

# How Adaptive Policies are in Japan and can Adaptive Policies Mean Effective Policies? Some Implications for Governing Climate Change Adaptation and Disaster Risk Reduction

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**S.V.R.K. Prabhakar<sup>1</sup>, Misa Aoki, Reina Mashimo**

Adaptation Team, Natural Resource Management Group, Institute for Global Environmental Strategies, Hayama, Japan

## **Abstract**

It has been widely regarded that policies and institutions that are adaptive in nature are better able to deal with the dynamic issues such as environmental degradation and climate change adaptation. In addition, there are claims made to suggest that experiences in disaster risk management could help in enhancing climate change adaptation. However, verifying the veracity of this hypothesis is difficult often due to absence of long experience in climate change adaptation in most countries in general and with developed countries in particular. Hence, this study, which is based on a country study of agriculture policies in Japan, reviews how various agriculture related policies have evolved over the years along with the evolving issues that they are designed to address and tries to answer questions such as how adaptive policies are in Japan and how these experiences relate to the experiences in disaster risk management. One of the interesting outcome of this study has been that indicators such as ‘timeliness’ of introduction of policies and ‘regular amendment’ of policies may not necessarily translate into effective policies

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<sup>1</sup> *Corresponding author*, Senior Policy Researcher, Institute for Global Environmental Strategies, Hayama, Japan. Email: prabhakar@iges.or.jp

since other factors such as how different stakeholders understand the issue that policy intends to address, understanding on the part of the governments and institutions on how a policy works on the ground after it is designed and implemented, information based on which policies were designed are the most important driving factors that determines the effectiveness of any policy. It is not necessary that experiences in disaster risk management could directly help in climate change adaptation in agriculture sector due to stark contrasts identified and discussed in this study.

**Keywords:** Adaptive policies, adaptive institutions, enabling environment, natural resource management, climate change adaptation, disaster risk management, Japan.

## 1. Introduction

Asia Pacific region is one of the most climate change vulnerable regions in the world due to its relatively high proportion of population depending on climate related sectors, dense population living in climate change vulnerable geographical locations, and poor development of risk governance systems. The national communications submitted to the UNFCCC showed gaps in the capacity, including research, in effectively coping with climate change impacts. The need for enhanced adaptation research and policymaking capacity in developing Asia was recognized in a series of stakeholder consultations conducted by the Institute for Global Environmental Strategies (IGES) and the work carried out at the Universiti Kebangsaan Malaysia (UKM), M.S. Swaminathan Research Foundation (MSSRF), and Vietnam Institute of Meteorology, Hydrology and Environment (IMHEM) (Pereira et al., 2011).

Analysis of policies in selected countries revealed that important decisions in the agriculture and water sectors are often implemented without consideration of projected impacts of climate change. One of the most important barriers identified was the limited capacity of researchers in the region to provide adaptation policy-relevant information. Climate change is full of uncertainties and knowledge on projected climate change impacts and needed responses continue to emerge. However, postponing actions until reliable information is made available is not an option, it may be too late. Hence, a policy environment that can learn and evolve with evolving knowledge is required to deal with uncertain challenges like climate change. In the absence of

adaptation specific information for decision making, one of the school of thoughts suggest that promoting some basic ingredients in the decision making may help support enhanced adaptation to climate change (IISD and TERI, 2006). According to this school of thought, promoting dynamic systems that can respond to known threats in a strategic manner reflects well the adaptive capacity of the system in question and these systems are able to deal with the climate change and related uncertainties than systems that are not ‘dynamic’ or ‘adaptive’ in nature. In other words, adaptive learning and adaptive management are crucial for climate change adaptation. In addition, it has also been suggested that lessons from disaster risk management can help enhance climate change adaptation since they both have several commonalities (Smit and Pilifosova, 2001; Vulnerability and Adaptation Research Group, 2006; Prabhakar, 2010). To what extent these similarities would help promoting climate change adaptation in the natural resource management sector is yet to be understood fully. A comparison of policy responses to issues in agriculture sector and disaster risk management could help in understanding the relevance of these experiences. In this paper, we endeavor to test some of these hypotheses through the case study of Japan.

The reason for choosing Japan for this case study is it being a developed country and the signatory of UNFCCC Kyoto Protocol it has obligation of reducing greenhouse gas emissions by 6% compared to the base year of 1990 (UNFCCC). In addition to this emphasis, there is an apparent understanding within Japan that Japan’s perceived threat from climate change in agriculture and allied sectors could be easily managed (IGES, 2011). To this extent, several research programs have already been taken up within Japan to understand climate change impacts and to implement actions on the ground. These actions are dispersed across different ministries disguised under different names without being named as ‘climate change adaptation’. This gives authors an impression that Japan is yet to travel a long distance to design and implement a clear climate change adaptation policy in terms of being clearly stated in its relevant national and provincial policy documents. However, there is a lot to learn from the vast policy making experience that the country has accumulated in the related fields such as agriculture wherein factors such as declining area under agriculture and declining farming population has become important policy issues for food security of the country. For this reason, this study assumes an importance for understanding how capable institutional systems and policy making

in Japan are in Japan and its implications for climate change adaptation within Japan and for those countries looking forward to Japan as a leader in the field of climate change.

## **2. Adaptive policies and policy dynamics**

Though the concept of adaptive policies is not new, the usage of this term in the context of climate change adaptation can be traced to IISD project entitled ‘Designing Policies in a World of Uncertainty, Change and Surprise’ (IISD, 2011). However, the basic notion of a policy being dynamic dates back to several years before to the beginning of 2000’s and has strong roots in a branch of policy science called ‘policy dynamics’ (Baumgartners and Jones, 2002). The branch of policy dynamics studies the feedback connections between the conditions and actors that are responsible for development of a policy over the time period. According to this branch of policy science, policies could either remain unchanged over a period of time or change in a very predictable or unpredictable manner depending on the actors involved and the stimulus to which these actors are responding to. The evolution of this branch of policy science has strong roots to the policy studies in United States and benefits from analysis of several decades of policy experience in that country. Few similarities and contrasts can be drawn between the concept of adaptive policies and policy dynamics (Table 1). The similarity between adaptive policies and policy dynamics is related to the fact that both deals with how a policy evolves over a period of time and how they deal with the dynamic pressures that operate within domain of influence that a policy is made to operate. The concept of adaptive policies state that policies have to deal with both known and unknown conditions operating within the sphere of influence they have and may lead to unknown and unintended impacts and probably may not be as effective as they are designed to be (IIED and TERI, 2006). This in the science of policy dynamics is considered as the positive and negative feedback processes that induce equilibrium and stability in the system (Baumgartner and Jones, 2002). Both concepts deal with the institutions that are involved in designing and implementing policies and how (processes) the policies are made. Hence, it can be concluded that good understanding of policy dynamics can help climate change adaptation community well. Understanding from both the school of thoughts (i.e. policy dynamics and adaptive policies) suggest that those policies and policy making environments (including

institutions and circumstances under which policies are made and implemented) that consider broad range of conditions in designing and implementing policy solutions reflects better ability for climate change adaptation since such systems are able to deal with the uncertainties that are inherent to problems such as climate change. This paper aims to test the veracity of this understanding and its implications for climate change adaptation.

Table 1: Conceptual similarities and dissimilarities between policy dynamics and adaptive policies

<b>Policy dynamics</b>	<b>Adaptive policies</b>
Recognizes feedback connections between various actors and policies over years	Recognizes how policies accommodate responses to emerging challenges
Recognizes that policies have both positive and negative feedback connections leading to equilibrium and stability in the system	Recognizes that policies have to face both known and unknown conditions leading to un-intended consequences
Largely retrospective based on historical analysis	Largely prospective and helps in strategic planning
May not address uncertainties lying outside the framework environment	Aims to address uncertainties brought from outside the framework environment

### 3. Methodology

This paper was derived from a study conducted as a part of a project on ‘Strengthening capacity for policy research on mainstreaming adaptation to climate change in agriculture and water sectors’ funded by the Asia Pacific Network for Global Change Research (Project Number CRP2009-02NMY-Pereira). The case study was conducted in Japan in two important sectors relevant for climate change adaptation i.e. agriculture and disaster risk management. We compared how different agencies respond to perceived threat through interventions either through specific policies as in case of agriculture sector or through specific amendments in a response plan as in case of disaster risk management. In this work, adaptive policy is defined as those policies that have changed with changing circumstances/triggers/problems that these

policies are developed to address. Using this definition, the adaptive policies and actions were identified through a three step process (Figure 1). In the first step, an issue has been identified that has long history of presence and there is considerable policy intervention through the literature review, expert consultations<sup>2</sup> and questionnaire survey. For identifying the adaptive policies, we gleaned through the published literature and tracked specific changes in policies and processes in response to identified stimulus. After prioritizing the issue and policies, we looked at how these policies were effective in achieving set objective to compare if the policy that has undergone continuous change evolves as an effective policy in achieving its objective.

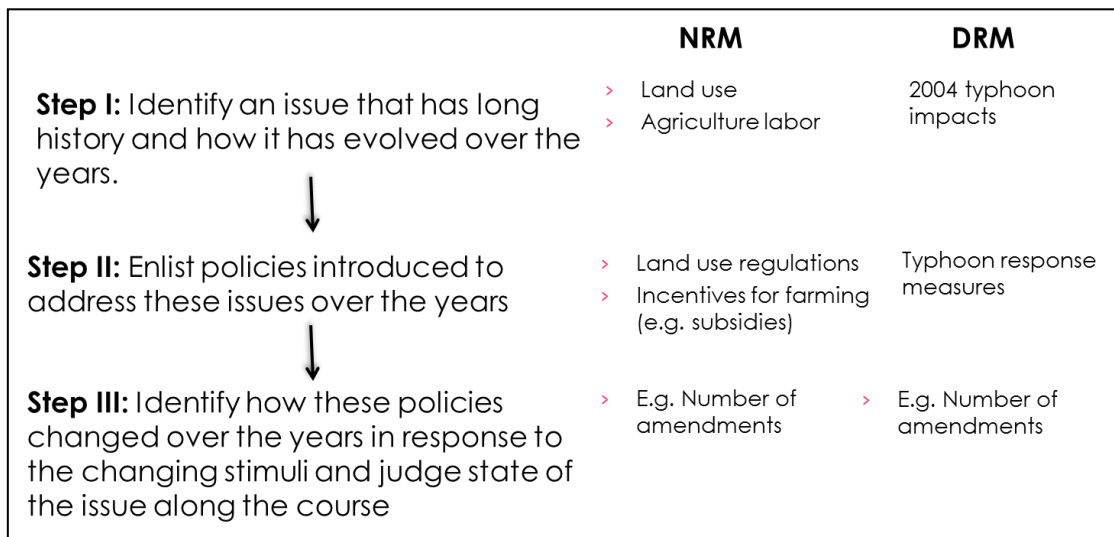


Figure 1: Process for identifying adaptive policies and actions in two cases of agriculture (natural resource management) and disaster risk management in Japan

In agriculture sector, the changes in land use and agriculture labor have been identified as important and persistent issues in Japan. In disaster risk management, we identified the case of

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<sup>2</sup> As a part of this project, a consultation meeting with various stakeholders involved in policy research and government in agriculture and allied sectors was conducted on 28th June 2011 at Japan Press Centre Building, Tokyo to understand how dynamic policies and institutions are in Japan in formulating and implementing policies. The participants have discussed the policy environment in agriculture and allied sectors in Japan, how dynamic it is, and reasons behind the effectiveness of policies. The specific subjects discussed were historical analysis of agricultural policies in Japan, declining number of farmers in Japan and evolution of related policies, historical analysis of interventions to deal with floods and droughts in Japan, and fiscal policy support in Japan.

typhoon that hit the Shikoku region of Japan in 2004 for identifying possible changes introduced soon after the typhoon. We have chosen the Saijo city for the reason that it was severely affected by Typhoon 21 and 23 which made landfall on Shikoku region during 29-30<sup>th</sup> September 2004. The Saijo city is located in the north of Ehime Prefecture in Japan. Ehime Prefecture is on the Shikoku Island of Japan, located on the side of the Pacific Ocean. The new Saijo city was formed by merging Saijo, Toyo city, Tanbara town and Komatsu town from Shuso County in 2004. The population in Saijo city has declined from the year 2000 while the population continued to grow in other cities. Saijo city also has more percentage of people with age 65 and above with relatively more number of single-person households.

For answering the overarching question of how adaptive policies are in Japan, a sub-set of questions were addressed that include

1. When the policies were introduced to address the perceived problem?
2. How frequently the policies were amended to address changing circumstances?
3. How effective are the policies introduced?
4. How the effectiveness is related to when and how frequently policies were introduced?

## **4. Results and discussion**

Results from the above analysis are discussed in the order of agriculture sector and disaster risk management sector for better readability and understanding.

### ***4.1 Agriculture sector***

#### **Identifying specific policy issue in agriculture sector**

Since the number of policy issues and related experience is vast in the agriculture sector, we conducted a questionnaire survey to identify and prioritize important issues in the sector. Most respondents indicated decline in number of farmers as a main policy issue for agriculture in Japan (33%) and they opined that the Agriculture Basic Law or any law that supports farmers and group farming as an important policy intervention for Japan (see Figure 2 and Table 2). As

second most important policy issue, most respondents ranked declining global competitiveness of Japanese agricultural produce (22%) followed by increasing income gap between rural and urban areas in Japan (19%).

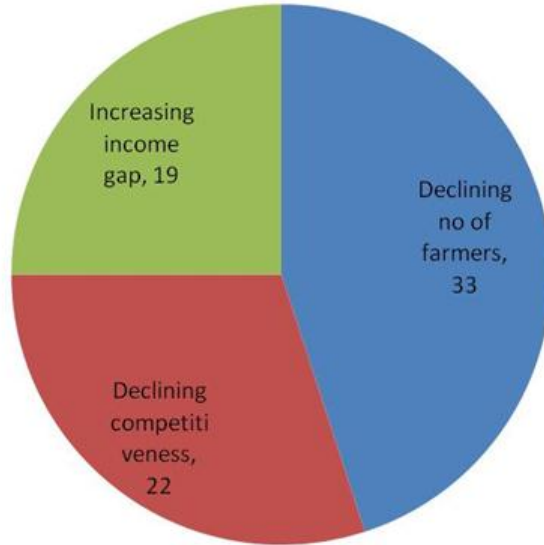


Figure 2. Top three important agriculture policy issues in Japan (n =27)

Table 2. Important issues identified and policies suggested by the respondents in the first round of Delphi Survey. (n=27)

Rank category	Important issue hindering agriculture in Japan	Important policies for overcoming these issues
First	Declining number of farmers	<ul style="list-style-type: none"> <li>• Agricultural basic law</li> <li>• Support for new farmers and group farming</li> <li>• Agriculture land act</li> <li>• Promoting strengthening of management foundations</li> </ul>
Second	Declining global competitiveness of Japanese agriculture	<ul style="list-style-type: none"> <li>• Rationalization of owned farm lands</li> <li>• Promoting “6th industrialization”</li> <li>• Trade protection</li> <li>• Fund for price stabilization of agro-crops</li> </ul>
Third	Increasing income gap between rural and urban areas	<ul style="list-style-type: none"> <li>• Direct subsidy to mountainous areas</li> <li>• Compensation for farmers' household income</li> <li>• Agriculture protection policy</li> <li>• Establishing system based on retail market act</li> </ul>



Respondents were asked to rate specific policies for their timeliness, adaptiveness, effectiveness and strategic on the scale of 1-5 where 1 is least timely and 5 is most timely. Those who said declining number of farmers is an important policy issue in Japan have rated the related policies as least timely, least to moderately affective, and least to moderately adaptive, and least to moderately strategic in nature (Table 3). Overall, the respondents were not satisfied on the effectiveness of policies introduced in Japan. This very much corroborates with the discussion in this section wherein introduction of different policies didn't lead to positive changes in the trend of number of farmers and land used for agricultural purposes. In the subsequent iterations, the survey will elicit from respondents on the institutional, social and economic reasons behind the poor rating of policies on above indicators.

Table 3: Ranking of policies on the scale of timeliness, adaptiveness, effectiveness and being strategic.

Policy (combined into two groups)	Criteria ranking (average across each group)			
	Timely	Adaptive	Effective	Strategic
Policies targeting top 3 issues (see Table 2 above)	Moderately timely	Less adaptive	Less effective	Less strategic
All policies identified by all respondents	Moderately timely	Well adaptive	Effective	Less strategic

### **When the policies were introduced?**

In order to answer this question, historical analysis of various agriculture and allied policies in Japan was conducted from the available literature and findings are presented in this section (see Tables 3-8). The logic behind this analysis was to identify a policy as 'dynamic' if it undergoes continuous change in its course of development and implementation over the years as a result of known external pressures operating in agriculture and allied sectors.

Tables 1-6 present a list of important driving forces that operated during various phases of agriculture policy development and policies that have been implemented in Japan in the past seven decades (modified and updated from Ohara and Soda, 1994). The agricultural policy development in Japan can be broadly divided into six broad time periods i.e.

1. Postwar reconstruction period (1940s-1950s);

2. Post-Agricultural Basic Act (1960s);
3. Low economic growth period (1970s to early 1980s);
4. Globalization period (mid 1980s to early 1990s);
5. Structural reform of agricultural and rural policies period (most of 1990s); and
6. Realignment of agricultural and rural policies to global trends.

Driving forces for policies introduced during these periods vary greatly. During the postwar reconstruction period (Table 4), the driving forces for policies were labor flow, dominance of landlords, reconstruction of economy, and decline in farming population in rural areas.

Government had to address these issues early by introducing policies such as Staple Food Control Act (1942), Agricultural Cooperatives Act (1947), Agricultural Land Act (1952), Act for promotion of mechanization (1953), and New Rural Construction (1956). All these acts very much correspond to the issues identified during that period. Same follows for most of the driving forces mentioned in subsequent tables (Table 5-9).

From the Tables 1-6, one would conclude that agricultural policy environment in Japan can be characterized either as reactive or adaptive. Reactive for the reason that mostly the policies were made in response to emerging issues but mostly well within a decade period within which these policies were identified and implemented with a reasonable period of identifying the issues by the policy formulating institutions and stakeholders. However, this conclusion should be read with a caution since there is no way for this research to identify ‘when’ a particular issue or driving force has come into existence since most agricultural policy issues have no clear beginning and end point but rather seamlessly emerge with time. By nature due to unknown reasons, agricultural policy issues may remain ‘under the carpet’ until they surface after crossing a threshold and identification of this period from literature is often difficult and not something that this research could do. Nevertheless, from this review, it can be broadly concluded that agricultural policies in Japan were made in immediate response to the issue once it came to the notice of the policy makers in the country. This addresses the question of how soon a policy was made and brought into effect in Japan.

Table 4: Major agricultural issues faced by Japan and major policy interventions addressing the issues during postwar reconstruction period (updated from Ohara and Soda, 1994).

Aspects of policy	Driving issues*	Characteristics				
		Agriculture and community	Farming as an occupation	Farm land	Farming community	Agrarian labor
1942 Staple Food Control Act 1947 Enact of Agricultural Cooperatives Act 1948 Agricultural Improvement Promotion Act 1949 Land Improvement Act 1951 Japan and US sign Mutual Security Treaty 1952 Agricultural Land Act 1953 Act on Promotion of Agricultural Mechanization 1954 Japan and US sign Agricultural Surplus-Commodity Agreement 1956 New rural construction; Act on Subsidies for Agricultural Improvement 1960 Japan Association of Corporate Executives announce opinions on Japanese agriculture, scheme of doubling national income	- labor out flow into other industries - farmland dominance by land lords - reconstruction needed for subsistence farming framework - Decline in farming population in rural areas	land-owned farmers; integration of agriculture, the community and farmers; vibrant agriculture; a very hopeful period	agriculture as a living and as a family business, diversified business (self-support and sell), natural energy dependant farming	family property, means for the earning	uniform and self-sufficient (rural) area; traditional system area; the countryside	family business, tough and hard working farmers

\* collected from several sources published during/addressing this period

Table 5: Major agricultural issues faced by Japan and major policy interventions addressing the issues during post-Agricultural Basic Act (updated and modified from Ohara and Soda, 1994).

Major milestones and policies	Driving issues*	Characteristics				
		Agriculture and community	Farming as an occupation	Farm land	Farming community	Agrarian labor
1961 Agricultural Basic Act 1962 Agricultural structural improvement project starts; Consumption of rice starts to decrease 1963 Free trade of bananas and other items 1964 Forestry Basic Act 1967 Record high rice yield of 14 million 4500 thousand tons 1970 Rice Paddy Reduction Policy starts, Amendment of Land Reform Act 1972 'Reconstruction of Japan' written by <i>Kakuei Tanaka</i> (to be prime minister a month after this publication); Establishment of Japan Agricultural Cooperatives	- labor out flow into other industries - full-time farmers decrease - part-time farmers increase - soil natural capability decrease due to over usage of chemical fertilizers and pesticides - income disparity between the rural and urban community - farming population decline in rural areas	agriculture as a part of the national economy; deepening as the side-business; mechanization; more usage of chemicals; modernization of lifestyle; disparity between rural and urban areas is narrower	viable farming business (request approval as an independent industry), collaborative farming, monoculture, regional specialization, scale expansion, capital investment, freedom of choice for farming continuation, outflow of labor into other industries	As a means for the earning, role as insurance	-For supply of industrial labor - urbanization of rural areas, depopulation, production area formulation, riddance from poverty	Agricultural labor, people with skills

\* collected from several sources published during/addressing this period

Table 6: Major agricultural issues faced by Japan and major policy interventions addressing the issues during low-economic growth period (updated and modified from Ohara and Soda, 1994).

Major milestones and policies	Driving issues*	Characteristics				
		Agriculture and community	Farming as an occupation	Farm land	Farming community	Agrarian labor
1973 Oil crisis 1974 National Land use Planning Act, Act Concerning Agricultural Land 1978 Restructuring paddy fields usage measures 1980 Agricultural Land Use Promotion Act; Act on Promotion of Improvement of Agricultural Management Foundation 1981 Initiative for agricultural self-sustainability research published by the National Institute for Research Advancement (NIRA) 1982 National rice cultivating managers committee is set up	- labor out flow into other industries - full-time farmers decrease - part-time farmers increase - income disparity between the rural and urban community - farming population decline in rural areas - environmental pollution issues	adjustment of production; loss of prospects for the future; environmental pollution issues; readjustment of farming; organic farming	Single generation farming, development of company-like farming, production of what sells, development of organic farming and fresh from the farm campaign	Used for transplantation, property management	Urbanization; aging of the farming community; declining population	Representative farmers, farmers with up-to-date information

\* collected from several sources published during/addressing this period

Table 7: Major agricultural issues faced by Japan and major policy interventions addressing the issues during globalization period (updated and modified from Ohara and Soda, 1994).

Major milestones and policies	Driving issues*	Characteristics				
		Agriculture and community	Farming as an occupation	Farm land	Farming community	Agrarian labor
1985 Brides from the Philippines come to Asahimachi town 1986 Coordination of economic framework for international collaboration workshop report (Maekawa report) is released 1987 Multi-polar Pattern National Land Formation agreed in The Fourth Comprehensive National Development Plan 1988 Embrace of GATT arbitration proposal for the 12 farm products 1991 Implementation of Taxation as home lot, Free trade of rice issue 1992 MAFF announces 'A new way to Food, Agriculture and Rural policy'	<ul style="list-style-type: none"> <li>- Income disparity between the rural and urban community</li> <li>- Full-time farmers decrease</li> <li>- Part-time farmers increase</li> <li>- Cultivated land abandonment</li> <li>- Farming population decline in rural areas</li> </ul>	Further progress in globalization and liberalization; resignation farming but at the same time hopeful for future farming	Diversification of farmers, resignation farming, renaissance of choosing agriculture as a living, new entry of farming corporations	Social effect, conscience development for public utilization of farm land; means to enjoy life and the living; landscape formation, environment conservation	Stimulation of intercommunity of urban and rural areas	Local agriculture successor, emergence of urban citizens, U-turns

\* collected from several sources published during/addressing this period

Table 8: Major agricultural issues faced by Japan and major policy interventions addressing the issues during structural reforms of agriculture and rural policies period (compiled by authors from various sources).

Major milestones and policies	Driving issues*	Characteristics				
		Agriculture and community	Farming as an occupation	Farm land	Farming community	Agrarian labor
<p>1993 The <i>Heisei</i> Rice Riots            1995 MAFF environment-sound agriculture implementation headquarters; National association of environment for sound agriculture implementation committee; Act on Stabilization of Supply, Demand and Prices of Staple Food; Repeal of Staple Food Control Act; Minimum access system of rice begin; Act on Special Measures concerning Incentive Loan Program for Youths to Become Farmers</p> <p>1997 Outline for New Rice Policy            1998 Outline for Agricultural Policy Reform            1999 Food, Agriculture and Rural Areas Basic Act; Act on Promoting the Introduction of Sustainable Agricultural Production Practices            2000 Hilly and mountainous area direct payment system            2001 Establishment of Research Group for Management Policies in Agriculture            September 11 attacks</p>	<p>- farmland usage change (farmland liquidation)            - full-time farmers decrease            - part-time farmers increase            - cultivated land abandonment            - aging of the whole farming society</p>	<p>Environmentally Friendly Farming, increase of farming organizations, direct income compensation</p>	<p>farming corporation labor, no more an occupation for farm or nonfarm origin but for all kinds of people</p>	<p>cultivated land is transferring into the hands of large-scale farm households</p>	<p>increase of urbanization of rural areas</p>	<p>overall aging, quality degradation of agrarian labor, U-turns</p>

\* collected from several sources published during/addressing this period

Table 9: Major agricultural issues faced by Japan and major policy interventions addressing the issues during realignment of agriculture to global trends period (compiled by authors from various sources).

Major milestones and policies	Driving issues*	Characteristics				
		Agriculture and community	Farming as an occupation	Farm land	Farming community	Agrarian labor
2002 Management Policy for Promoting Structural Reform of Agriculture Report; New Rice Policy 2004 Amendment of Food Control Act 2006 Production of main crops decrease due to extreme weather around the world; Restriction of genetically modified crops in local governments 2007 IPCC AR4; Concern over climate change impact on agriculture increase; Measures and Policies for the Improvement of Conservation of Rural Land; Comprehensive Strategy on countermeasures against global warming 2008 Rise in crop prices; Tainted rice scam 2009 Agricultural damage to lack of sunlight and low temperature Regime Change 2010 Trans-Pacific Partnership (TPP); Witness record heat; Introduction of income compensation system for individual rice farming households	- Change in farmland usage (farmland liquidation) - excess production of rice - full-time farmers decrease - part-time farmers increase - abandonment of cultivated land - aging of the whole farming society - food security - adaptation to Climate Change?	large-scale farm households, increase in Full-Time Farm Households, reconsideration of agricultural identity	increase of farmers from other industries origin	Increase in abandonment of cultivated land area in to other industrial use, concern on mobility of farm land	diversify into related businesses, high demand for nursing care in agricultural community	even more aging, increase in new outcome farmers

\* collected from several sources published during/addressing this period



## How frequent policies were amended?

To answer the question of how frequent policies have undergone change over the period (amended or repealed), following the changing circumstances or driving forces, the number of amendments and repeals some major acts have undergone were looked at. The Table 10 provides a list of amendments that some major policies have undergone over their implementation period. It is clear from the table that some policies have undergone very frequent changes, as much as every year during their implementation (e.g. Agricultural cooperatives act, agricultural land act and food, agriculture and rural areas basic act), while others have remained more or less same (e.g. agricultural improvement promotion act, act on subsidies for agricultural improvement).

From this analysis, few basic conclusions can be drawn:

- a) The high frequency of changes may have something to do with the importance of the areas these policies aim to address,
- b) Possible lack of consensus within government and institutions responsible for their formulation and implementation,
- c) Inability of earlier versions of policies to address/stem the issue,
- d) Lack of clear understanding among institutions and governments on how to address the problem, and
- e) Dynamic nature of environment within which various governments and institutions are expected to formulate and implement policies.

Table 10: Amendments in major agriculture and related policies in Japan

S No	Policy/Act	Number of Amendments	Duration in which the amendments carried out	Frequency (changes per year)
1	Staple food control act	27	1943-1994	0.5
2	Agriculture cooperatives act	83	1948-2010	1.3
3	Agricultural improvement promotion act	16	1950-2004	0.3
4	Land improvement act	55	1951-2011	0.9

S No	Policy/Act	Number of Amendments	Duration in which the amendments carried out	Frequency (changes per year)
5	Agricultural land act	66	1953-2010	1.2
6	Act on promotion of agricultural mechanization	13	1962-2006	0.3
7	Act on subsidies for agricultural improvement	16	1961-2010	0.3
8	Agricultural policy	3	1978-1999	0.1
9	Act on promotion of improvement of agricultural management infrastructure	19	1989-2010	0.9
10	Act on stabilization of supply, demand and prices of staple food	9	2000-2010	0.9
11	Act on special measures concerning incentive loan program for youths to become farmers	11	1995-2010	0.7
12	Food, agriculture and rural areas basic act	10	2000-2010	1.0
13	Act on promoting the introduction of sustainable agricultural production practices	3	2002-2010	0.4
14	Act on special measures for promotion of independence for underpopulated areas	9*	2000-2011	0.8
15	Policy for delivering subsidies to the farmers for stabilization of agriculture	1	2009	0.0

\* with another amendment scheduled in 2016

### **How effective the policies are?**

While the questions of how soon a policy was introduced and how frequent it was modified to keep abreast with the changing circumstance are important, what is even more important is that

the policy delivers the intended outcomes. For identifying the effectiveness of policies, the policies were overlaid on the time series diagrams of various indicators which reflect the effectiveness of a policy for a better visual representation.

### **Number of farmers**

Declining number of farmers has been a major cause of concern for Japan as it is leading to heavy reliance on imported food burdening national economy. Various specific policies and amendments were introduced to control the outflow of farmers from agriculture to non-agriculture sectors. Figure 2 depicts major policies introduced and their effectiveness on the trend of number farmers (full time and part time). It is clear from the figure that policies introduced over the years have failed to control the outflow of farmers as reflected from continuous decline in number of farmers in the country.

### **Land use changes**

A factor that is closely associated with the changing number of farmers is the associated decline in area (acreage) under farming. As in former case, several policies were introduced to control the change in land use from agriculture to non-agriculture purposes though some initial leverage was given for deliberate movement of land to non-agricultural purposes for promoting industrialization during the early years of economic growth in Japan. Figure 3 show the trend of total population, agriculture production, usage rate of cultivated land, and number of farmers. The main policy introduced to control the rate of land use change from agriculture to non-agriculture use was the Amendment of land reform act (1970) and other related policies. None of these policies could able to stop or control the reduction of agricultural land over the time.

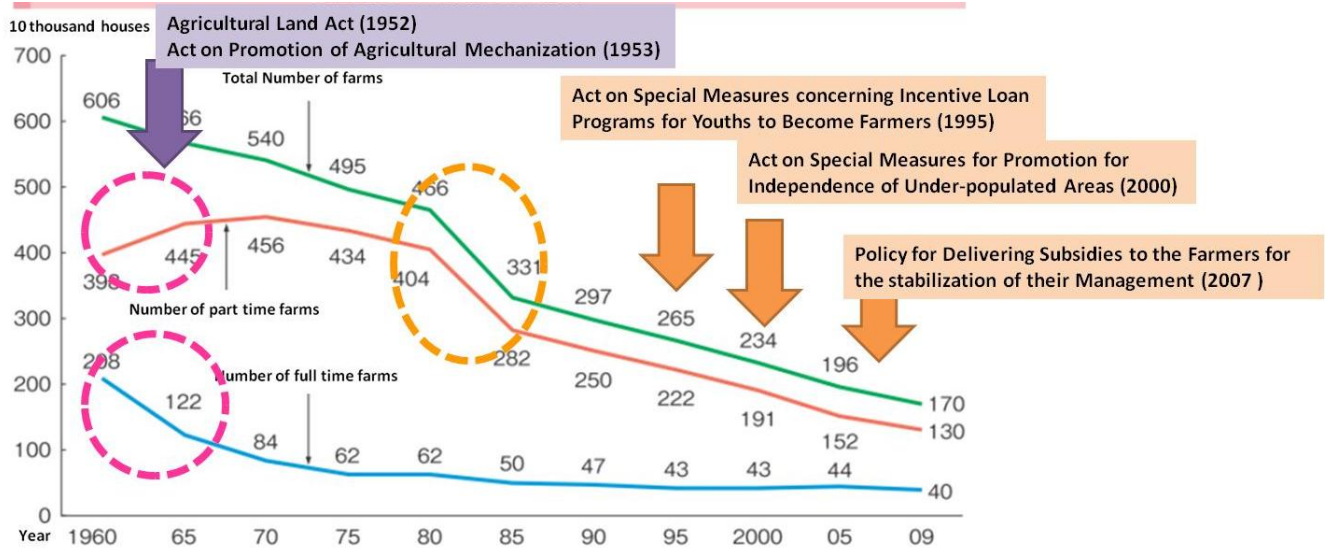


Figure 2. Trend of number of farmers in Japan over the past five decades and various policies introduced to stem the decline in number of farmers (Data source: MAFF, 2011a).

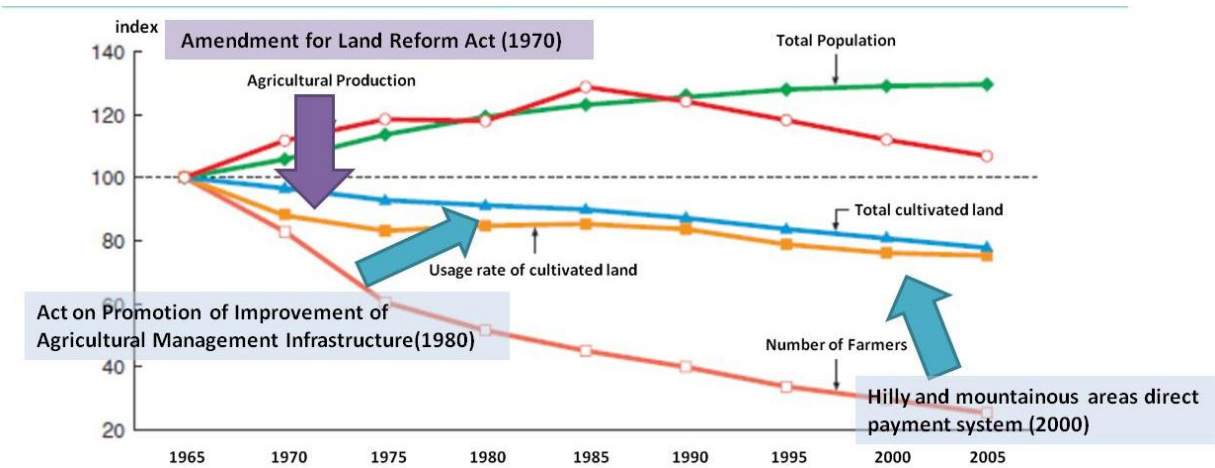


Figure 3: Land use changes and various policies introduced to control the land use change (Data source: MAFF, 2011b).

Figure 4 shows further details of land use changes within cultivated land in Japan. It is clear from the chart that the introduction of land reforms act in 1970 didn't had any positive change on the land use change from agriculture (both paddy and other field crops) to non-agriculture use.

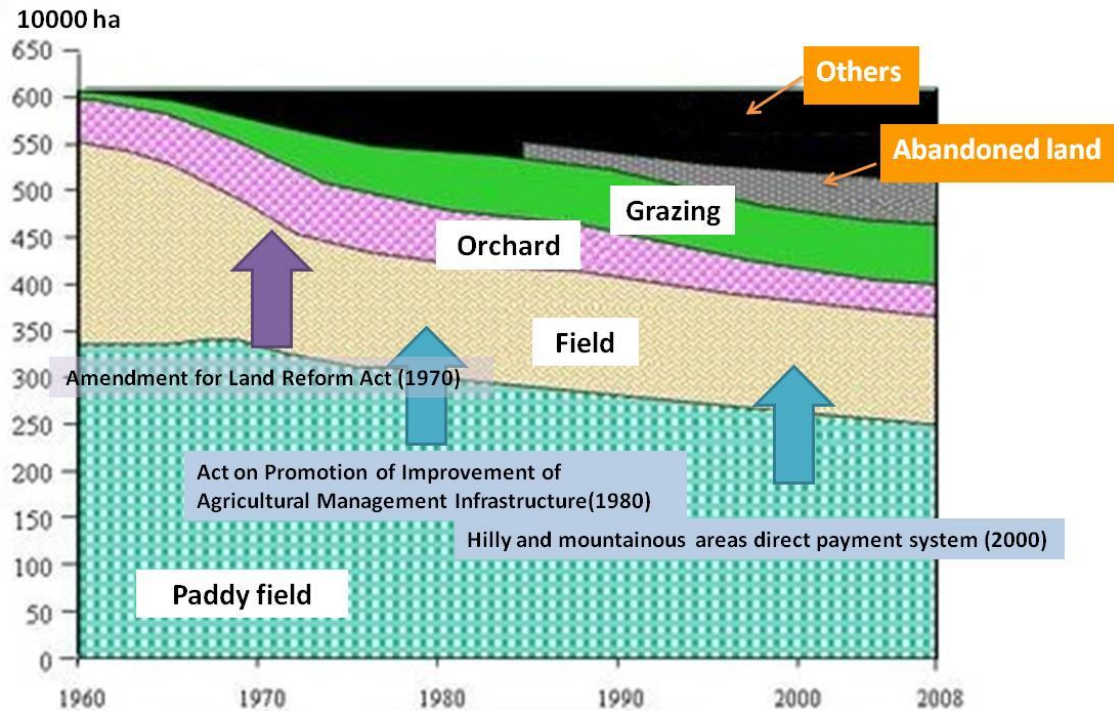


Figure 4: Trend of land use changes within agricultural land in Japan and various policies introduced (Data source: MAFF, 2009).

From the above examples of trend in farming population and land use changes, it is clear that related policies have failed to control the unintended changes in Japan. More interestingly, these are the policies that have undergone most amendments since they were introduced (e.g. agriculture land act which has undergone 66 amendments, Table 10). It can be safely concluded from these observations that the indicators such as ‘how soon policies were introduced’ and ‘how frequent policies were amended’ may not necessarily lead to effectiveness in policy outcomes.

## 4.2 Response to 2004 typhoon in Shikoku region

The typhoon of 2004 that struck the Shikoku region of Japan is the most severe typhoon known in the recorded history of Shikoku region (Figure 5). The typhoon killed 5 people, injured 2 and affected thousands of houses through inundation in the city. A typhoon of this nature was unknown in the history of the city, and the local DRM system was caught unawares. The typhoon has exposed the weaknesses of the city disaster risk management planning, and

problems such as the meager income of the city government due to poorly developed industries, outward migration of young people, and an aged population were exposed by the extreme event. In addition, the highly undulated landscape of the city caused heavy downpours to produce flash floods along the Kamo River that runs through the city, creating heavy landslides along the slopes. The impacts of Typhoons 21 and 23 made the city government think differently, and initiate a host of disaster risk management activities.

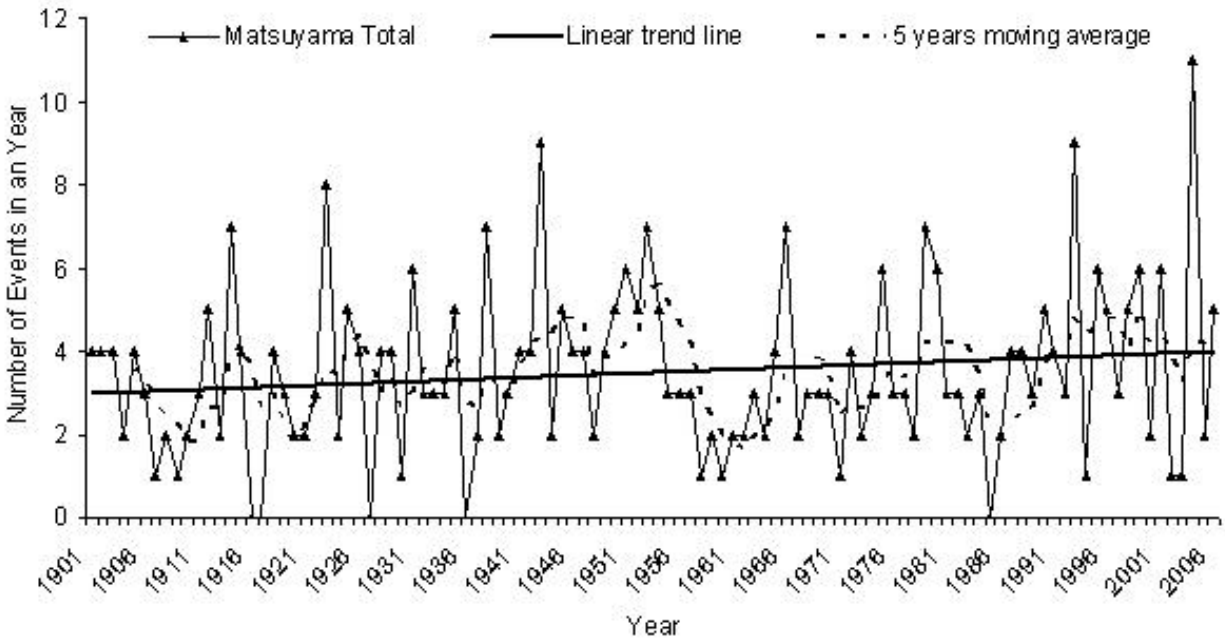


Figure 5: Long term trend of heavy precipitation (>50mm/day) events recorded at Matsuyama Observatory, Ehime Prefecture in the Shikoku region of Japan (Source: Using data obtained from Japan Meteorological Agency)

### ***Amendments in the city disaster management plan***

In response to 2004 typhoon, the city has made several amendments to the city disaster management plan. The number and the year of introduction of amendments are presented in Table 11. Most amendments were introduced in the same year of experiencing the typhoon or soon thereafter which is in contrast to the situation observed in the case of agriculture where the amendments to policies have been made continuously with little or no effect on the issue being addressed.

Table 11: Responses to typhoon (Amendments to DRM plan) by Saijo city government (modified from Prabhakar et al., 2012).

S No	Area of Disaster Management Plan Amended	No of Specific Amendments	Year of Amendment
1	Hazard, risk and vulnerability assessment	9	2004, 05, 06 & 07
2	Redundancy	2	2004 and 06
3	Rescue and evacuation	6	2005 and 07
4	Relief management	2	2005 and 06
5	Forecasting climatic events	6	2005 and 07
6	Dissemination of early warning	1	2006
7	Quick damage assessment	2	2006 and 07
8	Linkage with other stakeholders	4	2006 and 07

It is evident that mere ability to respond to policy imperatives is not sufficient for a policy to be effective. However, what is more important is assumptions based on which the policies were introduced and how clearly the threat has been perceived by the stakeholders engaged in the policy process. This point can be clearly made by the comparison made between policy processes in agriculture sector and in disaster risk management. The disaster risk management experiences have contrasting differences with experiences in agriculture sector in the following ways:

a) Clarity about the stimuli to which the agent responds: It is important that the agents involved in policy process are able to clearly see the stimuli to which they are responding. In disaster risk management, the stimuli to respond is clearly visible in the form of a specific event that has specific time scales and impacts while in agriculture sector, the stimuli is complex, often not clearly visible and any response to the stimuli tend to interact with several other interlinked factors that could nullify the effect of policy changes introduced.

b) Clarity with which institutional roles are defined: The clarity with which institutional roles could be defined depends on the clarity about the stimuli to respond. Hence, institutions engaged

in agriculture and allied sectors are vested with complex interdependencies and often lack clarity of challenge they are responding to. While in the case of disaster risk management, the agencies involved had clearly defined roles and terms of references that enable them to respond to the challenge in a more defined manner. This makes a lot of difference on the effectiveness of their interventions.

c) Time scales in which issues become clearer for agents to respond: Not all issues have clearly start date and end date and not certainly in the agriculture sector. In agriculture sector, as is evident from tables 2-7, we are only able to group the issue periods into decadal scales and any narrower delineation couldn't be possible for the reason that the natural resource management issues are pervasive in nature and they surface only at a later stages of their severity when they start appearing significantly in the national statistics. This lack of clear beginning time period makes it very difficult for institutions to respond in a timely manner. However, in the case of disaster risk management, the disaster event clearly sets the beginning period even if the underlying vulnerability factors exist but their existence surface only with a specific event.

d) Complexity in converting responses to outcomes: Ultimately, the policy effectiveness depends on how different policy responses converge into outcomes. In agriculture sector, being a sector influenced by policies from outside the sector, the outcome of a policy made in agriculture sector need to go hand-in-hand with policies made in other related sectors such as energy, mechanization, larger economic growth and composition of economy such as trends in the share of manufacturing and service sector. It appears that the agriculture policies in Japan have largely seemed to underestimate the impact of the trends outside agriculture sector and hence the policy effectiveness couldn't be achieved to the expected level.

## **Conclusion and implications for climate change adaptation**

One of the important criteria for assessing the ability of a country to adapt to climate change has been reported as its ability to formulate and implement policies in an adaptive fashion which can be represented in terms of how soon policies are implemented, how frequently they undergo changes to reflect the changing circumstances etc. From the assessment presented in this paper, it is clear that though countries like Japan have a good history of formulating and implementing



several policies to address perceived issues in agriculture, the mere assessment of these policies in terms of how soon they were introduced and how often they were modified doesn't appropriately reflect in terms of how effective the policies were. The effectiveness of a policy would go beyond these indicators/criteria presented in this paper. The additional criteria for effectiveness of policies could be whether policies are designed based on right stimuli, correct perceptions of policy makers to these stimuli, and if the policy is based on right information. In addition, assessment of these policies should be done based on the outcome of these policies should not be limited to indicators such as timeliness. This has major implications for the community engaged in climate change adaptation since these community need to take decisions often on limited information. Hence, providing policy relevant information that is timely is crucial for effective policies.

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