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INDIA
Crop Insurance Non-Lending Technical Assistance – Summary of Policy Suggestions

THE WORLD BANK

GFDRR
Global Facility for Disaster Reduction and Recovery

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India Country Management Unit
South Asia Finance and Private Sector Unit
Global Capital Market Non Banking Unit

Co-funded by the Global Facility for Disaster Reduction and Recovery (GFDRR)

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1 At the time of preparation of the note (June 2010), the modified National Agriculture Insurance Scheme (***mNAIS)*** had not been introduced by Government of India (it was introduced later in 2010). Nonetheless, the broad suggestions in the policy note and the way forward defined remains relevant to the implementation of ***mNAIS.*** In 2011, the Bank continued to support the ***mNAIS*** through technical inputs and suggestions which build largely, albeit with some exceptions, on the points mentioned in this note.

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India: Crop Insurance Non-Lending Technical Assistance (NLTA) Summary of Policy Suggestions

1. BACKGROUND AND OBJECTIVES

1. ***At the request of Government of India (GOI), the World Bank has provided technical assistance to the public insurance company, Agriculture Insurance Company of India (AICI)*** to develop an actuarially-sound rating methodology and improve the contract design of the area-yield based National Agriculture Insurance Scheme (NAIS) to reduce delays in claim settlement; to propose design and ratemaking of new weather index insurance products under the Weather Based Crop Insurance Scheme; and to perform a risk assessment of AICI's insurance portfolio and to suggest cost-effective risk financing solutions (including reinsurance).

2. ***Despite a declining share in national GDP two thirds of India's total population - including millions of small and marginal farmers – is dependent on agriculture for a livelihood and for them crop insurance forms an important element of risk mitigation.*** For over 110 million farmer households – of which around 80 percent are small and marginal farmer households, access to risk mitigation for agriculture production is critical. GOI has historically focused on crop insurance as a planned mechanism to mitigate the risks of natural perils on farm production. The National Agriculture Insurance Scheme (NAIS), implemented by the public crop insurer AICI, is the main crop insurance program in the country and has been supplemented more recently by the Weather Based Crop Insurance Scheme (WBCIS). The work under this and earlier technical assistance[2] supports GOI's efforts to improve agriculture insurance (see also Section 2).

3. ***Crop insurance can contribute to increasing access to rural finance and is required to ensure a more viable agriculture credit business.*** An improved crop insurance program supports and complements other critical agriculture sector related measures, including the reform of rural credit cooperatives, agriculture marketing reforms and efforts to improve agriculture extension and productivity. It also helps enhance the viability of agriculture lending through risk mitigation. A better understanding of

2 For detailed suggestions on the suggested features of *mNAIS*, please refer to the 2007 World Bank report: "India: NAIS - Market Based Solutions for Better Risk Sharing". This report provides detailed suggestions on product design and delivery improvements and on the methodology that could be used to determine the actuarially sound crop insurance premium rates.

risks entailed in particular crops in particular areas – which can be ascertained through assessing the actuarially sound insurance premium rates for the crop – can also be a significant input to agriculture policy at sub-national and national levels. Similarly, crop insurance is vital for creditors, such as banks and rural cooperatives, which otherwise face significant risks in agriculture lending that are otherwise difficult to price given political-economy factors and the underlying fragile economics of agriculture. Without adequate coverage of crop insurance, agriculture credit, which has witnessed growth in absolute terms, will continue to be insufficient to fully meet the needs of farmers.

4. ***Further, given the inherent risks in agriculture in India with its high degree of dependence on rain-fed cultivation, a well developed and widely used agriculture insurance program is critical from a farmer perspective.*** Without this, farmers run the risk of crop failures, which in turn, lead to inability to service their debts. Since crop cycles often follow seamlessly from one season to the next, delinquency on account of one crop could mean being ruled out of the formal banking system for the next crop cycle. This in turn leads to accessing higher cost credit from the informal market leading to a vicious cycle of crop failure, to delinquency leading to no access from formal sources, to reliance on high cost informal credit, and to a potential debt trap for farmers.

5. ***The broad structure of NAIS is technically sound and appropriate in the context of India.*** The NAIS is based on an indexed approach, where crop yield of a defined area called an insurance unit, IU, (e.g., an administrative block) is the index used ('area based approach'). The insurance is mandatory for all farmers that borrow from financial institutions though insurance cover is also available to non-borrowers. The actual yield of the insured crop (as measured by crop cutting experiments) in the IU is compared to the threshold yield. If the former is lower than the latter, all insured farmers in the IU are eligible for the same rate of indemnity payout. Individual crop insurance would have been prohibitively expensive, or even impossible on technical and administrative grounds, in a country such as India with so many small and marginal farms. Further, the method of using an 'area based approach' has several other merits and, most importantly, it mitigates moral hazard and adverse selection.

6. ***The NAIS also has low levels of leakages in claims reaching farmers.*** The NAIS largely uses the banking system, both to collect insurance premiums and to channel payments. This low-cash and transaction point intensity, together with the 'area based approach', has enabled low leakages in the channeling of claims (which are subsidized by government particularly for non-commercial crops and small and marginal farmers). While there are other issues with NAIS (discussed below, together with suggestions that can address these issues through implementation of *mNAIS*), such design features of

using the banking system and the 'area based approach' are appropriate in the Indian context.

7. ***However, the current NAIS is mainly funded by post-disaster government contributions, entailing an open-ended and highly variable fiscal exposure for state and central governments.*** Since its inception, the annual loss ratio (claim/premium) has been always higher than 100 percent, i.e., the total indemnities paid to farmers exceed the premiums received (including premium subsidies). This is a direct consequence of the arrangement that the insurance premium rates paid by the farmers to the implementing agency AICI are capped[3] (e.g., less than 1.5 percent and 3.5 percent for food crops and oilseeds, respectively). At the end of the crop season, based on claim data provided by AICI, aggregate claims that are in excess of the farmers' premium volume, are financed by the state (50 percent) and the central governments (50 percent). While subsidy for agriculture insurance programs are used around the world and can be justified as a development measure, this *post-disaster* funding arrangement – which in turn was necessitated on account of a lack of a actuarially sound premium rating methodology without which predicting likely payouts was not feasible – leads to an open ended fiscal exposure for governments and volatile annual contributions.

8. ***Furthermore, post-disaster funding is also a key reason for the current NAIS to be prone to significant delays in the settlement of the farmers' claims, leading to farmer distress and exposing them to the vicious debt cycle discussed above.*** NAIS indemnity payments tend to get extremely delayed (up to 9-12 months or more) in part because of government administrative and budgetary process for post-disaster funding of the excess losses. Delays in claims settlements not only cause cash flow problems for farmers already under the stress of a poor harvest, but also mean that they are unable to be eligible for the next round of formal credit from banks for the next crop cycle, which follows immediately from the previous cycle. This exposes them to a debt trap and continued financial stress at the household level.

2. TOWARD A MODIFIED NATIONAL AGRICULTURAL INSURANCE SCHEME (*MNAIS*)

9. ***GOI is likely to be proceeding with a plan to improve the NAIS and to move it to an actuarial regime*.** This is potentially a major initiative given the significant scale of NAIS, which while lower than what is required, is nevertheless very large in terms of absolute numbers with around 20 million farmers insured last year, making this the largest crop insurance program in the world in terms of insured farmers. An improved

3 Except for commercial cash crops, where premium rates are priced on actuarial terms.

program would result in increased benefits for millions of current farmer clients, and, its better product design and delivery can be expected to lead to far greater coverage of the insurance program in the medium term. It is understood that the Planning Commission has recently approved the Ministry of Agriculture's proposal to pilot the modified NAIS (*mNAIS*) in 50 districts of the country starting with the *rabi* (winter) crop later this year. This is a significant development and the technical and policy suggestions from earlier technical reports and from this report, are directly relevant to such a move.

10. ***The actuarial regime under mNAIS would help reduce both government contingent liability and delays in claims settlement, thereby resulting in potentially high economic and political economy gains***. Such a move would be appropriate from the government, AICI and farmer perspective. The *mNAIS* includes improved features (see Box 1) and would be appropriate as the main agriculture insurance intervention if implemented well.[4]

4 For detailed suggestions on the features of mNAIS, please refer to the 2007 World Bank report: "India: NAIS - Market Based Solutions for Better Risk Sharing". Apart from the use of a revised rating methodology entailing an 'experience based approach', amongst other features, the suggestions include use of weather indices for an early trigger payment, de-trending to account for technology impacts on yield, methods to compute the moving averages of yields, data cleaning suggestions, early purchase deadlines, improvements to the crop cutting experiments, etc. The technical report "Enhancing Crop Insurance in India", World Bank 2011, provides further analysis of index-based product design and ratemaking, with a specific focus on its implementation.

Box 1: Main Features of mNAIS

- An integrated methodology for design and ratemaking ('experience based approach') would incorporate a robust data cleaning and de-trending methodology.
- The mNAIS scheme would operate on an "actuarial regime" in which government's financial liability would be predominantly in the form of premium subsidies given to AICI and funded ex-ante (made possible by the ratemaking methodology as this would allow computation of expected total claims from which expected premium from farmers would be deducted to provide the upfront Government premium subsidy), thereby reducing the contingent and uncertain ex-post fiscal exposure currently faced under NAIS for government and reducing delays in claim settlement.
- AICI would receive premiums (farmer collections + premium subsidies from Government) and be responsible for managing the risk profile of the mNAIS through risk transfer to private reinsurance markets and risk retention through its reserves and be able to operate on a sustainable basis.
- The mNAIS product would continue to be based on an 'area based yield approach' (which entails crop cutting experiments at harvest), but with a provision for an early part payment to farmers (in-season) based on weather indices (which enable quicker measurement).
- The quality, standardization and monitoring framework for Crop Cutting Experiments (CCEs) could be enhanced through measures such as the development of a national CCE procedures manual, standardized training of loss adjusters and independent CCE audits. This would mitigate basis risk and the potential for manipulation of CCEs. The speed of claims settlement would be increased through a more efficient CCE reporting procedure.
- Adverse selection would be reduced through the enforcement of early purchase deadlines in advance of the crop season.
- Additional benefits may be offered for prevention of sowing, replanting, post harvest losses and localized risk, such as hail losses or landslide.

11. ***An actuarially sound premium rating methodology has been developed under this NLTA, drawing on international best practice and domestic context and expertise.*** The proposed ratemaking methodology builds on the 'experience based approach' (in contrast with the Normal Theory Method currently used), which allows for a better pricing of catastrophic losses and allows decomposition between catastrophic and non-catastrophic losses. This 'experience based approach' requires long term data, which is available in India, and mitigates the risk of under-pricing the underlying risk. It also includes a *crop yield de-trending component* to adjust for changes in farming practices/technology (such as the adoption of new seed varieties like BT cotton – see Box 2). The proposed rating methodology is designed to achieve actuarially-sound premium

rates that are stable yet reflective of regional differences and responsive to changes in risk over time.[5]

Box 2: Rating techniques impacting outreach – The case of Cotton in Gujarat

In 2008 the NAIS premium rate for cotton in Gujarat was perceived by farmers to be high compared to the likely claim payment, and insured acreage had fallen dramatically over the last few years. The NAIS premium rate for cotton in Gujarat state had risen from 11.9% in 2003 to 17.2% in 2008. Over the same period cotton claims had been very low. Consequently, insured acreage for cotton in Gujarat state had fallen by 96% from Kharif 2000 to Kharif 2008.

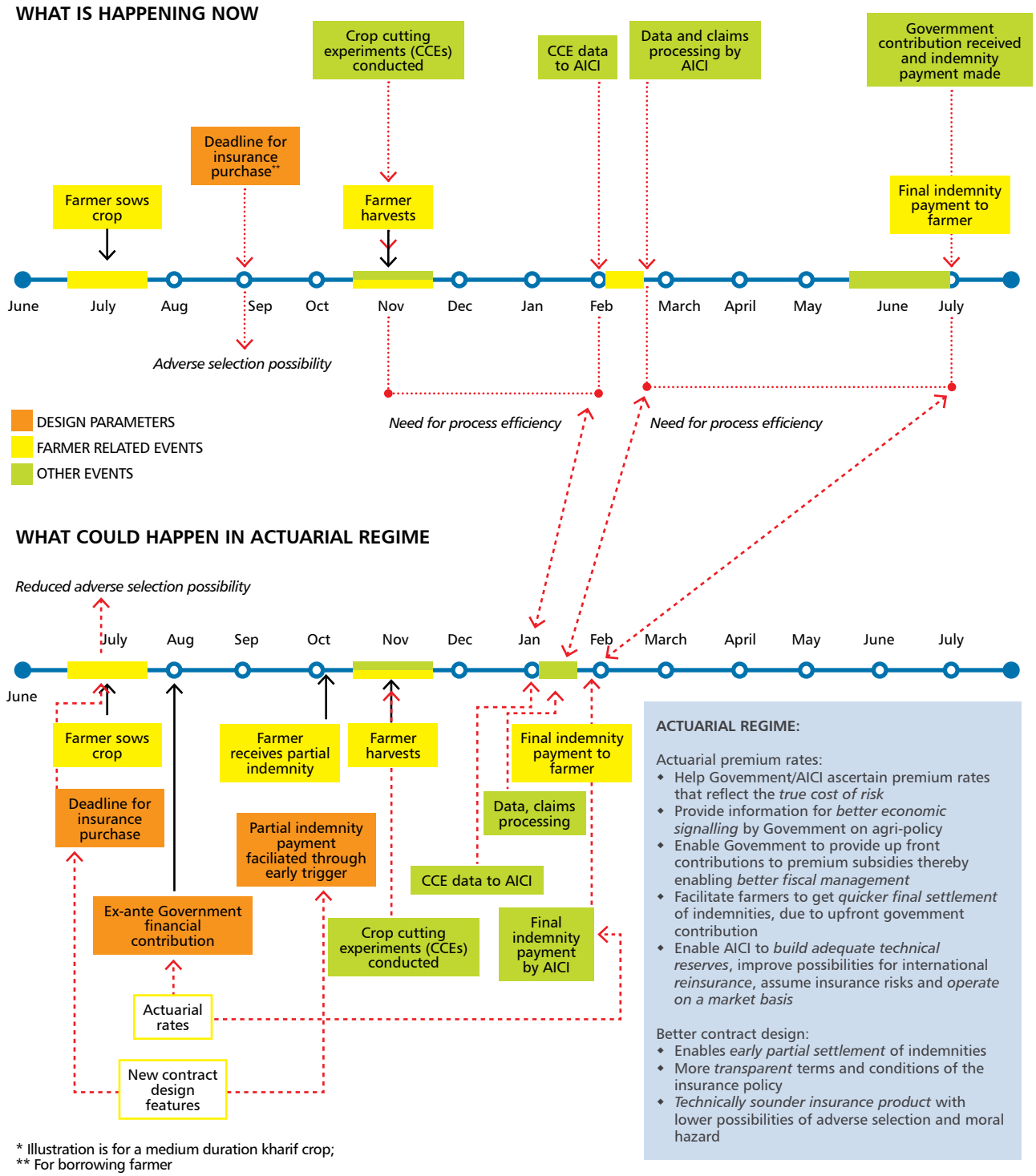
A possible explanation for the difference between the estimated high premium rates and the actual low claim payments may be the rapid uptake of Bt cotton, which appears to have increased the expected cotton yield and may have reduced significant variability in yields. The agricultural statistics collected under the crop cutting experiments (CCEs) do not distinguish traditional cotton and Bt cotton, although Bt cotton occupied 66 percent of the cultivable area under cotton in 2009.

The current NAIS pricing methodology, based on the Normal Theory Method (NTM), is not robust in its responsiveness to significant technological changes that cause a shift or trend in the probability distribution of yields and hence the premium rate for Bt cotton increased unreasonably over time as the current methodology mistakes an upward trend in yields for uncertainty, leading to high premiums. A revised pricing methodology including yield de-trending was developed and piloted in selected states in Kharif 2009, leading to an increased uptake. Premium rates for cotton have been revised and reduced by up to 50 percent in the states of Gujarat, Madhya Pradesh and Maharashtra. The number of cotton farmers insured has increased from 180,000 in Kharif 2008 to almost 300,000 in Kharif 2009.

12. ***The suggested rating methodology would improve social welfare.*** Ability to compute actuarially sound crop insurance premium rates would enable 'upfront contributions' or ex-ante contributions from states and the central government. This was earlier not possible and led to issues in budget management and severe delays in claims payments to farmers. Thus, the use of this methodology has implications in terms of benefits for farmers (faster payments), GOI (better budget management through ex-ante budgeting and funding) and AICI (e.g., moving to an actuarial regime, building up of technical reserves, and accessing reinsurance markets). (See Figure 1).

5 See technical report "Enhancing Crop Insurance in India" (World Bank 2011), Chapter 4.

Figure 1: Illustrative Crop Insurance Cycle*



* Illustration is for a medium duration kharif crop;
** For borrowing farmer

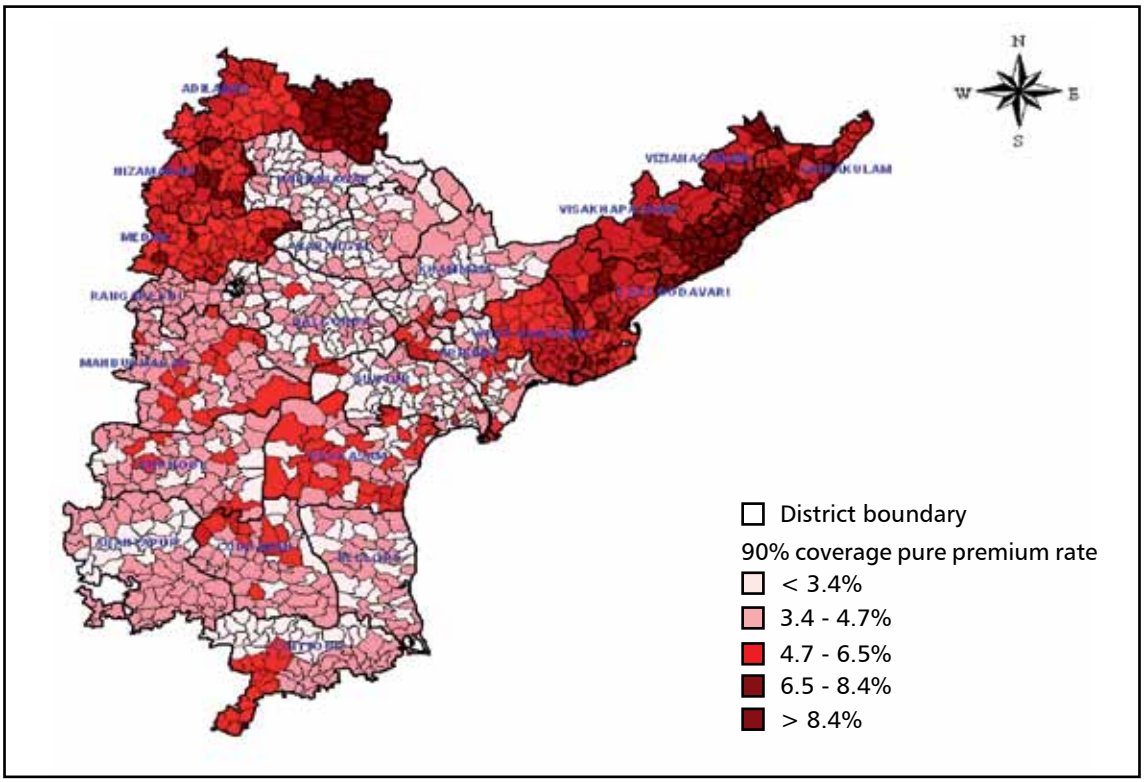
Source: World Bank report "India: NAIS - Market Based Solutions for Better Risk Sharing", 2007.

13. ***The mNAIS could allow for a more efficient risk classification and reduce inequity between farmers.*** Risk classification, whereby the insurance premium rates of high-risk crops are higher than those of low-risk crops, is essential for any sustainable insurance scheme. Figure 2, based on actual data for rice in Andhra Pradesh, shows the risk heterogeneity among insurance units. This means that there is significant inequity between farmers given the way the program is currently structured. The current NAIS does not allow for such a classification, leading to potential adverse selection. The Bank has assisted AICI in devising a risk classification methodology, based on the premium rates and/or the level of coverage, which can reduce the inequity between farmers through the mechanism of adjusting the level of coverage while retaining a common nominal price.[6]

14. ***To improve risk classification and reduce inequity it is suggested to adjust the level of coverage in each IU.*** A unique nominal crop premium rate should be set at the state level and the level of coverage should be adjusted at the IU level. Therefore, the underlying actuarial premium rates are uniform across the state: for the same premium rate the high average yield, low-risk areas are offered a higher threshold yield than the low average yield, high-risk areas, even while the nominal premium is constant across the state. The adjustment of coverage is required at the IU level to differentiate risk which varies significantly across areas. These adjustments would allow for a more equitable insurance program (with more risky farmers continuing to get higher claims despite the lower threshold yields; but low risk farmers would get higher payments as well on account of higher threshold or cut-off levels). Such risk differentiation could also have relevance at an inter-state level.

6 See technical report "Enhancing Crop Insurance in India" (World Bank 2011), Chapter 3.

Figure 2: Pure premium rate at 90% coverage level of rice crop in Andhra Pradesh



Source: World Bank report "India: NAIS - Market Based Solutions for Better Risk Sharing", 2007.

15. ***Crop insurance products offered under mNAIS could combine the best features of the area yield index and the weather index.*** Area-yield crop insurance provides "all peril" coverage but is plagued by delays in claims settlement, while weather based crop insurance covers only specific perils (such as rainfall deficiency or low temperature) but provides faster claims settlement. An area yield insurance product with an early partial payment based on weather index is suggested as part of *mNAIS*. Given that the premium collection and settlement happens significantly through banks, the administration of the 'double trigger' is also deemed to be feasible[7]. The Bank has assisted AICI in the design of prototype double trigger crop insurance products as well as stand-alone weather

7 Such a product configuration has been used successfully in several Latin American countries.

indexed products which have been piloted in several states under the Weather Based Crop Insurance Scheme[8] (WBCIS[9]).[10]

16. ***Under mNAIS, premiums would be charged by AICI on a commercial basis and governments, where necessary, would provide "up-front" contributions for premium subsidies.*** AICI would receive premium subsidies (from farmers and from Government) and be liable for all claims (unlike currently where claims in excess of premiums collected are paid ex-post by state and central governments). This will help reduce the contingent liability of state and central governments, smooth their fiscal contribution over time, and address the issue of delayed indemnity payments to farmers since government contribution would now be up-front. Through actuarially sound premium rates, the risk exposure of every crop can be assessed and governments can determine their premium subsidy contribution ex-ante based on the premium rates, farmer contributions and estimated outreach. Premium rates can also be used for broader agriculture policy signaling (for example, for crops that carry such high risks that it may be better to shift to alternate crops) since they indicate the inherent economics/risks in a particular crop.

17. ***The state and central governments would need to agree on the system of up-front cost-sharing structure of premium subsidies.*** A budget-neutral option – relative to the current NAIS arrangements – would be for farmers to pay the current capped premiums and for central and state governments to share equally the excess premium (that is, the difference between the actuarially-based premium and the capped premium) at the beginning of the crop season. Claims in excess of premiums collected (farmer plus government contribution) would be AICI's responsibility. On average, in the medium term the system could be budget neutral for governments relative to current arrangements, while providing for a more efficient insurance program, with faster claims settlements and less volatile government contributions.[11]

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8 In Kharif 2009, 1.1 million farmers in 13 states were covered; total sum insured was US$426 million. AICI is the lead player in this market, though two private sector insurers also account for substantive market shares.

9 Since there are some quarters that prefer using weather index as the base for the main national insurance program, an enhanced WBCIS (eWBCIS) could be an alternative to mNAIS. However, in practice there should be no significant difference between mNAIS and eWBCIS. Under eWBCIS, which is really the other side of the coin relative to mNAIS, weather based crop insurance payouts would be "corrected" by an end-of-season correction factor based on the area-yield index (as estimated by the crop cutting experiments and paid by state governments), with intermediate payments being made based on a weather index. The correction factor could take several forms. For example, an area yield index payout could be offset against any weather index payout already made, or there could be no offsetting.

10 See technical report "Enhancing Crop Insurance in India" (World Bank 2011), Chapter 3.

11 See technical report "Enhancing Crop Insurance in India" (World Bank 2011), Chapter 6.

18. ***The financial sustainability of the mNAIS would rely on global reinsurance assuming premium contribution from government (and farmers) is along expected lines.*** AICI would be responsible for the claims under the *mNAIS*. Premiums (including subsidies) collected in excess of claims would contribute to building up AICI's reserves, to be drawn down when claims exceed premiums. AICI could strengthen its claims paying capacity by securing a line of credit to finance middle risk layers and/or by accessing global private reinsurance to cover top risk layers. Under the current NAIS portfolio, it is estimated that AICI should secure risk capital of approximately US$1.7 billion to sustain a 1-in-100 year event.

19. ***In the short term, partly to address concerns of transparency in CCEs, till the time that the CCE process is improved, state governments could still be responsible for area yield index-based claims in excess of premiums.*** The current CCE process may not offer the adequate accuracy and transparency that are essential for a sustainable actuarial crop insurance regime including from the perspective of reinsurers[12]. As *mNAIS* is implemented, the quality, standardization and monitoring of CCEs would need to be improved (the key action points are summarized in Box 1 above[13]). In the short term, while the insurability of CCE data is being improved, the state governments could be partially or fully responsible for the final area yield index-based claim payment (e.g., a proportion of such claims, or the excess of claims above a threshold). To keep the program broadly budget neutral – relative to the current system – for the state this would imply that the ex-ante state government premium subsidy would be relatively lower than the central government's to allow for the additional ex-post element of the state government subsidy. State government subsidies could transition from mixed ex-ante/ ex-post to fully ex-ante over the short to medium term, as the CCE process is enhanced.[14]

20. ***Further, it is suggested that some features of mNAIS should be offered as 'social benefits'.*** While the Ministry of Agriculture's proposal for *mNAIS* and the suggestions of the World Bank are broadly consistent, some differences can be highlighted (see summary comparison in Table 1).[15] A key difference relates to the likely offer of area-yield insurance at an IU level lower than what is currently used, possibly at a *Panchayat* (typically comprising a large village or a cluster of a few villages) or village level. The objective of such an approach would be to reduce basis risk. However, given that time series data at these lower insurance units is not available, it would not be possible to

12 Since the state which controls the CCE, would have only a defined ex-ante cost, with the insurer needing to bear any incremental ex-post claim costs after the results of the CCEs.

13 See also technical report "Enhancing Crop Insurance in India", World Bank 2011.

14 See technical report "Enhancing Crop Insurance in India" (World Bank 2011), Chapter 2.

15 A more detailed comparison can be found in the technical report "Enhancing Crop Insurance in India", World Bank 2011.

compute the actuarial premium rates for such an IU. It is therefore suggested that, if this is to be offered, this should be offered as a 'social benefit' paid for by government (either central or state) and not be passed onto the insurance company since the company will not have the data to compute the premium for such an IU.

Table 1: Summary comparison between GOI and World Bank suggestions for mNAIS

Key Issue	Proposed Modifications by Joint Group (2004)	World Bank Suggestions (2007 and 2011)
Government crop risk financing	Ex ante financing in the form of upfront premium subsidies	GOI financing ex ante throught premium subsidies on weather index payouts. State government financing part ex abte, part ex post on area yield index payout, transitioning to full ex ante in the medium term as the quality of CCE data is improved to a level that is acceptable to insurers and reinsurers.
Basis risk	Reduce Insurance Unit size to individual village Panchayat for major crops.	Reduction in Insurence Unit size would be a 'social benefit'. Total claim payment from AICI detemined using data for existing Insurance Units. Split of claim payment between new Insurence Units, and any additional social benefit form state government, could be determined by village Panchayat level data.
Quality of CCEs	No specific recommendations	Independent CCE audits. Development of a national NAIS CCE operations manual and standardized training of crop yield loss adjusters.
Premium rates and coverage level/risk classification	Premium rates capped; Threshold Yields based on simple formula (best 5 out of last 7 years).	Premium rates set by GOI. Risk classifications throught a statistically robust approach to setting. Threshold Yields, using 10 years of yield data.
Delayed settlement	Early payment based on crop condition reports, weather data and satellite imagery	Early non-repayable part-payment, based on weather index. More efficient CCE reporting.

3. MOVING FORWARD

21. ***In the medium term, enhancing the crop yield estimation process is essential for the sustainability of the mNAIS.***[16] While in the short term risks of inaccurate computation of crop yields can be mitigated through making the state governments pay the "correction factor" claims, in the medium term there is a need to address CCE quality through other achievable measures. This is important since the sustainability of any crop insurance program is closely related to the soundness and timeliness of the crop yield estimation process. The current process, conducted by the states, could be enhanced in the medium term through: (i) establishment of a standardized national manual on crop cutting experiments (CCEs); (ii) systematic training and certification of loss adjusters; (iii) commission of randomized, independent, high quality CCE audits to be conducted

16 Or the enhanced Weather Based Crop Insurance Scheme (*eWBCIS).*

alongside the standard CCEs; (iv) standardized statistical approach to handle outlier yields in the calculation of the area yield; (v) implementation of an auditing system, such as video recording, satellite imagery and/or additional CCEs on plots adjacent to the official CCE plots.[17]

22. ***In parallel with a move to an actuarial regime, AICI would need to increase its institutional capacity and devise a cost-effective risk financing strategy.*** Under the *mNAIS*, crop yield losses would be borne by AICI. The company should devise a cost-effective risk financing strategy, relying on an optimal combination of reserves, contingent credit and reinsurance. A contingent loan facility could allow AICI to build up additional reserves quickly to increase its retention capacity and retain more premium volume within the country, while transferring excess risk to the reinsurance market when it is most efficient.[18] Contingent debt has proved to be a useful instrument for financing catastrophe loss exposures, particularly in the first years of operations, when rapid build-up of surplus is required. The contingent loan facility could help AICI to deal effectively with the over-dependence on reinsurance and with the fluctuations and cycles of the reinsurance market. It could supplement AICI reserves for the financing of the working layer, i.e., the financing of recurrent claims with a return period of less than 10 years, where reinsurance is very expensive (because the expected loss is high). It could also finance the upper layer, i.e., very infrequent but catastrophic losses, where reinsurance is also expensive.

23. ***The mNAIS could be piloted in selected states during the first years of operations***. Given the technical and operational challenges associated with the implementation of *mNAIS* (or the *eWBCIS*), it is suggested to implement it on a pilot basis in selected states who agree to provide up front financial contributions. This would also allow AICI to strengthen its technical and operational capacity.

24. ***An action plan is suggested, including short term measures that need immediate consideration.*** It describes the action steps including those pertaining to improvements in product design, refinement including differentiating risk between farmers and states and allowing greater choice to states, and bringing in the private sector (see Annex 1).

17 See technical report "Enhancing Crop Insurance in India", World Bank 2011 which provides a summary of options for improving the CCEs, with clearly identified measures for the short term and those for the medium term.

18 A detailed, draft technical note/presentation "AICI Risk Financing Options under Modified NAIS" on this has been prepared and discussed with AICI and concerned ministries.

25. ***The pilot-implementation of mNAIS will require institutional capacity building.*** The implementation of an actuarial regime for crop insurance under *mNAIS* will expose AICI to major technical and operational challenges. For example, the computation of actuarially sound premium rates for each crop and insurance unit, using the proposed experience-based approach, will require significant capacity, even for a pilot with selected states (which would imply the computation of thousands of premium rates). While prototype ratemaking software has been developed, its implementation on a larger scale will require additional work. Likewise, the design of area yield insurance products with an early partial payment based on weather index will require significant technical assistance.

Annex 1: Summary of suggestions if modified NAIS (*mNAIS*) is implemented[19]

Type of actions		Short term actions (less than 1 year)	Medium term actions (1 to 5 years)
Summary		Announce and implement modified NAIS on a pilot basis (selected state or states)	Expand *mNAIS* to all states, factoring any lessons from pilot.
Financing	State and Central Government subsidy structure	Central and state governments to fund ex ante premium subsidies and could provide catastrophic Stop Loss reinsurance coverage (selected states). State governments to be partially responsible for area yield index payments.	Transition to full ex-ante subsidies from state governments.
	AICI risk financing strategy	AICI to conduct portfolio risk analysis for its portfolio in advance of each season. AICI to develop and introduce a risk financing strategy for its portfolio, exploring options such as reinsurance and contingent/ direct credit.	
Quality of CCEs	Standardization	Develop a draft national NAIS CCE procedures manual, with additional technical assistance.	
		Standardize CCE process (selected states)	Expand to all states.
	Personnel and training	Develop standardized training for loss adjusters, certified to conduct or supervise insurance CCEs (selected states)	Expand to all states.
	Monitoring and auditing	Commission randomized, independent, high quality CCE audits to be conducted alongside the standard CCEs (selected states).	Expand to all states.
		Investigate the potential for remote sensing technologies (e.g. satellites) for monitoring CCE reports (selected states). Investigate the potential of video recording to mitigate the potential for manipulation of CCE reports (selected states).	Expand to all states.
	Speed of reporting	Primary Workers to be required to share raw yield data with AICI by mobile phone immediately after an NAIS CCE has been conducted. Full paperwork to follow later. (selected states)	Expand to all states.
	Statistical treatment of raw CCE data	Review and standardize the process for calculating the Actual Yield for an Insurance Unit from the raw yields for each CCE conducted within the Insurance Unit.	
	Assess the quality of CCEs	Acquire historic raw yield data from individual NAIS CCEs conducted in the state to assess whether more CCEs should be conducted and whether Insurance Unit sizes should be decreased (selected states).	

19 A similar set of actions could be used if ***eWBCIS*** were to be implemented instead of or in addition to *mNAIS.*

Type of actions		Short term actions (less than 1 year)	Medium term actions (1 to 5 years)
Delays in claims settlements	Timeliness of CCE reports	State Governments release CCE reports to AICI earlier (all states).	
	Double trigger policies with early weather-based payment	Introduce early part claim based on weather index into *mNAIS* such that either: The weather index payment is offset against any final area yield payment; The weather index payment is not offset against any final area yield payment.	GoI provides market infrastructure support (e.g., weather stations)
	Timeliness of claim settlement	Upfront premium subsidies by Central and State Governments (in selected states).	
4. Actuarial risk classification	Yield histories	All area yield calculations to be based on 10 year yield history (in selected states)	Expand to all states.
	Yield de-trending	Robust yield detrending methodology to be applied for all crops with a statistically significant trend in yields or weather (in all states). [Already piloted in selected states for selected crops.]	
	Premium Rates	Premium rates paid by farmers and subsidy rates paid by Central and State Governments to be set by Central and State Governments (in selected states).	Expand to all states.
	Threshold Yields	Experience-Based Approach to designing products to be operationalized and streamlined (in selected states)	Expand to all states.
Basis risk	Reducing size of Insurance Unit	Could be introduced as a social benefit with the objective of commercial viability when data is available for actuarial pricing.	
Adverse selection	Sales cut-off dates	Move back cut-off dates (could consider premium discount for early purchase)	
Incomplete benefits	Coverage for prevention of sowing, replanting, post harvest losses and localized risks		Could be introduced as a social benefit since data for actuarial pricing does not currently exist.
Private sector involvement	Open aspects of *mNAIS* to private sector	AICI to investigate the purchase of reinsurance for the weather and area yield based elements of *mNAIS*.	Encourage private sector participation in risk capital provision, product delivery and innovative product design.

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