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Policy Support for Home Gardens in Vietnam Can Link to Sustainable Development Goals

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Abstract: Despite research evidence on the diverse benefits of home gardens and their potential contributions to multiple sustainable development goals (SDGs), the role of policy towards supporting these contributions remains unclear in developing countries like Vietnam. In this study, we found that 25 out of Vietnam's 86 key rural development and agricultural policies enacted over the last decade (2010–2021) set specific targets for home gardens. The targets, however, focus strongly on income generation with indicators stipulating e.g., 50–80% of total income from home gardens should be generated by the main product. The policies set no specific target for other potential roles of home gardens beyond the economy of rural households and can exacerbate the widespread transformation of home gardens in Vietnam into farming practices with low crop diversity. The latter potentially limits contributions of home gardens to two (SDG 1, 10) of at least 11 (SDG 1–3, 5, 6, 8, 10–13, 15) of Vietnam's 17 SDGs. To narrow the gap between research and policy in home garden contributions to Vietnam's SDGs, we need to better mainstream integrated home garden systems and their diverse benefits, enrich policy targets beyond the income generation, and strengthen coordination among state departments for policy implementation.

Keywords: agroforestry; crop diversification; multi-functionality; plant genetic diversity; rural development

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1. Introduction

Recent studies have drawn a connection between the socio-economic and ecological benefits of home gardens in rural areas of developing countries with potential contributions to sustainable development goals (SDGs) [1–3]. Home gardens refer to relatively small land areas around homesteads where diverse annual and perennial crop species are usually planted by the members of the household for supplementary sources of food and income [4–6]. The average land sizes of home gardens in rural areas of developing countries vary e.g., 400–6000 square meters in Indonesia [5,7] and 1400–7500 square meters in Vietnam [5,8]. Albeit relatively small in land size, rural home gardens can potentially contribute to poverty alleviation (SDG1), food and nutrient security (SDG2), healthy lives and wellbeing (SDG3), gender equality and empowerment (SDG5), sustainable consumption and production (SDG12), climate change mitigation (SDG13), and reduced land degradation and biodiversity loss (SDG15) [1–3].

Despite this abovementioned potential, widespread transformation of home gardens in developing countries into intensive monoculture farming still prevails, generating limited co-benefits apart from income [5,7–9]. For example, driven mainly by market opportunities, 85% of 95 surveyed households in West Java province of Indonesia converted their traditional home gardens into monocultures, with annual crops such as spring onions (*Allium fistulosum*) as the main crop [7]. This conversion has contributed to making spring onions the main commodity crop in the study site. In Vietnam, home gardens have been strongly

affected by a series of land and market reforms promulgated in the late 1980s [8]. The reforms permitted private ownership of land and businesses, more liberated access to markets and investment, and encouraged farmers to cultivate commercial crops in their home gardens. For example, home gardens with monoculture longan (*Dimocarpus longan*) trees have become widespread in the southern part of Vietnam [8]. The transformation of home gardens into monocultures will seriously limit their diverse benefits [7,10]. In addition, home gardens (as verified in part of the current study) are invisible in the 2016–2022 United Nations' Decade on Nutrition, and are mentioned in only a handful of examples from the 2022–2030 Food Systems Summit solution cluster towards delivering on all SDGs in the Decade of Action initiative [11]. This indicates a gap between research and multilateral perspectives on home gardens' potential contributions to the SDGs.

Policy supports are needed to help ensure multi-functionality of home gardens [7,8]. Multi-functionality refers to potential concurrent roles of home gardens in: maintaining household food and nutrient security [1,4,12]; generating additional income [8,9,13–15] including for women [4,16–18], and uplifting women's status in the family or community thanks to their agronomic competency in managing home gardens [4,17,19–21]; generating ecological benefits through, e.g., regulating microclimates, sequestering carbon for greenhouse gas removal, and hosting rich agrobiodiversity [22–27] including native plant species, and playing a role as in situ conservation of genetic diversity in plants and endangered tree species [24–26,28,29]. In short, multi-functionality refers to the six key benefits of home gardens for income generation, food and nutrient security, gender equality, climate change mitigation, climate change adaptation, and biodiversity conservation [4,22,27,30].

Over the past decade, several Asian developing countries such as Sri Lanka and Vietnam have promulgated home garden policies [4,29,31,32]. There is, however, no study investigating the focus of the policies and, therefore, the benefits that can be generated by future home gardens in the countries are unclear. Studies have shown that traditional home gardens in the developing countries often feature a high crop diversity in contrast to other agricultural land uses dominated by common annual crop species such as paddy or maize or perennial crop species such as fruit or timber trees [5,6,20,33,34]. Rural households usually manage home gardens for subsistence or generating additional income [4,5,14]. The crop diversity in home gardens can, however, generate a substantial income and diverse benefits. For example, home gardens with pomelo (*Citrus maxima*), orange (*Citrus sinensis*), or other fruit tree species in different regions of Vietnam could generate income that contributed up to 60% of total family income [5,8]. The systems also accommodated food crops such as rice, maize, or sweet potatoes for family consumption, and fibers, timbers, fodder, fuelwoods, or medicinal herbs [8,9,35–39]. Some home gardens had fishponds of 72–1500 square meters in size as a source of protein, and water for different purposes such as irrigation, animal consumption, and household needs [5,36]. Home gardens with vertical crop stratification systems can protect households from strong winds or intense drought or heat through shades and improved micro-climate [35,36,38,39]. Traditional home gardens might accommodate native and endangered tree species. For example, a critically endangered (*Aquilaria crassna*) and two endangered (*Erythrophleum fordii* and *Parashorea chinensis*) species based on the global Red List of threatened tree species (http://www.iucnredlist.org/ accessed on 21 September 2017) were found in home gardens in the North East and North Central Coast region of Vietnam [29]. Trees in home gardens can store a substantial biomass. For example, the aboveground biomass of fruit tree-based home gardens in Northwest Vietnam could reach 250 tonnes CO_2 equivalent per hectare [40]. Furthermore, the tasks of managing home gardens which accommodate a high crop diversity are often shared between Vietnamese men and women within families [8,9]. Women usually manage crops for food and nutrient security [8,9]. The focus of home garden policies in the developing countries will determine the diversity and extent of benefits that can be derived from home gardens. The high proportion of rural to total population in Asian developing countries such as Sri Lanka, Nepal, or Vietnam that ranged between 60–82% in 2020 [41] suggests that millions of people could be affected by the

implementation of the home garden policies. For example, the rural population in Vietnam was about 61 million people in 2020 [42].

The absence of study on the focus of the policies also hampers further analysis on policy support for potential contributions of home gardens to national programs in the developing countries such as Vietnam's SDGs. Vietnam's 17 SDGs were declared in 2017 and mirror the 17 global SDGs, specifying 115 targets adapted to the country's context and priorities [43]. An in-depth study on home gardens' potential contributions to Vietnam's SDGs is absent from the literature. However, mapping between research evidence on benefits from home gardens in Vietnam and the targets of Vietnam's SDGs exists (unpublished data from the World Agroforestry) as described in Table A1 (Appendix A). The mapping indicates that home gardens can potentially contribute to at least 11 out of Vietnam's 17 SDGs, namely SDG 1–3, 5, 6, 8, 10–13, and 15, and to 23 of their 78 targets. A similar mapping for Indian home gardens added SDG 4 to the list but excluded SDG 6, 10 and 15 [1]. A similar effort for the context of smallholder farming excluded SDG 6 and 11 [44]. Vietnamese home gardens can potentially contribute to SDG 6 because some systems such as the garden–pond–livestock pen (or *vườn–ao–chuồng* in Vietnamese) have fishponds [5,36] that provide water for farm and household needs.

The objective of this study was to investigate the focus of Vietnam's rural development and agricultural policies enacted over the last decade (2010–2021) to inform their support of home garden multi-functionality that further determines potential contributions to multiple SDGs. We focused on Vietnam because more home garden policies have likely been enacted in the country following the declaration by the Deputy Prime Minister at the national congress in 2018 (Declaration 173/TB-VPCP issued on 5 October 2018) on the need to improve rural development and home garden demonstration models. The study also identifies the current gap between research and policy in potential contributions of home gardens to Vietnam's SDGs. The results figure out home gardens' benefits that are strongly or little addressed in the policies and will provide recommendations to ongoing national review processes of rural development and agricultural policies in Vietnam for the period up to 2030. In addition, the approach can provide guidance for potential applications in other developing countries wherein a gap in research and policy on the values of home gardens likely exists.

2. Materials and Methods

2.1. Overview of the Methodology

The study was conducted in three steps (Figure 1) and according to our knowledge, a similar approach is absent in the literature. The first step involved isolating policies that set specific targets for home gardens among Vietnam's rural development and agricultural policies. We considered these as home garden policies. We subsequently investigated the focus of the home garden policies based on their targets and indicators (step 2a) and provided supports (step 2b). Finally, using the results from step 2, we assessed the gap between research and policy in the potential contribution of home gardens to Vietnam's SDGs. Each step is described in detail below.

2.2. Step 1. Isolate Home Garden Policies from Rural Development and Agricultural Policies

Based on consultations with experts from the Institute of Policy and Strategy for Agriculture and Rural Development of Vietnam, policies relating to home gardens were found among those issued under the New Rural Development Programs (NRDP) (also known as *Nông thôn mới* in Vietnamese) or the National Agriculture Restructuring and Development of Other Agriculture Programs (NARDAP) (*Tái cơ cấu nông nghiệp quốc gia và các chính sách hỗ trợ phát triển nông nghiệp khác*). Both have been the main programs for implementing Vietnam's rural development strategies. Vietnam has implemented two NRDPs through Decision QĐ 800/2010/QĐ-TTg for the period of 2010–2015 and Decision QĐ 1600/2016/QĐ-TTg for 2016–2020. The two aimed at improving rural income and safeguarding natural resources and the environment. The NARDAP has been in place

since 2013 through Decision QĐ 899/2013/QĐ-TTg to support the agriculture sector's restructuring. There have been 14 key national and 72 key provincial policies under NRDP and NARDAP enacted since 2010. We first classified the 86 policies into two groups, namely those mentioning or those never mentioning home gardens. To do this, we used the search term *vườn* ('garden' in English), and since there is no synonym for the word *vườn* in the official Vietnamese language, it is certain that policies never mentioning *vườn* never mention home gardens. We eventually verified the targets of the policies that mention home gardens and isolated those setting specific targets for home gardens. Those mentioning home gardens but without specific targets for them were not considered as home garden policies.

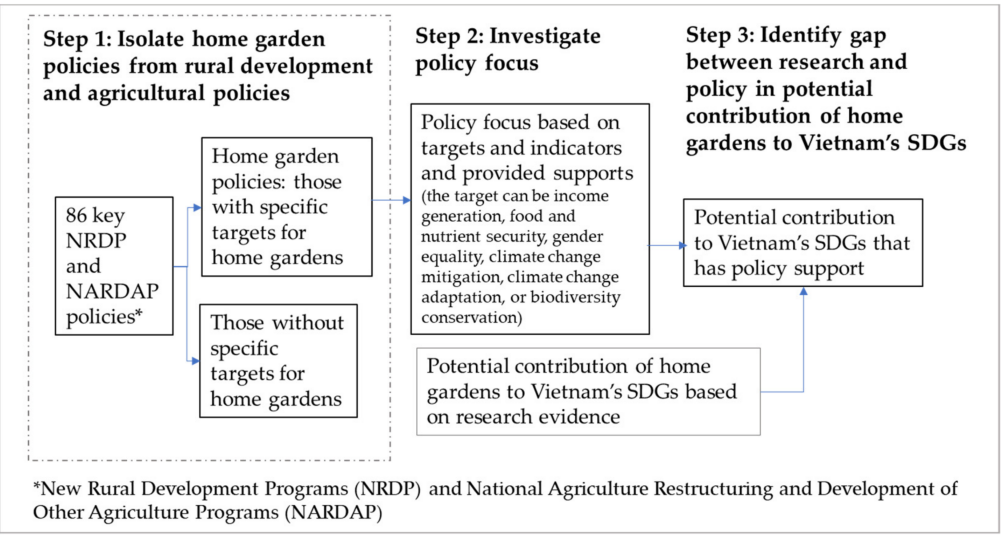


Figure 1. Three-step policy review in this study.

2.3. Step 2. Investigate Policy Focus

To figure out if the current policies support home garden multi-functionality, we investigated if the targets of home garden policies are associated with income generation, food and nutrient security, gender equality, climate change mitigation, climate change adaptation, or biodiversity conservation; namely, as described earlier, the six key benefits of home gardens highlighted in the literature (Step 2a). These benefits also determine if an agriculture or food system can combat dual challenges of food insecurity and climate change [45,46]. Based on studies [4,22,27,30], the following serves as guidance for identifying relevant policy targets:

Income generation: improvement in household income through developing home gardens.

Food and nutrient security: improvement in household food and nutrient security through, e.g., increasing home garden food production or production of nutritious crops.

Gender equality: advancing the gender agenda, e.g., higher involvement of women in decision making related to crop selection for home gardens or agricultural activities.

Climate change mitigation: reducing greenhouse gas emission or increasing sequestered carbon in home gardens for greenhouse gas removal.

Climate change adaptation: increasing resilience of rural households to climate change through, e.g., introducing drought-tolerant crop species or varieties, promoting integrated systems such as agroforestry-based home gardens to modify micro-climate, or infrastructure development, e.g., better water storage or irrigation systems.

Biodiversity conservation: policy that targets, e.g., crop diversification or domestication of native tree species in home gardens for genetic conservation of plants.

In step 2a, we also identified targets with or without indicators, and policies that have several targets. For example, they might target income generation and use annual income per unit area of home garden as an indicator, while also targeting improvement in food

and nutrient security without specifying an indicator. Hereafter, we refer to targets with indicators as "main targets" and those without as "secondary targets". We considered the former as the focus of the policies because policy implementation and funding often focus on achieving the targets with clear indicators.

In step 2b, we identified a variety of supports provided by the policies. These supports also reflect policy focus because they are tools for achieving the targets [47–49]. In Vietnam, policy support for smallholder farmers are in the form of, e.g., free planting materials or financial assistance to adopt new technologies that are important for agricultural development [47,50,51].

2.4. Step 3. Identify the Gap between Research and Policy

Finally, using the synthesis of policy review and research evidence that indicate the potential contributions of home gardens to Vietnam's SDGs (Table A1), we identified contributions that are supported by policy.

3. Results

3.1. Home Garden Policies Enacted over the Last Decade

We found 25 home garden policies (Table 1), all of which are provincial-level policies and 13 (or 52%) of them were enacted in 2019, likely as a response to the Deputy Prime Minister's declaration in 2018. A similar trend was found in the NRDP and NARDAP policies that include the home garden policies, in which 30 out of 86 policies were enacted in 2019. A list of the 25 home garden policies is provided in Table A2 (Appendix A).

Table 1. Number of home garden policies enacted over the last decade.

Year	NRDP and NARDAP Policies *	Home Garden Policies
2013	1	
2014	1	
2015	5	2
2016	11	
2017	9	1
2018	12	6
2019	30	13
2020	12	3
2021	5	
Total	86	25

* New Rural Development Programs (NRDP) and National Agriculture Restructuring and Development of Other Agriculture Programs (NARDAP) that include home garden policies.

3.2. Policy Targets and Indicators

All the home garden policies describe income generation as a target (Figure 2). Out of the 25 in total, 21 set this as their main target. The other four policies do not have any main target due to the absence of any indicator. No policy targets gender equality, climate change mitigation, or biodiversity conservation. All the 21 policies only set income generation as the main target except Decision QĐ 25/2018/QĐ-UBND on new and improved rural standards for Thanh Hoa province for the period of 2018–2020, which also targets 30% of home gardens in the province having irrigation systems. Based on the guidance from step 2, this target is related to climate change adaptation.

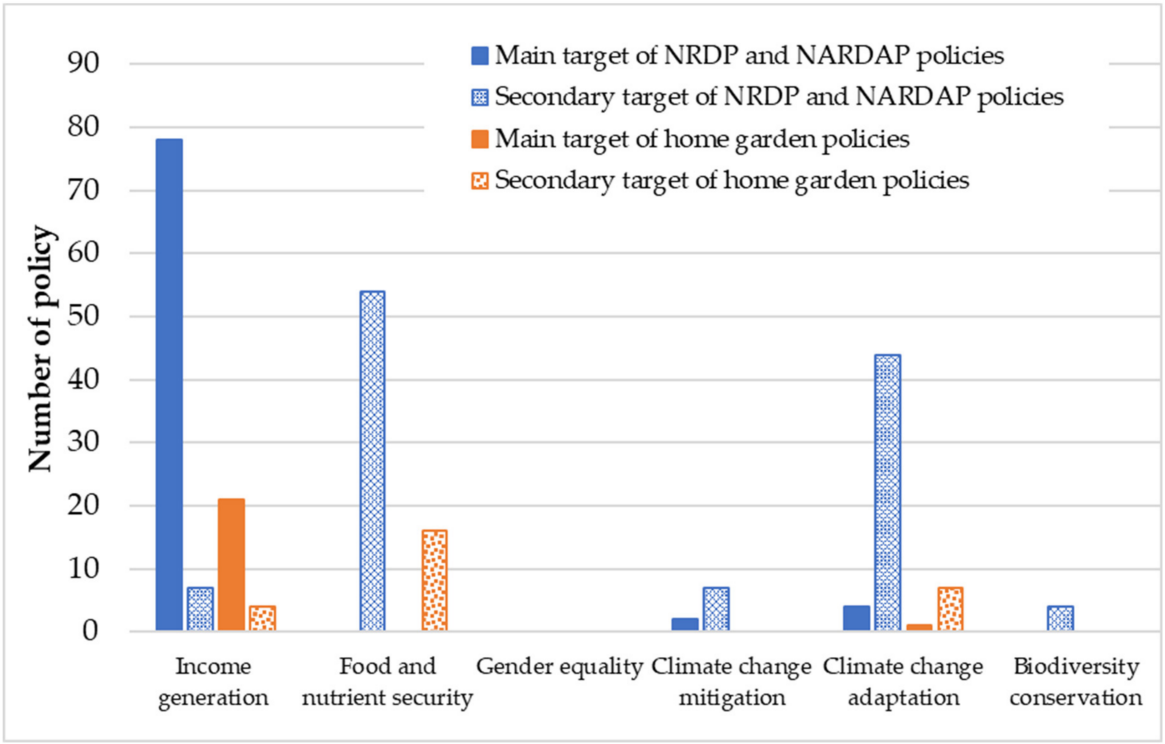


Figure 2. Main and secondary targets of the reviewed policies (the New Rural Development Programs (NRDP) and National Agriculture Restructuring and Development of Other Agriculture Programs (NARDAP) policies include home garden policies).

There are four different indicators that the policies use to measure income. The first is the level of income relative to that from paddy rice in the same year of observation. The policies generally set the objective of 3–5 times higher income from home gardens than that from paddy rice (Table A3, Appendix A). The second measures the share of income from the main home garden product to the total income obtained by a home garden. The share is targeted to range between 50–80%. The third is annual income by home garden size. The common target for home gardens with land sizes less than or equal to 1000 square meters is VND 40–60 million (or USD 1739–2608 with an exchange rate of VND 23,000 for USD 1). Table A3 describes targets for larger home garden sizes. Some policies, such as Decision QĐ 373/2019/QĐ-UBND for Binh Dinh province, set an income target per 1000 square meters for different land sizes. The fourth is income per capita and most of the policies that employ this indicator compare it with target incomes set in the regulation on new rural standards. The income standard varies across regions in Vietnam (e.g., described in Decision QĐ 1980/2016/QĐ-TTg on indicators for the new rural standard of Vietnam's communes for the period of 2016–2020) with USD 1956 per capita as a national standard. The home garden policies generally target income per capita towards being 1.1–1.5 times higher than the income standard. In addition to the four key indicators, one policy, namely Decision QĐ 11/2018/QĐ-UBND that supports the development of new rural areas in Bac Giang province, targets <5% poverty rate as a community-level indicator.

3.3. Supports Provided by Home Garden Policies

All the 25 home garden policies only provide supports for farmers, either individual farmers, farmer's groups, or cooperatives. The supports, either in cash or in kind, apply through two different mechanisms (Table A4, Appendix A): if farmers agree to cultivate crop species or develop home garden models specified by the policies, or they can propose any crop species, home garden model, or activity to improve crop production or product quality to the People's Committee at the community level and will receive support if their proposal is approved. Most of the policies offer the latter mechanism (Table A4).

Related to the "any home garden model" that farmers can propose, the policies underline that the model must aim towards improving income or product quality and minimizing any negative impact on the environment. No elaboration on the "negative impact on environment" is, however, provided. The variety of supports also indicates that the home garden policies focus on income generation. Several (6 out of 25) home garden policies set a minimum land size as an additional condition to receive support. The size ranges from 300 to 1000 square meters.

3.4. The Research and Policy Gaps in Home Garden Contributions to Vietnam's SDGs

The potential contribution of home gardens to reducing poverty and sustaining rural income (SDG1 Target 1.1, SDG10 Target 10.1 and 10.2, refer again to Table A1) has strong policy support because all 25 home garden policies target income generation. Contributions beyond the economy of rural households such as maintaining food and nutrient security, and reducing maternal and child deaths (SDG2, SDG3), enhancing resilience to climate change, and extreme weather events (SDG11, SDG13), ensuring gender equality (SDG5, SDG8), and in situ conservation of genetic diversity to include native and endangered plant species (SDG2, SDG15), however, have limited or no policy support.

Beyond the 25 home garden policies, there are eleven policies that mention home gardens without specifying targets for them. Of which, there are two that have targets other than income generation, namely Decision QĐ 819/2016/QĐ-BNN-KHCN which contributes to the action plan of the agriculture and rural development sector's response to climate change for the period of 2011–2015 and vision to 2050, and Decision QĐ 524/2021/QĐ-TTg approving a proposal to plant one billion trees in the period of 2021–2025. Both are national policies that describe climate change adaptation as the main target. The former supports a variety of integrated systems such as: the garden–pond–livestock pen (or, as mentioned earlier, *vườn–ao–chuồng* in Vietnamese, as used in the policy) which is a traditional Vietnamese home garden model integrating fruit or timber trees, annual crops, aquaculture, and livestock; climate-smart agriculture (*nông nghiệp thông minh với khí hậu*); ecosystem-based adaptation (*thích ứng dựa vào hệ sinh thái*), and agroforestry (*nông lâm kết hợp*). The latter policy supports tree planting programs, especially those promoting "native, woody, multi-purpose tree species with environmental protection values, precious and rare tree species, and those bearing local, regional, or national cultural identities". Furthermore, there are two other policies that have main targets other than income generation, but they do not mention home gardens. Both are also national policies and were enacted just recently in 2021, specifically, Decision QĐ 1055/2020/QĐ-TTg issuing the national plan to respond to climate change for the period of 2021–2030, with a vision to 2050, and Decision QĐ 1658/2021/QĐ-TTg approving the national strategy on green growth for 2021–2030, with a vision to 2050. The two policies set climate change adaptation and climate change mitigation as the main target, respectively. All four of these national policies clearly need to be translated towards provincial-level policies that mention, set specific targets for, and support home gardens.

4. Discussion

Other studies have also reported that most rural development and agricultural policies in Vietnam have been prioritizing production and income generation [52,53]. Such policy orientation has encouraged land expansion and intensification and other means of boosting production [52]. Co-benefits beyond the economy of rural households that can potentially be achieved using crop diversification have been little addressed in most of Vietnam's agricultural policies [52,54]. The policy focus on production and income generation has also exacerbated income inequality within rural areas and concerns over food safety driven by intensive chemical inputs to pursue higher production [55–58]. Future agricultural policies in Vietnam clearly need to pay more attention to product quality, safety, and added values, as well as resource efficiency, reduced waste, and resilience to economic and environmental shocks including climate change [52,56–58].

Likewise, home garden policies should not focus primarily on income benefits because rapid population growth and limited land in rural areas have also called for advancing the role of home gardens in sustaining social and environment benefits, apart from income generation [59–61]. Therefore, home garden models featuring crop diversification and biodiversity conservation should be promoted to reconcile multiple benefits [6,14,24,28,31,62]. The multi-functionality of home gardens mainly depends on the level of crop diversification and biodiversity [6,24,33]. Decision makers and other stakeholders in Vietnam likely need to be better informed on the critical role of home gardens in genetic conservation of plants. Home gardens can help preserve local varieties of different crop species as well as knowledge related to their origin, production, and propagation from generation to generation [10,29,62]. This indicates that, albeit relatively small in land size, the preservation, utilization, and management of species in home gardens can have wide and important applications [6].

All the 22 home garden policies enacted in or after 2018 (refer again to Table 1) were likely inspired by a successful implementation of a home garden program in Ha Tinh province of North Central Coast Vietnam regulated through the Decision QĐ 59/2015/QĐ-UBND. The program was the province's initiative and aimed at providing contribution to the achievement of income target set in Vietnam's New Rural Development Program. Vietnam's Deputy Prime Minister, through the 2018 national congress, encouraged other provinces to implement a similar home garden program. This can partially explain the fact that the 22 policies also focus on income generation. Some studies underlined challenges in integrating climate issues into Vietnam's agricultural policies [63,64]. The studies identified several barriers for such integration that might also explain the absence of home garden policies with focus beyond income generation. The challenges include a weak inter-ministry or department collaboration and information sharing, poor involvement of non-leading ministries or departments in policy formulation, and unclear guidelines for policy extension from national into provincial level [63,64]. It can also be the case that policy makers in Vietnam prioritized income generation for a dual purpose, namely, to reduce poverty and incidence of food and nutrient insecurity. Studies on smallholder farming in developing countries have demonstrated that such a dual objective can be achieved [44,65,66]. The studies provided evidence that smallholder farmers used additional farm income to afford more versatile and healthy diets. This might explain the fact that 16 out of 25 home garden policies mention food and nutrient security without specifying any target and indicator (refer again to Figure 1). We could not find any study on home gardens or smallholder farming in developing countries demonstrating a clear impact of increase in farm income on the other four key benefits apart from the food and nutrient security. The number of Asian developing countries that have addressed the multiple benefits of home gardens in their agricultural policies is limited. While policy support to halt the widespread transformation of traditional home gardens into monoculture cropping practices is still weak in Indonesia [7], the Sri Lankan government through the 2016–2018 Food Production National Program [67] promotes integrated farming practices in home gardens to optimize "horizontal and vertical spaces". As mentioned earlier, in Vietnam, the national policy QĐ 819/2016/QĐ-BNN-KHCN mentions home gardens (although without specific targets for them) and supports a variety of integrated systems for climate change adaptation. Vietnam's future rural development and agricultural policies must use this policy as an example or extend it into provincial-level policies that target home gardens and provide more support for such integrated systems that can potentially generate multiple benefits, not limited to income benefits or climate change adaptation. For example, depending on the crop species diversity, density, and ages, fruit tree-based agroforestry systems in Vietnam, including those developed in home gardens, can sequester 20–250 tonnes of aboveground CO_2 equivalent per hectare [40]. These systems can accommodate more than ten fruit tree species of different densities and ages as well as diverse annual crop species for different purposes [40]. Several studies provided examples of agroforestry-based home garden systems in Vietnam that integrate commercial crops such as fruit or nut trees, coffee, black

pepper, food and nutritious crops, and practices such as vermiculture or bee keeping [40,68]. Furthermore, technical guidelines for establishing and maintaining agroforestry systems in Vietnam's socio-economic and ecological context are also available e.g., [69–72].

To narrow the gap between research and policy as well as actions in home garden contributions to Vietnam's SDGs, some recommendations that can be used as guidelines for the review process of Vietnam's rural development and agricultural policies that lead up to 2030 include: (1) promulgate provincial-level policies as extensions to the national policies that have main targets other than income generation and then set specific targets for home gardens with suitable indicators. The targets and indicators can help ensure that the policy implementation and funding also prioritize home gardens. The fact that the recent policies, especially those enacted in 2021, have more diverse targets besides income generation, likely indicates an appropriate response from Vietnam's decision makers to other challenges, especially climate change, which Vietnam needs to address using rural development and agricultural policies. The other challenges affect outcomes of poverty reduction programs; (2) better mainstreaming of the potential socio-economic and ecological benefits of home gardens to decision makers and other stakeholders in Vietnam and encouraging the development of integrated home garden systems that feature crop diversification that can help generate diverse benefits, not only within rural homesteads. Vietnam can likely emulate Sri Lanka's 2016–2018 Food Production National Program that implemented a national awareness program on home garden benefits and supported the development of integrated farming practices and crop diversification in home gardens of rural, peri-urban and urban areas, schools, army camps, etc.; and (3) utilize existing or new research evidence to enrich future rural development and agricultural policies with diverse and feasible targets beyond the economy of rural households, as well as strengthen coordination among state departments for policy implementation and achievement of the targets. The strengthened interaction and coordination among the departments can also help set feasible targets and select suitable indicators. In addition, the literature has provided examples of indicators for the diverse benefits of home gardens. For instance, in relation to food and nutrient security, the production of grains (apart from rice), vegetables, and fruits as the main sources of food and nutrition that can be generated from home gardens, and the score of dietary diversity that represents a family's consumption of various crops can be used as indicators [73]. For gender equality, indicators that relate to the five domains of women's empowerment in agriculture exist [74,75]. The five domains include decisions on agricultural production, access to and decision-making power over productive resources, and control over use of generated income. Those indicators can also be used to calculate the Women's Empowerment in Agriculture Index [74,75] that can measure women's intra-household empowerment relative to men [73]. Several studies [73,76–79] describe indicators for sustainable agriculture or agroecological systems either at the farm or community level that can be selected to describe other key benefits of home gardens such as climate change mitigation and biodiversity conservation. Furthermore, the suggested studies associate these indicators with the SDGs.

Finally, it is worthwhile to note that the current study has insufficiently addressed the issue of interrelation among the six key benefits. Evidence on such interrelation is limited in the literature, especially under the context of Vietnamese home gardens. For the latter, we only found two studies reporting that improved nutrient sources in home gardens could affect farm income in two ways: first, nutritious crops provided protein and vitamins and could increase the productivity of family labor who managed cash crops in home gardens [80], and second, food and nutritious crops enabled rural families to reduce expense for versatile and nourishing diets and therefore, increased net income from the home gardens [8]. Under the context of smallholder farming in developing countries, apart from the interlinkage between income and food and nutrient security, gender equality or resilience to climate change has been known to improve farm productivity and income [17,18,44,81,82]. Related to gender equality, an increase in women's control over natural resources and land led to a higher farm production and

income [17,18]. The lack of evidence on interrelation among the six key benefits of home gardens clearly calls for further research. In addition, important issues such as potential social and environmental impacts of policies supporting the cultivation of commercial crop species in home gardens have likely been understudied. Most of the supported crop species were those considered as the flagship products of the provinces (refer again to Table A4) and were associated with the One Commune One Product (OCOP) program. The latter aims at boosting rural economy through promoting local agricultural and non-agricultural products and has substantially improved household income, encouraged the development of local food industries, and increased employment opportunities in rural areas of Vietnam [83,84]. While the economic impacts of the program have been clear, possible social and environmental impacts on rural families and communities that relate to, e.g., gender equality and health risks due to an intensified use of agricultural chemical inputs in a proximity to human dwellings, have not been properly studied.

5. Conclusions

While the scientific literature on home gardens can demonstrate contributions to at least 11 out of Vietnam's 17 SDGs, Vietnam's current home garden policies, as reflected by their targets, indicators, and provided supports, focus strongly on income generation (SDG 1, SDG 10). The other potential roles of home gardens beyond the economy of rural households (SDG 2, 3, 5, 6, 8, 11–13, 15) are less addressed by the policies.

To increase the representation of home gardens in Vietnam's rural development and agricultural policies, and therefore narrow the gap among research, policy, and actions in home garden contributions to Vietnam's SDGs, we recommend (1) extending national policies that have main targets other than income generation into provincial-level policies and setting specific targets for home gardens to ensure that policy implementation and funding also prioritize home gardens, (2) mainstreaming the diverse potential benefits of home gardens beyond the economy of rural households to decision makers and other relevant stakeholders and encouraging the development of integrated home garden systems that can help generate diverse benefits in home gardens of rural, peri-urban, and urban areas, schools, army camps etc., (3) enriching future rural development and agriculture policies with diverse and feasible targets based on existing or new research evidence, and strengthening coordination among state departments for policy implementation and achievement of the targets.

The current study has insufficiently addressed, however, a possible interrelation among the six key benefits of home gardens due to limited evidence in the literature. Future studies need to investigate such interrelation and other important issues such as potential impacts of policies supporting the cultivation of commercial crops in home gardens on rural communities and environment.

The synthesis of policy review and recommendation from this study can provide inputs to the ongoing national review process of rural development and agricultural policies in Vietnam for the period up to 2030. The methodology and framework for the policy review are replicable for similar research in other developing countries.

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Appendix A

Table A1. Potential contributions of home gardens in Vietnam to Vietnam's sustainable development goals (source: World Agroforestry, data unpublished).

Vietnam's Relevant SDGs and Targets *	Link to Global SDGs	Potential Contribution from Home Gardens	Evidence from Vietnam **
Goal 1: End all forms of poverty everywhere			
Target 1.1 Reducing the poverty rate especially of vulnerable groups, ethnic minorities, people with disabilities, and women and children	Target 1.1 and 1.2	Generate short- and long-term income through integrating annual and perennial crops, livestock etc., and reduce cost of providing food for family. Home gardens are also practiced by ethnic minority communities in mountainous areas to generate additional income	[8,35–40,85]
Target 1.3 Ensuring all citizens, particularly the poor and the vulnerable, have equal right to use and own land	Target 1.4	Farmers usually have full power to decide cultivation type and species selection for home gardens. Home gardens are part of homesteads, and rural households in Vietnam generally hold a residential certificate	[8]
Target 1.4 Increase resilience of poor and vulnerable groups to extreme weather events, economic, social, environmental shocks, and disasters	Target 1.5	Integrated agricultural practices in home gardens can provide shade and windbreaks, modify micro-climates, maintain soil humidity, and reduce erosion, solar radiation, and windspeed	[35,36,38,39]
Goal 2: Eliminate hunger, ensure food security, improve nutrition, and promote sustainable agricultural development			
Target 2.1 Eliminate hunger and ensure access, by especially poor and vulnerable groups, to safe, nutritious, and sufficient food throughout the year	Target 2.1	Home gardens can produce diverse products such as rice, taros, fruits, vegetables, spices, stimulants such as tea (*Camellia sinensis*), and fish and livestock as a source of protein for families throughout the year	[8,35–39]
Target 2.2 Eliminate malnutrition and ensure fulfillment of nutritional needs for children, pregnant women, lactatingmothers and elderly people	Target 2.2	Home gardens can produce fruits, vegetables, spices, stimulants, and protein from fish and livestock to fulfill nutritional needs	[8,35–39]
Target 2.4 Ensure sustainable food production, apply resilient agricultural production modalities that also help maintain ecosystems, and improve land and soil quality	Target 2.4	Perennial crops in home gardens can supply organic materials to the soil and reduce soil erosion and loss; nitrogen fixing trees can help maintain soil fertility; livestock waste can be used as manure	[5,9,35,36]
Target 2.5 Maintain and improve access to genetic diversity of plants and animals	Target 2.5	Home gardens can accommodate rich agrobiodiversity, including animals, as in situ conservation and enable community members to access information on the genetic diversity and transmit the knowledge to younger generations	[8,9,29,35,36]
Goal 3: Ensure a healthy life and enhance welfare for all citizens of all age groups			
Target 3.1 Reduce maternal and child mortality rate	Target 3.1 and 3.2	Home gardens can produce nutritious foods and medicinal plants, and generate income to help reduce the maternal and child mortality rates	[8,9,35,36]

Table A1. *Cont.*

Vietnam's Relevant SDGs and Targets *	Link to Global SDGs	Potential Contribution from Home Gardens	Evidence from Vietnam **
Goal 5: Achieve gender equality; empower and create enabling opportunities for women and girls			
Target 5.1 End all forms of discrimination towards women and girls	Target 5.1	Women usually manage crops in home gardens for food and nutrient security. This helps uplift the status of women in their families	[8,9]
Target 5.4 Ensure gender equality in domestic work and family care	Target 5.4	Thanks to crop diversification generating different benefits, the tasks of maintaining and managing home gardens are often shared between men and women	[8,9]
Target 5.7 Ensure that all women can access economic and natural resources and can use and own land	Target 5a	Thanks to their role in managing crops in home gardens, at least those for food and nutrient security, women can access natural resources and can use land	[8,9]
Goal 6: Ensure the full supply of and sustainably manage water resources and hygienic systems for all citizens			
Target 6.4 Increase water use efficiency and reduce incidence of water scarcity	Target 6.4	Fishponds in home gardens can provide water for different purposes including irrigation, animal consumption, and household needs; integrated home garden systems can also provide shade, modify micro-climates, and with cover crops and mulching practices, can maintain soil humidity	[36,38,39]
Goal 8: Ensure sustainable, inclusive, and sustained economic growth, and generate full, productive employment and decent work for all citizens			
Target 8.5 Achieve full and productive employment and decent work for all men and women	Target 8.5	Home gardens can become the main source of family income that requires full engagement of men and women for maintenance and management	[8]
Target 8.9 Develop sustainable tourism that promotes local cultures and products	Target 8.9	Sustainable tourism and the associated culinary and handicraft sectors can use local products from home gardens. Tourism can also portray local culture that uses products from home gardens such as betel nut (*Areca catechu*) for wedding ceremonies and daily offerings to shrines	[8,9,36,86]
Goal 10: Reduce social inequalities			
Target 10.1 Sustain income growth of the poorest population	Target 10.1	Home garden is often practiced by ethnic minorities in mountainous areas of Vietnam for generating additional income and other benefits	[35,36]
Target 10.2 Promote political, economic, and social inclusion of all citizens	Target 10.2	Most rural households in Vietnam including ethnic minorities have home gardens that can be improved towards generating diverse economic and social benefits	[8,9,35,36]
Goal 11: Promote sustainable, resilient urban and rural development; ensure safe living and working environments; ensure reasonable distribution of population and work force by region			
Target 11.5 Reduce the number of deaths, people affected, and economic loss caused by natural and other disasters	Target 11.5	Integrated home garden systems can help protect households and their homes from strong winds, can reduce the risk of severe soil erosion and loss in sloping lands, and modify micro-climates to reduce the impact of e.g., drought and heat	[35,36]

Table A1. *Cont.*

Vietnam's Relevant SDGs and Targets *	Link to Global SDGs	Potential Contribution from Home Gardens	Evidence from Vietnam **
Target 11.10 Develop sustainable rural areas that ensure harmony between economy and environmental protection	Additional target in Vietnam's SDG	Home gardens can simultaneously generate economic and ecological benefits to include higher carbon sequestration for greenhouse gas removal that results in lower net emission from the systems	[5,9,36,40]
Goal 12: Ensure sustainable production and consumption			
Target 12.3 Reduce post-harvest loss and food loss along production and supply chains	Target 12.3	Risks of post-harvest and food losses are minimized because home gardens are within homesteads	[36]
Goal 13: Respond in a timely and effective manner to climate change and natural disasters			
Target 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and capacity in responding to natural and other disasters	Target 13.1	Similar to Target 1.4 and 11.5	[36,38,39]
Goal 15: Protect and sustainably develop forests; conserve biodiversity; develop eco-system services; combat desertification; prevent the degradation of and rehabilitate land resources			
Target 15.2 Reduce deforestation and strengthen the implementation of sustainable forest management	Target 15.2	Home gardens can provide timber and non-timber forest products including firewood to reduce pressure on surrounding forests	[9,36]
Target 15.4 Conserve forest's biodiversity and ecosystem services for sustainable development	Target 15.4	Similar to Target 15.2, home gardens can also become buffers for natural reserves	[9,36]
Target 15.5 Prevent the extinction of endangered plant and animal species	Target 15.5	Home gardens can be used as in situ conservation of plant species, including native and endangered forest tree species	[29]

* Detailed descriptions of the targets can be found in [43]. ** Based on a literature review with Web of Science and Google Scholar using 'garden', 'home garden', 'home yard', or 'kitchen garden', and 'Vietnam' as search terms (both in English and Vietnamese), for peer-reviewed journal articles and grey literature (book chapters, theses, project reports, and working papers). Information from other types of publication such as news articles, blogs, or presentations were excluded.

Table A2. The 25 home garden policies enacted over the last decade (2010–2021).

No *	Policy Title in Vietnamese	Policy Title in English	Policy Number	Issued Date (d/m/y)
1	Quyết định ban hành bộ tiêu chí xây dựng vườn mẫu nông thôn mới áp dụng trên địa bàn tỉnh Hà Tĩnh	Decision on criteria for developing new home garden demonstration models for Ha Tinh province	QĐ 59/2015/QĐ-UBND	24 November 2015
2	Quyết định ban hành định mức hỗ trợ phát triển sản xuất giai đoạn 2016–2020 chương trình mục tiêu quốc gia xây dựng nông thôn mới trên địa bàn tỉnh Bình Định	Decision promulgating norms to support agricultural production for the period of 2016–2020 and the national target program on building new rural areas in Binh Dinh province	QĐ 67/2016/QĐ-UBND	15 December 2016
3	Quyết định 849/QĐ-UBND năm 2017 về Bộ tiêu chí tạm thời xây dựng vườn mẫu nông thôn mới áp dụng trên địa bàn các thôn thuộc tỉnh Quảng Ninh	Decision on temporary indicators for new rural development and home garden demonstration models in Quang Ninh province	QĐ 849/2017/QĐ-UBND	17 March 2017

Table A2. *Cont.*

No *	Policy Title in Vietnamese	Policy Title in English	Policy Number	Issued Date (d/m/y)
4	Quyết định quy định bộ tiêu chí thôn nông thôn mới kiểu mẫu và thẩm quyền xét, công nhận, công bố thôn nông thôn mới kiểu mẫu trên địa bàn tỉnh Bắc Giang	Decision stipulating a set of criteria for modeling new rural areas and competence to consider, recognize, and announce the model of new rural areas for Bac Giang province	QĐ 11/2018/QĐ-UBND	15 May 2018
5	Quyết định về việc ban hành tiêu chí, điều kiện, trình tự, thủ tục, hồ sơ xét, công nhận và công bố xã đạt chuẩn nông thôn mới nâng cao trên địa bàn tỉnh Thanh Hóa, giai đoạn 2018–2020	Decision promulgating criteria, conditions, order, procedures, dossiers for consideration, recognition and announcement of communes meeting the new and improved rural standards for Thanh Hoa province from 2018–2020	QĐ 25/2018/QĐ-UBND	10 August 2018
6	Quyết định 1799/QĐ-UBND năm 2018 về Bộ tiêu chí xây dựng vườn mẫu trên địa bàn tỉnh Thừa Thiên Huế' giai đoạn 2018–2020	Decision on criteria for building home garden demonstration models in Thua Thien Hue province for the period of 2018–2020	QĐ 1799/2018/QĐ-UBND	14 August 2018
7	Quyết định ban hành bộ tiêu chí về khu dân cư nông thôn mới kiểu mẫu giai đoạn 2018–2020 trên địa bàn tỉnh Kon Tum	Decision promulgating the criteria for new rural village models for Kon Tum province for the period of 2018–2020	QĐ 965/2018/QĐ-UBND	12 September 2018
8	Quyết định về việc ban hành bộ tiêu chí vườn mẫu–rẫy mẫu trong xây dựng nông thôn mới trên địa bàn tỉnh Dắk Nông	Decision on criteria for developing new home garden demonstration models for Dak Nong province	QĐ 1467/2018/QĐ-UBND	18 September 2018
9	Quyết định về Bộ tiêu chí Khu dân cư nông thôn mới kiểu mẫu và vườn mẫu tỉnh Hòa Bình giai đoạn 2018–2020	Decision on indicators for new rural development and home garden demonstration models in Hoa Binh province for the period of 2018–2020	QĐ 188/2018/QĐ-UBND	20 September 2018
10	Quyết định ban hành điều kiện, tiêu chí xã đạt chuẩn nông thôn mới nâng cao, thôn dân cư nông thôn mới kiểu mẫu, điều kiện xã nông thôn mới kiểu mẫu tỉnh Vĩnh Phúc giai đoạn 2019–2020	Decision promulgating conditions and criteria for new and improved models of rural communes, new models of rural demonstration villages, and new rural communes in Vinh Phuc province for the period of 2019–2020	QĐ 08/2019/QĐ-UBND	14 February 2019
11	Quyết định ban hành bộ tiêu chí ấp nông thôn mới kiểu mẫu và mô hình sản xuất kiểu mẫu tỉnh Bến Tre giai đoạn 2019–2020	Decision promulgating the criteria of new model of rural villages and demonstration model of agricultural production for Ben Tre province from 2019–2020	QĐ 373/2019/QĐ-UBND	1 March 2019
12	Quyết định về việc ban hành bộ tiêu chí vườn mẫu nông thôn mới trên địa bàn tỉnh Tuyên Quang, đến năm 2020	Decision on indicators of new rural development and home garden demonstration models for Tuyen Quang province until 2020	QĐ 73/2019/QĐ-UBND	11 March 2019
13	Quyết định ban hành quy định bộ tiêu chí khu dân cư nông thôn mới kiểu mẫu, vườn mẫu nông thôn mới trên địa bàn tỉnh Phú Yên	Decision promulgating the criteria of new models of rural village and home garden demonstration models for Phu Yen province	QĐ 05/2019/QĐ-UBND	18 March 2019
14	Kế hoạch xây dựng khu dân cư nông thôn mới kiểu mẫu năm 2019 trên địa bàn tỉnh Kon Tum	Plan to build a new model of rural areas in 2019 for Kon Tum province	KH 892/2019/KH-UBND	19 April 2019

Table A2. *Cont.*

No *	Policy Title in Vietnamese	Policy Title in English	Policy Number	Issued Date (d/m/y)
15	Quyết định ban hành kế hoạch xây dựng và hỗ trợ khu dân cư nông thôn kiểu mẫu trên địa bàn tỉnh Quảng Ngãi, giai đoạn 2019–2020.	Decision promulgating the plan and support for building new models of rural villages for Quang Tri province from 2018–2021	QĐ 602/2019/QĐ-UBND	3 May 2019
16	Quyết định 1606/QĐ-UBND năm 2019 về Bộ Tiêu chí khu dân cư nông thôn mới kiểu mẫu, vườn mẫu nông thôn mới giai đoạn 2019–2020 trên địa bàn tỉnh Bình Định	Decision issuing indicators for new rural development and home garden demonstration models for Binh Dinh province for the period of 2019–2020	QĐ 1606/2019/QĐ-UBND	14 May 2019
17	Kế hoạch thực hiện xây dựng khu dân cư nông thôn mới kiểu mẫu, vườn mẫu nông thôn mới trên địa bàn tỉnh Phú Yên	Plan to build a new rural development and home garden demonstration model for Phu Yen province	KH 120/2019/KH-UBND	27 May 2019
18	Quyết định 1333/QĐ-UBND năm 2019 về Bộ tiêu chí "Bản nông thôn mới", "Bản nông thôn mới kiểu mẫu", "Bản nông thôn mới của các xã đặc biệt khó khăn khu vực biên giới" tỉnh Sơn La, giai đoạn 2019–2020	Decision promulgating indicators of "new rural village", "new model of rural village", "new rural village of extremely difficult communes in the border areas" of Son La province, for the period of 2019–2020	QĐ 1333/2019/QĐ-UBND	12 June 2019
19	Quyết định ban hành bộ tiêu chí thôn, bản nông thôn mới kiểu mẫu trên địa bàn tỉnh Quảng Trị giai đoạn 2019–2020	Decision promulgating the criteria of new models of rural villages for Quang Tri province from 2019–2020	QĐ 1647/2019/QĐ-UBND	2 July 2019
20	Quyết định về Bộ tiêu chí thôn nông thôn mới kiểu mẫu trên địa bàn thành phố Đà Nẵng, giai đoạn 2019–2020	Decision promulgating the criteria of new models of rural villages for Da Nang city from 2019–2020	QĐ 3565/2019/QĐ-UBND	12 August 2019
21	Quyết định về Sổ tay hướng dẫn thực hiện Bộ tiêu chí xã nông thôn mới nâng cao tỉnh Bình Dương	Decision on guideline of indicators for new rural communes in Binh Duong province	QĐ 2575/2019/QĐ-UBND	9 September 2019
22	Quyết định về tiêu chí xã nông thôn mới kiểu mẫu trên địa bàn tỉnh Lâm Đồng giai đoạn 2019–2020	Decision promulgating the criteria of new models of rural communes for Lam Dong province, for the period of 2019–2020	QĐ 2584/2019/QĐ-UBND	11 December 2019
23	Quyết định về Bộ tiêu chí khu dân cư nông thôn mới kiểu mẫu trên địa bàn tỉnh Bình Thuận đến năm 2020	Decision on indicators for new models of rural areas in Binh Thuan province until 2020	QĐ 192/2020/QĐ-UBND	21 January 2020
24	Quyết định về việc ban hành bộ tiêu chí ấp nông thôn mới kiểu mẫu, vườn mẫu giai đoạn 2019–2020 tỉnh Kiên Giang	Decision promulgating criteria for new rural development and home garden demonstration models in Kien Giang province for the period of 2019–2020	QĐ 210/2020/QĐ-UBND	21 January 2020
25	Quyết định 1211/QĐ-UBND năm 2020 quy định về điều kiện, trình tự, thủ tục, hồ sơ xét, công nhận và công bố khu dân cư nông thôn mới kiểu mẫu; vườn mẫu nông thôn mới trên địa bàn tỉnh Quảng Bình	Decision on conditions, order, procedures, dossiers for review, recognition, and announcement of new models of rural areas; home garden demonstration models in Quang Binh province	QĐ 1211/2020/QĐ-UBND	22 April 2020

* Ordered based on date of issue.

Table A3. Income indicators used in the home garden policies.

No *	Policy Number	Income Indicators			
		Income Relative to Paddy Rice	**Annual Income by Land Size**	**Income Share from Main Product to Total Income**	**Income per Capita**
1	QĐ 59/2015/QĐ-UBND		≥USD 2608 for land size ≤1000 m^2, ≥USD 3478 for >1000–2000 m^2, ≥USD 5217 for >2000–3000 m^2, USD 6251 for ≥3000 m^2	≥75%	
2	QĐ 67/2016/QĐ-UBND	No indicator is provided			
3	QĐ 849/2017/QĐ-UBND	5 times	≥USD 1739 for land size ≤1000 m^2,≥USD 2608 for >1000–2000 m^2, ≥USD 3913 for >2000–3000 m^2, USD 5652 for ≥3000 m^2	≥75%	
4	QĐ 11/2018/QĐ-UBND				≥USD 4347, ≤5% poverty rate based on the multidimensional criteria in 2016–2020
5	QĐ 25/2018/QĐ-UBND			≥75%	
6	QĐ 1799/2018/QĐ-UBND	5 times		≥51%	
7	QĐ 965/2018/QĐ-UBND			≥80%	
8	QĐ 1467/2018/QĐ-UBND		≥USD 2608 for land size ≤1000 m^2,≥USD 3478 for >1000–2000 m^2, ≥USD 5817 for >2000–3000 m^2, USD 6521 for ≥3000 m^2	≥ 75%	
9	QĐ 188/2018/QĐ-UBND	3 times	≥USD 2173 for land size ≤1000 m^2,≥USD 3043 for >1000– 2000 m^2, ≥USD 4347 for >2000–3000 m^2, USD 5217 for ≥3000 m^2		
10	QĐ 08/2019/QĐ-UBND			≥ 70%	1.2 times higher than that generated by the commune that meets the new rural standards
11	QĐ 373/2019/QĐ-UBND		≥USD 2608 per 1000 m^2 for land size ≤1000 m^2,≥USD 2173 per 1000 m^2 for >1000–2000 m^2, ≥USD 1739 per 1000 m^2 for >2000–3000 m^2, USD 1304 per 1000 m^2 for ≥3000 m^2	≥ 50%	
12	QĐ 73/2019/QĐ-UBND	5 times			

Table A3. *Cont.*

No *	Policy Number	Income Indicators			
		Income Relative to Paddy Rice	Annual Income by Land Size	Income Share from Main Product to Total Income	Income per Capita
13	QĐ 05/2019/QĐ-UBND	5 times		≥ 70%	
14	KH 892/2019/KH-UBND	No indicator is provided			
15	QĐ 602/2019/QĐ-UBND	No indicator is provided			
16	QĐ 1606/2019/QĐ-UBND		≥USD 2608 for land size ≤1000 m^2, ≥USD 3478 for >1000–2000 m^2, ≥USD 5217 for >2000–3000 m^2, USD 6251 for ≥3000 m^2	≥ 75%	
17	KH 120/2019/KH-UBND	No indicator is provided			
18	QĐ 1333/2019/QĐ-UBND				≥18.5 million by 2020 (1.6 times higher than rural income in 2015)
19	QĐ 1647/2019/QĐ-UBND				At least 10% higher than that generated by the commune that meets the new rural standards
20	QĐ 3565/2019/QĐ-UBND				At least 1.2 times higher than that generated by the commune that meets the new rural standards
21	QĐ 2575/2019/QĐ-UBND				USD 2391 in 2018, USD 2608 in 2019, USD 2826 in 2020
22	QĐ 2584/2019/QĐ-UBND				At least 1.5 times higher than that generated by the commune that meets the new rural standards
23	QĐ 192/2020/QĐ-UBND				USD 2695 by 2020
24	QĐ 210/2020/QĐ-UBND		≥USD 3043 per 1.000 m^2		
25	QĐ 1211/2020/QĐ-UBND	5 times			

* Ordered based on date of issue.

Table A4. Support mechanisms by the home garden policies.

Mechanisms	Supported Species, Model, or Activity	Policies That Provide Supports
1. Farmers cultivate crop species or develop home garden models specified by the policies		
1.1 Crop species		
1.1.1 Names explicitly mentioned by the policies	Tea, pomelo, and black pepper (*Piper nigrum*)	1 policy: QĐ 67/2016/QĐ-UBND
1.1.2 Flagship commodities (no species name is provided)	For example, according to the other reference (not the home garden policies) e.g., Decision QĐ 46/2019/QĐ-UBND, the flagship commodities of Ben Tre province include coconut and fruit products such as longan and mango	9 policies: QĐ 849/2017/QĐ-UBND, QĐ 25/2018/QĐ-UBND, QĐ 1799/2018/QĐ-UBND, QĐ 1467/2018/QĐ-UBND, QĐ 1333/2019/QĐ-UBND, QĐ 2584/2019/QĐ-UBND, QĐ 2575/2019/QĐ-UBND, QĐ 05/2019/QĐ-UBND, QĐ 373/2019/QĐ-UBND
1.2 Home garden model	Garden–pond–livestock pen (or *vườn–ao–chuồng* in Vietnamese)	1 policy: KH 892/2019/KH-UBND
2. Farmers can propose crop species, home garden model, or activity to improve production and product quality to the People's Committee		
2.1 Crop species	Any crop species but likely those that can generate high income	22 policies: all policies in Table A2 except QĐ 59/2015/QĐ-UBND, QĐ 67/2016/QĐ-UBND, KH 892/2019/KH-UBND
2.2 Home garden model	The model must aim towards improving income or product quality and minimize any negative impact on the environment	23 policies: all policies in Table A2 except QĐ 1467/2018/QĐ-UBND and KH 892/2019/KH-UBND
2.3 Activities to improve production and product quality	Improve product quality and obtain certification such as the Vietnam's Good Agricultural Practices (VietGAP)	1 policy: QĐ 2575/2019/QĐ-UBND
	Improve water storage or irrigation systems	8 policies: QĐ 188/2018/QĐ-UBND, QĐ 25/2018/QĐ-UBND, QĐ 1799/2018/QĐ-UBND, QĐ 1467/2018/QĐ-UBND, QĐ 1606/2019/QĐ-UBND, QĐ 373/2019/QĐ-UBND, QĐ 1211/2020/QĐ-UBND, QĐ 210/2020/QĐ-UBND
	Apply advanced science and technology	16 policies: QĐ 849/2017/QĐ-UBND, QĐ 188/2018/QĐ-UBND, QĐ 25/2018/QĐ-UBND, QĐ 1799/2018/QĐ-UBND, QĐ 1467/2018/QĐ-UBND, QĐ 965/2018/QĐ-UBND, QĐ 1333/2019/QĐ-UBND, QĐ 73/2019/QĐ-UBND, QĐ 1606/2019/QĐ-UBND, QĐ 2584/2019/QĐ-UBND, QĐ 2575/2019/QĐ-UBND, QĐ 05/2019/QĐ-UBND, QĐ 373/2019/QĐ-UBND, QĐ 1211/2020/QĐ-UBND, QĐ 192/2020/QĐ-UBND, QĐ 210/2020/QĐ-UBND

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