

An Exploratory Analysis of Crop Diversification Policies of Select Developing Countries

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ABSTRACT

Crop diversification policy is considered as one of the sustainable livelihood strategies at global level. Empirical evidence shows that CDP ensures livelihood security by promoting more crop varieties, food and nutrition security, increasing agriculture production, and enhancing soil and land fertility. The success of CDP largely depends on the willingness of the farmers to adopt crop diversification practices. Farmers would be inclined to adopt CDP if it matches with their farming intentions. There are different types of farmers with different motivations towards farming. The present study intends to explore the CDP successful strategies that meet the motivations of different farmers. Based on the Food and Agriculture Policy Decision Analysis (FAPDA) policy database, the study has identified thirty developing countries and observed CDP introduced during the period of 2011 to 2021 in respect to policy instruments, farmer type, and policy outcome. The result from the directed qualitative content analysis (DQCA) shows that out of thirty countries, fifteen have implemented CDPs to overcome climate change. Rest of the countries have implemented for achieving food security, diet diversity, increase agriculture production and livelihood security respectively. The results show that the CDP of Bangladesh, Iran, Tunisia, Kazakhstan and Thailand met with success. These countries managed to shift from water intensive crops to water resilient crops. In these countries, the CDP were aimed at the medium farm size holders of sustainable and modern type of farmers. These countries mostly use capacitive building and incentive instruments in CDP.

Keywords: Crop diversification policy, policy instruments, farmer behaviour, policy outcome, FAO.

INTRODUCTION

Crop diversity is the high priority adaptation measure in irrigated and non – irrigated areas (Akinagbe, 2014) as well as cropping more than one crop gives the soil to get nutrients (Peter J. Jacques, 2012) and it reduces income variations of farmers (Guvele, 2001). Various studies have identified that compared to the mono-cropping, crop diversity has been an important resilient strategy for both irrigated and non-irrigated areas (Akinagbe, 2014), and crop diversity promotes broad agro eco system that provides variety of livelihood options (Brenda B Lin 2009, Fahong Wang 2009). Government of Thailand had implemented Crop Diversification Programme and it has provided attractive financial returns to the small farmers and this program is successful in Thailand (Sukallaya Kasem & Gopal B. Thapa, 2011). Vanden Berg (2007) study has pointed out that sustainable income level has been observed after the implementation of Crop Diversification Programme in China.

Various Studies based on Crop Diversification Programme has analyzed as an adaptation strategy for climate change, constraints of adapting CDP, challenges of CDP, opportunities and barriers of CDP implementation. This study proposes to assess the extent and nature of policy design in Crop Diversity Programmes in the thirty countries. To bridge the gap between the government and farmers behavioral study would help for policy analysis research to get the

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better outcome for the sustainable development. The present study intends to explore the CDP successful strategy that meets the motivations of different farmers.

Policy instruments are the techniques used by the governing authorities to promote certain policies to achieve a predefined set of goals. They are interventions designed by the authorities intending to motivate all stakeholders involved in the issue at stake. Having clear and realistic objectives is key to success, as policies without objectives tend to lose their purpose in the long run. These policies also fail in the process of implementation if there is a lack of motivation. Some common and routinely used policy instruments include providing grants, guarantees, and/or other means of funding sources (Hiroshan Hettiarachchi, 2019). In this context, the study has made an attempt to identify the policy instruments for crop diversification policies and its outcome.

METHODS

The present study was entirely based on secondary data sources such as Food and Agriculture Organization published documents on Crop Diversification Programme. Based on the Food and Agriculture Policy Decision Analysis (FAPDA) policy database, the study has identified thirty developing countries and observed CDP introduced during the period of 2011 to 2021 in respect to policy instruments, farmer type, and policy outcome. The study has chosen thirty countries namely Bangladesh, Cambodia, Indonesia, Pakistan, Thailand, Burkina Faso, Burundi, Ethiopia, Ghana, Kenya, Malawi, Mali, Mozambique, Nigeria, Rwanda, Senegal, Tanzania, Dominican, Uganda, Zimbabwe, Brazil, Argentina, Guatemala, Haiti, Mexico, Iran, Tunisia, Yemen, Kyrgyzstan and Kazakhstan. Directed qualitative content analysis (DQCA) method has used as a tool for the analysis. A document is considered as the source of data and it helps to identify the behavioural assumptions of the crop diversification policy. It involves systematic reading or observation of texts (codes) to indicate the presence of interesting. Content analysis helps to identify the intentions, focus or communication trends of an individual, group or institution. It describes the attitudinal and behavioral responses to communications. The present study follows the exploratory content analysis where the policies are in the form of text. The policy documents were classified under the framework of Policy document analysis (Anne Schneider & Helen Ingram 1990) quoted authority, incentive, capacity-building, symbolic-hortatory and learning tools are the five policy instruments. Policy instruments have five categories such as authority, incentive, capacity building, symbolic & hortatory and learning (Schneider & Ingram, 1990). Each instruments has specific nature and characteristics which is given below in table 1. In order to determining the outcome of the policy whether it is a success or failure, the study undergoes evident based reports and literature reviews for each country with the specific crop diversification policies. The study has coded 0 (no) and 1 (yes) for the policy instruments, and the farmer type used.

Table 1. Policy Instruments

S.No.	Policy Instruments	Features
1.	Authority	Obeying the government rules / orders
2.	Incentive	Inducements – incentives Charges Sanction Force
3.	Capacity Building	Community Mobilization program Information Training Decision Making Skills Training Start-up Cost Technology Training
4.	Symbolic & Hortatory	Persuasive communication to change the perspective
5.	Learning	Open ended purpose

Source: Schneider & Ingram (1990)

RESULTS AND DISCUSSION

Results of Directed qualitative content analysis method

Using the DQCA method, the study has explored the CDP adapted countries of FAO. From the thirty countries, some of the countries are successfully adopted CDP, some has partially achieved adaption and some countries are not able to achieve it.

Asia and the Pacific Countries:

- i. Bangladesh report declares the programme was successful. After the implementation of CDP, HVC varieties increased by vegetables (7 varieties), fruits (10 varieties), spices (7 varieties), medicinal plants (5 varieties) and other crops (8 varieties) through the adoption of good agricultural practices by at least 48.4% to 78.1% farmers, and organic farming by 73.4% farmers (Bangladesh – Second Crop Diversification Project, ADB 2021).
- ii. Cambodia shows the programme is successful were the proportion of crop diversification increased to 67.8% by 2023. Rice production increased by 3.0% annually, to 12.6 million tons by 2023. Exports of agricultural crops increased to 7.7 million tons by 2023 (Cambodia Agriculture, Natural Resources, And Rural Development Sector Assessment, Strategy, And Road Map, Adb 2021).
- iii. In Indonesia, increase in crop varieties other than rice and achieved food security. In 2018, the level of income of farmers was 30.37 million per capita, an increase of 4.47% compared to 2017. The increase in farmers' welfare was also shown by the decreasing number of rural poor people (Fajar Rahmanto, 2021).
- iv. Pakistan CDP project has benefited over 80,000 peasant and smallholder farmers in 120 targeted villages in the Sindh province. System of Rice Intensification methods have improved efficiency of inputs, increased farm income, improved crop yields, protected and revitalized soils, biodiversity and the natural resource base, and contributing to climate-smart sustainable agriculture and rural development. It is shifting to water intensive to water intensive crop i.e., rice to rice crop due to adapting drought resilient crop is critical (World Bank 2017, Climate-Smart Agriculture in Pakistan).
- v. Thailand has achieved Global food security index (GFSI) with an average score of 65.1 out of a total of 100 in 2019, compared to 58.3 in 2017 and 58.9 in 2018 (The Twelfth National Economic And Social Development Plan, 2017-2021).

Africa:

- i. Burkina Faso farmers learnt lessons in soil conservation, and in sustainable and increased agricultural production. After harvesting their cotton, farmers practiced crop rotation technology involving “dual purpose” cowpea and maize which helped to increase food and agricultural production (FAO, 2010).
- ii. In Burundi, Farmers receive training and assistance in managing their production through Farmer Field Schools (FAO, 2020).
- iii. In Ethiopia, CDP is failure due to farms that were small to medium sized, with low fertility and on sloping fields, and at lower elevations were found to suffer crop failure in the year studied (Romina Cavatassi, 2006).
- iv. Ghana shows that crop diversity at the farm level is positively associated with both self-consumption of food crops and cash income from crops sold, providing empirical evidence of the relative dominance of a diversification over a specialisation strategy in this specific setting (National Medium–Term Investment Programme (NMTIP), 2005).
- v. Kenya shows the high cost of farm inputs (in particular seed, fertilizers and agrochemicals), the inaccessibility of affordable credit facilities and unpredictable weather patterns have led to low potato productivity leads to the failure of CDP (FAO, 2013).
- vi. In Malawi, 36 percent of rural households grow maize in mono-crop. Maize in combination with legumes is the only crop system in Malawi that is significantly associated with an increase in productivity and a reduction in crop income volatility. Contrary to expectations, crop systems with 3 or more crops do not significantly reduce crop income volatility relative to maize mono-cropping. Market weaknesses for many non-maize crop is a disincentive to the adoption of diversified systems and pushes farmers toward mono-cropping (FAO, 2015).
- vii. Mali farmer’s capacities are developed and are already serving the farmers, while also contributing to the overall well-being of the community. Along with the cotton crop, sesame, maize, sorghum crop varieties are adapted by the farmers and it is successful (FAO, 2015).
- viii. The most prominent cropping system for maize producers in Mozambique is a three-crop system comprised of maize, with a legume, typical beans, groundnuts or pigeon peas, and an alternate staple food, such as cassava or sorghum. This system is adopted by 47 of all farmers in Mozambique (FAO, 2015).
- ix. Nigeria-The implementation of this programme had significant positive contributions to farmers’ incomes. When drip-irrigation and improved tomato seeds were combined with agro-ecological soil management practices such as composting and mulching, farmers were able to harvest more from the same amount of land. Consequently, farmer’s income significantly increased from 1-2 to 6-12 US\$ a day, resulting in about 4,000 US\$ of income in a year (Agroecology for Food Insecure Countries, 2020).
- x. Rwanda - Limited diversity in production with a focus on priority, staple crops (e.g., maize, potatoes) and cash-crops (e.g., coffee, tea), resulting in low production, affordability and availability of nutrient-rich foods e.g., vegetables, fruits (Accelerating Rwanda's Food Systems Transformation, 2021).

- xi. Senegal - As a risk management strategy, farmers in the Groundnut Basin are adopting alternative crops, such as cowpea and cassava, as these are more tolerant of poor soil conditions and drought. In the southern part of the zone, farmers are also diversifying their production to include watermelon and sesame (Climate-Smart Agriculture Country Profile, 2016).
- xii. Tanzania - Due to experienced adverse climatic conditions and other stressors, local farmers are responding through different adaptation strategies which include farming and non-farming activities (FAO, 2006).
- xiii. Uganda - The incomes and livelihood conditions of vulnerable communities were significantly improved through the implementation of market-oriented agriculture and livestock development, a diversification of livelihoods system, and access to microcredit. As a result of the promotion of climate change adaptation practices for coffee production, the farmers coffee yield increased by over 50 percent (FAO, 2017).
- xiv. Zimbabwe - The government and policy making bodies have failed to recognize the important role smallholder farmers have been playing in climate change mitigation and resilient practices. These practices range from agro ecology, food sovereignty, crop diversification, crop rotation, agro-forestry, conservation agriculture and water harvesting practices including sustainable water and soil management practices. The GoZ and the global institutions have also failed to recognize the importance of indigenous seeds and the production of small grains (Pulses) as another way of climate change resilient practices. The GoZ keep on pressurizing smallholder farmers to implement conventional forms of agriculture based on CSA, utilize hybrid seeds especially maize and synthetic fertilizers (Government of the Republic of Zimbabwe and Food and Agriculture Organization of the United Nations, 2015).

Latin America and the countries

- i. Argentina keeps its crop production diversified, and improvements are made in government support to local farmers, this agricultural giant could drastically improve the availability of food to both its own citizens and the rest of the world (The Role of Argentina's Government in Food Security and Biofuels, 2007).
- ii. Brazil - Both projects will increase the adoption of sustainable land management (SLM) practices such as: improved agronomic practices (improved crop varieties, extended crop rotations, particularly with legumes); integrated nutrient management (improved efficiency of fertilizer applications); improved tillage management (switch from minimum tillage to no-tillage); better water management (enhanced irrigation practices); and manure application and residue management (Giacomo Branca, 2013).
- iii. Dominican - once dependent on citrus and still a major producer of bananas, has been diversifying very successfully into exported fruit, vegetables and ginger (Challenges and Opportunities for Food and Nutrition Security in the Americas, 2020).
- iv. Guatemala - In 2015 they started a process of crop diversification and now produce vegetables in a staggered manner. The project executed by the Ministry of Agriculture, FAO and with the financial support of the Government of Sweden, has helped them to strengthen organizational capacities and links to schools (Strengthening the School Feeding Progra, in the framework of the Hunger-Free Latin America and the Caribbean initiative 2025).
- v. Haiti - Crop diversification is correlated with higher agricultural productivity. Households that grow larger number of crops have higher incomes on average. It may also suggest that intercropping has positive impacts on agricultural productivity. Interestingly, growing cash crops (mangoes and coffee) does not appear to be significantly correlated with agricultural productivity (Green Climate Fund, 2019).
- vi. Mexico - Crop species production diversity in Mexico generally increased from 1980 to 2019 at state, regional, and national levels. Second, diversity was highest among irrigated croplands in the North and North Central regions, though irrigated crop diversity tended to be higher than rainfed crop diversity in all regions (Mathew C. Lafavor, 2022).

Near East and North Africa

- i. Iran - Based on the extensive fieldwork undertaken in Karaj, Ahwaz, Iranshahr, Jiroft and Kahnouj, the crop was found to be adaptable to the climate conditions of the country. The project (joint efforts of both government and FAO) was successfully concluded in 2015 and the crop was introduced to farmers in the following cropping seasons (FAO, 2016).
- ii. Tunisia - Activities have reached community based organizations, farmers and agricultural technicians who have benefitted from more than 10 training sessions on methods to economize water irrigation in plots. Furthermore, during a date palm and apricots fair organized to demonstrate the biodiversity richness of the oases, 10 young graduates were trained on agro-tourism to improve and diversify their incomes (Globally Important Agricultural Heritage Systems (GIAHS), 2012).

- iii. Yemen - Some varieties (more than 10 maize, 7 wheat, 4 barley, 3 lentil, 3 pea, 2 sesame, and cowpea) that are adapted. The project distributed more than 1000 kg of seeds of adapted varieties selected by farmers from the targeted areas (FAO, 2015).

Northwest countries

- iv. Kazakhstan has increased more than twenty varieties of crops (Kazakhstan Finalizes 2021-2030 Agricultural Development Policy Document, 2022).
- v. Kyrgyzstan - 150 farmers trained on the conservation agriculture approach through attending 10 demo plots in different villages. The farmers learned how to manage their plots in terms of water access, diversification of crops and land management (FAO, 2018).

CONCLUDING REMARKS

Based on the FAO policy documents of crop diversification the study has traced the policy instruments, targeted farmers and its outcome for thirty countries. The study has found that to implement the crop diversification programme, various countries have used incentive and capacity building as a dominant policy instrument. Some countries are partially successful in adaptation due to geographical conditions and soil suitability. But it still needs more attention to focus in a farmer's point of view in farming practices. The study suggests that making the policy statements mandatory (authority) to the target people would be helpful to the government to nudge the people in a right way. By providing resources and financial support to farmers would motivate to perform better. Based on the farmers' characteristics the policy design should be relevant to the farming sector.

REFERENCES

- [1]. Accelerating Rwanda's Food Systems Transformation (2021), Diagnostic and Landscaping Analysis by the Food System Transformative Integrated Policy (FS-TIP) Initiative.
- [2]. Agricultural Statistics at a Glance 2018, Department of agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India.
- [3]. Amanjot Singh, Vikas Kumar, Vikram Sandhu, Bikramjit Singh Hundal (2019), Empirical analysis of Farmers' Intention to adopt Sustainable Agricultural Practices, *Asia-Pacific Journal of Management Research and Innovation*, pp.1-14.
- [4]. BFS/USAID. 2016. Climate-Smart Agriculture in Senegal. CSA Country Profiles for Africa Series. International Center for Tropical Agriculture (CIAT); Bureau for Food Security, United States Agency for International Development (BFS/USAID), Washington, D.C. 20 p.
- [5]. Byron Zamasiya (2017), Factors influencing smallholder farmers' behavioural intention towards adaptation to climate change in transitional climatic zones: A case study of Hwedza District in Zimbabwe, *Journal of Environmental Management*, vol. 198, pp. 233-239.
- [6]. Davidemenozzi, Martina Fioravanti, Michele Donati (2015), Farmer's Motivation to Adopt Sustainable Agricultural practices, *Bio-based and Applied Economics*, Vol. 4(2), pp. 125-147.
- [7]. Economic Survey 2018-19
- [8]. Food and Agriculture Policy Decision Analysis (FAPDA), Country Fact Sheet on Food and Agriculture Policy Trends, Kazakhstan Policy Briefs (2017), Food and Agriculture Organization of the United States, pp. 1-6.
- [9]. Food and Agriculture Policy Decision analysis (FAPDA), Country Fact Sheet on Food and Agriculture Policy Trends (2016), Bangladesh, pp. 1-7.
- [10]. Hazida Umar Ahmed (2015), Exploring Theory of Planned Behaviour for Understanding Agricultural Transformation Utilization by rural farmers' in Katsina State, *Journal of Humanities and Social Sciences*, Vol. 20, pp. 27-32.
- [11]. Helen Hansson (2012), psychological Constructs Underlying Farmers' Decisions to Diversify or Specialise Their Businesses – An Application of Theory of Planned Behaviour, *Journal of agricultural Economics*, Vol.63 (2), pp. 465-482.
- [12]. Hettiarachchi, H., & Kshourad, C. (2019). Promoting waste-to-energy: nexus thinking, policy instruments, and implications for the environment. In *Current Developments in Biotechnology and Bioengineering* (pp. 163-184). Elsevier.
- [13]. Icek Ajzen (1991), *The Theory of Planned behavior, Organizational behavior and Human Decision Processes*, Vol. 50, pp. 179-211.
- [14]. Igor Senger (2017), Using the theory of planned behavior to understand the intention of small farmers' in diversifying their agricultural production, *Journal of Rural Studies*, Vol. 49, pp. 32-40.

- [15]. Joao Augusto Rossi Borges (2015), An interdisciplinary framework to study farmers’ decisions on adoption of innovation: Insights from Expected Utility Theory and Theory of Planned Behavior, African Journal of Agricultural Research, Vol. 10 (29), pp. 2814-2825.
- [16]. LaFevor, M. C. (2022). Spatial and temporal changes in crop species production diversity in Mexico (1980–2020). Agriculture, 12(7), 985.
- [17]. Lilibeth Acosta-Michlik, Victoria Espaldon (2008), Assessing vulnerability of selected farming communities in the Philippines based on a behavioural model of agent’s adaptation to global environmental change, Global Environment Change, Vol.18, pp. 554–563.
- [18]. Mark Manning (2009), The Effects of Subjective Norms on Behaviour in the theory of Planned Behaviour: A Meta – Analysis, The British Psychological Society, Vol.48, pp. 649-705.
- [19]. Matsumori K, Iijima K, Koike Y and Matsumoto K (2018), Front. Psychology, pp.1-14.
- [20]. McKilligan, R., & Gilbert, I. A. The Role of Argentina’s Government in Food Security and Biofuels.
- [21]. Mirza B. Baig, Gary S. Straquadradine (2015), Sustainable Agriculture and Rural Development in the Kingdom of Saudi Arabia: Implications for Agricultural Extension and education, Vulnerability of agriculture, Water and Fisheries to Climate Change: Toward Sustainable Adaptation Strategies, pp. 101-116.
- [22]. Mohammad H. Mondal (2010), Crop agriculture of Bangladesh: Challenges and Opportunities, Bangladesh Journal of agriculture, Vo. 35 (2), pp. 235-245.
- [23]. Tahir Rehman (2008), Farmers’ Behavioral Inclinations and Their Influence on the Anticipated Response to the Reform of the Common Agricultural Policy in England, Journal of Farm management, Vol.13, pp. 1-29.
- [24]. Tully (2018), Farmers’ Problems of Behavioural Change, SAGE Social Science Collections, pp.374-382.
- [25]. WoldegebrialZeweld (2017), Smallholder Farmers’ Behavioural Intentions Towards Sustainable Agricultural Practices, Journal of Environmental Management, Vol. 187, pp. 71-81.
- [26]. World Bank. 2017. Climate-Smart Agriculture in Pakistan. CSA Country Profiles for Asia Series. International Center for Tropical Agriculture (CIAT); The World Bank. Washington, D.C. 28 p

Appendix

Table 2: Crop Diversification Policies of thirty countries

S.No		I. Identifying Crop Diversification Policies	II. Identifying policy instruments					III. Identifying farmer type			Policy Outcome
			A	I	C B	S H	L	Subsistence	Moder n	Sustainable	
		List of CDP's									
1	Bangladesh	HVC Production Support	1	0	1	0	0	0	1	0	1
2		Value Addition Support	1	0	1	0	0	0	1	0	1
3		Credit Support	1	1	0	0	0	0	1	0	1
4		Institutional Strengthening	1	0	1	0	0	0	1	0	1
5		Project Implementation Support	1	0	1	0	0	0	1	0	1
6	Cambodia	To increase agricultural productivity, diversification, competitiveness, and commercialization (ASSDP)	1	0	1	0	0	0	1	0	1
7	Indonesia	Improve non-rice crops for achieving food security	0	1	1	0	0	0	0	1	1
8	Pakistan	Promote water efficient and low delta crops	1	0	0	0	0	0	0	1	0
9		Explore new methods of cultivation suitable to changing climatic conditions such as terrace cultivation and contour farming	1	0	0	0	0	0	0	1	0
10		Adopt crop diversification with proper cropping patterns based on the climatic trends	1	0	0	0	0	0	0	1	0

11		Develop climate resilient infrastructure of farm products	1	0	1	0	0	0	0	1	0
12		Develop transport facilities	1	0	1	0	0	0	0	1	0
13		Develop new varieties of crops which are resistant to heat stress, drought tolerant, less vulnerable to heavy spells of rains, and less prone to pests and diseases	1	0	0	0	0	0	0	1	0
14		Remodelling and upgradation of the existing irrigation infrastructure	0	0	1	0	0	0	0	1	0
15		Strengthen science-based organizations and technological innovations in order to enhance basic agronomic research into new varieties and climate resilient crops	0	0	1	0	0	0	0	1	0
16		Conservation of indigenous gem plasm of crops and fruits for breeding and adaptation to climate change situation	0	0	1	0	0	0	0	1	0
17		Increase the acreage of farm land for sustainable agriculture increases to 5,000,000 rai in 2021.	1	0	0	0	0	1	0	1	1
18	Thailand	improve the crop varieties with innovative farming system	0	0	1	0	0	1	0	1	1
19	Iran	Sustainable intensification of oilseed crops, especially soybeans by integrating new technologies into cereal-based systems	0	0	1	0	0	0	0	1	1
20		Awareness raising on the importance of the dynamic conservation of oasis heritage through several meetings and workshops with local institutions and government agencies	0	0	1	0	0	0	0	1	1
21		Broadcasting in radio and television programs dedicated to local agri-cultural heritage	0	0	0	1	0	0	0	1	1
22		Dissemination of informational material such as posters and brochures	0	0	0	1	0	0	0	1	1
23	Tunisia	Coordination of training sessions for farmers on the dynamic conservation of traditional agricultural systems	0	0	1	0	0	0	0	1	1
24	Yemen	to increasing the production of grains through intensification, diversification (shifting away from qat cultivation), more effective natural resources management	0	1	0	0	0	0	0	1	1

25	Kazakhstan	Reduction in water - intensive (rice, cotton) crops	1	0	0	0	0	0	1	0	1	
26		Reduction in area planted for wheat	1	0	0	0	0	0	1	0	1	
27		Diversification in crop production of high profitable (oilseeds, vegetables, melons, fodder) crops	1	0	0	0	0	0	0	1	1	
28		Creation and implementation of seed traceability information system	0	0	0	0	0	0	0	1	1	
29		Modernization of the variety testing network	0	0	1	0	0	0	0	1	1	
30		Adoption of legislative measures regulating Kazakhstan's accession to the International Union for the Protection of New Varieties of Plants	1	0	0	0	0	0	0	1	1	
31		Address feasibility of regulating the return to the permissive (restrictive) nature of maintaining the State Register of Breeding Achievements recommended in the Republic of Kazakhstan	1	0	0	0	0	0	0	1	1	
32		widespread water-saving irrigation technologies	0	0	1	0	0	0	0	1	1	
33		accelerating equipment and tractor fleet renovation	0	0	1	0	0	0	0	1	1	
34		Revision of the marginal cost limits of agricultural machinery in the framework of investment subsidies	1	1	0	0	0	0	0	1	1	
35		Legislative regulation of control over genetically modified seeds, planting material and plant products	1	0	0	0	0	0	0	1	1	
36		Kyrgystan	plant farming i.e., climate-smart practices such as no-till and conservation agriculture, improvement and diversification of crop varieties	0	0	1	0	0	0	0	1	1
37		Burkina Faso	increased capacity building through the IPPM-FFS approach: increased number of trained farmers and increased farmer capacity to adopt and manage technologies for diversification and intensification in crop-livestock systems	0	0	1	0	0	1	0	0	1
38			strengthening farmer support system: increased number of service providers in the input and output supply chains.	0	0	1	0	0	0	0	1	1

39	Burundi	To provide diverse species / varieties to farmers according to interest and preferences	0	1	1	0	0	1	0	0	0
40		Train FFS members and youth groups as seed multipliers with support of ISABU, MINAGRIE and the Bugarama seed centre	0	0	1	0	0	1	0	0	0
41		Support use of healthy high quality germplasm and promote adapted new and preferred varieties (such as fruits, vegetables, coffee, corn and manioc)	0	0	1	0	0	1	0	0	0
42		Promote diversified systems with orphan crops, diverse legume species, fruits and vegetables to enhance nutrition, through awareness raising, complementary training and school gardens	0	0	1	0	0	1	0	0	0
43	Ethiopia	To increase climate resilient modern crop varieties especially to sorghum	1	0	0	0	0	1	1	1	0
44	Ghana	Agricultural diversification to high value crops such as vegetables and fruits and other tree crops as well as different livestock and fisheries products, linked to capacity building in processing and marketing skills	0	0	1	0	0	1	0	0	0
45	Kenya	Promote use of improved-quality (i.e. pest- and disease-free) seed – this is top priority	0	0	1	0	0	0	0	1	0
46		Take complementary initiatives to improve soil and water management practices in order to increase potato productivity	0	0	1	0	0	0	0	1	0
47		Facilitate access to affordable credit and financial services for small farmers	0	1	0	0	0	0	0	1	0
48		Strengthen smallholder organizations to improve farmers' bargaining power and to enhance production and the transmission of marketing information.	1	0	1	0	0	0	0	1	0
49		Foster widespread use by farmers of the expanded ICT (information and communications technology) network, such as cell phones and the Internet.	0	0	1	0	0	0	0	1	0
50	Malawi	to increase legume production	0	1	0	0	0	0	0	1	0
51	Mali	to increase cotton production	0	1	1	0	1	0	0	1	1

52		Support farmers to transition toward commercial oriented crops.	0	1	1	0	0	1	0	0	1
53	Mozambique	Improve the commercialization of crops that are already widely adopted by farmers	0	1	0	0	0	1	0	0	1
54		Support the seed market intensification	0	1	0	0	0	1	0	0	1
55	Nigeria	Farmer-to-farmer trainings and demonstration farms encouraged over 380 farmers in 19 different communities to implement organic vegetable production and drip irrigation.	0	0	1	0	0	0	0	1	1
56		The GoR is focusing on supporting French beans and peas, horticulture specialties - baby corn, chilli, mini leek, African eggplants, mushrooms and herbs	1	1	1	0	0	0	0	1	0
57	Rwanda	Food security, nutrition and climate and other shocks resilient agriculture improved through sustainable and diversified production systems	1	0	1	0	0	0	0	1	0
58	Senegal	to achieve rice and onion self-sufficiency by 2016 and 2017, respectively, optimizing the performance of the groundnut sector and developing the off-season fruits and vegetables	0	0	1	0	0	0	0	1	1
59	Tanzania	to increase climate resilient crops	1	0	1	0	0	0	0	1	1
60	Uganda	to improve climate change adaptation practices of farmers	0	0	1	0	0	1	0	0	1
61		promote crop rotations to include nitrogen fixing crops	1	0	1	0	0	0	1	0	0
62		promote research and adoption of high value crops such as horticulture as well as small grains, green legumes, pulses and tubers for inclusion in cropping pattern.	1	0	1	0	0	0	1	0	0
63		Promote post-harvest handling facilities for horticulture through investment in cold chain system for improved product quality.	1	0	1	0	0	0	1	0	0
64		Promote improvements in phytosanitary standards and product specification and	1	1	0	0	0	0	1	0	0
65	Zimbabwe	Support the production of small grains especially in the drought prone areas	1	0	1	0	0	0	1	0	0

66	Argentina	Strengthening the holistic approach to risk management policy, investing in prevention and preparedness, and improving the predictability and monitoring of disaster assistance	1	0	1	0	0	0	0	1	1
67	Brazil	Promoting diversity and multifunctionality of rural areas and stimulating technological innovation and sustainability.	0	1	1	0	0	0	0	1	1
68	Dominican	Strengthening the technical capacities of small- and medium-sized producers and the development of value chains.	0	0	1	0	0	0	0	1	1
69	Guatemala	to increase the crop varieties for achieving food security	0	0	1	0	0	0	0	1	1
70	Haiti	to increase the local food security	0	0	1	0	0	0	0	1	1
71	Mexico	Improving the drought tolerant crop varieties	0	0	1	0	0	0	0	1	1