Risk Management *in* Agriculture

Presentation to 46th APPPA Participants

By Ashok Vishandass

Professor (Applied Economics)
Indian Institute of Public Administration
New Delhi

July, 2020

Agriculture : A Risky Enterprise (1/2)

- Agriculture –
  - ❖ an enterprise under an open sky,
  - ❖ is highly uncertain.
- exposed to multiple risks at all stages of its long value-chain - pre-production, production and post-production segments.
- Climate change causes increase in the frequency, intensity and duration of extreme weather events such as
- droughts, floods, heat waves, hailstorms and cyclones, thereby cause extensive crop damages.

Agriculture : A Risky Enterprise (2/2)

- Cultivation being biological in nature, is vulnerable to several internal and external factors at different stages.
- Both endogenous and exogenous factors need to be identified, evaluated, negotiated and managed
- Governance and market support have an important role to play.

Risk in Agriculture (1/3)

- Refers to the probability of an endangering act or event and is closely associated with damage or loss, physical or financial.
- Arises due to uncertainties inherent in weather, yields, global markets and government policies; prices and other factors also impact agriculture, and cause wide swings in farm income;
- Risk management involves choosing among alternatives in such a manner as to reduce financial effects that can result from uncertainties
- An efficient marketing system backed by a robust agri-logistics, price & demand forecasting and market integration are important components that not only mitigate risks but
- also build the ability to take certain market risks.

Risk in Agriculture (2/3)

- The risks are both internal and external in nature, affecting the biotic system in the sector and the external services that depend on agricultural produce.
- Forewarning is forearming and early warning about an inclement weather can minimise its impact. This necessitates sharing of information and knowledge with farmers in advance and on real time basis.
- Govt. can play a pro-active role in dissemination of credible forecast of demand and prices well before sowing so that farmers can calibrate and design their strategy on what to produce, how to produce and for whom to produce.

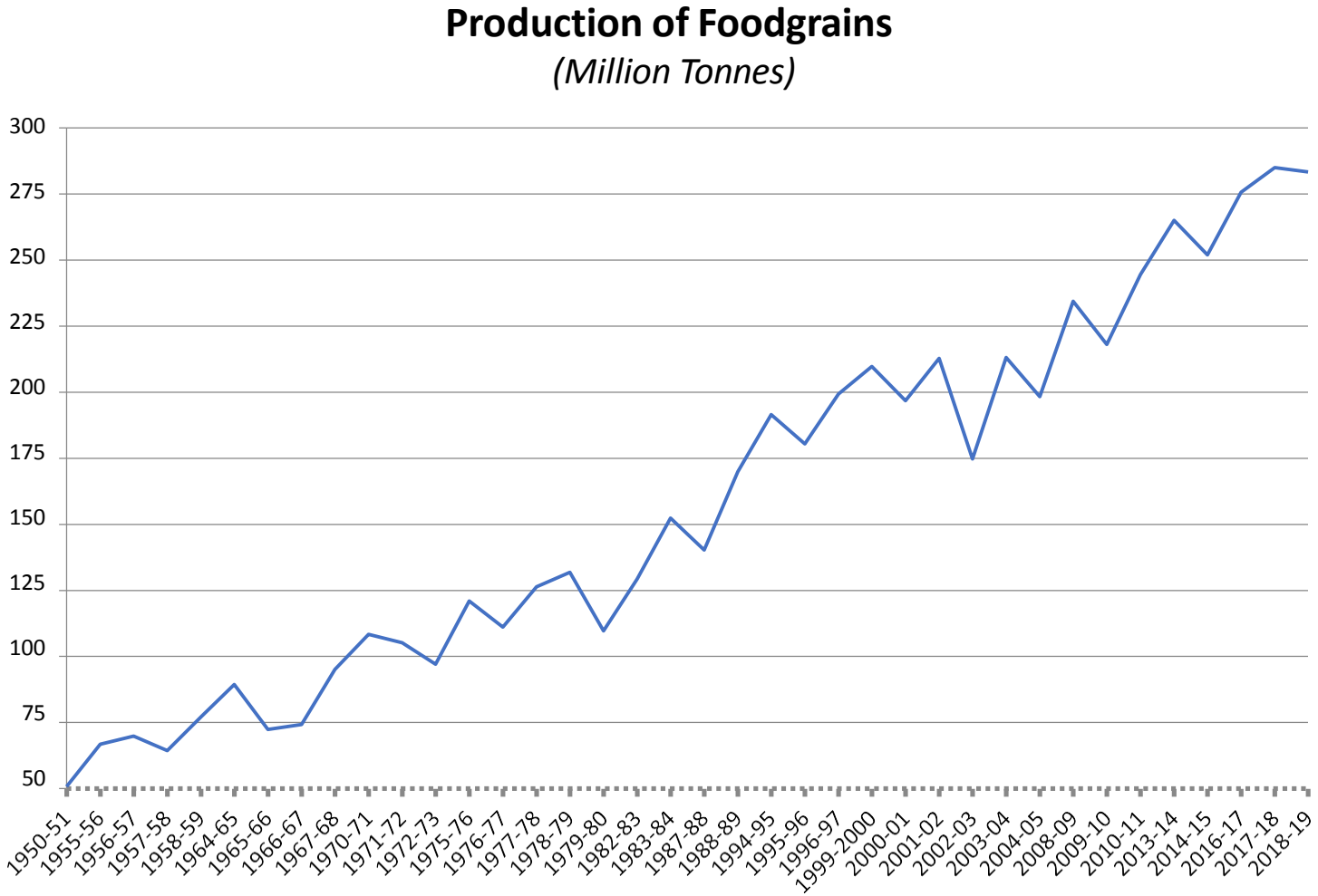
Risk in Agriculture (3/3)

- Even a cursory look at the set of agricultural activities and its business ecosystem will bring forth a sense of the unique set of uncertainties the system faces.
- Vagaries of Weather and force majeure events are normally beyond control of human intervention. However, its impact can be contained by an improved ability to predict an occurrence and act to repair or negotiate any detrimental impact.
- On the other hand, the market associated risks faced by farmers can be better managed and possibly be avoided by means of technology, enabling tools and good governance.

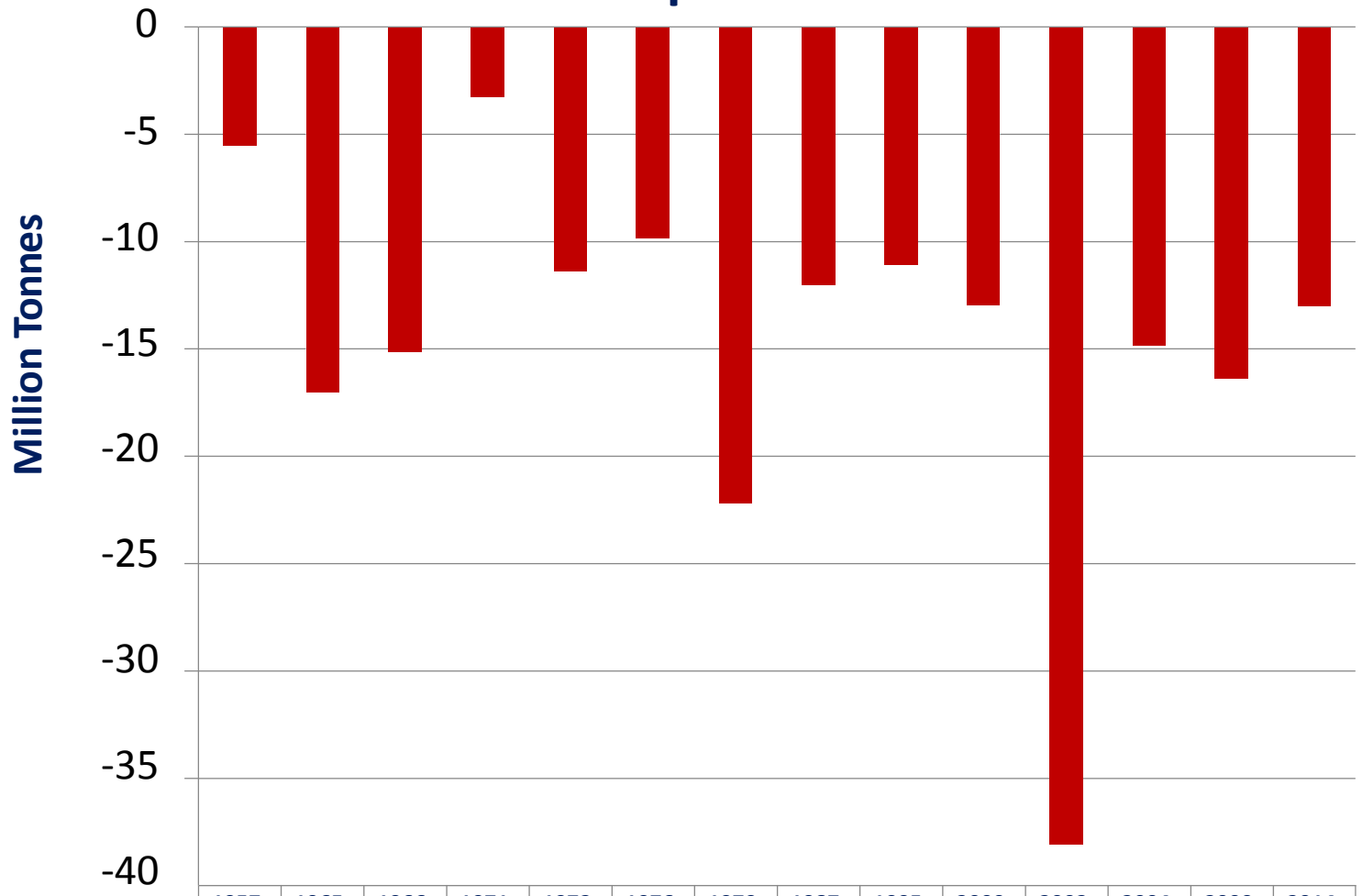
Effects of Risks in Agriculture

- The entire set of economic endeavours is hinged on the core undertaking of cultivating and producing useful goods
- One of the important aspects of risk management, is linked to the ability to forecast inclement weather situations, take steps to minimise the hazard, and insure to offset any damage that occurs.
- The downside of this is that investments made in the factors of production by a farmer are put at risk and at times are irrecoverable
- Weather changes the outcome from farms and is a key factor that makes farming more a matter of chance.

Impact of Vagaries of Weather



Production Losses of Foodgrains-Some Examples



	1957-58	1965-66	1966-67	1971-72	1972-73	1976-77	1979-80	1987-88	1995-96	2000-01	2002-03	2004-05	2009-10	2014-15
Production Loss	-5.52	-17.01	-15.13	-3.25	-11.39	-9.86	-22.2	-12.02	-11.08	-12.99	-38.08	-14.83	-16.36	-13.02

Risks and Farmers' Income

- The wide array of risks to the agriculture sector have effect on:
  - Yield
  - overall productivity of assets
  - market access
  - demand, supply and prices
  - Stability in agri-export-import policy which includes tariff and non-tariff barriers
  - Each of these impinge on farmers' income

Classification of Risks (1/3)

- Broadly, Agri-risks can be classified into 5 buckets:
- **Cultivation centric Risks**: Besides weather, other sources of risk of this kind are soil health, input quality. The production being biotic in nature, the range of factors that affect the biological processes of breeding, rearing or cultivation are sources of risk. And its mitigation strategy would be Forecasting, planning, irrigation, insurance.
- **Agri-logistics centric Risks**: Inability to directly communicate the output with markets of choice, quality & availability of storage & transport. Mitigation include Aggregation hubs, village level logistics services.

Classification of Risks (2/3)

- **Marketing centric Risks**: include Inefficient and ineffective market architecture, farmers not empowered to use markets as access platform, market only a transaction point. For mitigation : markets as supply chain component are to be reoriented and reformed.
- **Market predictability centric Risks**: Lack of quality and timeliness in periodic demand forecast. Production not linked to market demand. Farmers produce regardless of demand. Sometimes, focus only on post facto price information. For mitigation : Market intelligence to drive crop planning so as to enable farmers to calibrate and design their production according to demand.

Classification of Risks (3/3)

- **Universal impact Risks**: Trade policy, tariff and non-tariff barriers, restrictive market rules, undeveloped inter-state trade, procurement limited only to a few crops and regions, production centric rather than income centric public policy, water scarcity, climate change, decreasing per capita arable land, resource extractive and unsustainable production system.

Paradigm Shift (1/2)

- Of late, climate change has been causing significant disruptions to ecology in general and its impact has not bypassed agriculture. The major cause of climate change is attributed to green house gas emissions (GHG).
- As the impact of climate variability on agriculture in different agro-climatic systems has changed, the changes in risk management approaches have shaped the mitigation and the response strategies of farmers and societies.
- Hydro-meteorological risks such as droughts, floods, heatwaves, hailstorms, and cyclones not only endanger human lives and property, but also have a devastating impact on farmers' livelihood systems.
- Small, marginal and resource poor farmers, particularly in rain-fed regions do not have inbuilt buffering mechanisms.
- And they are the ones who are more vulnerable to the severity of extreme climate events.

Paradigm Shift (2/2)

- Shift paradigm to build farmers' capacity to take on risks that are more intrinsically linked with the markets
- Technology is emerging as a powerful tool to deploy forecast, early warning, alerts and the like
- It can be gainfully utilised in agriculture across its multiple sub-sectors to be informed in advance, and take appropriate actions that will help in mitigating the risk impact, and secure output and income.

Technology in Risk Management (1/2)

- Technology is emerging as a powerful tool to deploy credible forecast, early warning, alerts well in time.
- It can be gainfully utilised in agriculture across its multiple sub-sectors to be informed in advance, and take appropriate actions that will help in mitigating the risk impact, and secure output and income.
- Risk management in agriculture ranges from informal mechanism like avoidance of highly risky crops, diversification across crops & sub-sectors, and across income sources to formal mechanisms like agriculture insurance, minimum support price system and futures markets

Technology in Risk Management (2/2)

The litmus test of success of emerging technology in mitigating risk lies in its ability to enhance farmers welfare and bring monetary gains to them

Climate Change-Its Impact

- Increases agricultural risks by increasing variability in rainfall, causing water stress, enhancing susceptibility to plant diseases and pest attacks

- More importantly, raise the frequency, intensity and duration of extreme weather events like droughts, floods, heat waves, cyclones and hailstorms surge, thereby cause extensive crop damage

Climate Change: Risks in Agriculture

- A long term, more drastic impact from climate change is a major concern of risk in the agricultural system. The data points available over the last decade demonstrate greater certainty of climate change and associated risks.
- The changing climate is a major impediment in sustaining agricultural productivity, especially in case of small and marginal farming, where the event of loss of even a single crop can lead to starvation or malnutrition of the family.
- Given that the risk is a way of life in agricultural system, it needs to be negotiated and managed. Resilience and capacity to face risks needs to be built. The ability to take risks allows various actors in the agri-value system to explore and develop new markets.

Strategy to Counter Risk (1/2)

- Risk mitigation normally requires a strategy on both financial cover and physical front
- This includes building resilience and capacity to recover from challenges resulting from force majeure events, man-made actions, which could be omissions or commissions
- The focus on income security of farmers is taking agriculture into the phase of risk management with a view to neutralising or minimising the impact of risks
- Farmers' propensity to take a risk or challenge new frontiers is limited due to resource crunch.

Strategy to Counter Risk (2/2)

- Build resilience to recover from challenges resulting from force majeure events
- Counter the risks that result from man-made actions, which could be omissions or commissions
- Managing risk to crop helps to stabilise the income of the farmers and encourages the resilience and capacity to adopt innovative practices.

Minimise the Impact of Risks

- The focus on income security of farmers is taking agriculture into the phase of risk management with a view to neutralising or minimising the impact of risks
- All development, directed to build financial independence for the farmers and their income, or minimise their costs, are directly linked to risk management in agriculture
- Farmers' propensity to take a risk or challenge new frontiers is limited due to resource crunch, the fear of the unknown, from structural weaknesses in the system.
- Reforms and interventions in the agricultural value system are all designed to build resilience in the farmers against natural calamities

Agricultural Development has little meaning if it is not pro-poor, pro-women, and pro-nature

Conclusion

- While it is not possible to eliminate risks altogether, it is possible to prepare the farmers to face the probability of the occurrence of such a risk, and enable them to negotiate and manage it appropriately with a view to minimise the negative outcomes
- Emerging Technology can be gainfully deployed across agricultural sub-sectors to forecast early warnings and alerts.
- With the power of technology, it is possible to collate data from dispersed geographies and subject them to big data analytics and draw meaningful forecast that can be shared with the farmers
- Here, timeliness of forecast is no less important than the forecast itself

Quiz

1. Which of the following is not a risk in agriculture?
   (a)Cultivation centric risks
   (b)Agri-logistics centric risks
   (c)Marketing centric risks
   (d) All of these

Quiz

2. Climate change has increased risks because of increase in which aspect(s) of extreme weather events?

   (a) frequency

   (b) intensity

   (c) duration

   (d) All of these

Quiz

3. Risks to the agriculture sector can have an effect on

(a)Yield,

(b) Market access,

(c)Demand, supply and prices

(d) All of these

References

1. Adam M.Komarek (2020) 'A review of types of risks in agriculture: What we know and what we need to know' Available: https://www.sciencedirect.com/science/article/pii/S0308521X18312034
2. David Kahan (2008) ' Managing Risk in Farming' Available: http://www.fao.org/uploads/media/3-ManagingRiskInternLores.pdf
3. Kolli N. RAO (2008) 'Risk Management as a Pillar in Agriculture and Food Security Policies: India case study Policy Brief' Available: http://www.fao.org/docs/up/easypol/764/risk_mngmnt_pllrfs_policy_indiacs_209en.pdf


Thank you