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Total Risk Management Process (TRMP) in Agrifood Supply Chain (ASC)

Research Paper

Related Topic: Financial Risk Management in Food System

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KEY WORDS:
Total Risk Management Process, Agri-food Supply Chain

ABBREVIATIONS:
TRPM (Total Risk Process Management), ASC (Agri-food Supply Chain), TQM (Total Quality Management), SCM (Supply Chain Management), GoP (Government of Pakistan), EDL (External Debt Liabilities), KPI (Key Performance Indicator), FDI (Foreign Direct Investment)

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INTRODUCTION:

80% world resources are being consumed by 20% of people__ Clearly there is a long way to go before the food system serves the needs of all the world's people (Tansey 1994)

Risk is an inherent part of business and public life. People take risks either because of reward or its being inevitable. Tensay stresses about the importance of risk identification in these words "Nothing is certain except that we face innumerable uncertainties; but simply recognising that fact provides a vital starting point, and is, of course, far better than being blindly unaware of how our world is changing".

The research is about agriculture sector that is characterised by having properties of low capital intensive and high labour absorption nature. Tansey (1994) says "Millions of people still face starvation due to conflicts, drought and inadequate policies". Food is something everyone, everywhere, needs every day, so even small changes in the way it is channelled and marketed can offer immense benefits. Focus of the study is on having a better understanding and management of consumer-driven food supply chain (Straete, 2008) using a systems-oriented approach by integrating marketing and consumer science with TQM (Total Quality Management) aspects [e.g. process orientation, quality function deployment, logistics, and information technology (Sparkes et.al. 2001) etc]. It presents an integrated view of how food supply chain is to be managed to handle the potential risks for remaining competitive in market place.

Brown says "Although there is a difference in specific definitions of risks and uncertainty, yet in most financial literature the two terms are used interchangeably. For most investors, risk means the uncertainty of future outcomes; an alternative definition might be the probability of an adverse outcome" (Brown et.al. 2006). Young et.al. (2000) take this point ahead and say "Uncertainty is broken down into four components. There is uncertainty for the buyer over product quality which imposes sorting costs on the buyer in determining a product's true quality (Barzel, 1982). Buyer uncertainty also arises with respect to the reliability of supply (timeliness and quantity) - this is a long-run planning problem. For example, a French fry manufacturer must have timely supplies of potatoes to fulfil its own contracts with fast food restaurants on a regular basis. Both buyer and seller face price uncertainty. Again, this is a long-run planning problem. At the time a production decision is made there is uncertainty over the prices that will be received/paid for agricultural produce. Sellers may face uncertainty in finding a buyer, particularly if their product has idiosyncratic qualities. This raises their information or search costs. As uncertainty increases, we expect closer forms of vertical co-ordination to be selected over open market transactions because of increased information and monitoring costs." Definitions of risk are taken around these lines in this study.

Tansey (1994) says, "The food system determines the how and why of what we eat – i.e. how food is produced and reaches our mouths and why we eat what we do. It subsumes the terms "food chain", which is too linear a model for today, and "food economy", which is too narrowly economic. The idea of a system implies that there is interconnectedness beneath the surface of things, which is the case when we look at any aspect of food today." He further says "The food system encompasses three aspects of life: 1) biological: the living processes used to produce food and their ecological sustainability; 2) economic and political: the power and control which different

groups exert over the different parts of the system; 3) social and cultural: the personal relations, community values and cultural traditions which affect people's use of food." Food system has been taken more or less along this definition in this piece of work

Like any research, this research has also some assumptions: 1) Food is taken as an organic one, 2) Operational aspects also covers technological domain, 3) Measures taken in the models are generally acceptable measures across the food industry 4) Measures are excellence oriented (covering financial profitability as well). The problem statement is"How to control internal and external environmental risks in agrifood supply chain for maximizing profits by handling potential losses?" This broad question is broken down in to three sub questions: 1) How can the ASC resources be threatened through potential risks? 2) How can the risks prevent an organisation in achieving its goals? 3) How should the risks be managed effectively and efficiently? The foundation questions are chosen to embed excellence in agrifood risk management. This contributes towards bringing food economy at home in developing countries (like Pakistan, that is selected as an example in this paper), which are new to such concepts in food industry specifically. The research is deductive in nature. Cross sector literature review covering mostly the agrifood industry is the methodology adopted to find out about how TRMP can be managed to remain competitive in the future agri markets. Pakistani Government's agriculture sector statistical indicators' information (for at least one year) is critically analysed to show impact of public policy on agrifood system of the country specifically the ASC.

PAKISTAN'S AGRICULTURE BACKGROUND:

Pakistan is an agriculture country. Its agriculture sector consists of crops, livestock, fishing and forestry sub-sectors. Due to limitation of scope, this study focuses mostly on the 'general' crop side of agriculture sector. The crop subsector is again divided in to major (wheat, cotton, rice, sugarcane, gram and maize) and minor crops (pulses, potatoes, onions, chillies and garlic). "But the share of agriculture in GDP has been falling persistently. "It accounted for 24.1% in 2001-02 but subsequently has declined to 20.9% in 2007-08. However, it still remains the single largest sector of Pakistan's economy and an overwhelming majority of the population depends directly or indirectly on income streams generated by the agriculture sector. Apart from being a major source of foreign exchange earnings, the agriculture sector also provides employment to the 44% of the country's labour force. The crop sector has enormous potential to influence not only the performance of overall agriculture but can serve as an anchor for food security of the country, particularly after the emergence of a food crisis on the global front, but the lacklustre performance of this sector has reduced its contribution to 45% of agriculture sector in 2007-08. Having grown at a healthy 8.3% last year, crop sub sector has posted a negative growth of 3% in 2007-08" (ES 2008).

ES (2008) argues that there are several reasons for that performance as fiscal year 2007-08 has been a challenging fiscal year for Pakistan's economy because of occurring of several unexpected events e.g. disturbed political situation of Pakistan with an unstable law and order situation, supply shocks, soaring oil/food/other commodities prices at domestic and international fronts, and turmoil in international financial market.

LITERATURE REVIEW & ANALYSIS:

Sparkes says "world is not a market - it is a complex series of myriads of sub-markets each with their own particular requirements. Same is the case with food system in terms of having diversified stakeholders (some times with colliding interests). Tansey (1994) identifies food system's stakeholders, "Different groups of people behave as key actors in the food system. These key actors – farmers, workers, traders, processors and manufacturers, wholesalers and retailers, caterers and consumers – have competing interests. Usually, each group acts in ways to suit its needs and argues for policies that benefit it. However, within each group there are differing interests. Often, those with the most need have the weakest voices; for example, poor, small farmers and consumers." A system oriented approach is required in developing a comprehensive risk control model for agri-food supply chain as Hawkes says "Poor decision making is caused by looking at the individual elements of an interactive system in isolation" (Hawkes, 1997).

Moreover, Singhal et al (2007) argue that senior executives are becoming increasingly aware that supply chain performance is critical to business success. Supply chain management is getting a place for "value creation" for the business by providing a base for process orientation. It's an integral component of best practices; as customer's satisfaction is directly associated with how they are being served by company. In most industries, supply chain performance has become a much more strategic and competitive issues as it directly affects a firm's ability to generate revenue (e.g. through outsourcing etc. Gupta et.al. 2005), manage cost, improve asset productivity, and enhance customer satisfaction e.g. TNT Express Limited is a market leader in logistics, providing a comprehensive range of transportation and supply chain management services. Its philosophy is that quality is an integral part of the operation and not a bolt on accessory (Zairi, 2005). (Appendix 2 shows ASC in Pakistan and Appendix 3 groups the performance indicators in a score card to monitor performance of ASC).

Besides the above argument of looking at food market in a system oriented way, Peter et.al. (2001) argue about the roles of dramatic growth in consumer demand for organic food and move from niche to mainstream market in shaping 'the current challenges of stakeholders' oriented excellence' that crosses the conventional concerns for product quality only. Traditionally many of the small independent organic food retailers have had long-term relationships that extend beyond issues of healthy eating, food safety and quality to embrace shared concerns for natural production, environmental sustainability, animal welfare, fair trade and community values

Following 9 domains are explored through cross industrial literature review (covering mostly agriculture industry) that contribute to the development of Total Risk Management model leading towards excellence in agri-food industry.

1) Leadership: The role for senior management is to create a climate for change by developing ambitious product and operating standards. They are also responsible for highlighting successfully revitalized units as models for the entire company and to provide a vision (Tharoor, 2005). SHU (2003) further takes this point ahead and says, "Excellent leaders develop and facilitate the achievement of the mission and vision. They develop organisational values and systems required for sustainable success and implement these via their actions and behaviours.

During periods of change they retain a constancy of purpose. Where required, such leaders are able to change the direction of an organisation and inspire others to follow."

Several authors have declared leadership commitment as a vital tool for the success of an excellence oriented programme. For instance Feigenbaum (1991), Pascale (1990), Maslach (2002), Martz et al (2001), Sohail et al (2003), Ishikawa (1985) and Zairi et al (1995) consider commitment of senior executives as a crucial factor of excellence and their doubts as the greatest enemy. Promoting organisational commitment to excellence is achieved as a result of top management commitment. Juran (1993) attributes the failure of the quality initiatives in the West in the 1970s and 1980s to senior managers' lack of personal commitment. (Appendix 1 shows leadership based 8 stepped total risk management process)

Leaders have a strong impact on the culture of their organisations as well because they set role model to be followed by their followers. Schein (1997) and Bairstow (2006) suggest that organisational cultures begin with leaders who impose their own values and assumptions on a group. Further, Hackman et al (1995) suggests that organisation culture is influenced by leaders and it helps in refining the behaviours towards the right direction for excellence.

In Pakistan this leadership aspect is required at Government level specifically in terms of describing consistency of food policy regarding export/import quota, export/import concentration etc for quantifying and minimising risk for farmers, traders, etc. Tansey (1994) argue about the role of inadequate food policy in creating droughts. "Pakistan's exports are highly concentrated in a few countries. USA, Germany, japan, UK, Hong Kong, Dubai and Saudi Arabia alone account for almost one-half of Pakistan's exports" (ES 2008). Pakistani Government is in need to break this concentration to minimize the risk of investment in this sector.

2) Physical: Okoroh et.al (2002) defend the contribution of managing infrastructure or physical risk in bringing excellence. At the moment there is no system of making crops risk free in Pakistan. Butt (2006) implies that hedging of crops is a common recommendation in this regard to help prevent the risk to cultivate crops and give farmers a secure edge. GoP should get in venture with insurance companies to provide this basic facility to producers. This will also contribute towards improving farmer's quality of life who is the back of agriculture economy.

3) Political/Legal: Brown et.al. (2006) argues about impact of political stability of a country in determining the cost of transaction in/with that country. Stable political conditions along with friendly policy can secure return on investments in agri-food industry of Pakistan. This can be done by many ways e.g. investment in providing various inputs (e.g. machinery, funds etc) to agri-food traders. As Buatsi says "Exporters require funding for a wide range of inputs and activities: to purchase and/or produce goods, tools and machinery, processing, packaging, marketing, etc. This type of finance is particularly important for small firms that have limited access to long-term capital markets and, therefore, need to rely on trade credit and short-term loans" (Butasi 2002). Govt. of Pakistan (GOP) has facilitated exporters a lot in this regard in the current trade policy e.g. Zero % duty has been imposed on importing agriculture machinery (ES 2008).

4) Social: Tansey (1994) says "Millions of people still face starvation due to conflicts,

drought and inadequate policies, while American and European farmers set aside land from production. More over, he has identified six societal factors critical to be considered for managing food systems: 1) Increasing longevity and increasing numbers; 2) Increasing urbanization; 3) Globalization of the food market; 4) Increasing technological change; 5) Changes in attitudes and values (Peter et.al. (2001) projects the customer buying preference in big retail shops) 6) Decline of the traditional "housekeeping" role.

Sparkes says world is a complex series of myriads of sub-markets each with their own particular requirements. He argues about the role of information technology and marketing in linking the various food submarket of it. He further implies that from recent research carried out by the Welsh Enterprise Institute (WEI) it was found that there may only be 4 percent of agri-food SMEs in Wales using the internet to market their products (Sparkes et al., 2001).

In Pakistan there is still an unexplored market for introducing the usage of internet in Agri-food industry. This market opportunity can be trapped by promoting the use of technology in linking customers with agri-food outlets. This will enhance the quality production by providing customers with lots of buying/selling information. GoP should provide subsidy on the use of internet in this sector to help link this market with the international market. This facility can also be outsourced for getting expert services.

5) Operational: Tansey (1994) says 20 per cent of humanity uses about 80 per cent of the world's resources. Will this system meet the needs of ten billion people in 2050? To answer such questions, we need to see the connections that exist in the food system, and how change in one aspect affects others. We need to understand all parts of the system and their interactions – or at least to make it such an open system that the effects of changes in any one part are clearly visible and can be dealt with. In addition to it, Berends says that systematic approach facilitates developing partnerships among different variables e.g governance and community co-ordination etc. (Berends 1994).

Firm's operations can be improved by using advanced technology. As Persson (2007) argues that technological advances have continued to make significant advances in the ways the company operates at all levels. Moreover Dittenhofer (2001) says, "Financial management in government as well as in industry is becoming more mechanized as we develop sophisticated electronic equipment that produces information, assembles it, edits it, analyzes it, and in many cases stimulates action guided by artificial intelligence." Jones supports the same in agriculture industry in these words, "More general arguments would stress the role of modern, high technology, intensive agriculture in helping to feed the world's seemingly ever growing population while casting doubts on the capacity of traditional organic farming to achieve similar production levels (Jones et.al. 2001)."

GoP should facilitate a research for using appropriate advanced technology in agrifood industry to make its system at an international level. This, in turn, would contribute in linking the domestic market with the international one.

6) Economical: Young et.al. (2000) argue about the role of economic drivers in affecting the product characteristics and its direct influence on transaction environment. ES (2008) says

"High and rising external debt burden constitutes a serious constraint for development and a major impediment to macroeconomic stability of a country because it creates a high risk environment and exchange rate depreciation; and a discouragement for government to carry out structural development in various sectors of the economy. Pakistan's external debt and liabilities (EDL) is comprised of all Government debt denominated in foreign currency, loans contracted by enterprises with Government ownership of more than 50% as well as the external debt of the private sector" (ES 2008). Last year GoP has to borrow a lot because of the earthquake related spendings and depreciating trend of dollar against leading currencies like Euro and Japanese Yen etc.

GoP should take steps to diversify the currency of its foreign reserves (which are US dollars at present) to help minimise its economic risk to some extent for potential domestic investors and FDIs (Foreign Direct Investments).

7) Business Results/CSF: Business results refer to the measures that are used to track progress towards business priorities. Sparkes et.al. (2001) say "Critical success factors (CSFs) are the critical areas that management must constantly monitor for ensuring successful performance by the organisation". They refer to Magal et al. (1988) who identified five composite CSFs for general management: 1) commitment; 2) quality of support services; 3) facilitation; 4) role clarity; and 5) co-ordination.

Mann et al (1999) argue about the use of a range of financial and non-financial measures to gauge business success. Generally, these measures are compared not only with past performance but also with similar measures in other companies. Moreover he says that these measures can be set with benchmarking. That in turn can enable companies to set competitive performance targets, identify performance gaps, and identify and implement best-practice approaches, and then provides a method for re-assessing the performance gap. Sainsbury's Logistics has appointed a benchmarking manager specifically to ensure that logistics compares its performance against the best-in-class rather than against previous performance.

8) Customer Satisfaction: Straete (2008) has emphasized on consumer orientation in food industry. Harrington further says that systematic approach can also make an organisation more customer-focused by training each stake holder towards customer satisfaction (Harrington 1997). Customers are the receivers of firm's services so its Key performance indicators (KPIs) should be designed to better serve them as Pille (1998) says that KPIs about website should be divided in 3 categories as per customer requirements: 1) Informational level; 2) Transactional level; 3) Relational level."

At present no packaging of agrifood is made as per customer requirements. GoP should take facilitate research in this area to develop that design and weightage of packs which are more convenient to be handled by all stakeholders specially customers.

9) People Management: People are taken in the context of employees of an organisation under this heading. Food system involves multi level stakeholders in an organisations. They should be motivated to have maximum output of people. Dittenhofer (2001) identifies a generic six step process for managing people to improve performance and gives this process: 1) Find out what

outcomes each employee desires; 2) Use the theories of motivation, observe behaviour, and conduct interviews; 3) Establish a definition of the performance sought; 4) Ensure that the expected kinds and levels of performance are attainable and are perceived to be so; 5) Make clear and explicit links between the workers' desired outcomes and desired productivity; 6) Develop goal congruence and a system of rewards that is perceived by the workers as fair.

Fig. 1 shows the model of Total Risk management drawn from the above discussion covering all the nine domains of leadership, economical, political, customer satisfaction etc. (Appendix 3 shows a score card having measures drawn from these domain to better manage risk in Agrifood supply chain).

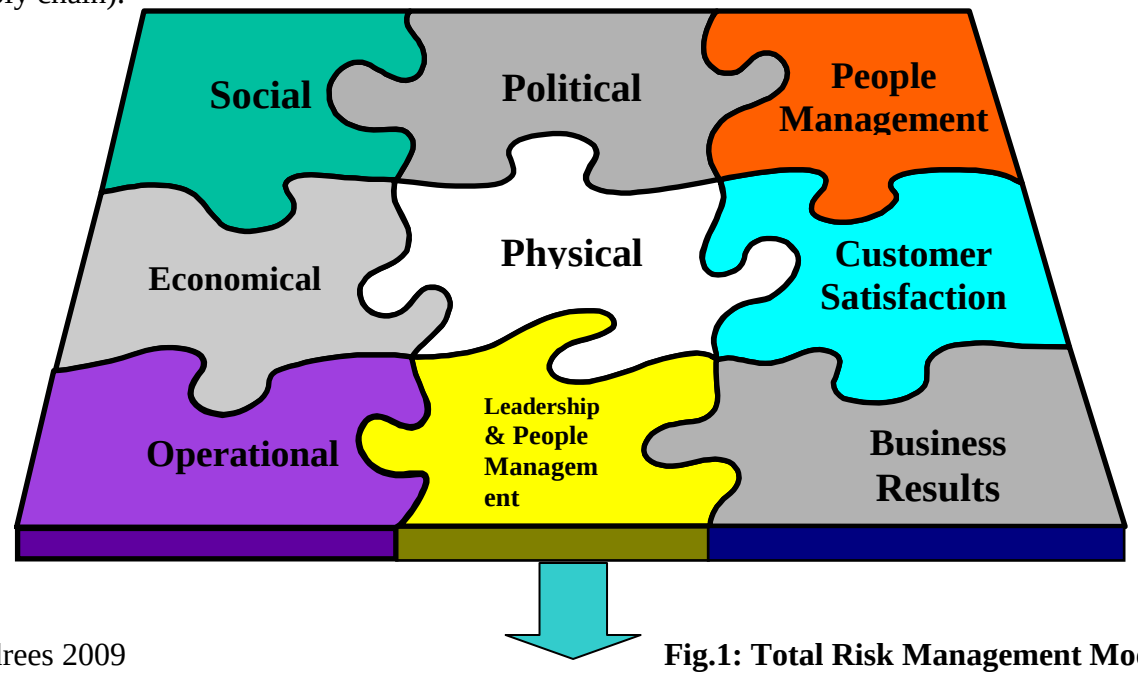

Fig.1: Total Risk Management Model

Excellence through Risk Management in ASC

HOW DOES MODEL WORK:

The above model has been derived by using the secondary data i.e. literature review regardless of industries and sectors. The literature review is mostly from the agriculture industry to help GoP in better understanding the need of brining excellence in its existing ASC.

Since the model contains about 9 KPIs, so it is easy to deploy. It focuses on driving measures from leadership strategy. That in turn ensures the right direction of an organisation by brining strategy in to day to day operations. Moreover it is general in nature. This facilitates its deployment at all levels of the organisation. Further, its holistic characteristic provides an entrepreneurial approach to an organisation. Above all, it is dynamic in terms of relations among the KPIs. This makes it a non prescriptive model; able to serve multi functions in terms of self assessment for continuous improvement.

RESULT:

TRMP has been defined in holistic manner_covering activities from farm to fork (Tansey 1994). Tchankova (2002) and Tansey (1994) works have been used in ASC by presenting an agriculture sector specific risk management model. Seven domains of risk sources have been covered (Williams et.al. 1998) that is Physical (Worsfold 2001), Social, Political (Tregear et.al. 2006), Operational, Economic, and Legal environments encompassing three groups of resources (i.e. Physical, Financial, and Human). Impacts of changes in the environment of an agri-food system on food innovation/quality, such as the changing consumer behaviour and changing market (Morris et.al. 2001), the growing concern about food safety and new insights in human nutrition, changing house keeping roles etc are identified which clearly shows that a new century is being build up which requires the use of modern high technology to feed up world's growing population. The work provides the role of government's policies in levelling the playing field for uplifting the sector by taking Pakistan as an example, which is a predominant South Asian agriculture country. Government of Pakistan's statistical indicators' information reveals its inconsistency in some strategic variables (e.g. concentration of exports and countries, wrong prediction of consumption patterns at domestic level etc.) that could prevent the last food shortages (Wagner et.al. 2001) in the national market specifically related to wheat. Some common non value added activities are identified (e.g. hedging, use of technology in regulating food chains etc), that can be outsourced to improve risk return ratio.

CONCLUSION:

Food industry is ideally suited to build on the strengths of traditional skills and knowledge in an agriculture country through infusion of correct government's policy, technology, and innovative marketing practices. The implementation of proposed model can help in preventing the potential losses through managing the resources mostly exposed to risks.

The research has achieved its aim in answering all the three research questions. ASC resources can be threatened through potential risks from leadership strategies, economical and political conditions, customer satisfaction, people management, operations etc. Risks prevent an organisation in achieving its goals through getting low investments from potential investors due to high risks. The risks can be managed effectively and efficiently through implementing the proposed model drawn from a diverse and thorough cross industrial literature review revolving mostly around the agriculture industry. This sector can be more profitable for all stakeholders specially farmers by securing the before mentioned risky domains.

IMPLICATIONS:

This study provides valuable information for academicians/professionals/students in the food industry (covering food technology/management) on the latest developments in the ASC regarding managing their risks both internally and externally of an organisation. Integrated risk management strategies can be developed by keeping in view the interests of all stakeholders (Keefe, 2001). Corporate and operational level scorecards can be developed to monitor and manage risk in their supply chain, which in turn can help companies in deploying their risk management strategies. The text also helps marketers in finding out the sources of quality in

ASC to brand their product in a better way for generating consumer and customer loyalty (Davis 2002). The research can be useful for public sector in finding out the impact of their policy on agriculture sector of especially Asian agriculture countries. In the last, banks and traders can more rationally quantify the risks in food supply chain (Buatsi 2002).

FUTURE RESEARCH DIRECTIONS:

Agriculture sector specific framework can be developed to implement the proposed TRMP model. Children food or country specific issues can be addressed to funnel down the findings of this research in these areas. The work can be applied to non organic food industry. Agri product specific (e.g. wheat, rice, floor etc) consumer behaviour (Morris et.al. 2001) can be linked with public sector health and safety policies. Above all, only crop side of agriculture has been covered, other areas of agriculture can be explored to further spread the benefits of the research.

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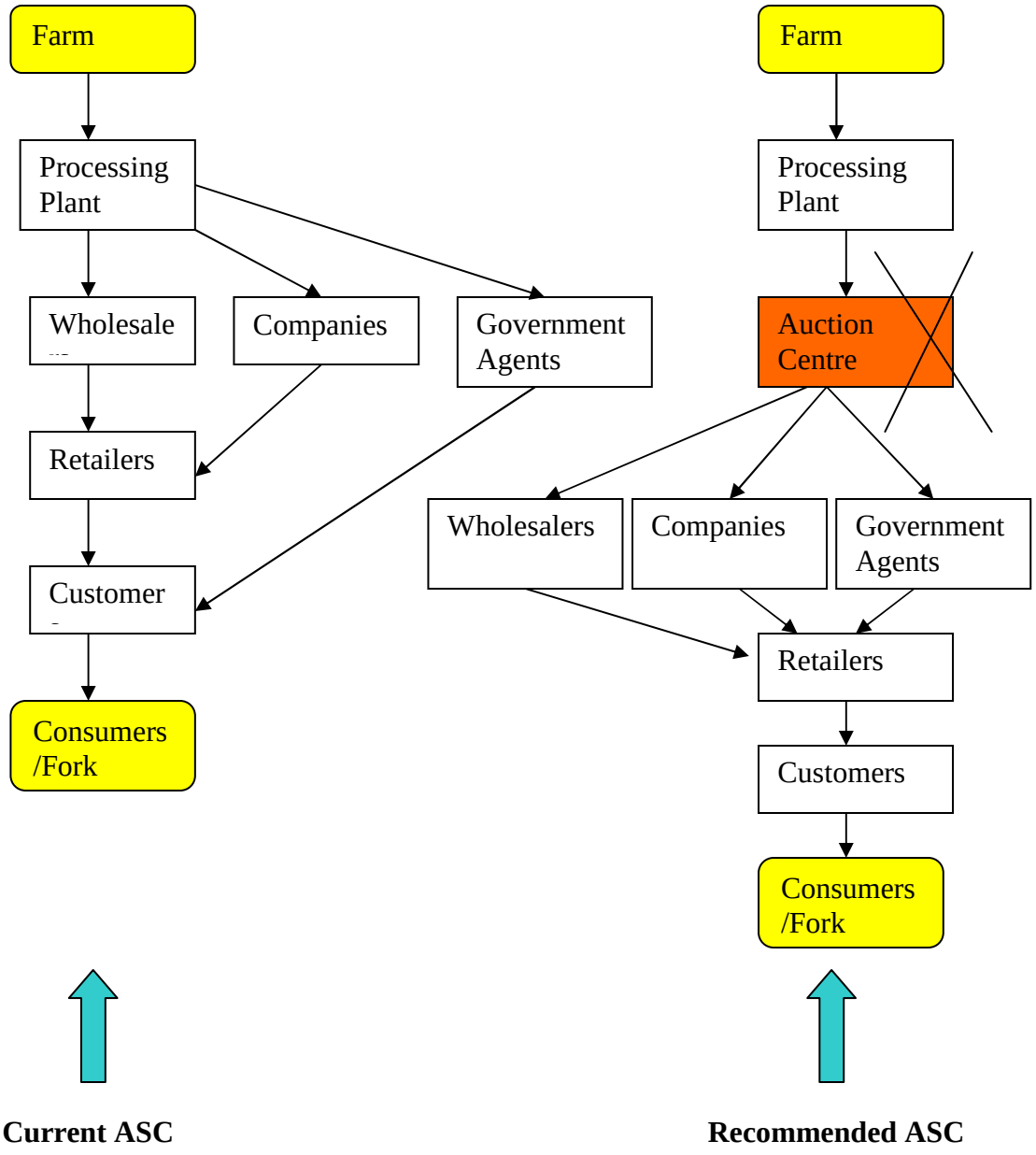
APPEDIX 1: Agri-Food Supply Chain (ASC) (in Pakistan)



APPENDIX 2: Total Risk Management Process (TRMP)

Leadership & Followership Commitment

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Classify firm's (activities) processes on a matrix of performance & importance

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Selection of the critical process(s) i.e. with high importance and low performance

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Identification of Internal (Human, Financial & Physical risks) & External (Political, Social, Environmental) Risks

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Selection of risk management technique (risk avoidance, retention, transfer etc)

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Implementation of risk management technique

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Regular Monitoring of the risk situation

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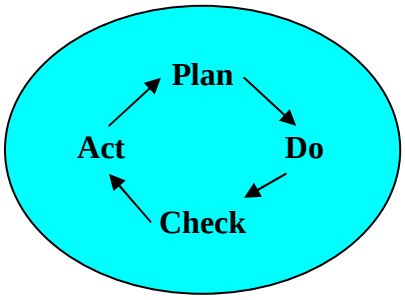
Selection of the process critical to risk



APPENDIX 3: Score Card for ASC Management (Especially for Regulatory Authorities)

Farm	Auction Centre/Processing plant	Wholesaler	Govt. Agent	Company	Retailer	Customer/ Consumer
Area of land harvested per crop	# of units per auction	# of units in reserve stock for emergency	# of units in reserve stock for emergency	# of units in reserve stock for emergency	# of units in reserve stock for emergency	Price fluctuations per month
Area of land cultivated per crop	Quality Check on Each Unit	# of units purchased and supplied/month	# units purchased and supplied per month	# of units purchased and supplied/month	# of units purchased and supplied/month	Sustained quality per every buying
Time gap between cultivation & Transport to Auction centre	Standard Packaging of units	# of complaints received for quality defects	# of complaints received for quality defects	# of complaints received for quality defects	# of complaints received for quality defects	Agri food stocks instantly available in shops for house hold buying
Use of technology to prevent crops from un organic food	Units presented in auction/# of units produced	Use of technology to forecast future buying and selling	Use of technology to forecast future buying and selling	Use of technology to forecast future buying and selling	Use of technology to forecast future buying and selling	Availability of technology to buy online
Hedging of crops	# of farms registered with auction	Availability of technology to buy & sell online	Availability of technology to buy & sell online	Availability of technology to buy & sell online	Availability of technology to buy & sell online	Accessibility of easy complaint handling process
# of farms used for crops cultivation	# of auctions/month	Accessibility of subsidy amount from GoP per crop	Accessibility of subsidy amount from GoP per crop	Accessibility of subsidy amount from GoP per crop	Accessibility of subsidy amount from GoP per crop	Conducting social trend monitoring research
Amount of subsidy from GoP per crop	# of packaging					Continuous monitoring of consumer buying behaviours
Instant availability of irrigation and seed for cropping	Use of technology to predict weather conditions for crops					
	Use of technology to link with International food market or auctions					
	Benchmarking of agrifood quality standards with International market					