

Agricultural development and its new trends in Japan.

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Abstract-

The role of agriculture is always important. Japan is such a developed country that a small part of its population is engaged in agriculture. The participation of women in these agricultural activities is getting progressively increase. In Japan there is a close relationship between "unable to divert the attention of the youth from agriculture and achieve food self-sufficiency". Urban agriculture in Japan is developing as a new trend in agriculture. In Japanese agriculture, new trends (organic farms, robotics agro, urban agriculture, and increasing women's participation) are emerging that can accelerate the pace of agricultural development in Japan.

Key words- Japanese Agriculture, New trends, Organic farms, Robotics agro, Urban agriculture, and Increasing women's farmer, Youth Farmer, Japanese Agriculture policy.

Introduction:-

The role of Agriculture is very important in Japan's culture and tradition. Inside agriculture of Japan's characterizing picture, must be paddy field, where rice is produced with extraordinary care and attention on small land. Rice is the main staple food in Japan that encouraged the Japanese individuals and efficiency and plenitude which is essential for their prosperity. Today, Japan is the 3rd largest economy in the world with one of the highest standards of living and its dynamic growth nourished by innovation, technology industries and exports. The role of agriculture in economy is very low percentage in its total economy and its development has declined due to the growth of other sectors of economy. But it hold a strong culture and custom power as the common population, now very few people engage in agriculture from the urban as well as from rural areas. .

In this article we focused on urbanising agriculture and robotics agro and its role in Japan. We examine in this article also that how many women participate in agriculture of Japan and their role and will try to find answers also why Japanese youth distract from agricultural activity. Finally, what is the present scenario of japan as a food self-sufficiency country.

Characteristic of Japanese agriculture:

According to Iwanaga Masa(1996), there are many characteristics of Japanese agriculture which are following-

1-Japan situated at the Asian monsoon zone which is able to rice production in almost whole country. The rice planting system is favourable for its summer and rainy season but some area of the Japan, located on the pacific zone with a dry winter and less rainfall, are able to double cropping system by wheat.

2-Mountain region of Japan is 61% of the total country land region and there is some plain land useable in Japan. Only 14% of the total land is used as a cultivated land and 1.6 hectare land hold in one house hold in Japan comparison with other developed country such as 176.1 ha in USA, 70.1 ha in UK, 38.5ha in France and 30.3 ha in Germany. So, we can see that the agriculture land in Japan is very small and country needs new technology, innovation and new land for cultivation such as urbanising agriculture.

3-Irrigation facility in Japan is very well developed. The total irrigation is 56% of the total land which figure is one of the highest irrigated land in the world. Japanese people save their rice field from the continuous cropping, soil erosion, thick weeds, unfertilised by the several method such as used contour agriculture, crop diversification strategy and used fertilizer and organic composed.

4-Japan is the highest importer of agriculture product and cereals in the world. Japan bought 70\$ billion food product from other country. The country imports 21 % of the food imports hence it has developed as a major food importing country. Wheat , soyabeans Maize and vegetables are main importer agricultural product in Japan. In Japan, there are thirty most cultivated crops in Japan at 1997.(Iwanaga Masa)

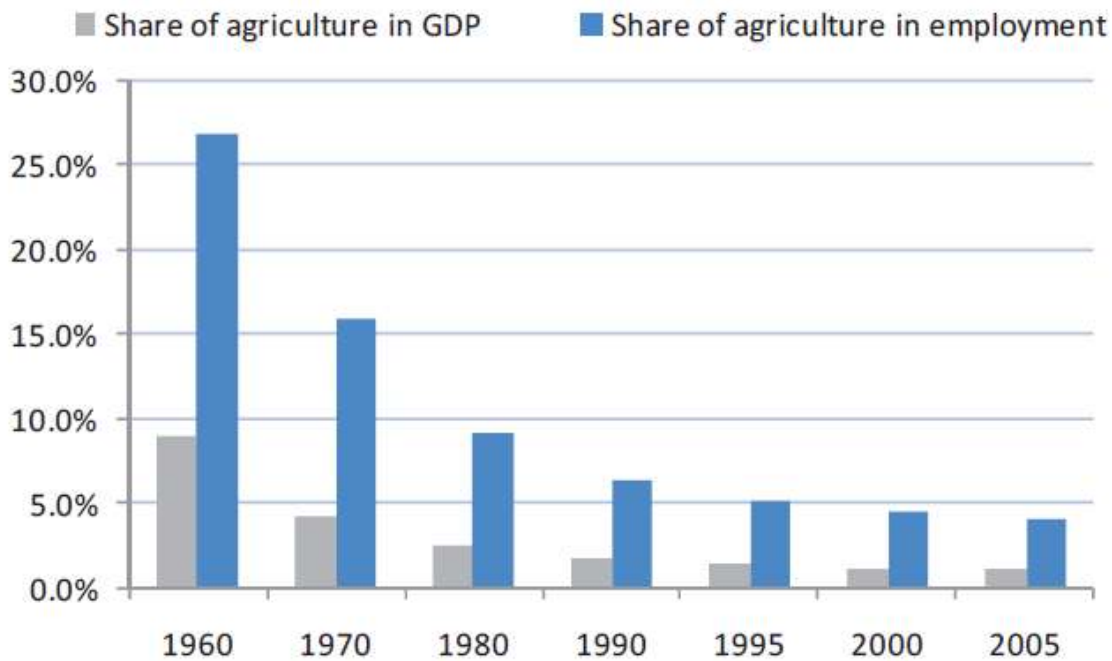
Thirty Most Cultivated Crops in Japan in 1997.

Crop	Cultivated Area (ha)	Yield (t)	Value (× 100 million Yen)
1. Paddy Rice	1,953,000	10,030,000	27,094
2. Wheat	157,500	573,000	856
3. Potato	103,000	3,394,300	1,322
4. Soybean	83,200	145,000	377
5. Sugar Beet	68,500	3,685,000	665
6. Orange	66,000	1,553,000	1,660
7. Other Cereals	57,450	-	-
8. Tea	51,800	401,000	1,136
9. Radish	49,800	2,020,000	1,208
10. Apple	49,300	993,000	1,192
11. Sweet Potato	46,500	1,130,000	1,053
12. Cabbage	37,900	1,504,000	965
13. Young Corn	31,600	302,000	380
14. Chestnut	30,000	32,900	99
15. Onion	27,200	1,256,000	751
16. Persimmon	27,100	301,200	425
17. Spinach	26,100	330,900	1,111
18. Leek	24,700	549,300	1,146
19. Chinese Cabbage	24,400	1,135,000	508
20. Carrot	23,200	714,800	532
21. Grape	22,800	250,900	1,179
22. Taro	21,400	269,900	418
23. Lettuce	21,400	532,700	725
24. Plum	19,100	136,200	387
25. Pear	18,500	404,200	1,149
26. Water Melon	18,500	613,900	848
27. Pumpkin	17,100	244,700	249
28. Cucumber	16,400	797,700	1,754
29. Melon	15,800	359,300	1,316
30. Egg Plant	14,000	474,900	1,156

Source- www.fao.org

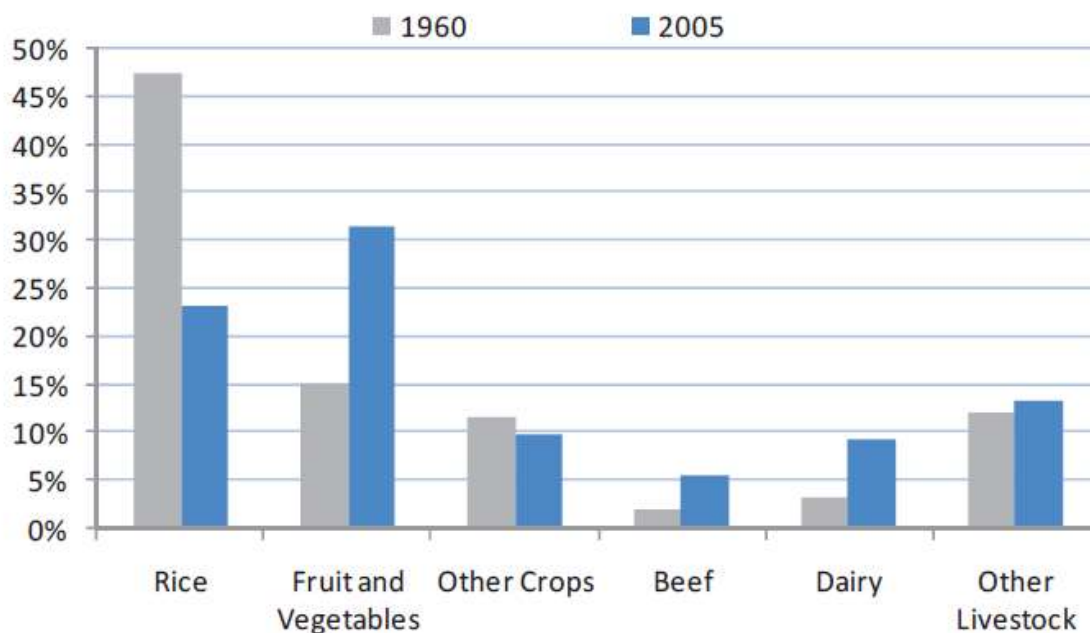
In 1960, Japan had already converted develop industrial country and contribution of agriculture in total economy was 9% and 28% employees engaged in labour force. The Rice production was nearly half of the total agricultural production and rice cultivation was dominants in whole agriculture in japan. But time has changed, the economy of Japan was growing rapidly and agriculture sector did not compete from the other sector in growth rate. Result the contribution of agriculture in total GDP of Japan was only 1.1% and 4% employment generation in total employment in 2005. During that time, 80% agriculture workers left their works and went to other sector. But the main character of agriculture of Japan was that the labour productivity growth very strong compare with other sector because the competition between labour from other sector of the economy as well as sophisticated production technology.(Martini.Roger and Kimura shingo,2009)

Contribution of agriculture to the economy, 1960-2005.



Source: Statistical Annex to the Annual Report on Food, Agriculture and Rural Areas FY2008.

Value of production, 1960 vs. 2005
As per cent of total value of agricultural production



Source: Statistical Annex to the Annual Report on Food, Agriculture and Rural Areas FY2008.

Above the data shows Rice production in Japan has declined from 1960 to 2005, and other production of agriculture has increased same time because westernization food habit increases and new technology implemented. (Martini.Roger and Kimura shingo,2009)

Literature review

Hayami yujiro and Yamada saburo(1991) showed in their book that the procedure of the development of institution and strategy that may basic reason of development in produced and accuracy and in adaption changes in their development tip over the diverse stage . He demonstrated the three major factors regularly considered to underlie the sustained growing in land productivity were the development and diffusion of improved plant varieties, important in land infrastructure irrigation and drainage system and used of various kind of fertilizer. They also explain in his book also how did Japanese agriculture develop before world war2 and after world war 2. Author emphasis the main point of development in sericulture and its major role of brought foreign exchange.

Moore.H.Richard(1990) describe in his book that the issue of land and water was historically incident, the stage of irrigation is important, the transition of the property right from usufruct to ownership and the opposite force of land fragmentation and consolidation and the come and impact of the American occupation's land reform.

Ohkaw,Kazush(1990) explain that the mechanization process introduced in Japanese agriculture. In this period,100000 electric motor used in agricultural land and combustion engine number increases up to 200000. The government played an important role, and it was implementing large size project of reclamation, irrigation, drainage system etc by self or through public cooperation. Older measures of supporting price, giving various subsidies, big size extension service and must be measures among the reason pushing out put increases.

Balachandirane.G and Hayoshi.Yuichi (1995)say that, the Japanese cultivated land has been decreased and less then 14% land used for agriculture. Author also shows the productivity gap between agriculture and industries in this article. They gave various data and table about productivity gap between agriculture and industries. In this article they explain that how did labour force decrease in agriculture and simultaneously the participation of labour increase in manufacturing sector and they also mention aged people engaged in agriculture is 36% of the total labour force in 1996. In this article, author argued that how does decline of the contribution of agriculture in the Japanese economy and increase in the agricultural exports which to make unable to self-sufficiency country of Japan in recent year.

Klinedinst. Mark and Sato.Hitomi(1994) said that the cooperative sector is most powerful, influential institution in Japan has relation to agriculture and farm factories. Its also impact on the retail distribution of food, housing, education institution, medical facility, insurance or credit union. They showed that development of cooperative in Japan from edo period to modern era including Meiji ruled. In this article Japanese cooperate are various formed and very influential economy institution.

Carr.Michael(1990) describe that Japanese agriculture has a dual structure. First, full time farming with small farm household which operating agriculture work very efficiency. Second, big number of part time farming household engaged in agriculture. He also showed that the Japanese agriculture's main characteristic is part time farmers. There are three basics characteristics of Japanese farming are following- 1st –the predominantly family ownership, 2nd-the small size of Farm holding and 3rd- agriculture cooperative system which was reason of land reform by the government after World War – II.

Kaneda.Hiromistsu(1980) showed that there are two step of measurement for productivity impact of the land reforms. First, before world war they compare and contrasting between the productivity of owner cultivators and tenant farmers. Second, he analysed productivity of owner cultivates and tenant farmer after and before the land reforms respectively. He also explain that how could labour saving innovation's factor on the momentum of rise agricultural growth for small household oriented agricultural of Japan. Author observed that three combined effect happening after the reform was

1st- technical innovation and changes inputs that increase crop per acre.

2nd- technical innovation in inputs that decline labour demand per acre.

3rd- changes in the share of output of the two time period between early and post the reform.

There are many reason behind development of Japanese agricultural production in the after reform. There are following-

1-Machanization of field operation

2- Increase the chemical and fertilizers in agriculture

3- High production crop used and shifting crops patterns adopted

4- Vinyl sheeting and green house utilised in unfavourable condition for agriculture.

5-A slowly increases in the share of output of farm with larger land showed by the author in this articles.

The study is an assessment of new trends in Japanese agriculture and its role. My study also focus the historical development of Japanese agriculture and how is differ from contemporary agricultural process. The study will assist the government and society to come up with the affirmative approach towards the agriculture of Japan. In my study I have taken the some research questions

- ▶ What is special character of Urban agriculture and its major challenges . Which one is more productive between Japanese Urban agriculture and Japanese Rural agriculture?
- ▶ Is Japanese Farming Industry prepared for automation revelation(Robotic agro)?
- ▶ Why does Japanese youth distract from agriculture?
- ▶ What is the recent trend in the participation of women in agriculture?
- ▶ What is the effect of aging and population decline on food agriculture and rural areas?
- ▶ Is it possible that the Japan converted to food self sufficiency country from food dependable country?
- ▶ What is the basic characteristic and role of agriculture cooperatives and farming reform policy in Japan?

Research methodology

The study has used deductive reasoning, and is analytical and qualitative in nature. Independent variable-. youth distract ,food self- sufficiency, organic farm, urban farm female participation Dependent variable- growth of agricultural development, closed relationship.

Primary source – The primary source include government documents white paper on agriculture, annual project report by MAFF, government documents, interviews and videos. **Secondary sources**- The secondary source will be include books journal article, on line articles, online newspaper article and magazine.

Urban agriculture in Japan:-

Urban agriculture is a special charter of Japanese agriculture. Despite Japan is a developed country, and maximum land used by the urban infrastructure. So, urban agricultural trade is increasing in japan recent year. In Japan, the urban agriculture produced 1/3 agriculture product of the total product and 25% of

farming households in urban agriculture. The productivity of urban agriculture is more than rural agriculture. In facts, urban agriculture profitable more than two times of mountainous zone and 10 times more from rural plain area. Even Tokyo one of the biggest city in the world produces the agricultural product for 700000 people (Penarand-moreno.Raquel, 2011).

According to MAFF, there are many role of urban agriculture -

1. Urban agriculture produces fresh clean and save farm products including organic or low organic crop, vegetables, flowers and fruits.
2. Urban agriculture gives chances to their resident to connect to agricultural activity.
3. Urban agriculture helps disaster management. We know that generally earth-quack comes in Japan due to pacific zone location.
4. Urban agriculture educate and aware their resident on understanding farmers problem and issues.
5. Urban agriculture is a source of fresh and good environment, green space for spiritual peace and personal leisure.

And other benefit is that it helps to maintain sustainability city, maintaining water management, reducing heat impact and promoting biodiversity and eco system by giving habitats and managing species(eg-pollination and growing local insects.(ibid)

Youth in Japanese Agriculture-

Japan is the 3rd largest economy of the world and 60% food item import from other country. Due to global warming and climate change the product cost increases in international market. Japanese youth worry about food security and many youth of Japan want to join agriculture (Burk.roland,2011).

Some youth want to change job trend and joining primary sector. Japanese youth create a farming network to connect youth called Kosegare means “Farmer son” and this network connected 200 young farmer. The cultivation of mushrooms, urban agro, growing green tea and new technology are very popular in Japanese youth and attract more youth in this areas (ibid).

According to AFA(2015),there are many reason for destructing youth from agriculture. They are following-

- 1- Agriculture is low status job because it is unglamorous, dirty job, needless skill, back backing. The dignity of farmer is not good in society.
- 2- Agriculture is not beneficial job, its means it could not give lots of money therefore farmers suffers from poor economic condition and faces many kind of problem. Such as not acquire basic needs for life.
- 3-Increases land cost, agricultural cost, fertilizers and pesticide rate and high risk in agriculture product for storage in unfavourable condition so youth maintain distance from agriculture works.
- 4- Lack of youth organisation which works at international, national and local level for giving farmer solidarity, financial support and exchange or sharing information and ideas.

According to MAFF (2016), the image of farming made by THREE “K”. Its means Kitusi (hard), Kitanai (Dirty) and Kiken (dangerous) or Kakkowanci (Uncool), Kasegenai (Unprofitable) and Kekkendekinai(Unmarriageable). But now agriculture change in to new 3 “K”. It means Kakoi(cool),

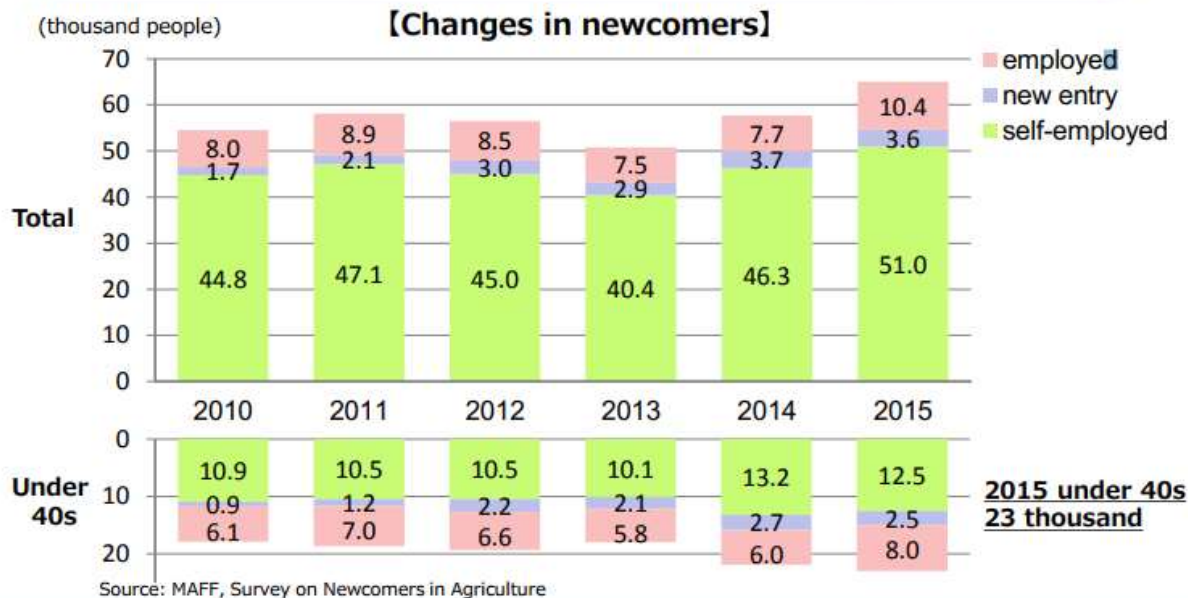
Kasegeru(Profitable) and Kandoteki (Impressive). And, Japanese government introduced new farmer policy is called new farmer support programmes.

1-Agricultural employment programme for the corporation side (2008) - In this programme government help to training cost for new young generation who interested in agriculture.

2-Young Farmer Benefits (2012) - In this programme, government assist to farming preparation or independent and self-employed farming. And government provide loan is 1.5 million for two year training and also give 1.5 million yen after starts farming for ten years.

So, government has taken aforesaid steps and result number of new comers increases in agriculture.

- The Entry of New Farmers remains 50-60 thousand per year. Among them, those who are under 40s marks about 23 thousand in 2015, which is the highest since 2007.
- While most of new farmers are the self-employed who succeeds its family farm, thy entry of new farmers employed by agricultural companies or entrepreneurs with non-farming family is increasing.



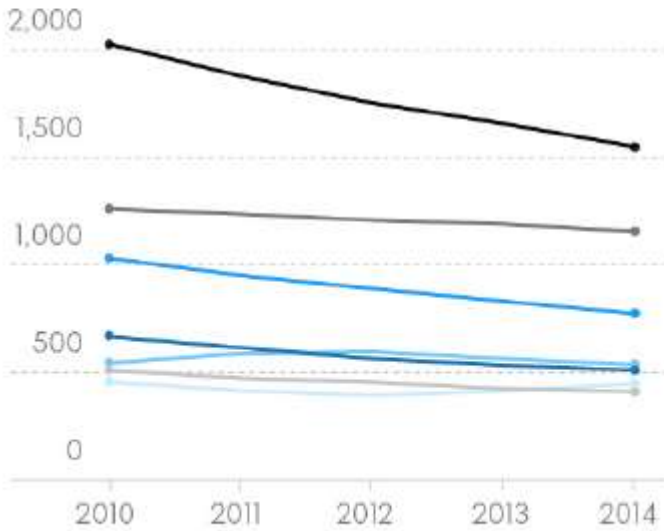
Aging in Japanese agriculture:-

The average age in Japanese agriculture is 65.8 in 2010. The age group 60 contribute 2 /3 of Japans 3.12 million farmers. 65 aged grouped is 50% and 70 years are many more in Japanese agriculture. This data shows Japan agriculture run by old people and its bad impact on productivity. Agriculture need hard work and energetic people but old people could not do lots of physical work due to oldness. So, aged people searches youth or agriculture work but could not find because youth does not interested in agriculture. The old people has not skill so they could not able to operate modern equipment and result productivity declined (fact and details).

AGE OF JAPANESE FARMING POPULATION

● 39 and under ● 40-49 ● 50-59
 ● 60-64 ● 65-69 ● 70-74 ● 75+

2,500 (In thousands)



SOURCE: Japan Ministry of Agriculture, Forestry and Fisheries

Women participants in agriculture:-

Women contribution in agriculture is very important. In Japan women participants in agriculture work traditionally but in recent time the engagement of women in agriculture are falling. In the present time, it is interesting fact that the number of women are higher than men in contribution of agriculture. In 2014 the number of female farmers was 1.14 million and same time the number of male farmers around 1.12 million(Iijina,midori,2015).

Table 1. Women Engaged in Farming

	Unit: Thousand persons					
	1990	1995	2000	2005	2010	2014
Total number of farmers	4,819	4,140	3,891	3,353	2,606	2,266
- Women (total number)	2,841	2,372	2,171	1,788	1,300	1,141
- Women (percentage of total)	59%	57%	56%	53%	50%	50%

Source: Ministry of Agriculture, Forestry and Fisheries

Customs allows agricultural land to be transferred to the older son so women has no land ownership and their role is very limited in the ownership of land and decision making process in agriculture. Women works in agriculture as wife, daughter and in law of farmer. The participation of women is very less in local agricultural institution or committee. But in recent period the participation of women gradually increases due to encouraging by the gender equal society, the centre body of agriculture committee and JA since 1999. In 2014. These efforts, the number of women participation in committee increases. Only 7.2% women member in committee and 5.5% women member in agricultural cooperation(Iijima,Midori,2015)

Table 2. Women Farmers' Participation in the Decision-making Process					
	Unit: person				
Agricultural Committees	2000	2005	2008	2011	2014
Agricultural Committees Members - Total	59,254	45,379	37,456	36,034	35,653
- Women (total number)	1,081	1,869	1,741	2,070	2,572
- Women (percentage of total)	1.8%	4.1%	4.6%	5.7%	7.2%
Japan Agricultural Cooperatives (JA)					
JA Board Members – Total	32,003	22,799	20,074	18,852	18,910
- Women (total number)	187	438	605	833	998
- Women (percentage of total)	0.6%	1.9%	3.0%	4.4%	5.3%
Source: Ministry of Agriculture, Forestry and Fisheries					

In 2014, PM Shinzo Abe said that the participation of women should increase in various kind of institution and set a target to raise the promotion of women in leadership position to 30% by 2020(ibid).

Automation revolution in agriculture of Japan:-

Japanese agriculture faces aging problem and 50% population of farmers are over 60 year. Thus, new technology and automation revolution is essential to Japanese agriculture. In present time, Japanese farmer use robotics technology, unmanned farming machinery, multipurpose tractor etc for farm works. Japan connected GPS system to own agriculture. Japan will be making planning to launch two navigation satellites in 2017 end for agricultural data and measurement. The team researchers from Graduate school of agriculture at Hokkaido develops remote control tractor and its teams are also working on Robotics system who observes climate and environment. Japanese researchers try to make a tractor who equipped with GPS receiver as well as various kind of devices and sensor. Japanese agriculture equipped with modern technology and devices so productivity increases and work burden of older farmers decreases (Ishii,Hayato, 2017).

According to the newspaper Yomiuri Shimbun (2012), Bio industries produces agricultural product controlled by various technique such as artificially controlling temperature ,water condition, nutritional element and other factors. Its product better than paddies products, and products has high quality nutritious controlled by this industries. Radioactive elements are used for removing harmful insect from food items. In Japan, on the other hand where people's engagement in agriculture are decline due to unfavourable environment but on the other side the new technology is attracting attention toward agriculture. Osaka Prefecture University constructed vegetable factory in Sakai. It is the largest agro factory in Japan which does not use sunlight. Professor Haruhiko Murse said that “please eat this time lettuce without washing it, because the vegetable is much cleaner than tap water.”(Yomiuri shibun.2012).

Food Self Sufficiency in Japan:-

According to MAFF (2015) when a country produces food for all its people without import from other country is called Food Self Sufficiency. The food self-sufficiency is measured by the calories based and production value base. According to MAFF, food self-sufficiency ratio is 39% on a calories supply base and 65% on a production value base.

The food self-sufficiency ratio set a goal under basic plane foe agriculture and rural areas of 2000 and 2005 are 45% on a calories supply basis and 74% (for 2000) and 76%(for 2005) on the production value base. In 2010 the target set by government are 50% on calories based and 70% on a production value base which can only happen by uses of all resources.(ibid)

	Total food self-sufficiency ratio targets		Approach to food self-sufficiency ratio targets
	Calorie supply basis	Production value basis	
Basic Plan of 2000	45%	74% (reference value)	Since the targets serve as guidelines for food consumption and agricultural production during the plan period, they were set with consideration given to their feasibility and their impact on initiatives by people concerned and on the promotion of measures.
Basic Plan of 2005	45%	76%	Bearing in mind that the targets function as guidelines for desirable dietary patterns and domestic production that meet consumer needs, they were set with consideration given to their feasibility over the plan period.
Basic Plan of 2010	50%	70%	The targets were set as high targets that can only be achieved by inputting all of Japan's available resources.

Source: Compiled by MAFF.

Agriculture Cooperative Institution in Japan.

Agriculture cooperative is a powerful institution in Japan. It is more politically and effectively organisation in Japan which strong impact on agricultural subsidy, control tariff and foreign competition, and remove unfavourable barrier in agriculture. It also provides machinery and storage facility, loans and insurance, market access facility, effective fertilizers etc to Japanese farmers. Noyko is the federation of agriculture cooperative in Japan that dominate all kind of agriculture works or process. Its help to maintain good farmer income, supporting friendly political party and politician and other organisation who help them, and maintaining high food price for farmers (facts and details,20) But some farmers rise voices against Noyko because gradual loss of ability to be to take independent decision on farmer issues or policies. They also criticise Noyko bureaucracy because they are not friendly with farmers and the number of farmers decline is 70% since last thirty five years. At the same time, Noyko employees had doubled more than 3,00,000.(ibid).

Today farmers can buy the pesticides and composed fertilizers on reasonable price from other sources as compare to Noyko. Farmers say Noyko does not maintain the lower prices of fertilizers, farm equipment and pesticides. So it failed to support farmers and need to create new cooperative but conservative bureaucrat refused their demands.(ibid).

Agricultural reform policy

Today's japan faces huge amount of problems or challenges in agriculture sector such as decreasing population, ageing farmer, shrinkage farmland, production decline, food security crises and food self-sufficiency decline. Japan has to change its present policies for development of agriculture. (the Tokyo foundation, 2008).

According to OECD report 2015, there are many reform policies initiated by Japanese government.

1. A target set for the increase rice production.
2. Income support system initiated by the government.
3. Provide financial support to farmers and encourage to divert rice producing land to other crops.
4. To secure farmers self -decision on production.
5. To promote business oriented agriculture for growth and prosperity.
6. To provide the common platform for business oriented farms and agricultural innovation system, and provide the agricultural education to youths.

Conclusion

In the present time we can see the Japanese agriculture changed from traditional method to a modern method. There are many processes to convert into a modern agricultural system adopted by the Japanese government. Japan introduced new technology innovation in agriculture area for increasing production and reaching food self-sufficiency target set by itself. The participation of women in agriculture is good in Japan but they need more empowerment for taking self-decision on agriculture practices. Japan government tried to effort that more women participate on decision making institutions and organizations. Japan's agricultural agenda is very clear. Japan want to achieve production goal and provide the food security to all people. They are working lot of work in this field. For instance - improving the robotic technology, remote control tractors introduced, promote urbanising agriculture and took several reform policies on farm land, crops etc.

Japan government is trying to attract more youth in agriculture sector. They are taking several steps such as providing financial aid, subsidy, security, establishing agro related industries, introducing new technology in agriculture, opening the training centre related to agro works and promoting organic agriculture etc. So finally, we can see Japan has great agricultural potential in crop production and it could produce new higher value production and calorie based production. The limited source and growth stagnant profit, declining population and ageing population in agriculture are most general problems in present Japan. But, Japan took reform policy and recommendations which will help to change these conditions. So, Japan's agriculture sectors future is bright but need some above changes.

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