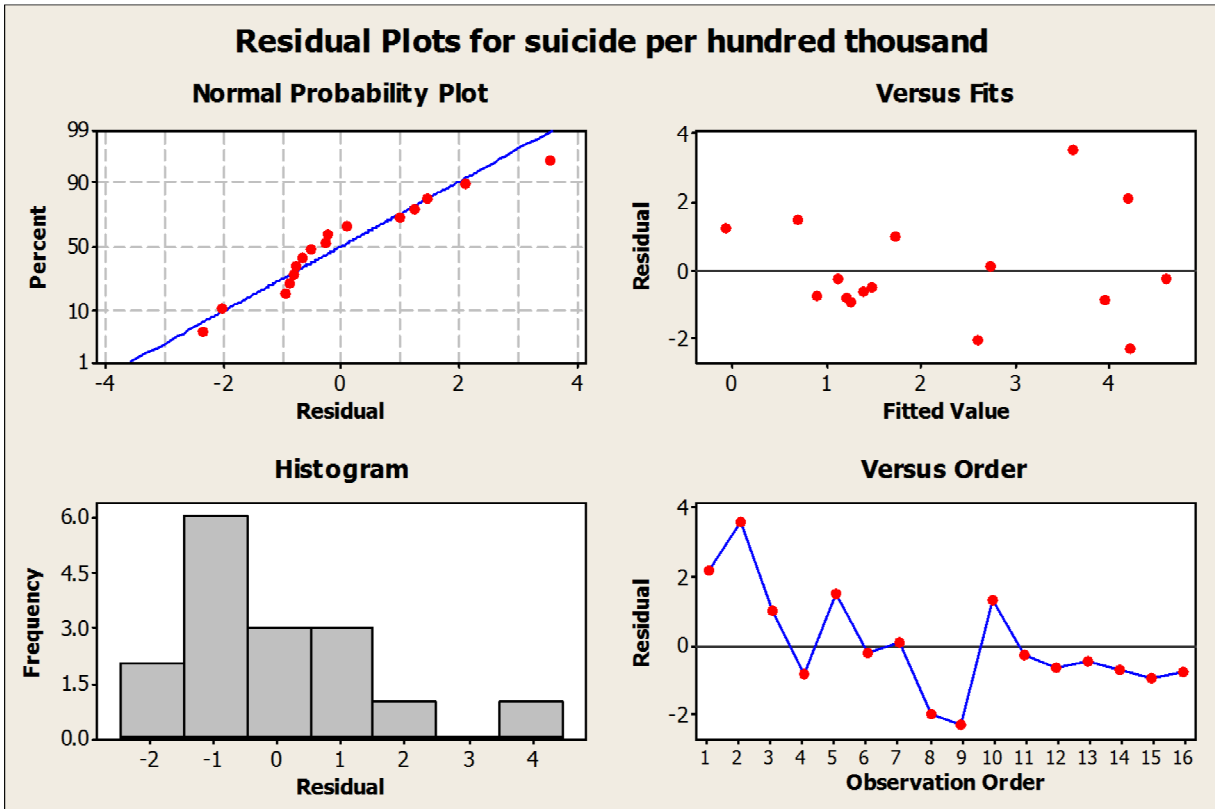
Next, we need to observe whether there are any potential outliers or leverage points that throw off the strength of the regression. Although our output does show a single unusual observation, we can run some diagnostics to see the extent that this observation disrupts the data output. The following table shows the standard residuals (SRES) and the high leverage points (HI1) for each state:

State	SRES1	HI1
Maharashtra	1.47741	0.180172
Karnataka	2.38428	0.120321
Andhra Pradesh	0.64734	0.069863
Madhya Pradesh	-0.59607	0.15343
West Bengal	0.99368	0.133663
Kerala	-0.16975	0.235499
Tamil Nadu	0.05735	0.070247
Uttar Pradesh	-1.33747	0.066723
Gujarat	-1.63126	0.182341
Rajasthan	0.9004	0.224049
Orissa	-0.18671	0.100284
Assam	-0.43244	0.083853
Haryana	-0.33309	0.079316
Bihar	-0.51344	0.115917
Punjab	-0.6399	0.090744
Himachal Pradesh	-0.52944	0.093577

None of the data points violate the $-3 < SRES < 3$ cushion that qualifies a point as an outlier, so we can safely assume that no outliers are throwing off the data. To check for high leverage points, we need to use the following equation:

$$2.5(p+1/n)$$

Whereby p is the number of predictors, in our case one, and n is the number of observations, in our case 16. In this case, this equation comes out to equal 0.3125. A high leverage point would be an observation with a HI value over 0.3125, and no observation fits this description. Of course, all these tests and predictions are based on believing that the assumptions of the regression hold. For instance, least squares regression assumes the residual errors must be a constant variance, normally distributed, uncorrelated with each other, and have an expected value of zero. The following charts help prove these points given our regression:



The graph on the top left, or the normal probability plot, we can determine roughly a straight line, which is what we hope to see as a curved line is evidence of non-normally distributed standard errors. The next graph, the residuals versus fits, we should see no signs of isolated points, nor a noticeable tilt, nor an impression of different heights as you move from left to right along the graph, which would be evidence of heteroscedasticity, or non-constant variance. In this plot, there is a small clouding of points, but no major patterns like those mentioned above. Finally, there is nothing to suggest that the errors are in any way correlated with each other, nor would we expect them to be given the nature of the data.

Using this statically significant data and realizing the fact that farmer suicide is in fact influenced by rainfall and drought in India, we are able to understand the meaning behind rain insurance and how it can provide a significant social benefit. Farmer suicide is a large problem in India, whether it is a few farmers who commit it each year, or hundreds who do it in mass. Using rain insurance to compensate farmers who have not received the appropriate amount of rain to grow a comparable harvest will mitigate the feelings of indebtedness and helplessness. It is of my opinion, that by mainly focusing on the alleviation of farmer suicide while implementing rain insurance as micro-insurance, MFIs will see significant social improvement. And with social improvement, comes more business. Other farmers, who realize those who invested in rain insurance are being socially uplifted, will jump on the bandwagon and invest to help their families stay afloat as well. Of course the social improvement of micro-insurance can be measured in other ways qualitatively. Quantitatively, is another issue, and one which is addressed theoretically in the next section.

Measuring Social Impact

Measuring social impact and social benefit of MFIs is one of the most controversial issues facing the industry. There are a variety of shortcomings for every metric possible, not to mention the fact that the data collected is very difficult to obtain accurately, and needs to be done in the country affected by that MFI. Quantitatively, it is a challenge to measure the social impact that financial services because of the challenge in isolating the variables. For example, to measure women empowerment, one may try to pinpoint when the woman gains control of micro-loans rather than her husband. Although good in theory, there is no way to know with certainty when a woman actually does get control of funds. Even personal interviews may have biased opinions on the woman's end, and therefore accuracy suffers. Another example is education. Many times scientists will try to gauge enrollment rates and see if there was a significant increase after a MFI entered a village. However, even if there was, it is impossible to decipher causation. No outsider can say with certainty that because of the loans a family took out, their children then enrolled in elementary school. Therefore, correlations are on the one hand, very difficult to measure and prove, but causality is almost impossible.

It is also a challenge to be objective when evaluating the social benefit of microfinance and micro-insurance. Even the most basic metric, defining the world's poor, has had a trying controversy. For a while the global poor was defined as the lives of individuals who survive on one dollar a day. More recently, it has been accepted that even those who spend two dollars a day are part of the global poor. If one cannot come to a verifiable consensus on what the world's poor is, it is extremely difficult to measure their improvement socially. The next step is to ensure the global poor, defined currently as those who live on two dollars a day, are actually receiving the services provided by the MFI. "...when client poverty is carefully measured, there is

evidence that shows that, on the one hand, many non-poor use microfinance and, on the other hand, most MFIs do not serve large numbers of the very poor.”⁵³ Therefore, purely assessing who is receiving the service is a difficult task, let alone the measurement of their life improvement on soft variables such as health, education, and empowerment.

Although the global poor is defined as living on two dollars a day, it is important to be aware of the many different levels of poverty within this tier of low income. As of 2005, 2.5 billion individuals were in this category, and 1.1 billion were living on solely one dollar a day.⁵⁴ It is easy to see that within these billions of individuals, effects of micro-insurance and micro-credit can vary greatly. Not only by country and culture, but by the sheer nature of their day to day lives given the lowly amount they spend a day. If the ‘wealthier’ clients have a greater access to financial services than those whom are ‘poorer’ in this subset, they may realize much more benefits than the latter group. Here also, selection bias comes into play. It has been argued that those who are more willing to better their lives, those who are harder working, those who have better health, those who have better education, are those who will seek the help of microfinance. Those will be the individuals whom will be proactive in the betterment of their lives. Therefore, comparing them to the average poor individual in a village or country is not one hundred percent accurate as the average villager may not have the aforementioned characteristics that motivate them to gain access to micro-financial-services.

On the other hand, it is important to note that while it is difficult to prove quantitatively the social benefit of microfinance and micro-insurance, it is also hard to disprove it. Two well-known studies have recently been brought to light which raise doubts about the beliefs and

⁵³ Meyer, Richard L. What’s wrong with microfinance?, Chapter 18. *Measuring the impact of microfinance*. Page 226.

⁵⁴ Collins, Daryl and Morduch, Jonathan and Rutherford, Stuart and Ruthven, Orlanda. Portfolios of the Poor, 2009. New Jersey: Princeton University Press. Page 1.

ultimate benefits of microfinance. The studies claim to use “randomized controlled trial methodologies,” and found little or no impact on health, education, and women empowerment.⁵⁵ One study, which employed researchers from the Massachusetts Institute of Technology, studied slums in Hyderabad, India for approximately a year and a half. In this study the researchers claim that half of the slums were randomly selected and received access to financial services, while the other half had no access to the same services. The second study, conducted by two researchers from Yale University and Dartmouth College, utilized a similar method but assessed Manila, Philippines, instead. ““While microcredit succeeds in affecting household expenditure and creating and expanding businesses, it appears to have no discernable effect on education, health, or women’s empowerment,”” the India study phrased.⁵⁶ Both relayed that in the short term, microfinance does not have the desired effect on households that align with the withstanding belief of microfinance’s image.

There are several issues with these studies, just as there are several issues with measuring the success of micro-finance on the other side of the coin. These studies, firstly, have made their decision on the failure of microfinance with regards to the softer variables on an extremely short time frame. MFIs do not expect miraculous changes in lifestyles within every facet of a family’s life in fifteen months. It is not possible, and also not expected. As stated earlier, Mary Ellen Iskenderian, President and CEO of Women’s World Banking, made it clear in her keynote speech at New York University’s New Challenges in Microfinance Seminar that, based on years of studying specific villages, on average it takes three years before women gain control of the funds. She gauged this number by studying decision making patterns, which indicated a female

⁵⁵ Knowledge@Wharton. “How to Measure Microfinance’s Social Impact.” *Forbes*. December 2, 2009. <<<http://www.forbes.com/2009/12/02/microfinance-poverty-wharton-entrepreneurs-finance-wharton.html>>>

⁵⁶ Ibid

head of the household was starting to make financial decisions. Women, tend to make more frugal decisions and ones that will better the family in terms of sustainability.⁵⁷ Therefore a year and a half of studying one particular village will most likely not yield the same results as a longer study.

Further, the study claims to have a control group which had no access to MFI services. Logically, it does not make sense that an MFI would refrain from entering a market because a few researchers are attempting to conduct a study on the effects of microfinance. For example, Paul Breloff, former Vice President of Business Development at SKS, the largest MFI in India,⁵⁸ confirmed the previous thought. He admitted that while the study was taking place, SKS was indeed serving financial services to those individuals in the “control” group. He further stated that because the slums in Hyderabad were close proximity wise, it is inaccurate to claim those receiving financial services were not helping families or friends in the slums next door. Therefore, there are a number of issues that surround the measurement of success of MFIs, both from a positive and negative viewpoint.

There is no mastered science on how to measure the social benefit of microfinance quantitatively. This paper does not attempt to prove that fact quantitatively, given the resources available to the author. Especially given the nascent field of micro-insurance, and the subset of that, rain insurance, it is very difficult to accurately and confidently say with numbers the social benefit. Qualitatively, this paper has tried to show there is significant benefit to be gained by the poor of the world from micro-insurance.

⁵⁷ “Microfinance: A Platform for the Empowerment of Women.” *Allianz*. <<
http://knowledge.allianz.com/en/globalissues/microfinance/microfinance_basics/microfinance_women.html>>

⁵⁸ “SKS – India’s Largest Micro Finance Institution.” *TravelPod*. August 26, 2008. <<
<http://www.travelpod.com/travel-blog-entries/martysb/1/1219773000/tpod.html>>>

Conclusion

As illustrated throughout this paper, the micro-insurance industry is a nascent one, with a lot of room for growth. Only about 5% of the developing world is covered by some form of micro-insurance, leaving a huge portion of the poor population untapped.⁵⁹ These individuals may not fully understand the concept of insurance or be initially culturally aware of the idea. However, although there are many challenges in the implementation of micro-insurance, they can be overcome through education, shift in traditional mindset of the insurers, and customizing products to better suit the needs of the poor.

It has been argued that insurance is a right to all humans across the globe. Every individual deserves the access to be protected against risks they may be susceptible to and which could also cause extreme financial burden. This social protection can take the form of insurance, where poor citizens can purchase a service that will compensate them for extremely hazardous situations. In theory, we project that microfinance is a way to help individuals come out of poverty. But, it is micro-insurance that allows that to be a sustainable foothold. This is because using micro-credit allows poor individuals to start businesses and become entrepreneurs, but in order for that wealth to accumulate rather than disappear with one unforeseen disaster, such as a health crisis or a destructive fire, insurance must be issued.

I have described the issue of farmer suicide in India. The fact that many farmers turn to this face given the financial burdens of private or informal lenders compounded with droughts that ruin their harvest leads to a very dismal situation. The alleviation of suicide should be viewed as a social good, and using micro-insurance to formulize the goal can be viewed as social

⁵⁹ “Microinsurance potential market between 1.5 and 3 billion policies: Lloyd’s report.” *Microfinance Focus*. November 2009. << <http://www.microfinancefocus.com/news/2009/11/22/microinsurance-potential-market-between-1-5-and-3-billion-policies-lloyd%E2%80%99s-report/>>>

impact. This paper delved into the intricacies of measuring social benefit and social impact, and the controversy that it is associated with. It is difficult to gauge accurately and precisely the benefit microfinance has on poor individuals whom utilize it for a number of reasons. Using this precedent it is even more difficult to assess the social impact of micro-insurance, given its emerging nature and small penetrated market.

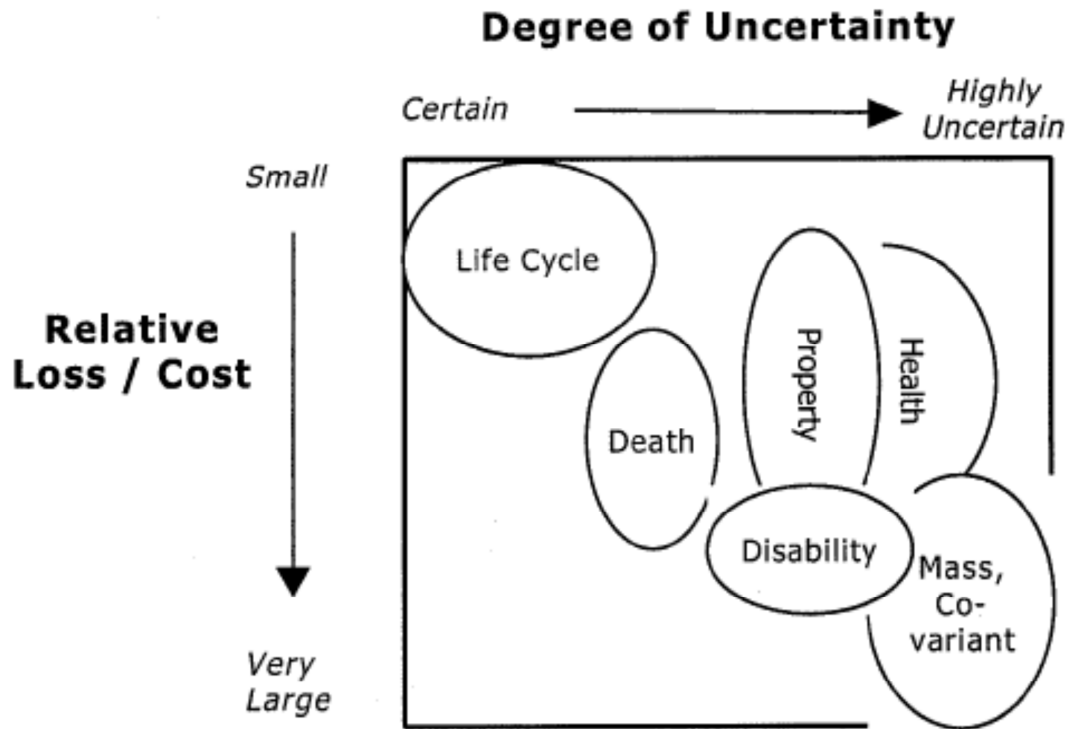
However, both statistically and logically I have attempted to prove there is a correlation between farmer suicides in India and the amount of rain that falls each year. This makes sense logically as, the less rain, the more likely a farmer will commit suicide as their crops do not yield as much as expected. Falling deeper into debt, they turn to suicide. It is important to note that most suicides occur during the seasons when the farmer realizes his/her crops will not be as fruitful as s/he hoped or when selling seasons begins and s/he receives fewer sales than s/he hoped for.⁶⁰

In conclusion, it is my theory and thought that micro-insurance, especially indexed rain insurance, can have a significant social benefit in alleviating farmer suicide in India. Indexed rain insurance can be both a feasible and reliable solution to the problem of farmer suicide. When less rain occurs in a region, farmers who have invested in insurance will be compensated for the loss of crops of what the farmer would usually yield. For this security, they pay a premium. Indexed rain insurance is a viable solution to the growing problem of farmer suicide. It is my belief that if it becomes widespread in India, not only will it mitigate these deaths, but alleviate the issue significantly.

⁶⁰ Lohan, Tara. "1,500 Indian Farmers Commit Mass Suicide: Why We Are Complicit in These Deaths." *AlterNet*. April 16, 2009. <<http://www.alternet.org/economy/137059/1,500_indian_farmers_commit_mass_suicide:_why_we_are_complicit_in_these_deaths/>>

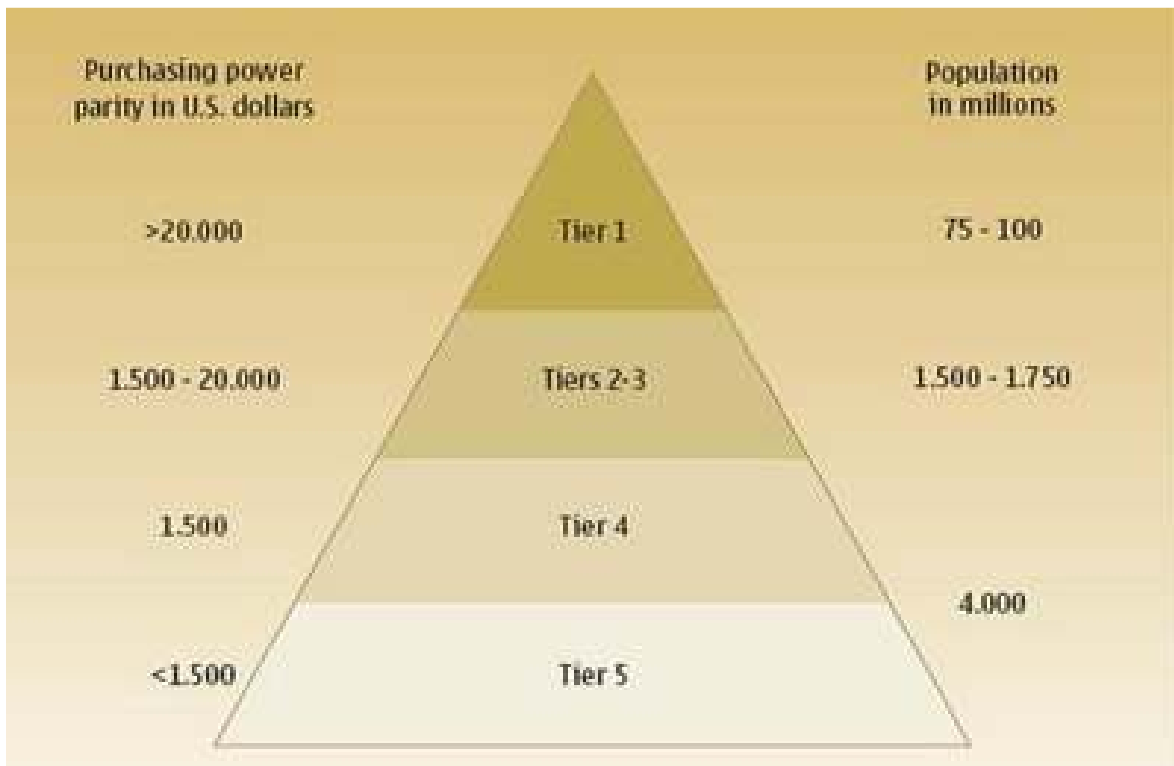
APPENDIX

A



Source: Bamako 2000, Innovations in Microfinance: Insurance as a Microfinance Product, 2001. Page 2.

B



Source: Prahalad, C.K. and Hart, Stuart. (2002) The Fortunate at the Bottom of the Pyramid. New Jersey: Wharton School Publishing.

C


Table 2.1
Insurance Companies in India, 2005

Life Insurance Companies	
Private Sector	Public Sector
Bajaj Allianz Life Insurance Company Ltd, Pune Birla Sunlife Insurance Company Ltd, Mumbai HDFC Standard Life Insurance Company Ltd, Mumbai ICICI Prudential Life Insurance Company Ltd, Mumbai Ing Vysya Life Insurance Company Pvt Ltd, Bangalore Max New York Life Insurance Company Ltd, Gurgaon Metlife India Insurance Company Pvt Ltd, Bangalore Kotak Mahindra Life Insurance Company Ltd, Mumbai SBI Life Insurance Company Ltd, Mumbai TATA AIG Life Insurance Company Ltd, Mumbai Reliance Life Insurance Company Ltd, Chennai Aviva Life Insurance Company India Pvt Ltd, Gurgaon Sahara India Life Insurance Company Ltd, Lucknow Shriram Life Insurance Company Ltd, Hyderabad	Life Insurance Corporation of India, Mumbai
Non-Life Insurance Companies	
Private Sector	Public Sector
Bajaj Allianz General Insurance Company Ltd, Pune ICICI Lombard General Insurance Company Ltd, Mumbai IFFCO Tokio General Insurance Company Ltd, Gurgaon Reliance General Insurance Company Ltd, Mumbai Royal Sundaram Alliance Insurance Company Ltd, Chennai TATA AIG General Insurance Company Ltd, Mumbai Cholamandalam Ms General Insurance Company Ltd, Chennai HDFC Chubb General Insurance Company Ltd, Mumbai	National Insurance Company Ltd, Kolkata New India Assurance Company Ltd, Mumbai Oriental Insurance Company Ltd, New Delhi United India Insurance Company Ltd, Chennai Export Credit Guarantee Corporation Ltd, Mumbai Agriculture Insurance Company of India Ltd, New Delhi


Source: Building Security for the Poor: Potential and Prospects for Microinsurance in India. Human Development Report Unit. 2007. Page 32.

D

INSURE LIVES & LIVELIHOODS
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Micro insurance is an effective risk reduction tool against natural disaster and other risks undermining livelihoods of low-income households and thus empowering low income households through financial inclusion.



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E


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Programme schedule



10.30 am to 10.40	Display on Micro Insurance
10.40 am to 10.45	Prayer and welcome Speech
10.45 am to 10.50	Song on Micro Insurance
10.50 am to 11.00	Experience Sharing (Lifer Award) + Claim Distribution
11.00 am to 11.15	Villa Party on Micro Insurance (Mrs. Moheswary & Team)
11.15 to 11.20	Felicitation By MR. Michael (Allianz - Germany)
11.20 am to 11.25	Felicitation by Sr. Prudha (Director-SMDS)
11.25 to 11.30	Felicitation by Mr. Devaprakash (TL- Care, Chennai)
11.30 to 11.35	Coin Box Distribution
11.35 to 11.40	Vote of Thanks

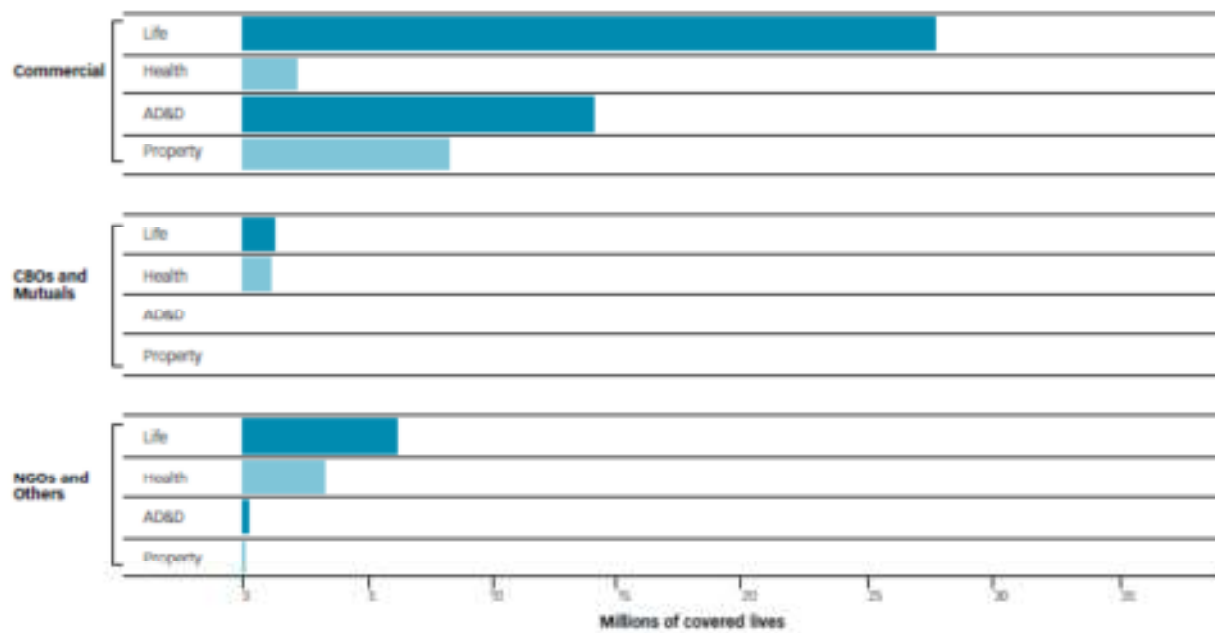






Source: "Mass Awareness and Enrollment Campaign." Bajaj-Allianz Care Initiative.

F



Source: Bamako 2000, Innovations in Microfinance: Insurance as a Microfinance Product, 2001.

G

State - 2001	# of Suicides Among Farmers	# Farmer's Suicides as a Percent of all Suicides	Rural Population	Suicide per Hundred Thousand	Normal (mm)	Actual Rainfall (mm)	Difference
Maharastra	3536	24.2	55,777,647	6.3394571	1212	940	272
Karnataka	2505	21.2	34,889,033	7.1799066	1140	905	235
Andhra Pradesh	1509	14.3	55,401,067	2.7237743	940	824	116
Madhya Prades	1372	20	44,380,878	3.0914215	1090	833	257
West Bengal	1246	9.1	57,748,946	2.1576151	1439	1389	50
Kerala	1035	10.8	23,574,449	4.3903465	3107	2808	299
Tamil Nadu	985	8.7	34,921,681	2.8205973	975	795	179
Uttar Pradesh	709	18.5	131,658,339	0.5385151	1025	854	171
Gujarat	594	12.4	31,740,767	1.8714104	1107	833	274
Rajasthan	505	15.8	43,292,813	1.1664754	575	574	1
Orissa	256	6.3	31,287,422	0.8182202	1764	1688	76
Assam	167	6.3	23,216,288	0.7193226	2818	2724	94
Haryana	145	7.2	15,029,260	0.9647847	617	517	100
Bihar	88	10.3	74,316,709	0.1184121	1186	1123	63
Punjab	45	6.9	16,096,488	0.2795641	649	563	86
Himachal Prade	22	7.2	5,482,319	0.4012900	1251	1168	83

WORKS CITED

1. Allianz. Microfinance: A Platform for the Empowerment of Women. <<http://knowledge.allianz.com/en/globalissues/microfinance/microfinance_basics/microfinance_women.html>>
2. Andrabi, Jalees. (July 9, 2009) Indian Farmers Threaten Mass Suicide. << <http://www.thenational.ae/article/20090709/FOREIGN/707089830/1103/NEWS>>>
3. Barnako 2000. (2001), Innovations in Microfinance: Insurance as a Microfinance Product.
4. CGAP. Microinsurance Overview. <<<http://www.microfinancegateway.org/p/site/m/template.rc/1.11.48248>>>
5. Churchill, Craig (Ed.) Protecting the Poor: A Microinsurance Compendium. (Rome: International Labour Office, 2006).
6. Collins, Daryl and Morduch, Jonathan. (2009). Portfolios of the Poor. New Jersey: Princeton University Press.
7. Garcia, A Bonilla and Gruat, J.V. (November 2003) Social Protection. *International Labour Office*. <<<http://www.ilo.org/public/english/protection/download/lifecycl/lifecycle.pdf>>>
8. Honohan, P. <<www.knowledge.allianz.com>>
9. Human Development Report Unit. (2007) Building Security for the Poor: Potential and Prosepects for Microinsurance in India.
10. Knowledge@Wharton. (December 2, 2009) How to Measure Microfinance's Social Impact. *Forbes*. <<<http://www.forbes.com/2009/12/02/microfinance-poverty-wharton-entrepreneurs-finance-wharton.html>>>
11. Knowledge@Wharton. (October 10, 2009). Micro-Insurance: A Safety Net with Too Many Holes. *Forbes*. <<<http://www.forbes.com/2009/10/10/micro-insurance-bangladesh-entrepreneurs-finance-wharton.html>>>
12. Lloyd's 360 Risk Insight. (November 2009) Insuring in Developing Countries: Exploring Opportunities in Micro-Insurance.

13. Lohan, Tara. (April 16, 2009). 1,500 Indian Farmers Commit Mass Suicide: Why We Are Complicit in These Deaths. *AlterNet*. <<http://www.alternet.org/economy/137059/1,500_indian_farmers_commit_mass_suicide_why_we_are_complicit_in_these_deaths/>> Microfinance Focus. (November 22, 2009).
14. Meyer, Richard L.(2007) What's wrong with microfinance? (pp. 226-238). Practical Action Publishing.
15. Microinsurance potential market between 1.5 and 3 billion policies. Lloyd's Report. <<<http://www.microfinancefocus.com/news/2009/11/22/microinsurance-potential-market-between-1-5-and-3-billion-policies-lloyd%E2%80%99s-report/>>>
16. Nagaraj, K. (March 2008). Farmer Suicides in India: Magnitude, Trends, and Spatial Patterns. *Madras Institute of Development Studies*.
17. Shukla, Shubhlakshmi.(December 26, 2009) Radio ear tags for cattle in tribal Sabarkantha. *Indian Express*. <<<http://www.indianexpress.com/news/radio-ear-tags-for-cattle-in-tribal-sabarkantha/559352/0>>>
18. StatsSoft. Distribution Tables. <<<http://www.statsoft.com/textbook/distribution-tables/#f05>>>
19. The Independent. (April 15, 2009). 1,500 Famers Commit Suicide in Mass in India. <<<http://www.independent.co.uk/news/world/asia/1500-farmers-commit-mass-suicide-in-india-1669018.html>>>
20. The Microinsurance Center. <<www.knowledge.allianz.com>>
21. Times of India (February 2, 2010). Farmer Suicides—Karnataka in the top 5 states says Sainath. <<<http://timesofindia.indiatimes.com/city/bangalore/Farmer-suicides--Karnataka-in-top-5-states-says-Sainath/articleshow/5525519.cms>>>
22. United States Department of Agriculture. Crop Policies and Pilots. <<<http://www.rma.usda.gov/policies/>>>
23. Walter, Ingo. (2009) Insuring the Poor: Bajaj Allianz Microinsurance Initiatives in India.