Food and Agriculture Organization of the United Nations

Bottom-up solutions to promote conservation agriculture in Cambodia

Results from a multistakeholder policy dialogue process

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Executive summary

Despite impressive economic growth in recent years, low agricultural productivity and rural poverty persist in Cambodia. These problems are made worse by widespread land degradation which is compounded by climate change. Conservation agriculture (CA) is a set of farming practices that are based on agroecology (an ecological approach to agriculture) and can contribute towards sustainable intensification (SI) by increasing productivity, while improving climate resilience. Yet, the area under CA in Cambodia has expanded slowly due to a lack of targeted policies and strategies to practically promote CA. To address this issue, the Cambodia Conservation Agriculture and Sustainable Intensification Consortium (CASIC) with support from the Food and Agriculture Organization (FAO) of the United Nations facilitated a multistakeholder policy dialogue process to identify key issues and potential solutions in a bottom-up manner. The major issues identified were the high cost and limited availability of inputs for CA, especially machinery, low prices and limited market opportunities for CA crops, limited education and training opportunities on CA and weak collaboration and organization among CA stakeholders.

The policy dialogue on conservation agriculture in Cambodia identified four main recommendations for policy change:

1. Further develop supply chains for CA inputs, such as modern agricultural machinery, to reduce their cost.
2. Explore higher value market opportunities for CA crops.
3. Mainstream CA and related agroecological approaches into research, extension and education programs.
4. Increase collaboration and organization among CA farmers and other key stakeholders.

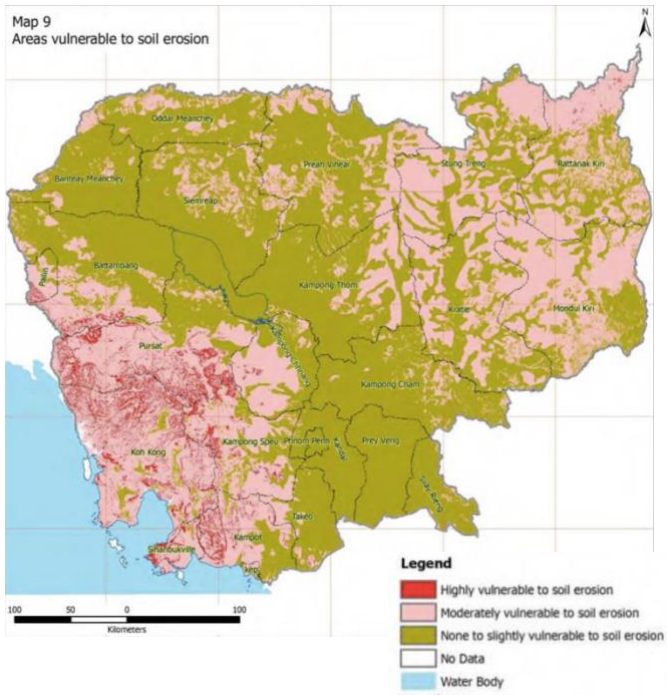
Why conservation agriculture?

Cambodia is one of the fastest growing economies in the world with an average annual growth rate of 7.7 percent between 1998 and 2019. This rapid growth has contributed significantly to poverty reduction and improved food security in the country (World Bank, 2022). However, the benefits from economic growth have not been distributed equally, with rural areas still suffering from the highest poverty rates in the country at around 22.8 percent (World Bank, 2022). Overall, around 76 percent of the population lives in rural areas and relies on agricultural livelihood activities, and around 35 percent of the population is directly employed in agriculture, making sustainable agricultural development key to further reducing poverty (World Bank, 2021). Yet, Cambodia is still facing multiple interrelated challenges that threaten its sustainable development such as climate change, land degradation and the persistence of rural poverty (MAFF, 2018). To address these issues Cambodia's agriculture sector will need to become more productive, efficient and environmentally sustainable.

Conservation agriculture (CA) is based on three key principles that promote sustainable land management: (i) minimum soil disturbance (zero/no till), (ii) permanent soil cover and; (iii) crop rotations (FAO, 2022a). CA is an agroecological approach, which can contribute to sustainable intensification (SI) of agriculture and combat land degradation while contributing to adaptation and in some cases mitigation of climate change (Kassam, Derpsch and Friedrich, 2014; Powlson *et al.*, 2016).

As noted by the United Nations Convention to Combat Desertification (UNCCD), conservation agriculture can increase water infiltration, retention of organic matter and reduce soil erosion which leads to higher resilience against droughts and other extreme weather events and can increase the long-term profitability of cropping systems (UNCCD, 2016). This makes CA a good fit to benefit Cambodian agriculture, as over 43 percent of the total land area of Cambodia (78 000 km^2) is affected by land degradation (Bai *et al.*, 2008) and Cambodia is ranked as one of the most vulnerable countries to climate change (ND-GAIN, 2021). CA has great potential to reduce rural poverty while achieving sustainable intensification of agricultural production by reducing land degradation, adapting effectively to climate change and increasing farmers' profitability.

Map showing areas vulnerable to soil erosion in Cambodia[1]



Source: **Ministry of Agriculture, Forestry and Fisheries (MAFF).** 2018. *National Report on LDN Target Setting Program.* Phnom Penh, Cambodia.

Cambodia has already emerged as a regional leader in conservation agriculture, with good competencies and experience in CA management, research and capacity development embedded in various national institutions and with support from international partners (Niino *et al.*, 2022). There is considerable institutional knowledge on CA within the Ministry of Agriculture, Forestry and Fisheries (MAFF), the General Directorate of Agriculture (GDA), the Department of Extension for Agriculture, Forestry and Fisheries (DEAFF) and multiple Provincial Departments of Agriculture, Forestry and Fisheries (PDAFF), in particular in Battambang province.

Moreover, the Royal University of Agriculture (RUA), the Center of Excellence on Sustainable Agricultural Intensification and Nutrition (CE SAIN), the University of Battambang (UBB) and the Institute of Technology (ITC) in Cambodia as well as private sector companies Lorano, Angkor Green and Smart Agro have played roles in developing CA in Cambodia. This knowledge and experience have been advanced over the past almost 20 years with support from international partners such as the French Agricultural Research Centre for International Development (CIRAD), Swisscontact and the United States Agency for International Development (USAID).

The above-mentioned actors, working in tandem with the most important stakeholders: farmers and their organizations, have made significant progress on CA in Cambodia through their collaborative efforts. And since the establishment of the Cambodia Conservation Agriculture and Sustainable Intensification Consortium (CASIC) in 2020, which acts as a multistakeholder coordination mechanism, this network of actors supporting CA has further improved its visibility and organization. Through the concerted efforts of multiple stakeholders in Cambodia, some

[1] ***Disclaimer**: The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of FAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers and boundaries.*

progress on expanding CA has been made, and importantly, the evidence base (covering diverse Cambodian agroecosystems including upland crops such as maize, soybean and cassava, vegetable production and lowland rice) indicating the environmental, economic and social advantages of CA over conventional practices is strong.

Studies from Cambodia show that CA practices significantly improve soil health (Hok *et al.*, 2018; Hok *et al.*, 2021; Pheap *et al*., 2019) and improved soil health increases resilience to climate change and reduces farmers' dependency on fertilizers, which are often expensive, especially for small Cambodian farmers. There is also evidence that CA lowland rice systems in Cambodia have healthier soil, higher and more stable yields and less incidence of a major pest in the long term (Beesa *et al.*, 2021). In addition to the clear environmental (soil health) and economic (stable yields, less reliance on expensive inputs) benefits, anecdotal evidence also indicates a broader social benefit to adoption of CA practices. Several initiatives to study and promote CA in Cambodia have reported increased community knowledge exchange and overall cohesion between farmers and other stakeholders involved in promoting innovative sustainable practices (Kong *et al.*, 2021; Niino *et al.*, 2022).

The current policy framework in Cambodia promotes sustainable, productive and climate-smart agriculture. This commitment to productive and sustainable agriculture is clear from the recently adopted Agriculture Development Policy 2022 – 2030, which includes Objective 3 (out of four Objectives) to "promote sustainable land, forestry and fishery resource management." Under Objective 3, a target is set to reach 30 percent agricultural area under climate-smart production systems by 2030. Conservation agriculture, as a widely recognized climate-smart and agroecological approach, will surely need to be expanded rapidly in the coming years to meet this target.

In spite of the commitment of the Royal Government of Cambodia (RGC) and great efforts by a network of CA stakeholders to promote CA, its adoption has remained slow. There are currently just an estimated 7250 ha in Cambodia under full or partial CA management. This is due to a lack of targeted policies and implementation strategies to promote CA adoption in Cambodia and widely recognized difficulties in changing farmer behavior towards more sustainable practices, in particular among small-scale farmers that face resource constraints.

Participants discussing issues related to markets for CA at the second policy dialogue in Battambang province

The multistakeholder policy dialogue process

CASIC recognizes that multistakeholder policy dialogue is an important tool to identify effective bottom-up policy solutions to promote CA (CASIC, 2021). Thus, with the support of FAO's TAP-AIS project ("Developing capacities in agricultural innovation systems: scaling up the Tropical Agriculture Platform Framework"), CASIC initiated a multistakeholder policy dialogue process in November 2021 to examine underlying issues and seek solutions to the challenges facing the expansion of CA in Cambodia (FAO, 2021).

Following a "bottom-up" approach to identifying policy solutions, the policy dialogue process began with two policy dialogue events held at the subnational level in Ratanak Mundul District, Battambang province. The first policy dialogue event was held on 4 April 2022 and the second was on 13 June 2022; the two dialogue events brought together a total of 56 participants to discuss issues and opportunities related to CA from their perspectives. Participants represented all relevant local stakeholder groups including the local government, research institutions, NGOs, agricultural traders, input suppliers, micro-finance institutions and importantly, farmers and agribusinesses. Battambang province was selected as the location of the subnational policy dialogue events because of the region's relatively long experience with CA as well as local stakeholders' interest and commitment to CA and related approaches.

In order to validate and supplement results from the subnational policy dialogue events, CASIC conducted an online survey in July 2022 among six directors and deputy directors of Provincial Departments of Agriculture, Forestry and Fisheries (PDAFFs) in provinces which have had experience with CA; besides Battambang, these included Kampong Speu, Kampong Thom, Kratie, Preah Vihear and Tbong Khmum provinces. Finally, the results from the subnational level policy dialogue events and survey were presented, discussed and validated at a national level policy dialogue event held at the Ministry of Agriculture, Forestry and Fisheries (MAFF) in Phnom Penh on 7 September 2022. This policy dialogue event had 49 participants (12 women), including

government officials from the national level, like H.E. Dr. Chan Saruth and H.E. Dr. Yoeu Asikin, Undersecretaries of State of MAFF, who presided over this event, and representatives from academia, NGOs, development partners, private sector companies and farmer groups (FAO, 2022c).

Challenges to the expansion of conservation agriculture

Policy dialogue participants and survey respondents identified various challenges to the expansion of CA in Cambodia, which generally fall into four major issue areas: (i) mechanization; (ii) accessing markets; (iii) education and training; and (iv) collaboration and organization among farmers and other key stakeholders. These issues are interrelated in many ways and should ideally be addressed at the same time in order to achieve the successful expansion of CA in Cambodia.

With regards to mechanization, access to affordable and appropriate machinery, adapted to local conditions and the needs of small- and medium-scale farmers including women, is essential to the expansion of CA in Cambodia. Indeed, it is widely recognized that appropriate mechanization not only increases productivity, but also reduces hard labor, can relieve rural labor shortages and can even improve the efficient use of resources and contribute to mitigating climate related hazards (FAO, 2022b).

Appropriate machinery for CA has been identified, imported, manufactured locally in some cases and pilot tested for use by farmers in Cambodia, as evidenced by policy dialogue participant statements and available studies (e.g., Hin *et al.*, 2020; Hin *et al.*, 2021). However, efficient use of machinery for CA (such as land levelers, soil cultivators and no-till planters) is still quite limited due to, first and foremost, the high cost of said agricultural machinery, low involvement by the private sector (with some noteable exceptions) and the overall limited availability of accompanying services (credit, extension and advisory services, etc.).

The high cost of machinery can be attributed to limited local supply. This is due to overall low domestic manufacturing capacity and the high cost (in part because of import taxes) and complicated procedures required to import agricultural machinery and spare parts into Cambodia. Moreover, for most Cambodian farmers, individual mechanization is not economically feasible due to their small land size and limited access to credit with low interest rates (access to credit can be a particular challenge for female farmers). These factors all contribute to low involvement by private sector companies, who do not see small-scale machinery for CA as a profitable investment and thus supply chains for agricultural machinery for CA remain underdeveloped.

Mechanization issues are compounded by low market prices (no price premium) for CA crops and the high cost of other inputs (e.g., cover crop seeds). These issues, including limited access to higher value markets and low bargaining power among farmers to obtain higher prices, are a top priority among CA stakeholders. As one survey respondent at a provincial PDAFF stated: "*conservation agriculture requires higher time and knowledge investment* [than conventional agriculture]" and so, although the long-term benefits of CA are clear, an economic incentive may be needed in the short-term to encourage more farmers to adopt CA. Higher awareness among consumers and companies of the value of CA is also essential to potentially obtain a price premium through certification or labelling schemes.

Generally, limited availability and access to information on CA in local schools, among extension agents, at universities, and among consumers remains a roadblock to the sustainable expansion of CA. There are not enough demonstration sites to raise awareness and educate on the benefits of CA and too few opportunities for farmers to come together to share experiences and success stories with CA. Overall, policy dialogue participants pointed to the need to integrate and mainstream CA into education, research and extension at all levels, from national universities' curricula, to training programs for farmers and extension agents at provincial and commune levels.

Finally, the overarching challenge of limited collaboration and organization among farmers and other CA stakeholders (e.g., service providers) requires attention. Indeed, although there is a relatively good structure in place to support CA initiatives at the national level with the support of MAFF, CASIC and partner organizations, there is still a widespread lack of good organizational structures to facilitate collaboration between farmers and other key stakeholders at the local level. This limitation underlies many of the identified issues related to mechanization, market access and education and training. Without organizing among themselves, farmers are unable to bargain for higher prices and without good collaboration with private sector service providers and local government they are unable to work together on reducing input prices, including for cover crop seeds and machinery.

The path forward to promote conservation agriculture in Cambodia

In light of the many challenges to CA identified through the multistakeholder policy dialogue process, the path forward for promoting CA expansion in Cambodia may appear long and challenging. However, given the threats of land degradation, climate change and rural poverty, the importance of pushing forward and scaling out CA and related agroecological approaches cannot be understated. There has already been encouraging progress made in Cambodia on promoting CA, and with the continued strong commitment of the government of Cambodia coupled with the engagement of farmers, the private sector, NGOs and development organizations, conservation agriculture will surely be expanded to benefit more farmers across Cambodia.

The following are the major recommendations from the multistakeholder policy dialogue process. They represent bottom-up proposals to address the most daunting issues to CA to contribute to sustainable agricultural development in Cambodia. There are four overall recommendations with more specific proposed options listed underneath each.

Policy recommendations

1. Further develop supply chains for CA inputs, such as modern agricultural machinery, to reduce their cost.

i. Introduce an incentive mechanism to support domestic manufacturing of machinery for CA that is appropriate for small- and medium-sized and female farmers.

ii. Import more machinery for CA (appropriate machinery has already been imported from e.g., Brazil, but more affordable import options should be explored).

iii. Implement an import tax exemption for relevant agricultural machinery and spare parts for CA.

iv. Work to improve quality and quantity of available cover crop seeds.

2. Explore higher value market opportunities for CA crops.

i. Identify, promote and use labelling or certification schemes (such as GLOBAL G.A.P.) to target global and higher value markets with CA crops from Cambodia.

ii. Introduce an incentive mechanism (e.g., payments for environmental services (PES) scheme, etc.) and/or explore emerging opportunities such as carbon credit markets for participation by CA farmers and their organizations.

3. Mainstream CA and related agroecological approaches into research, extension and education programs.

i. Promote CA and related approaches through extension networks, e.g., the *Met Kasekor* (Farmer's Friend) extension service model of the Department of Extension, Agriculture, Forestry and Fisheries (DEAFF) is a good example of a model to promote sustainable agricultural practices.

ii. Incorporate CA and related agroecological approaches into agricultural programs at schools and universities at all levels in Cambodia to promote climate-smart research, development and innovation (RDI).

iii. Facilitate more trainings, awareness raising, networking and knowledge sharing events for farmers and agri-businesses, hosted by multistakeholder platforms and farmer groups.

iv. Increase the number of field demonstrations of mechanized CA practices to promote awareness and interest in CA in general and especially among youth.

4. Increase collaboration and organization among CA farmers and other key stakeholders.

Through establishing some form of collaboration mechanism/platform for promotion and implementation of CA, for example:

i. Multistakeholder innovation platforms (such as CASIC's innovation platform (IP) established in Battambang province in July 2022) should be supported and could be further developed and scaled out to more districts and provinces.

ii. Farmer organizations can be established, and existing ones strengthened, however, the administrative procedure for establishing agricultural cooperatives/farmer groups should be simplified.

iii. Other forms of clustering farmers and other key stakeholders (such as service providers) together in a beneficial way to e.g., provide mechanization services for a fee; information and service centers, such as the Conservation Agriculture Services Center (CASC) in Battambang province could be further utilized and scaled out as platforms.

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