



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Performance of Crop Yield and Rainfall Insurance Schemes in Odisha: Some Empirical Findings

Mamata Swain*

Department of Economics, Ravenshaw University, Cuttack - 753 003, Odisha

Abstract

This paper makes a comparative assessment of the performance of the National Agricultural Insurance Scheme (NAIS) (an area-based crop yield insurance) and the pilot Weather Based Crop Insurance Scheme (WBCIS) (an area-based rainfall insurance) under implementation in the state of Odisha in terms of their coverage, financial performance and operational efficiency in providing a safety net to the farmers when they experience crop loss. The study has used time series secondary data and also primary data collected from 100 sample WBCIS users from the Bolangir district and 100 NAIS users from the contiguous Kalahandi district in the drought-prone western Odisha. The study has revealed that WBCIS performs better than NAIS because of its higher adoption rate, higher percentage of farmers benefited, lower premium, faster claim payment, and frequent indemnity payment. Though the findings show WBCIS to be a more popular scheme than NAIS, in a frequently disaster-affected state like Odisha, the study sees a need for a multi-peril crop yield insurance scheme like NAIS.

Key words: Risk in agriculture, adaptation, crop insurance schemes, weather, yield performance, Odisha

JEL Classification: Q14, Q18, Q54

Introduction

Agriculture is a highly risky venture due to occurrence of natural calamities, pest attack and plant diseases, which are unpredictable and non-preventable risks. Therefore, farmers are required to insure their crops, so that in the event of crop failure, insurance provides them economic support, stabilizes their farm income, induces them to invest in agriculture, reduces their indebtedness and decreases the need for relief measures. Thus, realising the need for crop insurance, the Government of India has implemented various agricultural insurance schemes from time to time. Usually the Central Government announces the scheme details and the state governments may adopt the schemes for their respective states with minor modifications. The National Agricultural Insurance Scheme (NAIS), which is currently under

implementation in 27 states of India, was launched in 1999. This is an area-based crop yield insurance scheme which, during 2011-12, covered 16.7 million farmers and a cultivated area of 23 million hectares (Mha). In order to speed up claim payments, the Weather Based Crop Insurance Scheme (WBCIS), popularly known as rainfall insurance, was introduced in 2007 on a pilot basis and is currently executed in 19 states. During 2011-12, the scheme covered around 11.6 million farmers and 15.6 Mha of land area. In comparison with crop yield, rainfall as an index is more objective and easier to measure and verify. However, the penetration of insurance in India is less than 20 per cent of total farming households, which is a major concern for the government.

There has been an efflorescence in research studies on agricultural insurance in recent times assessing the feasibility and evaluating the performance of different crop insurance schemes. Many such studies have

*Email: mama_swain@hotmail.com

revealed that these schemes have become fiscally burdensome and unsustainable (Skees *et al.*, 1999). The main reasons adduced by economists for the disappointing performance of crop insurance in both developing and developed countries are: (i) it attempts to provide multi-peril coverage for the correlated and covariate risks which in fact cannot be pooled and thus are not insurable; (ii) it has given rise to a moral hazard among insurers, who have had to rely on government bailouts within a subsidized premium-setting (Yaron *et al.*, 1997); and (iii) it has given rise to a moral hazard in relation to either the farmers or the region because of high-risk farmers/states/regions benefiting more from the scheme.

In India too, many empirical studies have attempted to evaluate the performance of crop insurance schemes. Analysing the secondary time series data on the performance of NAIS, many such studies have concluded that this scheme has failed to achieve its objectives owing to its low coverage, poor financial performance and low effectiveness (Sinha, 2004; Kalavakonda and Mahul, 2005; Vyas and Singh, 2006; Raju and Chand, 2008a; 2008b). The WBCIS, on the other hand, is considered an improvement over NAIS because rainfall as an index, in comparison to crop yield, is easier to measure objectively and, hence, the process of data collection is more transparent and less time-consuming. In turn, the administrative cost is low, thus facilitating quicker payment of indemnity to the buyers of insurance.

Moreover, WBCIS eradicates the problems of moral hazard and adverse selection (Hess, 2003). Additionally, WBCIS allows reinsurance by the primary insurer as it is based on standardized/well-defined internationally verifiable data. The major drawback of WBCIS, however, is that it covers only the weather-related risks so that if there is crop loss due to any other reason such as plant disease and pest attack, the insured farmer does not get any compensation. The most challenging disadvantage of WBCIS, however, is the basis risk, which refers to the variability between the value of losses as measured by the weather index and the value of actual losses experienced on the farm (Collier *et al.*, 2009). Furthermore, in WBCIS, the start-up cost is high as time series and historical data on rainfall and yield are required to define the trigger events that necessitate indemnity payment.

In the above backdrop, the present study has examined the performance of NAIS and WBCIS in the state of Odisha with the objectives: (i) to make a comparative assessment of the performance of NAIS and WBCIS with respect to their coverage, financial performance, and operational efficiency as risk management strategies, and (ii) to suggest measures to make them financially viable, administratively implementable, socially acceptable, and more efficient and effective in managing agricultural risk in the context of the increased vulnerability of crop production due to climate change. To date, there are no empirical studies on assessing the comparative operational efficiency of NAIS and WBCIS in India, more specifically in Odisha, using both secondary and primary data. The present study attempts to fill this research gap.

Data and Methodology

To evaluate the functioning of NAIS and WBCIS in Odisha, data were collected from both primary and secondary sources. The secondary data on various performance indicators of these schemes such as area and number of farmers covered, sum assured, premium collected, claims paid, and farmers benefited in Odisha were collected from the year of inception of these schemes in the state from the regional office of the Agriculture Insurance Company of India Limited, Bhubaneswar. Thus, data were collected for NAIS for the period 2000 to 2010, and for WBCIS for three years only, i.e., from 2008 to 2010.

The primary data were collected through a field survey in two districts, namely Bolangir and Kalahandi. The Bolangir district was selected to assess the performance of WBCIS because it is most vulnerable to the drought risk. To examine the performance of NAIS, we included the Kalahandi district, which is contiguous with Bolangir and has similar socio-economic and ecological characteristics.

The economies of the Bolangir and Kalahandi districts are predominantly agrarian with more than 90 per cent of the households living in rural areas. The literacy rates for the Bolangir and Kalahandi districts are nearly 66 per cent and 60 per cent, respectively. Of the total population, the scheduled castes (SC) and scheduled tribes (ST) constitute 38 per cent in Bolangir and 47 per cent in Kalahandi (GoI, 2011). Paddy is the

major crop grown in the area during the *kharif* season. More than 80 per cent of cultivators belong to the marginal and small farmers category with most of them following mono-cropping due to inadequate irrigation facilities. Agriculture is mostly rain-fed in these two districts. The percentage of gross irrigated area to gross cropped area is 26 per cent in the Kalahandi district and only 19 per cent in the Bolangir district (GoO, 2011b). In both the districts, agriculture is prone to major contingencies like drought, flood, pests and disease outbreaks in addition to the occasional heat-waves.

For the study, multi-stage sampling method was used. After selecting Bolangir and Kalahandi districts, we selected five blocks from each district and then two villages from each block and finally from each village 10 users of the insurance scheme. Thus, the sample covered 200 adopters of crop insurance schemes — 100 NAIS and 100 WBCIS.

The data were collected on demographic characteristics, landholding patterns, asset positions, sources of income, indebtedness status, etc. by using a structured questionnaire through personal interview method between October 2011 and May 2012. The data were also gathered on the agrarian economy, including crop yield, cropping pattern, cost of cultivation and farm income, for the 2011 *kharif* season. Information on different sources of agricultural risk in the study area was collected from the farmers along with the

adaptation measures they use to manage agricultural risk and the importance of insurance as a risk management strategy in terms of farmer preferences. The scale of satisfaction of farmers with crop insurance schemes was measured by interviewing the adopters of the insurance schemes. The opinions of the farmers were also solicited on the ways to improve crop insurance schemes through several rounds of focussed group discussions with the insurance users.

Coverage of Crop Insurance Scheme

Table 1 shows that the area under NAIS during both *kharif* and *rabi* seasons has increased over the period 2000-2010. The total area under NAIS has increased from 0.86 Mha in 2000 to 1.06 Mha in 2010, but area as percentage of the gross cropped area has only increased from 10.1 per cent in 2000 to 11.7 per cent in 2010 (Table 1). Thus, the penetration of NAIS is very low, as nearly 90 per cent of the gross cropped area in the state of Odisha is not yet covered under NAIS.

For the farmers taking crop loans from institutional sources such as commercial banks, cooperatives and regional rural banks, the adoption of NAIS is compulsory, but for non-loanee farmers, it is voluntary. Therefore, a break-up analysis was carried out of area and farmers covered according to loanee and non-loanee categories to examine the farmers' adoption rate of NAIS and WBCIS voluntarily (Table 2). Since

Table 1. Coverage of NAIS in Odisha state for period 2000-2010 *kharif* and *rabi* seasons

Year	Gross cropped area (⁰ 000 ha)	Area under NAIS (⁰ 000 ha)			% of GCA under NAIS
		<i>Kharif</i>	<i>Rabi</i>	Total	
2000	8526	752	109	860	10.1
2001	7878	625	175	800	10.2
2002	8799	1378	123	1501	17.1
2003	7853	634	178	812	10.3
2004	8638	943	198	1141	13.2
2005	8718	923	217	1140	13.1
2006	8928	890	200	1090	12.2
2007	8960	906	139	1044	11.7
2008	9014	591	145	735	8.2
2009	9071	981	132	1113	12.3
2010	9075	1031	32	1063	11.7

Source: Computed from data collected from the Regional Office of National Agriculture Insurance Company of India, Bhubaneswar

Table 2. Percentage distribution of insurance users and area covered under NAIS and WBCIS according to non-loanee category of farmers in Odisha, Kharif 2000-2010

Year	No. of insurance users		Area covered	
	Total No. of insurance users ('000 Nos.)	% of non-loanee insurance users	Total area ('000 ha)	% of area of non-loanee insurance users
NAIS				
2000	681	11.9	752	10.5
2001	628	10.4	625	9.4
2002	1205	45.6	1378	46.8
2003	638	3.8	634	5.2
2004	873	11.3	943	14.7
2005	900	0.9	923	1.6
2006	880	1.6	890	2.6
2007	841	0.5	906	0.8
2008	611	2.6	591	4.5
2009	1069	3.0	981	5.4
2010	1108	1.0	1031	1.9
2009-2010	2176	2.0	2013	3.6
WBCIS				
2008	13	100	22	100
2009	81	8.8	113	14.1
2010	75	2.9	102	5.7
2009-2010	156	6.0	215	10.1

Source: Computed from data collected from the Regional Office of National Agriculture Insurance Company of India, Bhubaneswar

WBCIS covers only the *kharif* season, for comparison the adoption behaviour of NAIS users was considered during the *kharif* season only. During 2010 *kharif* season, only one per cent of NAIS users were non-loanees and they accounted for 1.9 per cent of the total area under NAIS, which is a cause for concern. Further, the trend analysis revealed that over the 2000-2010 *kharif* seasons, the percentage of non-loanee farmers availing themselves of NAIS has declined substantially, from 11.9 per cent in 2000 to only one per cent in 2010 (Table 2). Likewise, the percentage of area covered by non-loanee farmers had declined from 10.5 per cent in 2000 to only 1.9 per cent in 2010. This suggests that the insurance scheme has gained only scant acceptance among non-loanee farmers for whom insurance is voluntary. Attempt to explore the reasons for such a low non-adoption of NAIS through the focussed group discussions with the farmers and the implementing agency personnel, revealed that while cooperatives,

regional rural banks and the State Bank of India extend insurance facilities to the loanee farmers, for whom insurance is compulsory, they are reluctant to provide insurance services to non-loanee farmers due to the additional work burden and the shortage of manpower. Moreover, most of the farmers are unaware of the benefits of the insurance schemes, as no awareness generation campaigns have been conducted in the area by either the Agriculture Insurance Company or the financial institutions.

In the case of WBCIS, during 2008, the scheme was available to only non-loanee farmers; hence, all the farmers buying insurance were non-loanees. In the 2009 and 2010 *kharif* seasons, the percentage of non-loanee farmers was 8.8 per cent and 2.9 per cent, respectively (Table 2). During the period 2009-2010, the percentage of the number and the area of non-loanee farmers covered was higher for WBCIS than for NAIS adopters. The adoption rate was higher in the case of

WBCIS than for NAIS because of its transparency and the speedier payment of indemnity. Moreover, the survey revealed that for WBCIS the percentage of repeat buyers (at 90%) was substantially higher than that for NAIS (at 10 %). This indicates that WBCIS users were more satisfied with the scheme and were inclined more to buy it during the next crop season.

The NAIS covers various crops during *kharif* and *rabi* seasons. In Odisha, during the 2009-10 *kharif* season, out of a total insured area of 0.98 Mha, the paddy coverage was as high as 0.95 Mha, i.e. nearly 97 per cent of the total cropped area. The other crops covered were maize (15,276 ha), cotton (8457 ha), ginger (1039 ha), turmeric (767 ha) and groundnut (140 ha). During the *rabi* season, too, paddy was the most important insured crop (11,2953 ha), followed by groundnut (13611 ha) and potato (8467 ha). However, WBCIS covers only paddy during the *kharif* season and does not cover any other crop during the *rabi* season. Moreover, while NAIS covers all types of production risks including various natural calamities, pest attacks, and plant diseases, WBCIS covers only crop losses due to rainfall deficit or excess.

Performance of NAIS and WBCIS

For a comparative assessment of the performance of NAIS and WBCIS, several indicators were used and these are depicted in Table 3. It was found that the

insured area per farmer was higher in the case of WBCIS than with NAIS for all the *kharif* seasons. The percentage of farmers who benefited out of the total number of insurance users was much higher for WBCIS than for NAIS. During the period 2009-2010, the percentage of farmers who benefited was 44 per cent for WBCIS and only 14 per cent for NAIS (Table 3).

The indicators of financial performance, as shown in Table 3 revealed that the per hectare sum assured, premium paid and claim received were higher for NAIS than for WBCIS during *kharif* 2009-2010. To assess the financial performance, the claim-premium ratio was computed by dividing the indemnity claim or compensation payment by the insurance premium collected, as used by Raju and Chand (2008a) and Banerjee and Bhattacharya (2011) in their analyses. If the claim-premium ratio exceeds one, it suggests financial loss on the part of the insurer in the insurance business, whereas from the viewpoint of a farmer, it suggests more compensation than the premium paid. According to the data, the claim premium ratio exceeded one for all the *kharif* seasons for WBCIS as well as for NAIS, except for 2010 *kharif* for WBCIS. During 2009-2010 period, the average claim-premium ratio was 2.1 for NAIS users and 1.4 for WBCIS users (Table 3). However, for the years 2008 and 2009, the claim-premium ratio was much higher for WBCIS users than for NAIS users.

Table 3. Performance indicators of NAIS and WBCIS in Odisha (Kharif 2008-2010)

Year	Area insured (ha/ farmer)	Sum assured (₹/ ha)	% of farmers benefited	Premium paid (₹/ ha)	Claim received (₹/ ha)	Claim/premium
NAIS						
2008	1.0	14235	9.1	368	514	1.4
2009	0.9	16054	9.3	405	478	1.2
2010	0.9	18161	19.3	456	1333	2.9
2009-2010	0.9	17134	14.4	431	916	2.1
WBCIS						
2008	1.7	20000	100.0	500*	1862	3.7
2009	1.4	12000	67.3	300*	662	2.2
2010	1.4	12000	18.6	300*	123	0.4
2009-2010	1.4	12000	44.0	300*	407	1.4

Note: *These are subsidised premiums calculated at 2.5 per cent of sum assured. The gross premium is 10 per cent of sum assured and ₹ 2000 in 2008 and ₹ 1200 in 2009 onwards.

Source: Computed from data collected from the Regional Office of National Agriculture Insurance Company of India, Bhubaneswar

The data suggest that WBCIS, on the whole, has performed better than NAIS because of higher adoption rate, higher percentage of farmers benefited and lower premium. But, the data were analysed for only three years, the findings may not be considered conclusive and are only indicative.

Socio-economic Profile of Insurance Users

The socio-economic profile of insurance users in the sample, given in Table 4, revealed that only 5 to 6 per cent of the insurance users belonged to the general (higher) castes, whereas the remaining 95 per cent were from the socially and economically backward classes, scheduled castes and scheduled tribes. A majority of the WBCIS users (75 %) belonged to the marginal and

Table 4. Socio-economic profile of insurance users

Characteristics	NAIS	WBCIS
Total households (No.)	100	100
Caste (%)		
General	5	6
Socially and economically backward classes	81	55
Scheduled castes	5	5
Scheduled tribes	9	34
Education level (%)		
Below primary	13	26
Primary and above	87	74
Farmer category (%)		
Marginal and small farmers (≤ 2 ha)	36	75
Medium and large farmers (> 2 ha)	64	25
Land (ha/household)	3.0	1.7
Area operated (%)		
Marginal and small farmers	15	56
Medium and large farmers	85	44
Annual income (₹/household)	102236	56942
Income from cultivation (%)	48	41
Income from agricultural wages (%)	2	2
Income from non-agricultural wages (%)	7	11
Income from other sources (%)	43	46
Farm income		
Gross income (₹/ha)	9601	5778
Paid out cost of cultivation (₹/ha)	11828	11543
Net income (₹/ha)	-2227	-5765
Imputed value of family labour (₹/ha)	2743	6516

Source: Field Survey

small farmer category (owning land ≤ 2 ha), whereas the majority NAIS users (64 %) were from the medium and large farmers category (owning land > 2 ha). Although cultivation is the major source of income of sample farmers, the net income from cultivation was found to be negative during the survey year due to the drought condition and erratic rainfall.

Risks in Agriculture

Table 5 gives the data on the frequency of responses of the insurance users on potential risks in agriculture. The weighted score was computed by assigning the value of 3, 2 and 1 to the first, second and third important ranks, respectively. According to the results, for both NAIS and WBCIS users, the percentage weighted score was the highest for drought, followed by variability in rainfall, and pest attacks. During the survey year 2011-12, all the sample households had suffered more than 80 per cent loss in crop yield due to drought conditions. In the study villages, drought conditions are not created by just deficits in rainfall but also by variability in rainfall. Drought is a chronic phenomenon in the area and occurs almost every other year.

Farmers' Satisfaction with Crop Insurance Schemes

To assess the efficacy of the existing insurance schemes, viz. NAIS and WBCIS, the farmers were asked to rate their level of satisfaction with these schemes on a five-point scale, the results of which are presented in Table 6. It was found that out of the total 200 insurance users, only 7 expressed satisfaction with the NAIS. The remaining 193 were either strongly dissatisfied, dissatisfied or 'neither satisfied nor dissatisfied'. Thus, excepting a few farmers, almost all users of both NAIS and WBCIS were dissatisfied with the schemes.

To find the reasons for their dissatisfaction, the insurance users were asked to rank the three most important reasons as 1st, 2nd and 3rd. Table 7 shows the data on the frequency of responses and the weighted score on various causes of dissatisfaction. According to them, the two most important reasons for dissatisfaction, as adduced by both NAIS and WBCIS users, were (i) the loss assessment unit of the area was very large, and (ii) individual and independent risk was

Table 5. Ranking of risk factors by insurance users: Frequency of responses

(No. of households)

Risk factors	NAIS				WBCIS			
	1 st rank	2 nd rank	3 rd rank	Weighted score (%)	1 st rank	2 nd rank	3 rd rank	Weighted score (%)
Flood	3	20	4	8.8	3	12	10	7.2
Drought	93	5	1	48.3	97	3	-	49.5
Variability in rainfall	1	55	10	20.5	-	69	9	24.5
Pest attack	1	12	58	14.2	-	12	59	13.8
Plant disease	1	1	4	1.5	-	-	3	0.5
Untimely irrigation	-	1	2	0.7	-	-	1	0.2
Inadequate/ surplus irrigation	-	-	1	0.2	-	-	1	0.2
Decline in crop prices	-	2	7	1.8	-	-	-	0.0
Unsuccessful investment	1	3	13	3.7	-	3	16	3.7

Source: Field Survey

Table 6. Satisfaction of insurance users with crop insurance scheme: Frequency of responses

(No. of households)

Level of satisfaction	NAIS	WBCIS
	% of total	% of total
Satisfied	7	-
Neither satisfied nor dissatisfied	27	32
Dissatisfied	43	53
Strongly dissatisfied	23	15

Source: Field Survey

not covered. Both NAIS and WBCIS being area-based schemes, do not cover individual risk, and compute the claim amount on the basis of the average area yield/rainfall with the insured farmer receiving compensation only when the actual yield/rainfall of the defined area fall short of the threshold yield/normal rainfall of the area, irrespective of the farmer's individual yield. However, when the loss assessment area is large, the area yield/rainfall may not reflect the actual individual crop loss of the farmer. Therefore, insurance users were of the view that the loss assessment area should be reduced from block level to *panchayat*/village level in order to cover the actual crop loss of the farmers.

The third most important reason for dissatisfaction was different for the users of NAIS and WBCIS. For NAIS users, it was delay in compensation payment and for WBCIS users, it was the lower amount of

compensation (Table 7). In the case of NAIS, there was a delay of more than six months in receiving compensation as the collection of yield data through the crop-cutting experiment takes time. However, in the case of WBCIS, since rainfall data are collected from weather stations, indemnity is paid within 45 days of receipt of rainfall data.

In the case of NAIS, the compensation amount is higher as the sum assured is higher. Farmers reported that while they receive some amount of compensation almost every year from WBCIS, under NAIS they receive compensation only when an incidence of severe crop loss affects the entire notified area.

As regards the amount of premium paid to insure their crops, most NAIS and WBCIS users (95 %) viewed the premium to be reasonable. This suggests that no further subsidy is required to incentivise farmer participation in the insurance market. Moreover, direct premium subsidies from the government may actually impede household adaptation to production risk. Indeed, subsidized insurance may cause economic inefficiencies by encouraging farmers to invest in production strategies that are not suited to the local environment.

Farmers also complained about the last date for applying for crop insurance. For loanees it is 31st September while for non-loaneees it is 15 July to 31 July. The difficulty arises from the fact that the time-period given is not sufficient for them to prepare the

Table 7. Reasons for dissatisfaction with crop insurance scheme: Frequency of responses of insurance users

(No. of households)

Reason	NAIS				WBCIS			
	1 st reason	2 nd reason	3 rd reason	Weighted score (%)	1 st reason	2 nd reason	3 rd reason	Weighted Score(%)
Delay in compensation payment	17	15	44	22.4	3	2	15	4.7
Loss assessment unit is very large	45	31	14	37.8	23	42	28	30.2
Individual, independent risk is not covered	27	40	22	32.8	21	48	22	30.2
Proper facilities are not available at financial institutions	1	7	12	5.2	2	7	24	7.3
Payout is very low	3	-	1	1.8	51	1	11	27.7
Others	-	-	-	0.0	-	-	-	0.0
Total	93	93	93	100.0	100	100	100	100.0

Source: Field Survey

Note: The total number of dissatisfied NAIS users was 93, as shown in Table 5.

necessary documents since the Village Agricultural Worker has to recommend their names and issue a sowing certificate. Moreover, in the case of normal rainfall, farmers do not go for WBCIS and wait till they observe a shortfall in rain. They become interested in insuring their crops only after such an observation. However, by then, the deadline to apply for crop insurance by non-loanees is over so that they are not able to avail themselves of crop insurance scheme.

In the case of loatee farmers, the amount of indemnity is adjusted towards the loan taken through a Transfer Voucher about which the farmers are usually unaware. Thus, the farmers are not adequately aware about the indemnity that they receive from the insurance and, being ignorant of the benefits of insurance, they do not show much interest in insuring their crops.

Farmers also complained that some important agricultural risks are not covered by both NAIS and WBCIS. During 2010, for instance, due to heavy rains during harvest time, the harvested paddy of almost all the farmers in the study area got destroyed. However, they did not get any compensation under the NAIS/WBCIS schemes for this loss because these types of losses are not covered under any scheme. Crop insurance schemes need to cover such risks to cater to the needs of farmers.

Interestingly, when the insurance users were asked to express their preference for three different types of insurance products, namely, crop yield insurance, rainfall insurance and revenue insurance, most of the NAIS users expressed their preference for WBCIS while most of the WBCIS users preferred NAIS. Thus, there is a need to create a variety of insurance products to cater to the needs of farmers under varied circumstances. WBCIS is particularly relevant to the scenario of climate change because it insures against weather risk and is considered a sustainable market mechanism to transfer weather risk.

Improving Scheme Performance

The suggestions made by the insurance users to improve the operational efficiency of the schemes were: (i) assessment of individual crop loss and devising of a compensation payment thereof, (ii) making the scheme voluntary for loatee farmers, (iii) taking the *gram panchayat* as the unit of loss assessment instead of block, and (iv) speedy processing and settlement of claims (Table 8). Thus, one major reason for farmers' disinterest in crop insurance is both NAIS and WBCIS are area-based schemes, which do not cover individual, independent and idiosyncratic risk. Also, as the unit area is very large, the area-based yield and rainfall data do not accurately represent their individual yield loss or the amount of rainfall received in their micro

Table 8. Suggestions for improving agricultural insurance scheme: frequency of responses of insurance users
(No. of households)

Suggestions	NAIS				WBCIS			
	1 st rank	2 nd rank	3 rd rank	Weighted score (%)	1 st rank	2 nd rank	3 rd rank	Weighted score (%)
Cover more crops	4	1	3	2.8	2	1	4	2.0
Individual assessment	47	26	12	34.2	35	22	19	28.0
Quick settlement of claims	1	21	17	10.3	2	7	5	4.2
Making scheme voluntary	20	18	15	18.5	37	27	19	30.7
<i>Gram Panchayat</i> as unit of loss	11	25	27	18.3	8	32	19	17.8
Insurance service at doorstep/at village level	4	4	6	4.3	5	6	10	6.2
Crop cutting experiments to be conducted in the presence of villagers /insurance company's representatives	9	4	12	7.8	7	2	16	6.8
Raise the indemnity level percentage from 60% to 80-90%	-	-	-	0.0	1	2	1	1.3
Others	4	1	8	3.7	3	1	6	2.8

Source: Field Survey

environment, thus depriving farmers of the right amount of compensation commensurate with their individual loss.

According to the insurance users, the major sources of information on insurance schemes were bank representatives, progressive farmers, and friends and neighbours. Thus, there was a strong need for awareness generation about crop insurance schemes across the farmers.

Conclusions and Policy Implications

The study on the basis of a comparison of the operational efficacy of NAIS and WBCIS in the state of Odisha, has observed WBCIS to be better than NAIS because of its higher adoption rate, higher percentage of farmers benefited, lower premium, faster and more frequent compensation payment, and greater degree of transparency. However, WBCIS covers only weather-related risks while the sum assured and amount of compensation are lower. The distinct advantage of WBCIS is the speedier processing of claims and payment of indemnity, which is usually within 45 days of receipt of rainfall data. In the case of NAIS users, on the other hand, there is undue delay in compensation payment, which can take a year or more, as the

collection of yield data via the crop cutting experiment takes time. Thus, the performance of NAIS in Odisha is not satisfactory due to low coverage and the delay in compensation payment. Moreover, the operational modality of WBCIS is better understood by the farmers and, consequently, it is a more popular scheme.

Of the total 200 insurance users of NAIS and WBCIS that were surveyed in the study, only 7 farmers expressed complete satisfaction with the schemes. Most of the insurance users have been found either dissatisfied with the scheme or remained neutral. Therefore, to increase the coverage of the schemes, policymakers would need to generate awareness about the benefits of these schemes among the farmers.

The arguments put forward by farmers for the adoption of *gram panchayat* instead of block as the reference unit in both NAIS and WBCIS seems convincing. The study has also shown the importance of making the applying procedure for crop insurance simple for non-loanee farmers. Appropriate steps should be taken to appoint insurance agents as in Life Insurance Companies, to provide insurance services at the doorstep of farmers. Procedures for speedy payment of compensation should be evolved.

In a frequently disaster-affected state like Odisha, where reasons for crop failure are many, there is a need for multi-peril crop insurance schemes. The public sector could cover catastrophic risks and provide multi-peril insurance where the subsidy requirement is high while the private sector could provide insurance products for less severe events and for individual, independent, idiosyncratic and localized risk. Therefore, appropriate steps should be taken for the promotion of private sector participation in agricultural insurance. The government can encourage private participation by providing subsidies, guarantees and reinsurance facilities.

The insurance providers should also be ready to provide varied insurance products like crop yield insurance, weather index insurance, single peril insurance, and revenue insurance to meet the needs of different farmers in different areas while making sure that premium rates are set that commensurate with risk and make judicious use of premium subsidies (Swain, 2013). The policy planners could encourage the concept of micro-insurance, i.e. insurance for the poor/smallholders, through participation of banks, non-governmental organisations and microfinance institutions. To manage the risk of default and enterprise loss in a more proactive manner, micro-insurance may be integrated with microfinance.

Acknowledgements

This paper has used data from the research project 'Performance of Area Based Crop Yield and Rainfall Insurance Schemes in Odisha' undertaken with the technical and financial support of the South Asian Network for Development and Environmental Economics (SANDEE) and its sponsors. The author is grateful to the advisor Jean-Marie Baland and the anonymous referee for their useful comments that helped to improve the paper. Also, thanks are due to the SANDEE technical editor, Heman Lohano; English editor, Carmen Wickramagamage and Research Assistant, Sasmita Patnaik for their help.

References

- Banerjee, Debisree and Bhattacharya, Uttam (2011) Innovations in agricultural insurance in India: Retrospect and prospect. *Indian Journal of Agricultural Economic*, **66**(3): 457-471.
- Collier, Benjamin, Skees, Jerry and Barnett, Barry (2009) Weather index insurance and climate change: Opportunities and challenges in lower income countries. *The Geneva Papers on Risk and Insurance - Issues and Practice*, **34** (3): 401-424.
- Goodwin, Barry K. (2001) Problems with market insurance in agriculture. *American Journal of Agricultural Economics*, **83**(3): 643-649.
- GoI (Government of India) (2011) *Population Census of India*. Registrar General, Ministry of Home Affairs, New Delhi.
- GoO (Government of Odisha) (2011a) *Odisha Agriculture Statistics 2011-12*. Directorate of Agriculture & Food Production, Bhubaneswar.
- GoO (Government of Odisha) (2011b) *Economic Survey (ES) 2011-12*. Planning and Coordination Department, Directorate of Economics and Statistics, Bhubaneswar.
- Hazell, P.B.R., Poareda, C. and Valdes, A. (1986) *Crop Insurance for Agricultural Development: Issues and Experience*. The John Hopkins University Press, Baltimore.
- Hess, Ulrich (2003) *Innovative Financial Services for Rural India: Monsoon-indexed Lending and Insurance for Smallholders*. Agricultural & Rural Development Working Paper 9. World Bank, Washington, D.C.
- IPCC (Intergovernmental Panel on Climate Change) (2007) *Climate Change, Impacts, Adaptation and Vulnerability. Contribution of Working Group III to the Fourth Assessment Report of IPCC*. Cambridge University Press, Cambridge, UK.
- Kalavakonda, Vijay and Mahul, Olivier (2005) *Crop Insurance in Karnataka*. World Bank Policy Research Working Paper 3654. World Bank, Washington, D.C.
- Miranda, Mario and Vedenov, Dmitry V. (2001) Innovations in agricultural and natural disaster insurance. *American Journal of Agricultural Economics*, **83** (3): 650-655.
- Raju, S.S. and Chand, Ramesh (2008 a) A study on the performance of National Agricultural Insurance Scheme and suggestions to make it more effective. *Agricultural Economics Research Review*, **21**: 11-19.
- Raju, S.S. and Chand, Ramesh (2008b) *Agricultural Insurance in India: Problems and Prospects*. NCAP Working Paper No.8. National Centre for Agricultural Economics and Policy Research, New Delhi.
- Sinha, Sidharth (2004) Agriculture insurance in India: Scope for participation of private insurers. *Economic and Political Weekly*, **39** (25): 2605-11.

- Skees, Jerry, Hazell, P. and Miranda, M. (1999) *New Approaches to Crop Yield Insurance in Developing Countries*. Environment and Production Technology Division Discussion Paper No. 55, International Food Policy Research Institute, Washington, D.C.
- Swain, Mamata (2008) Agricultural risk and crop insurance in a globalised economy. *Man & Development*, **30** (3): 107-28.
- Swain, Mamata (2013) Agricultural risk and efficacy of crop insurance schemes in Odisha. In: *Agrarian Crisis in India: The Way Out*, Eds: Suman Chandra, K.V. Suresh Babu and P.K. Nath, Academic Publishers, New Delhi, pp. 477-496.
- Swain, Mamata (2014) *Crop Insurance for Adaptation to Climate Change in India*. Working Paper No. 61. Asia Research Centre, London School of Economics and Political Science, London.
- Yaron, Jacob, Nenjamin, McDonald P. and Piprek, Gerda L. (1997) *Rural Finance: Issues, Design, and Best Practices*. The World Bank, Washington, D.C.
- Vyas, V.S. and Singh, S. (2006) Crop insurance in India: Scope for improvement. *Economic and Political Weekly*, **41** (43 & 44): 4585-94.

Received: January, 2015; Accepted July, 2015

