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How to 'Enable Vegetable-rich Diets Environment in Mali'? An Analysis of Policies, Stakeholders, and Framings

NESTOR ALOKPAÏ[1]*, JODY HARRIS[2]

[1]School of Rural Sociology and Agricultural Extension, National University of Agriculture, Republic of Benin.
Email: alones2025@yahoo.fr
[2]World Vegetable Center, Thailand.
Email: jody.harris@worldveg.org

*Correspondence: alones2025@yahoo.fr

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To enhance healthy diets, food system policies should encourage and enable vegetable consumption. But in Mali, vegetable consumption is low and there is a need to understand the policy drivers of this. This study aims to analyze written food environment policies, and the perceptions of stakeholders around the challenges and policy priorities for enabling production and consumption of vegetables for healthy diets in Mali**.** Through a three-pronged qualitative approach, a document review of existing written policies; a stakeholders' NetMap workshop which gathered 15 participants; and 20 stakeholders' in-depth interviews were carried out and analyzed and synthesized through multiple steps. The results showed that many policies have been designed and implemented for food system improvement in Mali. These policies are mostly from governmental initiatives under the Ministry of Rural Development, with the financial support of donors. They are mostly oriented toward agricultural product supply in terms of quantity (availability) and on improving social protection, equity, and livelihoods, but with little attention paid to quality. Policy challenges include weak or no impact on high post-harvest losses, high use of chemical fertilizers and pesticides, poor quality of the water used for vegetable production in the cities, and the lack of food marketing and promotion issues. These latter are worsened by weak adaptation strategies to climate change and the effects of insecurity in the north of the country, which has drawn most of the policy and investment focus during recent years. The study recommends creation of a specific policy targeting vegetable production and consumption through a food system lens, with a focus on pesticide and fertilizer regulation mechanism; post-harvest losses reduction; irrigation facilities promotion; and food marketing and promotion to positively impact vegetable rich diets environment.

1. Introduction

Poor-quality diets are the root of all forms of malnutrition as well as common non-communicable diseases and they affect both individuals and societies (Willett et al., 2019). Although there is consensus in the nutrition community on dietary requirements, which set up appropriate intake ranges of nutrients for healthy populations of all ages and sexes (National Academies of Sciences et al., 2019), diets based exclusively on nutrient reference intakes may lack certain food groups (for example, fruits and vegetables) and fail to provide the dietary diversity required to prevent diet-related chronic diseases (Herforth et al., 2020). Diversifying diets with vegetables is a cheaper, more safe, and more sustainable way to supply a range of nutrients to the body and combat malnutrition and associated health problems than other approaches that target only a single or a few nutritional factors (Ojiewo et al., 2015).

The past decade has been very turbulent in Mali, owing to a protracted armed conflict between the government

and rebel groups in the northern and central of the country. This has led to high numbers of internally displaced people. Undernourishment has worsened in recent years, probably as a result of the internal problems in Mali (Sissoko et al., 2023). This sociopolitical crisis resulting from the coup (The coup, and its subsequent governance arrangements with the recent withdrawal from ECOWAS), added to the COVID-19 pandemic has tipped Mali into an economic recession. With USD 859 in 2020 as the gross domestic product (GDP) per capita, Mali is a poor country with a population of more than 20 million inhabitants in 2020 (World Bank, 2021). Mali is facing enormous problems related to food security. For instance, one-quarter and one half of households are moderately to severely food insecure in Mali (Smale, Theriault, & Vroegindewey, 2019; WFP, 2017). In Mali, a nutrient-adequate diet would cost 144% of average food expenditures, making it unaffordable for most; and 58% of women do not achieve minimum dietary diversity, with 12% of adults never eating vegetables (Food Systems Dashboard. https://www.foodsystemsdashboard.org/). 22% of children are stunted (Dashboard), and from 1980 to 2015, obesity rates went up from less than 2% to over 13% in Mali (The GBD 2015 Obesity Collaborators, 2017).

In Mali, horticultural products constitute an important component of the Malian agricultural economy, with high economic value and strong growth potential. Given their high labor input and high nutritional density, horticultural products offer considerable potential for vulnerable populations – women, young people and the poor (Haggblade et al., 2014). Vegetables are often the most important source of cash income for smallholder farmers, and indigenous vegetables provide an important source of nutrition, particularly for poor people (World Veg, 2013). However, the vegetable sector in Mali is severely underdeveloped and vegetable consumption remains extremely low (Mamary et al., 2018). According to Bai et al. (2023), improving access to healthy food requires a better understanding of the food environment. These same authors estimated that a better understanding of the determinants of availability and accessibility (particularly economic) of a healthy diet, as well as their interactions, is also essential to enable political leaders to design effective and targeted policies (Bai et al., 2023). Then, there is a need to understand the policy environment and how this has been shaped by different actors and their various norms, narratives, and interests across the food system to draw lessons to inform decisions in support of vegetable-rich healthy diets. This case study aims to understand the Mali policy landscape as it affects food environments within national food systems related to vegetable production and consumption, stakeholders' perceptions of the policy issues, and the policy priorities that should be addressed by policymakers to improve vegetable rich-diets environment for healthy diets in the country.

2. Materials and Methods

2.1. Theorical Framework

This is an in-depth, qualitative case study (Yin, 2003), based on traditional policy science, tracking the food policy process over time and assessing how certain policy issues came to the fore and who and what drove this process. Within this, we are interested in understanding written policy content; key actors and their interactions and power; and how these actors see specific policy issues and aim to set agendas to address these (Shiffman & Smith, 2007).

The research was framed by the High-Level Panel of Experts on Food Security and Nutrition (HLPE) food system framework (HLPE, 2018) (for the written policy review and the NetMap), and focusing specifically on the Turner et al. (2018) Food Environment Framework (for the in-depth interviews). The food environment includes key domains external to consumers (availability, prices, and product properties and marketing of different foods), and key domains personal to consumers (accessibility, affordability, acceptability, information, and knowledge of different foods (Turner et al., 2018).

2.2. Research aims and questions

Within a broader project aiming to understand West African food systems, this research aimed to analyse the current policy environment for vegetable-rich food systems for healthy diets in Mali.

The research questions were:

1. How does written food system policy and legislation enable or disable vegetable-rich diets, and how complete and coherent is the written policy environment across levels and sectors?
2. Who is involved in food system policy creation, and how do these actors interact?
3. How do policy actors feel policy processes have affected food systems (with particular reference to vegetables)?

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2.3. Data Collection

This study was deployed around three phases. First, we proceeded to the collection and data extraction and summary in Excel of existing written policies and strategies designed in the sectoral ministries (agriculture; health and nutrition; education; water, sanitation and hygiene, and, social protection, equity and livelihood) as well as the multisectoral policies.

Second, this phase was followed by the mapping of key stakeholders in the vegetable policy process, and their interactions and influence. To realize this, we used the NetMap method (Schiffer, 2007; Schiffer & Hauck, 2010; Schiffer & Waale, 2007), through a workshop held in January 2022. This workshop gathered 15 key informants with knowledge of the sector from different vantage points, and took them through a facilitated process of creating drawn maps of actors in the vegetable-related policy network, elaborating their links, and assigning relative influence (power), based on the respondents' understanding of the network.

Third, 20 in-depth interviews were undertaken with key informants knowledgeable about aspects of vegetable policy processes in Mali, from a list of 122 stakeholders. They have been identified through the NetMap workshop, purposively selected to represent different actor types and viewpoints. The interview guide was grounded in a key policy agenda-setting framework (Shiffman, 2007) and included guiding questions on among others: the respondent's framing of key policy issues; how they see the current policy environment; and their perceptions of policy priorities to better enable vegetable-rich diets.

2.4. Data Analysis

The data and information gathered from the policy documents were synthesized by summarizing information from each policy relevant to vegetables under the different headings of the food environment framework as defined above. The NetMap data from the map drawn with respondents was entered into a matrix in Excel showing connections and relative influence of the actors, and the Excel matrix was used to draw a network map using Vizualyzer software. This map was analysed visually to look at the most central actors within the policy process and those defined as most influential by respondents, and to look at linkages and disconnects between different types of actors. Interview transcripts were processed and coded in Quirkos qualitative data analysis software. From this, issue framings and policy priorities were coded, and patterns were identified across different actor types. In addition, a quantitative variable "n" was chosen to estimate how the interviewees' policy priorities have referred to the food environment headings, and a comparison was done with the policy documentary review data.

4. Results

4.1. How does Written Food System Policy and Legislation Enable or Disable Vegetable-rich Diets, and how Complete and Coherent is the Written Policy Environment Across Levels and Sectors?

The data obtained from the policy documentary review showed how current policies in Mali are shaped across different sectors which contribute to shaping the food environment in the country. This policy review summarized 46 national-level, 07 regional and 06 international policies that are relevant to the food environment conceptual framework (see table 2 in annex 2). The analysis of table 2 shows that, based on the five aspects of the food environment, considered in this study, no Malian food policy is complete; the policies targeted from one to a maximum of four aspects of the food environment. In general, many sectoral policies focused on one to two aspects while overarching policies targeted more than two aspects. As shown on figure 1, clearly, food affordability and availability, were the two most targeted aspects of the food environment, respectively and Food safety, accessibility and information and knowledge have medium considerations in the current policies. This may be justified by the fact that the country aims to put much of its efforts to address the high poverty and food insecurity levels by increasing and diversifying the food production. Noteworthy is that food marketing and promotion is the orphan aspect of these policies as we found no related indication during the policy review.

In the same line, as shown on Figure 2 below, most of the relevant food policies in Mali are designed in the agricultural sector, followed by the social protection and Nutrition sectors, but few in the health sector. This last result is in opposite of the Netmap result which showed that the Ministry of health play an almost central role and has a great influence in the food policy designing and implementation in Mali.

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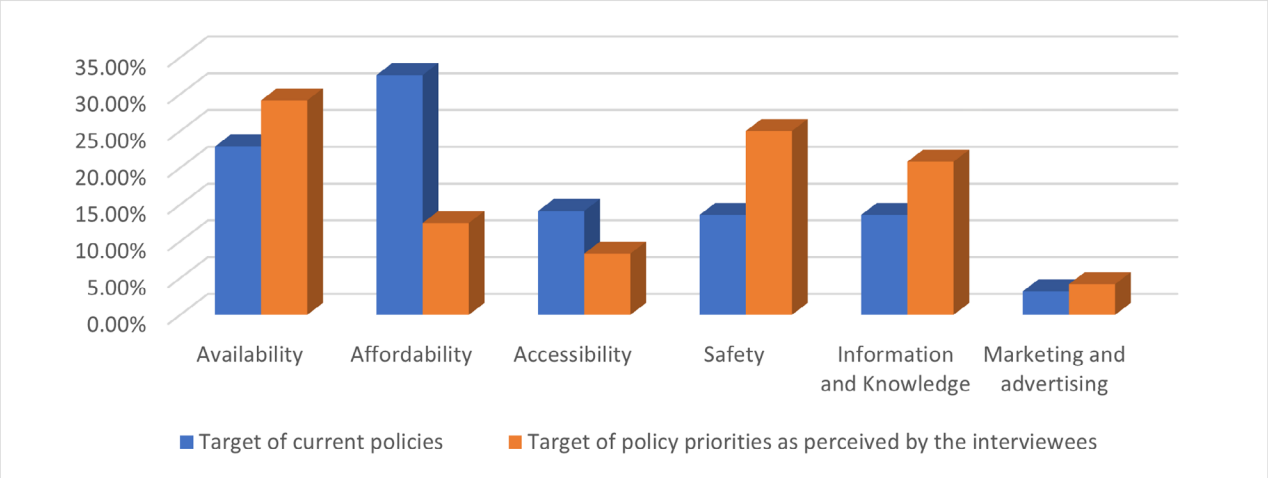

Figure 1: Food Policies Target per HLPE Food System Area in Mali.
Source: The Authors.

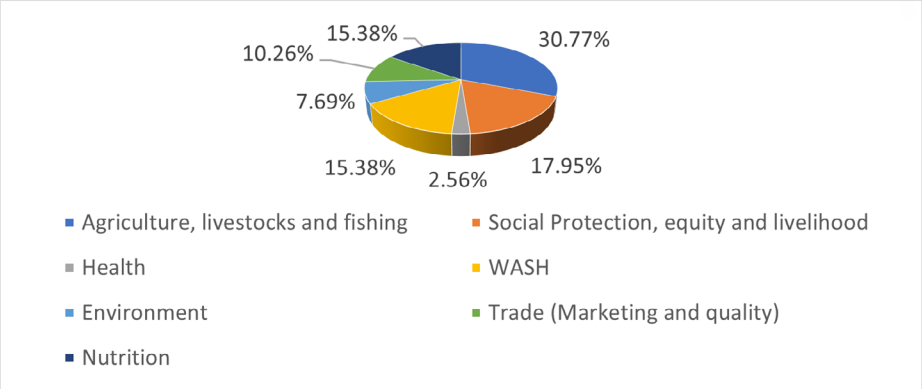

Figure 2: Coverage of Current Sectoral Policies in the Food Environment in Mali.
Source: The Authors.

However, the documentary review noted some intra and inter-policies contradictions. Indeed, some policies aim to improve both food security and food export including vegetables by increasing food production without making specific indications on which crops are prioritized for making food available to local populations and for exporting. As a result, these policies are in contradiction with other policies which addressed food security, diets, and nutrition, and social protection, equity, or affordability. For instance, the national policy of agricultural development (2013) aims to increase food production to address the food insecurity problem in the country but aims, at the same time, to constantly explore export opportunities for these foods. This policy may contradict itself if its implementation prioritized export opportunities, leaving local populations food insecure. In that sense, this policy may directly contradict the food and nutrition security and the social protection policies of the country that aim to utilize food production to make food available and affordable to populations, especially the most vulnerable segments of the society.

Furthermore, documentary the review noted some incoherence in the policy timeline in the country. For instance, the irrigation strategy of 1999 is still in effect today while the law of agricultural orientation was passed since 2006.

4.2. Who is Involved in Food System Policy Creation, and how do these Actors Interact?

The netmap workshop helped to identify 122 actors from different categories among which 31 are governmental, 49 are donors and international institutions and NGOs, 17 are private, 25 of the civil society. The governmental actors are among others the Ministries and their agencies mainly the Ministry of Rural Development and its agencies are strongly represented. As part of the donors, we have among others: FAO, WFP, African Development Bank (ADB), International Fund of Agricultural Development (IFAD), West African Economic and

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Monetary Union (WAEMU), Economic Community of West African State (ECOWAS), the foreign embassies such as the embassies of the Netherlands, Canada, Denmark, Sweden, France and the Kingdom of Norway, etc. As part of the private sector, we have among others: Faso Kaba Sarl, COOP Faso Djigui, Togouna Sarl, the Seeds Producers Cooperative (COPROSEM), most of them are gathered in the Association of Seeds Producers of Mali (ASSEMA), etc.

Furthermore, the agricultural sector's governance enshrines the partnership between the government and line ministries, local authorities, the agricultural profession, the private sector, and the civil society in the definition, implementation, and monitoring of development policies. This partnership is guided by some key principles such as an alignment with national procedures, results-based management, mutual accountability, and policy dialogues. On trade issues, the country avails of a national commission on trade negotiations. As this commission encompasses all economic sectors, it comprises various actors from the Ministry of economy, the Ministry of industries, the ministry of environment and sanitation, the Ministry of foreign affairs, the Ministry of agriculture, the Ministry of livestock and fisheries, the Ministry of health, the Ministry of communication and ICT, the Ministry of transports, the Central Bank of West African States (BCEAO), the banks and financial institutions, the private sector, the interprofessional organizations, the civil society organizations, the consumer organizations and the academia and research. The commission is coordinated under the leadership of the Ministry of trade, we have among others, the Permanent Assembly of the Agricultural Chambers of Mali (APECAM), the Consumers Association of Mali (ASCOMA), the National Coordination of the Peasants Organizations (CNOPP), the Professional Peasants Organization Association (AOPP), etc.

As shown in Figure 3 below, the Government (Gouv) plays a central role with the most important connections and influence in the food policy designing and implementation in Mali, and this corroborates the predominance of agricultural policies in the food system environment enabling in Mali as shown above. In addition, the analysis of the figure 2 shows that there are regulation links from the Government towards all the actors, and from the Ministries towards their agencies. The Ministries such as the Ministry of Rural Development, the Ministry of Finance, the Ministry of Health, play also a central role and are seen as very influential in food environment enabling in the country, especially for vegetable production. Some of the agencies of the Ministries such as the Commissionership of food security (CSA) and the National Cluster of food security and the Rural Economics Institute (IER) are playing peripheral but are seen playing important role in the food environment in Mali. In the private sector, (ASSEMA) plays also a central role and has a great influence in policy designing in the vegetable subsector as they govern the seed production and commercialization activities in the country. The donors such as the UN agencies (UNICEF, WFP, etc.), the foreign embassies, etc. are playing a peripheral role but are seen as important as they are assigned a great influence through their financial support to the government and some national NGO and Civil Society actors. These donors fund the government directly and also many programs and projects in the agriculture and food domains. The specificity of Mali is that the financial links from the donors to the other actors are huge. The regional organizations such as ECOWAS and WAEMU are playing central roles as they fund many initiatives and projects but have a medium influence in the food environment. This is also the case of some NGOs and Research companies such as the Alliance for the Green Revolution in Africa (AGRA) and the World Vegetable Centre which seems playing also peripheral role but assigned medium influence. The Civil Society and farmer's organizations, such as APECAM, are assigned medium influence but play an important role in agricultural policy design, especially where that targets the vegetable sub-sector. There are also collaboration links between the NGOs that are working in the same domain such as food security and nutrition for the local populations' well-being (see figure 3).

4.3. How do Policy Actors Feel Policy Processes have Affected Food Systems?

In this rubric, the vegetable production and consumption issues as well as the required policy priorities as perceived by the stakeholders are summarized in Table 1 (see Annex 1). The analysis of this table shows that many issues are still hindering the interventions to improve food and nutrition security as well as vegetable production and consumption. In terms of key issues, different aspects were raised by different respondents. For instance, for all of the actors, the insecurity in the country and the climate change effects are key challenges for all the food and nutrition sector. For the farmers, one most important issue is the lack of specific fertilizers and pesticides for

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food crops growing especially for vegetable whereas for the local government actors, the main issues raised were related to land splitting without taking into account the land availability for agricultural activities. For the governmental actors, the key issues raised are mainly related to the low yield of agricultural production to cover the market needs. In addition, they talked about the poor quality of the water use in urban and surrounding areas for vegetable growing as a big issue for the quality of vegetable supplied on the market as these are mostly contaminated. The climate change effects are key issues for agriculture, food, and nutrition and this is mentioned by all the actors. Finally, the fact that there is no special policy nor regulation to promote healthy vegetable production and consumption was raised as an issue.

The events that had some worst effects on the agriculture, food, and diets in Mali are among others: the insecurity situation in which the country has been dived since many years now is the most important pointed out by most of the interviewees. This led to some terrorist attacks and the travels restrictions to the north of the country. This was followed by the COVID-19 outbreak which highly impacted the food environment in the country.

The policy priorities as perceived by the interviewees are diverse and target differently in terms of weight in the food environment headings (see Figure 2 above: target of the policy priorities as perceived by the interviewees). The analysis showed that most of the future policy priorities as perceived by the interviewees targeted food availability, information and knowledge (on food product quality and cooking), and food safety. Food affordability and acceptability policy priorities are less raised, and food marketing and advertising got the lowest consideration. These results are in the same line as what has been found through the documentation review, which showed that most of the policies designed and implemented for food system improvement in Mali are mostly oriented on improving agricultural product supply in terms of quantity (availability). Thus, food availability as well as food safety, and information and knowledge on food products quality and usage, need to be strengthened through future policies according to the interviewees. In addition, all the interviewees pointed out that there is less attention paid to the quality of vegetables supplied on the market and perceived this as a priority focus. According to them, this can be explained by a lack of policy mechanism that could promote best practices in the vegetable subsector and mostly the control and the regulation of the high usage of chemical fertilizers and pesticides by farmers in general and particularly vegetable producers, as this is a big issue for vegetable production and consumption. In addition, as shown in table 1, most of the interviewees said that the government has been subsidizing over the pass decades chemical inputs for small scale farmers to improve their productivity for mostly cereals production but this policy action is the bed of the high use of chemical fertilizers and pesticides use by vegetable farmers.

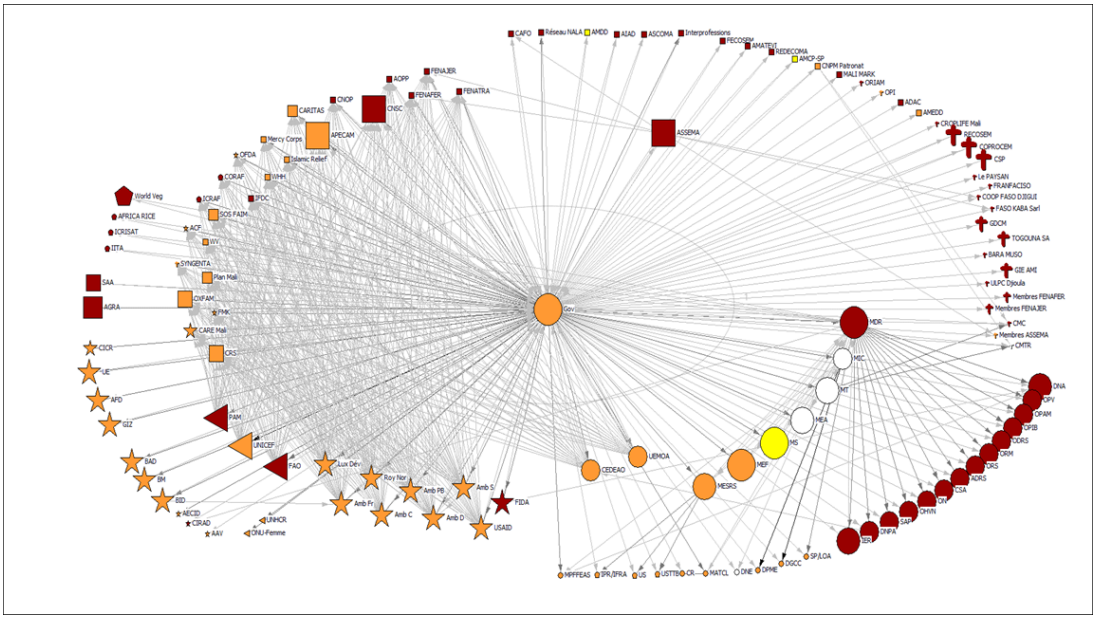

Figure 3: Actors Involved in Vegetable Policy Processes, their Links and Influence. Source: Authors.

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The NetMap shows the combination of all the links discussed (formal regulation, financial links, advocacy, negotiation, and collaboration); the darker the line, the more of these links exist between a pair of actors. The shape of each node denotes the actor type, and the colour the major sector of the actor. Influence over the policy process is shown in three ways: the size of the node shows the level of relative influence assigned by the workshop participants; the number of links shows how connected an actor is in the network; and the centrality in the diagram shows how central the software has determined the actor to be in the network.

5. Discussion

These results showed that the Government plays a central role with the most important connections and influence in the food policy designing and implementation in Mali, and also corroborates the predominance of agricultural policies in the food system environment enabling with many stakeholders' organizations in connection with this sector. In addition, agriculture is the main economic sector of the Mali as stated. Nevertheless, there is no specific policy targeting vegetable production and consumption nor improving food diets. These results are somehow well aligned with WHO (2004) which estimated that agricultural policy and production often have a great effect on national diets and called the Member States to take healthy nutrition into account in their agricultural policies. As pointed out by Babio, Hougni, & Yabi (2023), food security has long been considered in terms of the quantities of food available to different segments of the population in most African countries, rather than diet quality. According to Brooks and Giner (2021), over the past twenty years, the effects of agricultural policies on nutrition have received increasing attention from policymakers. They also estimated that agricultural production fundamentally responds to, rather than drives, final food demands. This is also corroborated by the interviewees (as shown in the results above) who revealed that food availability as well as food safety, and information and knowledge on food products quality and usage, need to be strengthened through future policies according to the interviewees. On overhand, Gómez et al. (2013), pointed out that the Mali's population, as other West African countries is experiencing changes in lifestyle and diets that are driven in part by urbanization and income growth. They found that on-farm production represents only 25% of the food consumed by rural households during the lean season and 36% after harvest. Then, achieving food and nutrition security in Mali will require supporting national policies and investments in agro-processing and food markets to ensure the provision of affordable, diversified, and healthy foods year-round in both urban and rural areas.

Most of the results as stated above regarding vegetable production in Mali are well aligned on the same found by Aune, Coulibaly, & Giller (2017) and Sissoko et al. (2023) who estimated that food production in Mali is constrained by low soil fertility, access to seeds, erratic rainfall, pests and diseases, postharvest losses, access to agricultural mechanization, agricultural input, credit, volatile markets, agricultural extension services, access to land and gender issues in accessing resources. According to the interviews, these constraints are potential areas that future policies should cover to enhance food environment in general and vegetables production and consumption in particular. In addition, the high usage of prohibited chemical fertilizers and pesticides with no specific policy regulating this as raised by vegetable farmers in Mali seems to be a global concern in Sub-Saharan African (SSA) countries as said by Cachomba et al. (2013). They estimated that there is evidence at the local level that small-scale farmers in SSA have become greatly reliant on synthetic pesticides, replacing more traditional methods of pest control. In the same line of idea, Samake et al. (2011), revealed that the concentrations of pesticide residues, often high, were found in all the market garden products analysed in Mali. According to these same authors, often, more than one pesticide residue is found on the

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same plant and the high concentrations of pesticide residues detected in market gardening products from urban and peri-urban market gardening in Bamako for instance constitute the main dangers to which consumers of these products are exposed to. In addition, consumers are still largely unaware of the dangers of toxic pesticide residue. In the Mali context as this is the case of many sub-Saharan African countries over the last decade, the country has established a new generation of agricultural input subsidies with the goal of expanding input use to smallholder farmers outside the reach of commercial suppliers to increase their productivity (Theriault & Smale, 2021). But this policy action needs be accompanied by a control and regulation mechanism for the use of chemical fertilizers and pesticides for crops production in general and vegetable production in particular as the interviewees estimated this is the bed that encourages the high use of chemical inputs on vegetable growing. Based on all the above, Snyder et al. (2015) suggested that in the short run, immediate policy action must be taken to ban the use of "highly toxic" pesticides. To overcome this, Samake et al. (2011) suggested that it would be necessary to raise awareness, train and inform producers and consumers about the risks linked to market gardening activity and the consumption of products from market gardening to minimize the risks incurred by the population. After all these, it seems to be relevant that one of the priorities raised by most of the interviewees is to set up clearly in the policies a mechanism for the strict control of chemical fertilizers and pesticides for food crop production in general and vegetable farming systems in particular while working on consumer education and the promotion and training of the vegetable farmers in organic fertilizers and pesticides usage.

On the other hand, setting up a policy for a local seed production chain seems to be a priority. In fact, despite there are many local companies that are operating in this sector in the country, the farmers estimated that there is a predominance of imported seeds that are not suitable for their local production weather and are not high-yield seeds. These results are also similar with those of Dagnoko and Asiedu (2016), who said that the supply seeds system in Mali are traditional or informal system and for many vegetables, despite imports and many companies are operating in this. These authors also revealed that the imported seeds escape controls while the informal system produces many traditional varieties to which consumers remain attached is characterized by low volumes, non-certified seeds and the use of varieties that are not listed in the national catalog.

Finally, the findings in Table 1 showed that climate change effects are seen as one of the big challenges that are brought up by respondents, affecting agricultural production in general and vegetable production in particular. This result is in the same line of those of Jettah, Mbasa, & Mdoe (2024) concluded that the variation in food and nutritional quality is attributed to different experiences of adverse impacts of climatic variation in Tanzania.

6. Conclusion

In Mali, food and nutrition security is still a priority for the government and many policies target this sector. Also, many donors are funding the food system sector to promote special norms such as the compliance of the policies with the SDGs, climate change mitigation, gender aspects as well as human rights, etc. There are also, many civil society organizations that are influencing the policies through advocating and lobbying. Through this work, we noticed that many policies are targeting food system in terms of quantity (availability) and less attention is given to food and nutrition quality. In addition, despite the existence of many policies that are targeting the food environment in general, there is no specific policy which is focused on the vegetable subsector promotion nor an existing policy that is working to promote healthy production and consumption in this subsector. Then, vegetable healthy rich-diets promotion is still hindered by some key issues like among other the high use of chemical fertilizers and pesticides, the poor quality of water used by vegetables growers in the cities and the surrounding areas and the negative climate change effects. Related to all this, some key policy priorities have been raised by the interviewees which are among others: to work to secure the whole country so as Malians can find food for their purposes; to continue working on measures to address climate change effects; to improve the yield in the vegetable production farms and to make the sector more attractive and more interesting for farmers. In addition, they recommended to create a policy to promote healthy vegetables for the population through a mechanism to control and regulate the use of chemical fertilizers and pesticides, promoting agroecology in the farming systems, and work to maintain the young people in their villages by developing with them some employment opportunities. To this end, they recommended that agriculture must be made more attractive to interest these young people. Finally, most of the actors mentioned that there is a specific policy need to promote irrigation facilities in urban and suburban areas and work for post-harvest loss reduction in the vegetable subsector.

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References

Aune, J. B., Coulibaly, A., & Giller, K. E. (2017). Precision farming for increased land and labour productivity in semi-arid West Africa. A review. *Agronomy for Sustainable Development, 37*(3), 16. doi: https://doi.org/10.1007/s13593-017-0424-z

Babio, S., Hougni, A., & Yabi, J. A. (2023). Sécurité Alimentaire au Bénin: Les Grandes Familles de Pratiques Agro-écologiques Adoptées dans les Zones Cotonnières. *European Scientific Journal, ESJ, 19*(12), 32. doi: 10.19044/esj.2023.v19n12p32

Bai, Y., Bouscarat, J., Sokourenko, K., Heinrigs, P., & Zougbédé, K. (2023). *Alimentation saine, coûts et politiques alimentaires au Sahel et en Afrique de l'Ouest* (No 39). OECD Publishing. doi: https://doi.org/10.1787/43a62f1d-fr

Brooks, J., & Giner, C. (2021). What Role Can Agricultural Policies Play in Encouraging Healthier Diets? *EuroChoices, 20*(3), 4-11. https://doi.org/https://doi.org/10.1111/1746-692X.12322

Cachomba, I. S., Cairns, J., Tschirley, D., & Snyder, J. (2013). Risk Perception and Behavior in Pesticide Use by the Horticultural Producers of Maputo. *Flash 69E. Maputo: Ministry of Agriculture*. Retrieved from https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=9de08f426e8bfa2298914629b16f68fe087cc5b0

Dagnoko, S., & Asiedu, E. (2016). Innovative experiences in access to foundation seed for commercial and non-commercial crops for formal and informal seed systems. *The Case of Malian Stakeholders and the West Africa Seed Programme (WASP). ISSD (Integrated Seed Sector Development) Africa.*

Gómez, M. I., Barrett, C., Raney, T., Pinstrup-Andersen, P., Meerman, J., Croppenstedt, A., et al. (2013). *Post-Green Revolution food systems and the triple burden of malnutrition* (No. 288990). Food and Agriculture Organization of the United Nations, Agricultural Development Economics Division (ESA). Retrieved from https://ageconsearch.umn.edu/record/288990/files/ca2273en.pdf

Haggblade, S., Traoré, A., Diakité, L., Dramé, Z., & Sidibé, M. (2014). *Promotion d'une chaîne de valeur inclusive: perspectives et potentialités des produits horticoles au Mali* (Document de Travail no. 2014-2). AgEcon Search. doi: https://doi.org/10.22004/ag.econ.211458

Herforth, A., Bai, Y., Venkat, A., Mahrt, K., Ebel, A., & Masters, W. (2020). *Cost and affordability of healthy diets across and within countries* (No. 309369). Food and Agriculture Organization of the United Nations, Agricultural Development Economics Division (ESA). doi: https://doi.org/10.4060/cb2431en

HLPE. (2018). *A report by the High-Level Panel of Experts on Food Security and Nutrition of the Committee in World Food Security*. Nutrition and Food System: Rome. Retrieved from https://www.fao.org/3/a-i7846e.pdf

Jettah, R. N., Mbasa, B., & Mdoe, C. N. (2024). Enhancing food and nutritional security through Gender-Disaggregated Analysis: A case study of Lake Victoria Shore, Tanzania. *The North African Journal of Food and Nutrition Research, 8*(17), 123-134. doi: https://doi.org/10.51745/najfnr.8.17.123-134

Mamary, K. A., Lagat, J. K., Langat, J. K., & Teme, B. (2018). Determinants of Technical Efficiency of Small Scale Vegetables Production Under Different Irrigation Systems in Koulikoro and Mopti Regions, Mali. *American Journal of Agriculture and Forestry, 6*(4), 71-77. doi: https://doi.org/10.11648/j.ajaf.20180604.12

National Academies of Sciences, E., Medicine, Health, Medicine, D., Food, Nutrition, B., Committee to Review the Dietary Reference Intakes for, S., & Potassium. (2019). The National Academies Collection: Reports funded by National Institutes of Health. In M. Oria, M. Harrison, & V. A. Stallings (Eds.), *Dietary Reference Intakes for Sodium and Potassium*. National Academies Press (US). https://doi.org/https://doi.org/10.17226/25353

Ojiewo, C., Keatinge, D. J. D. H., Hughes, J., Tenkouano, A., Nair, R., Varshney, R., et al. (2015). The Role of Vegetables and Legumes in Assuring Food, Nutrition, and Income Security for Vulnerable Groups in Sub-Saharan Africa. *World Medical & Health Policy, 7*(3), 187-210. doi: https://doi.org/10.1002/wmh3.148

Samake, F., Babana, A. H., Yaro, F. K., Cisse, D., Traore,

ISSN-Internet 2197-411x OLCL 862804632

I., Kante, F., et al. (2011). Risques sanitaires liés à la consommation des produits maraîchers cultivés dans la zone urbaine et périurbaine de Bamako. *Mali Santé Publique,* (1), 27-31. doi: https://doi.org/10.53318/msp.v1i01.133

Schiffer, E. (2007). *The Power Mapping Tool: A Method for the Empirical Research of Power Relations* (IFPRI Discussion Paper 00703). Washington DC: IFPRI. doi: https://doi.org/10.22004/ag.econ.42410

Schiffer, E., & Hauck, J. (2010). Net-Map: Collecting Social Network Data and Facilitating Network Learning through Participatory Influence Network Mapping. *Field Methods, 22*(3), 231-249. doi: https://doi.org/10.1177/1525822X10374798

Schiffer, E., & Waale, D. (2007). *Tracing Power and Influence in Networks: Net-Map as a Tool for Research and Strategic Network Planning* (IFPRI Discussion Paper 00772). Washington, D.C.: International Food Policy Research Institute (IFPRI). doi: https://doi.org/10.22004/ag.econ.42318

Shiffman, J. (2007). Generating Political Priority for Maternal Mortality Reduction in 5 Developing Countries. *American Journal of Public Health, 97*(5), 796-803. doi: https://doi.org/10.2105/AJPH.2006.095455

Shiffman, J., & Smith, S. (2007). Generation of political priority for global health initiatives: a framework and case study of maternal mortality. *The Lancet, 370*(9595), 1370-1379. doi: https://doi.org/10.1016/S0140-6736(07)61579-7

Sissoko, P., Guindo, S. S., Togola, S., Dembélé, B. D., Grimsby, L. K., & Aune, J. B. (2023). Effect of Adoption of Climate-Smart-Agriculture Technologies on Cereal Production, Food Security and Food Diversity in Central Mali. *Agriculture, 13*(6), 1196. doi: https://doi.org/10.3390/agriculture13061196

Smale, M., Theriault, V., & Vroegindewey, R. (2019). *Dietary Patterns in Mali: Implications for Nutrition* (No. 303052). Michigan State University, Department of Agricultural, Food, and Resource Economics, Feed the Future Innovation Lab for Food Security (FSP). doi: https://doi.org/10.22004/ag.econ.303052

Snyder, J., Smart, J., Goeb, J., & Tschirley, D. (2015). *Pesticide use in Sub-Saharan Africa: Estimates, Projections, and Implications in the Context of Food System Transformation* (No. 230980). Michigan State University, Department of Agricultural, Food, and Resource Economics. doi: https://doi.org/10.22004/ag.econ.230980

The GBD 2015 Obesity Collaborators. (2017). Health Effects of Overweight and Obesity in 195 Countries over 25 Years. *New England Journal of Medicine, 377*(1), 13-27. doi: https://doi.org/10.1056/NEJMoa1614362

Theriault, V., & Smale, M. (2021). The unintended consequences of the fertilizer subsidy program on crop species diversity in Mali. *Food Policy, 102*, 102121. doi: https://doi.org/10.1016/j.foodpol.2021.102121

Turner, C., Aggarwal, A., Walls, H., Herforth, A., Drewnowski, A., Coates, J., et al. (2018). Concepts and critical perspectives for food environment research: A global framework with implications for action in low- and middle-income countries. *Global Food Security, 18*, 93-101. doi: https://doi.org/10.1016/j.gfs.2018.08.003

WFP. (2017). *Mali*. World Food Program. Retrieved from http://www1.wfp.org/countries/mali

WHO. (2004). *Global strategy on diet, physical activity and health*. Geneva: World Health Organization.

Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., et al. (2019). Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. *The Lancet, 393*(10170), 447-492. doi: https://doi.org/10.1016/S0140-6736(18)31788-4

World Bank. (2021). Mali – World Bank national data: GDP and Population. Retrieved from https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=ML&view=map

World Veg. (2013). AVRDC Highlighting horticulture in Mali, USAID-Mali project: "Improving Vegetable Production and Consumption in Mali". Retrieved from https://avrdc.org/highlighting-horticulture-mali

Yin, R. K. (2003). *Case Study Research: Design and Methods*. Thousand Oaks: Sage.

ISSN-Internet 2197-411x OLCL 862804632

Annex 1

Table 1: Vegetable Production and Consumption Issues, Priorities as Perceived by the Interviewees, and their Weight in the Food Environment Framework.

Actor Type and Specificities	Perception of Vegetable Production Issues	Perception of Vegetable Consumption Issues	Perception of Priority Policy Actions	HLPE Framework Food Environment Components Referred by the Priorities and their Weights (n*)
All the actors' types	✓ Climate change effects ✓ Agricultural labor scarcity because many young people abandon agricultural activities and migrate to mining areas to work in the mines ✓ In urban areas, there is unsanitary water that is used for production and contains heavy metals, which degrade the quality of products and constitute a health risk for consumers ✓ Lack of conservation and storage facilities High post-harvest losses	✓ There is the effect of chemical fertilizers on vegetables, which really makes some people resign themselves to consuming them Hight emphasis on yield improvement (quantity) rather than on quality through government policies	✓ Set up a policy to enhance measures to adapt farmers to climate change effects ✓ Set up irrigation facilities for vegetables production in quantity and quality	Availability and affordability
			✓ Laws and regulations should be adopted to prohibit the use of synthetic chemicals for vegetable production but rather encourage the use of organic fertilizers ✓ There is also a need for the authorities to issue orders or define laws to prohibit the production of vegetables in certain areas (in cities) to avoid the contamination of products	Safety Safety
			✓ There is a need to harmonize the interventions of partners in the sector, ✓ The need to integrate specific recommendations into policies and legal texts and the need to promote agroecology	Availability, Affordability Information and knowledge Safety
			Facilitate access to cold rooms by vegetable farmers or their cooperatives	Availability, accessibility Affordability
Farmers	✓ Problems of inaccessibility of seeds (price), poor quality of seeds ✓ Weak availability of quality seeds essentially dominated by imports and not high-yield seeds ✓ Lack of profitable markets ✓ Vegetable production is seasonal in several areas because there is a major problem of access to water	✓ The high use of pesticides without any control and regulations. ✓ Many people are not consuming vegetables as they fear falling ill by eating contaminated vegetables.	Set up a policy to regulate the banned agricultural inputs markets	Safety
			Sensitize farmers to produce healthy vegetables for the population	Safety knowledge and information
NGOs and Civil society actors	✓ The input subsidy policy set up by the Government led to the abusive use of chemical inputs by the farmers. Today, the market gardening is becoming more and more contested in terms of the use of chemical products ✓ There is also a deficit about agricultural advice for the benefit of vegetable crops. Some farmers do not even know the techniques routes of pest control. The services responsible for providing agricultural advice are often very far from farms or producers' places of residence ✓ There is no real policy for the production and conservation of seeds of traditional vegetables	✓ There is a problem of ignorance of the methods of cooking vegetables to better preserve their nutritional elements ✓ There is a segment of the population who do not consume vegetables ✓ There is a cultural problem because some communities are not used to consume vegetable, even they produce them. Even if the prices are low, they prefer to throw the products away than consume them at home ✓ Vegetables are more consumed in large cities such as Bamako at 80% and only at 20% in villages outside Bamako	Promote local seeds production	Availability Safety
			Promote vegetable-specific fertilizers and pesticides	Safety
			✓ Popularize the texts of existing laws and regulations for chemical fertilizers and pesticides for vegetable production ✓ Promote the local production of seeds to make prices affordable compared to imported seeds and to raise awareness in all areas of production of market garden seeds to encourage them to use it. ✓ There is a need to define special policies for food marketing and regulation to improve food environment in the country	Availability Safety Affordability Safety, Marketing and advertising
Governmental	✓ There is a problem of ignorance of the technical routes of vegetable production by some farmers ✓ Lack of knowledge on the appropriate treatments on vegetables to control pests ✓ Many farmers do not approach the technical services to seek technical support.		✓ Reinforce agricultural extension services for better advice and support to farmers	Availability, safety Information and knowledge
Research and academy	✓ There are difficulties in preserving market garden products where there are periods of abundance during which prices are very low and there are many post-harvest losses	✓ There are problems related to the traceability and labeling of vegetables supply on markets ✓ Excessive use of fertilizers and pesticides which contaminate crops which affects the health of consumers. This is also due to the subsidizing of chemical fertilizers by the Government ✓ Little knowledge of food cooking practices that preserve nutritional value of vegetables	Fund researchers to set up local seed varieties by the breeding of local seeds with imported seeds to improve yields	Availability, Safety
			Work through research to develop varieties that are resistant to climate change and that can be better preserved	Availability Affordability
			Train and sensitize consumers on the cooking practices that preserve nutritional value	Information and knowledge
Private sector	✓ Seed companies sometimes complain that for certain tenders concerning the purchase of seeds at the Governmental level or for certain projects, where individuals or companies that do not operate in the seed sector who win contracts and sometimes deliver poor-quality seeds ✓ Lack of coordination in the projects interventions that target the farmer's capacity building. That often leads to low-impact		Set up a mechanism to involve only private seeds companies for seeds supplying and purchasing markets by both government and projects	Safety Availability

Source: Authors
*Availability (n=9), Safety (n=11), Information and knowledge (n=4), Affordability (n=6), Acceptability (n=1), Marketing and advertising (n=1)

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Annex 2

Table 2: Food Environment Policies in Mali.

	Food Agriculture, Inputs and Supply	Food Markets, Trade and Economy	Food Marketing, Sales and Promotion	Social Protection, Equity and Livelihoods	Food Security, Diets and Nutrition	Food Environment Headings and Sectors Covered
International	UN Sustainable Development Goals (SDGs) 2015-2030					
	Cadre stratégique mondial pour la Sécurité Alimentaire et nutrition (CSA) 2012					
	World Trade Organisation Agreement					
	African Growth Opportunity Act (AGOA).					
	Accord de Partenariat Economique					
	General Agreement on Tariffs and Trade					
Regional	Programme Détaillé de Développement de l'Agriculture Africaine (PDDAA)					
	Politique Agricole de la CEDEAO (ECOWAP)					
	Politique Agricole de l'UEMOA (PAU)					
	Politique commerciale UEMOA					
	Politique publique en matière de sécurité alimentaire dans le sahel					
	L'initiative « AGIR-SAHEL ET AFRIQUE DE L'OUEST					
	Charte pour la prévention et la gestion des crises alimentaires (version révisée 2012)					
National	Cadre Stratégique de Lutte contre la Pauvreté					Multisectoal
	Cadre stratégique pour la Relance Economique et le Développement Durable au Mali (CREDD : 2019-2023)					Multisectoral
	Cadre Stratégique pour la Croissance et la Réduction de la Pauvreté (CSCRP 2012-2017)					Multisectoral
	Politique Nationale sur les Changements Climatiques 2011					Environnent
	Loi d'Orientation Agricole					Agriculture
	Loi foncière agricole					Agriculture
	Politique Nationale de Décentralisation (DCPND) 2015-2024					Multisectoral
	Politique Nationale de l'Aménagement du Territoire (PNAT)					Multisectoral
	Politique Nationale de la Ville					Multisectoral
	Politique Nationale Genre du Mali 2011-2015					Social Protection, équity and livelihood
	Comprehensive Africa Agriculture Development Program-Mali 2009					Agriculture
	Plan pour la Relance Durable du Mali (2013-2014)					Multisectoral
	Etude Nationale Prospective ENP (2025)					Multisectoral
	Priorités Résilience du Mali (PRP, 2015-2035)					Social Protection, equity and livelihood
	Schéma Directeur du Développement Rural (SDDR)					Agriculture
	Programme de Développement Accéléré des Régions du Nord (PDA/RN)					Multisectoral
	Politique foncière Agricole 2014-	Code du commerce	---	Politique Nationale de Protection Sociale (PNPS) 2016	Politique Nationale de Nutrition (PNN) 2010-2021	Agriculture Trade Social Protection, equity and livelihood Nutrition
	Politique de Développement Agricole 2013	Stratégie Nationale AGOA Mali - 2016-2025		Plan Décennal de Développement Sanitaire et Social 2015-2024	Politique Nationale de Sécurité Alimentaire et Nutritionnelle (PoINSAN) 2017-2025	Agriculture Trade Health Social Protection, equity and livelihood Nutrition
	Plan National d'Investissement dans le secteur agricole (PNISA) 2015-2024	Code des investissements		Plan de Développement Socioéconomique et Culturel	Politique Nationale de l'Assainissement	Agriculture Trade Social Protection, equity and livelihood Nutrition WASH
	Politique Nationale de Développement de l'Elevage	Politique Nationale des Transports, des Infrastructures de Transport et du Désenclavement			Stratégie de Pérennisation de l'Alimentation Scolaire au Mali – 2013-2015	Agriculture Multisectoral Nutrition
	Politique Nationale de Développement de la Pêche et de l'Aquaculture	Programme de Restructuration des Marchés Céréaliers			Politique Nationale de l'Eau	Agriculture Trade WASH
	Politique de développement de la pisciculture				Stratégie Nationale de Gestion des Déchets Liquides	WASH Environment
	Politique Nationale de Protection de l'Environnement				Stratégie Nationale D'approvisionnement en Eau potable en milieu rural 2017 - 2030	Environment WASH
	Stratégie Nationale pour le Développement de l'Irrigation (SNDI)				Plan National de réponses aux difficultés alimentaires 2016	Agriculture Social Protection, equity and livelihood Nutrition WASH
	Stratégie Nationale de Développement de la Riziculture (SNDR)				Stratégie Nationale de Sécurité Alimentaire 2003-2015	Agriculture Social Protection, equity and livelihood Nutrition WASH
Local	Plans de développement communal	Stratégie Nationale d'Orientation du Développement Economique Régional 2016				Multisectoral Multisectoral

Source: Authors.

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Annex 3

Interview Guide

Thank you for meeting me today. My name is _____.

I am working for a project called SafeVeg managed by the World Vegetable Center, which researches how policy is made in the areas of agriculture, food, and diet in several countries in the ECOWAS region. We want to understand how you think this policy is made and enacted, and how you feel policy processes have affected food systems (with particular reference to vegetables, but also other foods).

We requested to speak with you because you work on a specific issue with relevance to this question in this country. With this conversation, I am hoping to get a sense of the issues and changes here from your perspective, and we will be speaking with other people to get other perspectives. This is not an evaluation of your work at all, but rather trying to understand how decisions are made. I'm looking for your own thoughts, opinions, and experiences, from your own point of view.

I would like to audio-record our conversation today, to make sure I don't miss anything. Anything we discuss will be confidential and made anonymous for any analysis. Would that be ok?

Do you have any questions before we start?

SECTION 1: Respondent background and organizational priorities *(5 minutes)*

- Can you tell me a little about your own background, and your organization?
- How does your organization's work relate to agriculture, food, or diets?
- How is your organization involved in influencing policy and action for these areas?

SECTION 2: Attention to key issues *(15 minutes)*

- What are key issues for agriculture, food or diets in this country, from your point of view?
- How are vegetables part of these issues?
- What priorities or approaches are needed to address these issues?
- Why would these be the right priorities or approaches?
- Are there competing priorities that might affect action on these?
- Has there been change in your thinking on approaches or priorities over time?
- Why did any change in your thinking happen; what influenced change?
- Have there been any key moments that changed your thinking on these issues?
- Has the COVID-19 pandemic changed anything?

SECTION 3: Policy environment (15 minutes)

- How has the way these issues are seen affected the policy or regulatory environment?
- What has affected how policy or regulation is made on these issues?
- Have there been any key events or moments that set policy towards certain priorities or actions?
- How would you characterize the policy environment or enabling environment for healthy food systems at the moment?
- Do you know anything about policy and regulation for vegetables in particular?
- Are there policies or regulations that are missing?
- Why are these not in place?
- What do you think should be done to address missing policies or regulation?

SECTION 3: Actors and actions *(15 minutes)*

- Who are the main people or groups you consult or collaborate with in the course of your work on these issues?
- Why are these the most important people or groups to work with?
- How do you interact with these people or groups day to day?
- How is policy action regulated among the different groups with an interest in these issues?
- How are your organization and these different stakeholders accountable to each other?
- How do funding and resources affect the actions of different groups?

SECTION 4: Concluding and looking forward *(10 minutes)*

- How is your organization planning to address policy affecting issues of agriculture, food, or diets in the coming year?
- What will be organizational priorities, also now in times of COVID-19?

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- What are your personal priorities?
  - Are there any other issues around policy or practice for agriculture, food, or diets that you would like to highlight, either in the past, present, or thoughts for the future?

Following up and thanks

Thank you for speaking with me today.

Your thoughts will help us to understand how changes in food system policy and implementation were decided and enacted, and help us to make recommendations for future action in these areas.

  - Do you have any written materials that might shed further light on our questions, that you could share?
  - Is there anyone else you feel we should talk to with useful perspectives on policy processes for the issues of agriculture, food, or diets?

If you have any further questions, I would be happy to answer them now or later by email.

Otherwise, I thank you very much for your time, and we will share the outcomes of this work in the coming months.

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