



**KINGDOM OF CAMBODIA**  
**Nation Religion King**

# **Cambodia Agriculture Survey 2022**

## **Report 5:**

### **Production Methods and the Environment**



**National Institute of Statistics, Ministry of Planning**  
in collaboration with **Ministry of Agriculture,**  
**Forestry and Fisheries.**



**Food and Agriculture**  
**Organization of the**  
**United Nations**

With technical support from the Food and  
Agriculture Organization of the United Nations.



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## Production Methods and Environment

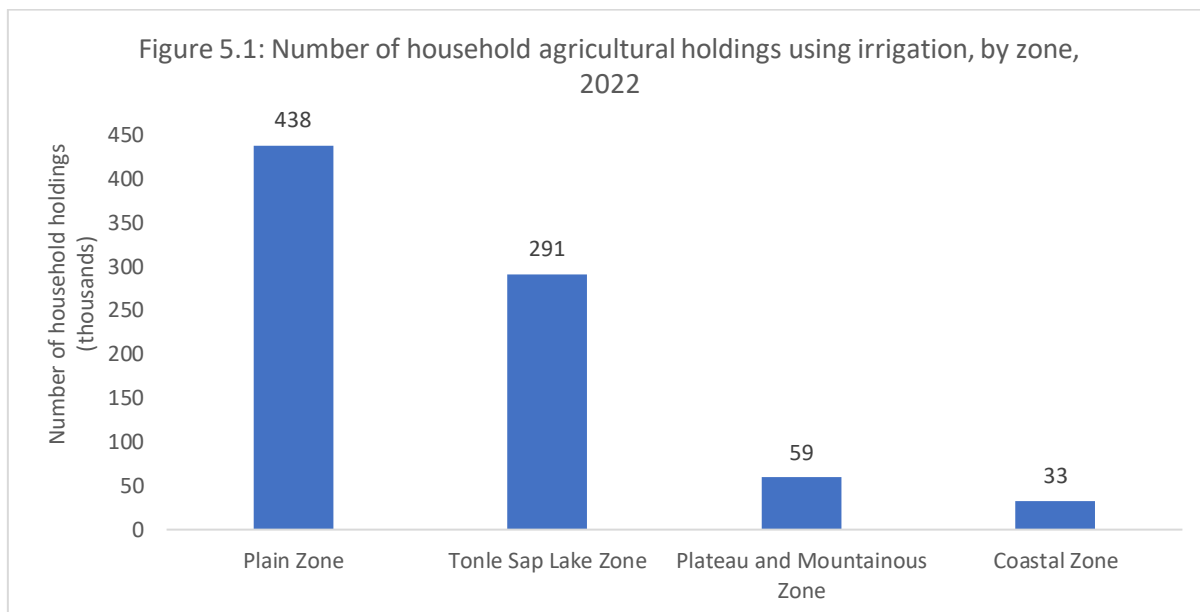
The CAS 2022 questionnaire included a rotating module with additional questions on production methods and the environment. This module included many questions related to irrigation, energy, expenditures of the holding, the impacts of using of fertilizers and pesticides, waste management and soil cover. These aforementioned aspects are included in this report. Furthermore, this report also includes results related to shocks, soil quality change, and good agricultural practices program (GAP) due to their related impact on the environment.



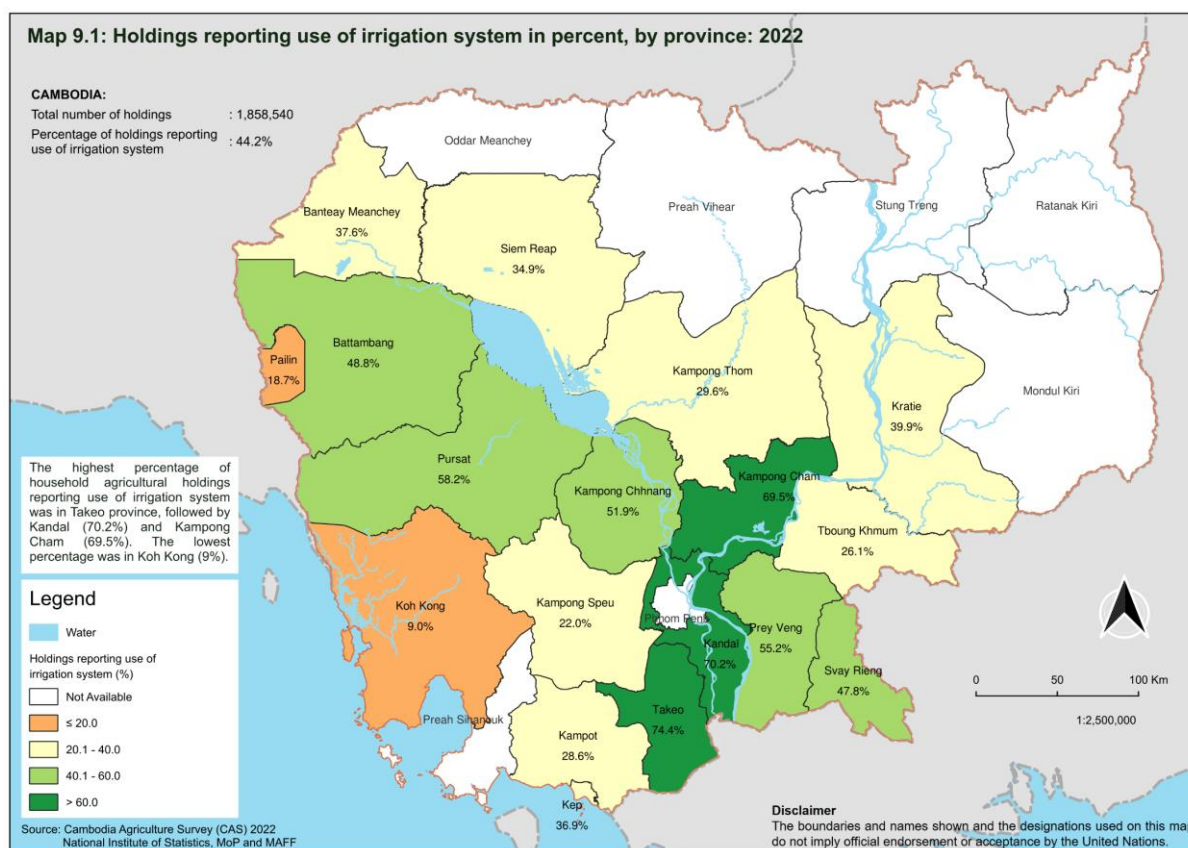
*Farmer use pesticides to rice on parcel. Source: NIS-MOP photograph, 2022.*

### Irrigation

In Cambodia, an estimated 821,000 household agricultural holdings reported the use of any irrigation system on their holding (around 44% of all household agricultural holdings). This was highest in the plain zone where 438,000 holdings used irrigation (58%) and lowest in the coastal zone where only 33,000 holdings used irrigation (26%). On average, for those who used irrigation, 64% of the total holding area was irrigated. The primary reasons given by those who do not use irrigation were that it was not needed (67% of holdings that do not use irrigation), there was no water available (22% of holdings that do not use irrigation) or they could not afford it (11% of holdings that do not use irrigation).



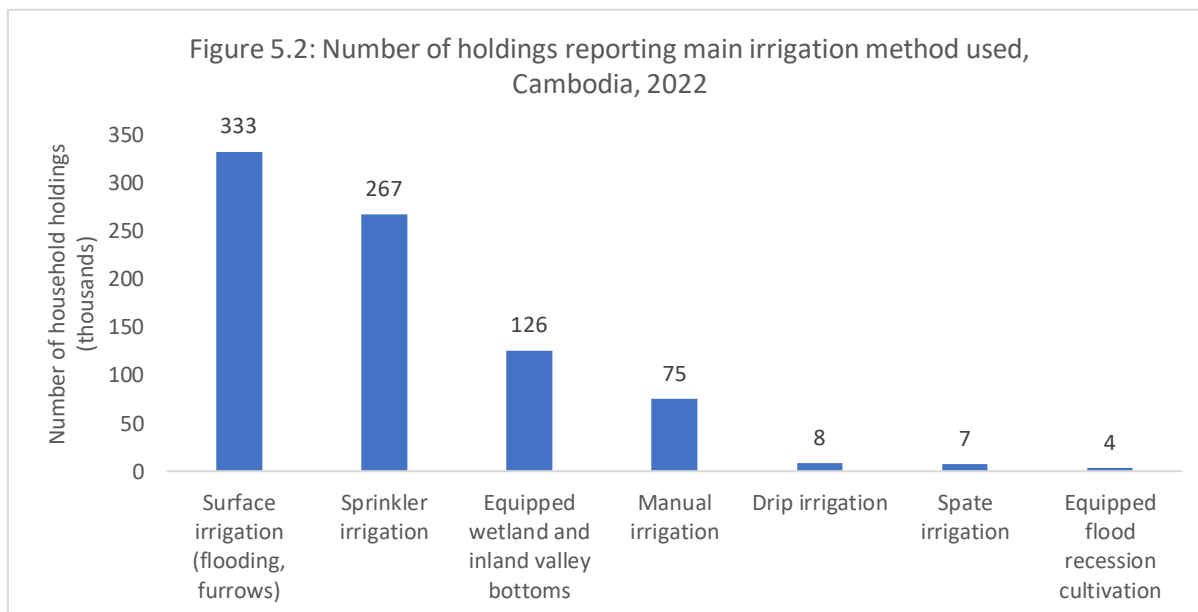
Source: CAS 2022



Source: Cambodia Agriculture Survey 2022 (CAS 2022) Selection of Thematic Maps; NIS-MOP, MAFF 2024.

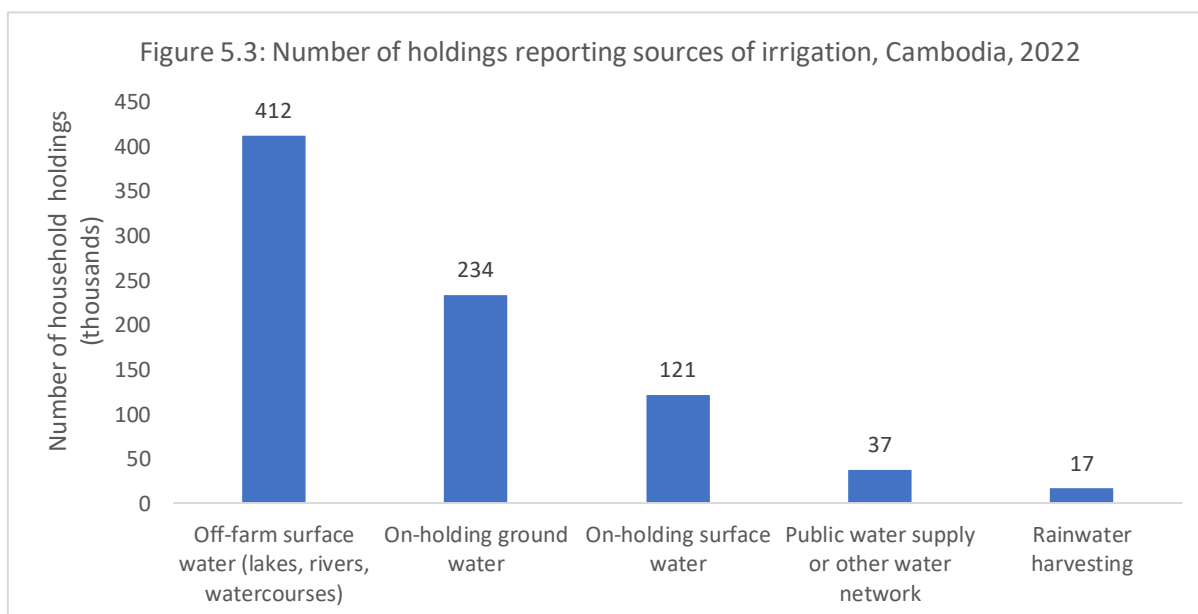
The primary irrigation method used by agricultural holdings was surface irrigation (flooding, furrows), used by 333,000 holdings or around 40% of the holdings using irrigation. Other

frequently used methods included sprinkler irrigation (267,000 holdings), equipped wetland and inland valley bottoms (126,000 holdings) and manual irrigation (75,000) holdings.



Source: CAS 2022

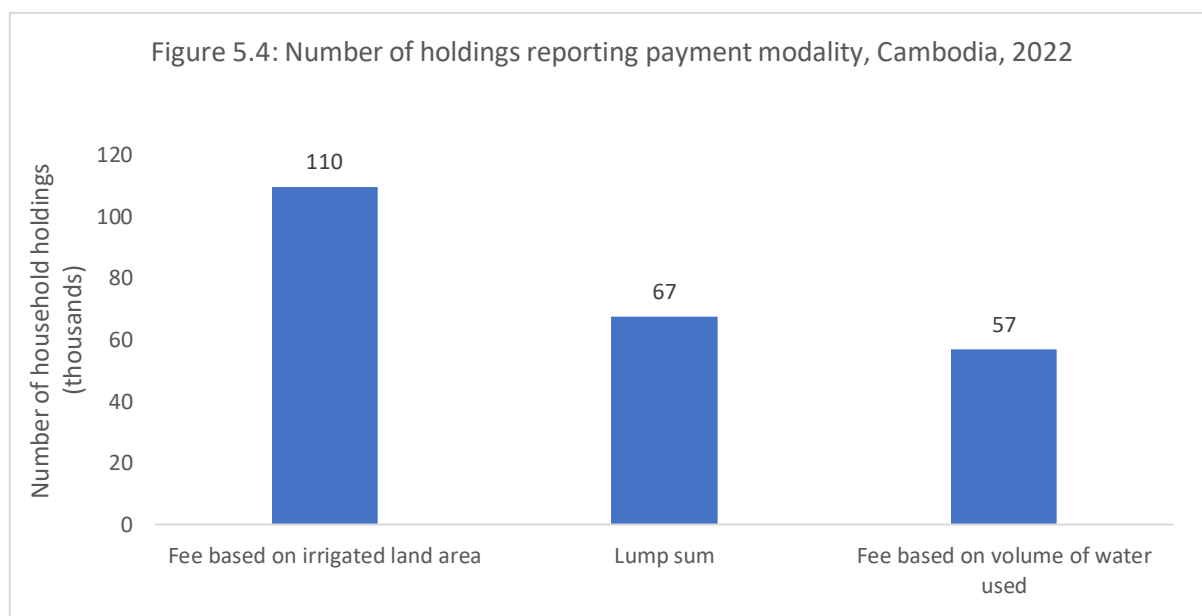
An estimated 412,000 household agricultural holdings get the water for their irrigation from off-farm surface water. This accounted for around 50% of households which use irrigation. The next most frequent sources of irrigation were on-holding ground water (234,000 holdings) and on-holding surface water (121,000 holdings). Only 37,000 holdings reported using public water supply or other water networks, and 17,000 household agricultural holdings (around 2% of all household agricultural holdings) get water for irrigation from rainwater harvesting.



Source: CAS 2022

According to the CAS 2022, Most farmers do not pay for their irrigation. Of the 821,000-reporting irrigation only 29% (237,000) paid for irrigation. The most common payment

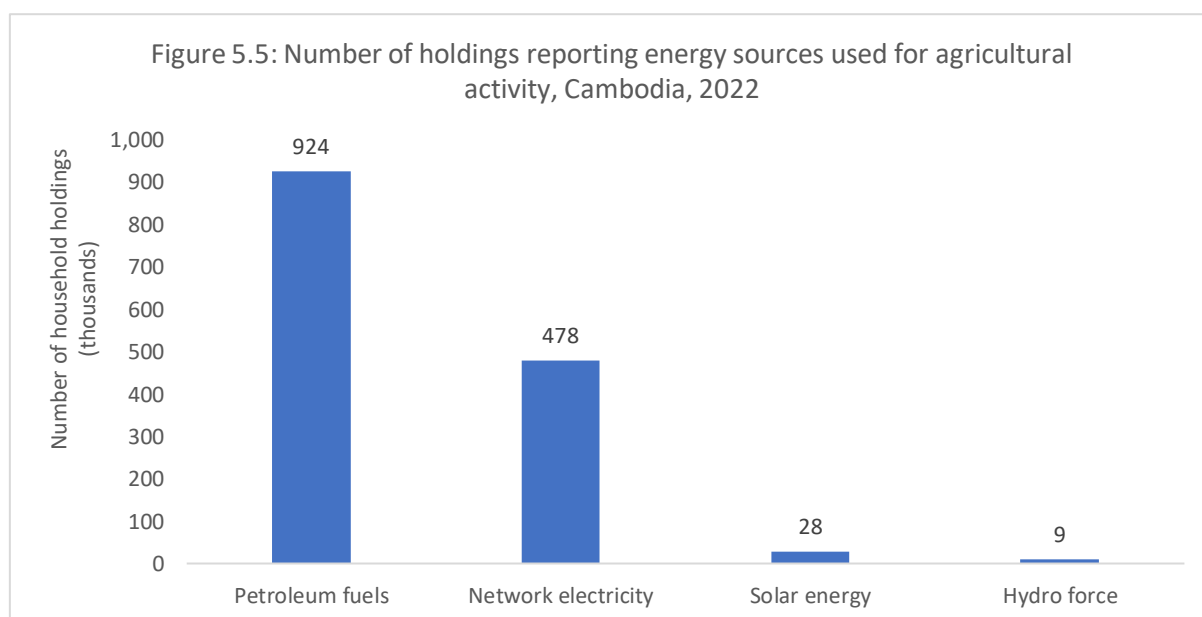
modality was to pay a fee based on irrigated land (110,000 households, 47% of households spent on irrigation). A reduction in water availability from wells or other sources like lakes, canals or rivers was noted by 198,000 holdings (24%).



Source: CAS 2022

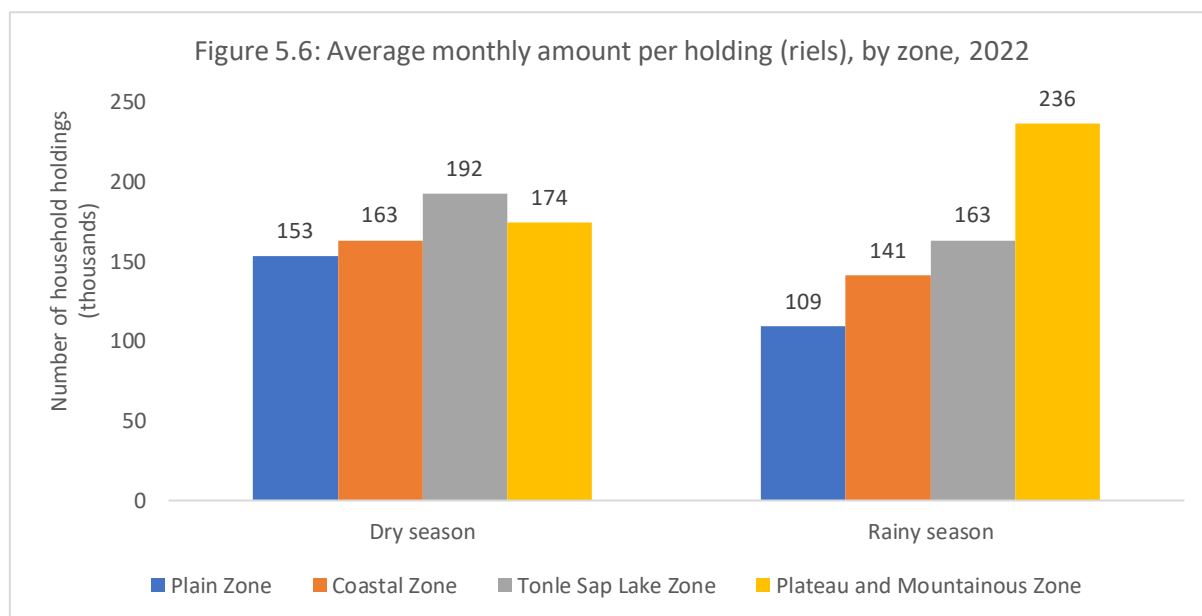
## Energy

The largest source of energy consumed by household agriculture holdings was petroleum fuels with 924,000 households (50% of agriculture holdings), followed by network electricity (478,000 holdings), solar energy (28,000 holdings) and hydro force (9,000 holdings).



Source: CAS 2022

According to the CAS 2022, the highest monthly spending on fuel in the dry season is in the Tonle Sap Lake Zone, in which holdings using fuel spend an average of 192,000 riels per month, followed by Plateau and Mountainous Zone, Coastal Zone and the lowest spending is in Plain Zone where holdings using fuel spend an average of 153,000 riels per month. In the rainy season there is a greater spread of results whereby the highest spending is greater, and the lowest spending is less. In the Plateau and Mountainous Zone holdings using fuel spend 236,000 riels on average per month. Conversely, in the Tonle Sap Lake Zone, the average spend on fuel is lower at 109,000 riels per month.



Source: CAS 2022

## Waste Management

Waste management is an operation to solve and maintain waste with the aim of reducing the potential harm to the environment and public welfare. Figure 5.7 shows the types of waste generated from holdings. Empty packaging was the waste generated by most holdings (439,000). It was followed by used plastic film (348,000), other non-hazardous organic waste (202,000), waste oils (190,000), and other non-hazardous inorganic waste (159,000). Among the listed types of waste, the type of waste generated by the smallest number agriculture household holdings was veterinary waste in 25,000 holdings.



Source: CAS 2022

The most common management method for the waste created by the holdings was to burn it on the holding with 581,000 doing this. 256,000 holdings reported that they buried their waste on the holding whilst 223,000 holdings reported that they left the waste on the farm/no treatment. Only 95,000 holdings reported that waste was taken away from the holding by a professional. Only 27,000 holdings reported that waste was taken away from the holding by other treatment on the holding.

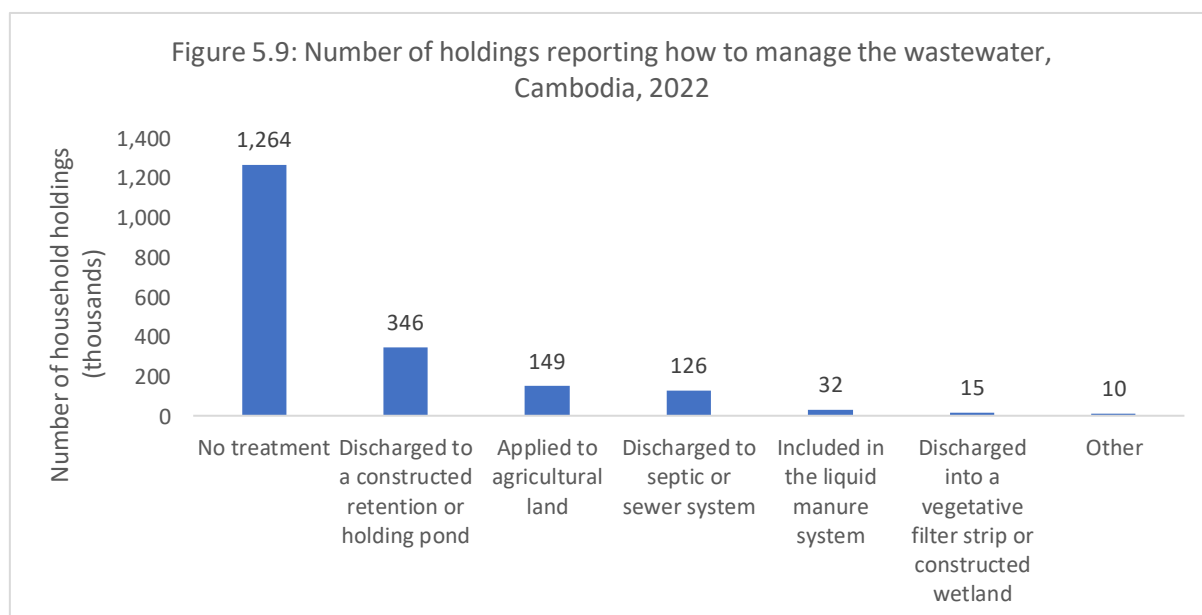


Source: CAS 2022



Source: Cambodia Agriculture Survey 2022 (CAS 2022) Selection of Thematic Maps; NIS-MOP, MAFF 2024.

About 68% (1,264,000) of agriculture holdings do not treat the liquid waste on their farms. The most frequent methods to manage the wastewater were 346,000 holdings discharged to a constructed retention or holding pond, 149,000 applied the wastewater to agricultural land and thirdly, 126,000 discharged to a septic or sewer system.

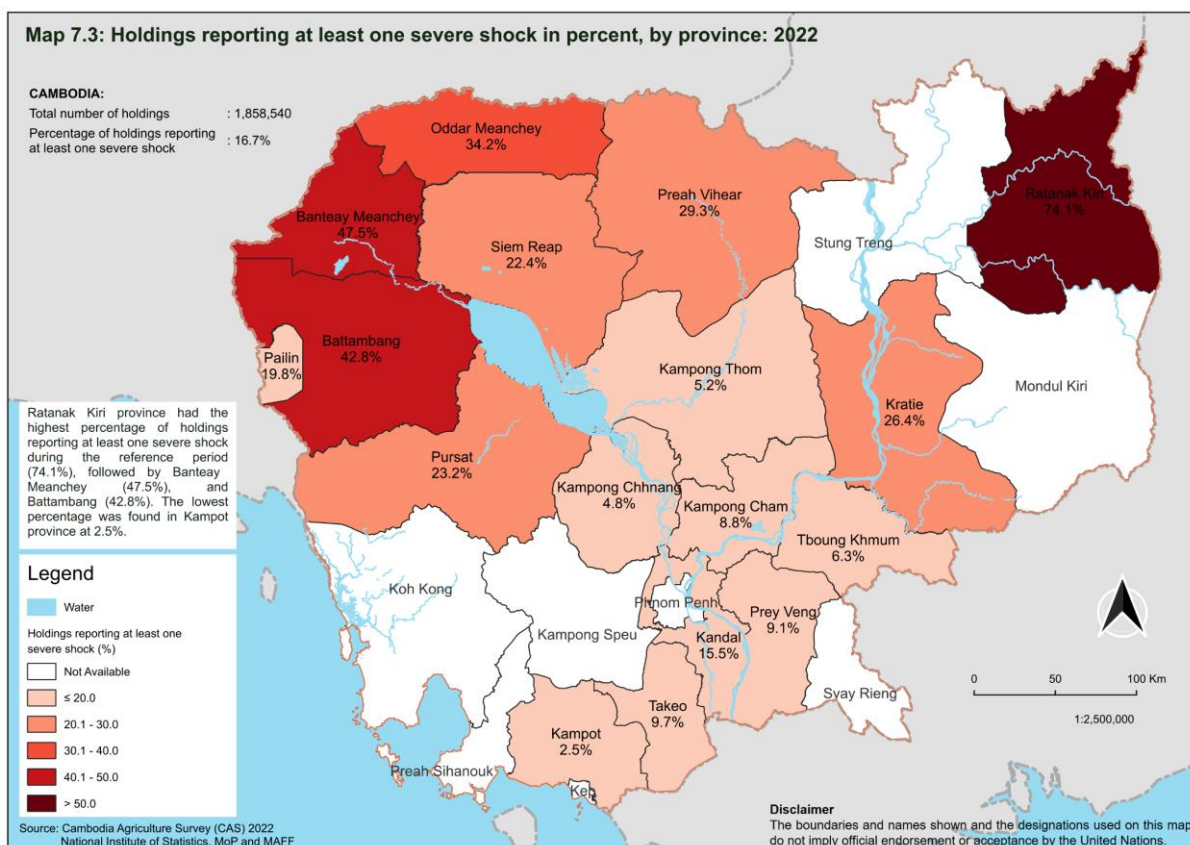


Source: CAS 2022



## Shocks

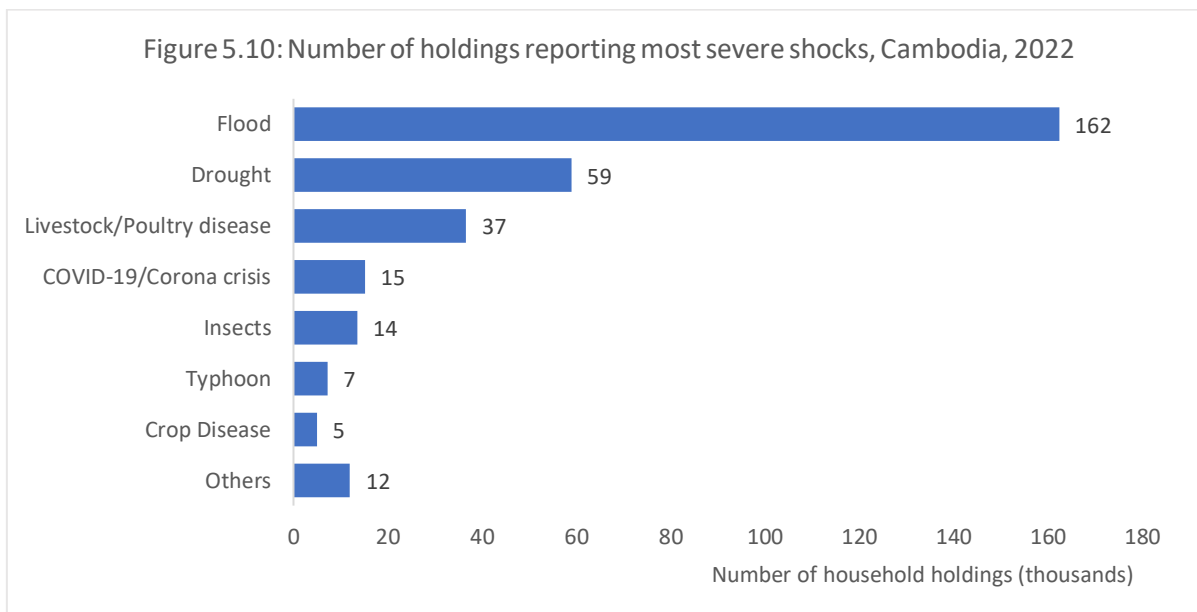
Shocks in agriculture refer to unexpected events that significantly impact agricultural production or markets. These can be due to natural factors such as droughts, floods, pests, or diseases that can lead to crop failure, but they can also be man-made such as changes in government policy, trade restrictions, or conflicts that disrupt supply chains. These shocks can have a profound impact on the agricultural sector and the broader economy. They can lead to increased food prices, reduced income for farmers, increased poverty and food insecurity among vulnerable populations.



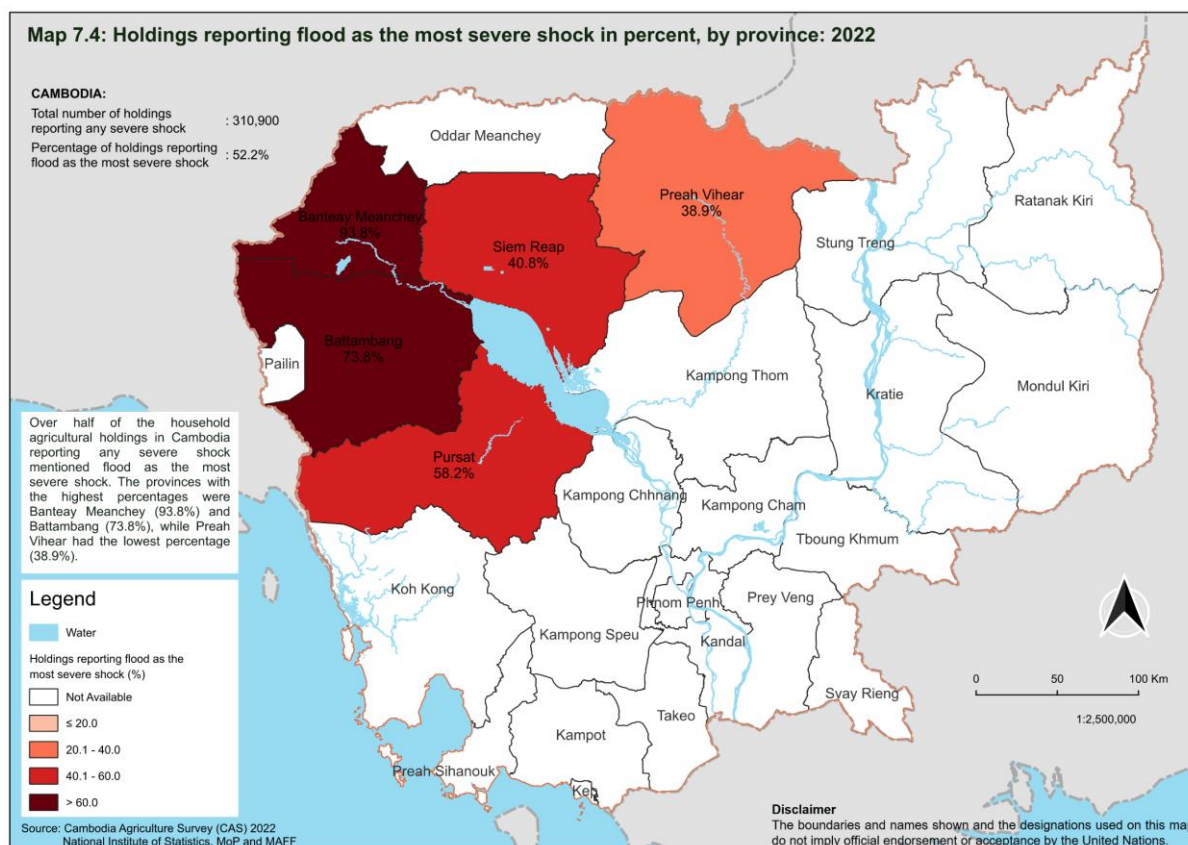
Source: Cambodia Agriculture Survey 2022 (CAS 2022) Selection of Thematic Maps; NIS-MOP, MAFF 2024.

Within the CAS 2022, the Tonle Sap Lake zone had the most holdings reporting a severe shock throughout the year (183,000). The Coastal zone had the lowest number of holdings reporting a severe shock (7,000).

The severe shock which was referenced by the most holdings was flooding, affecting 162,000 household holdings in 2022. Drought was the second most cited shock with 59,000 holdings reporting it having a severe effect on the holding within the reference period. Thirdly, livestock/poultry disease was mentioned as being the most severe shock for a total of 37,000 holdings.



Source: CAS 2022

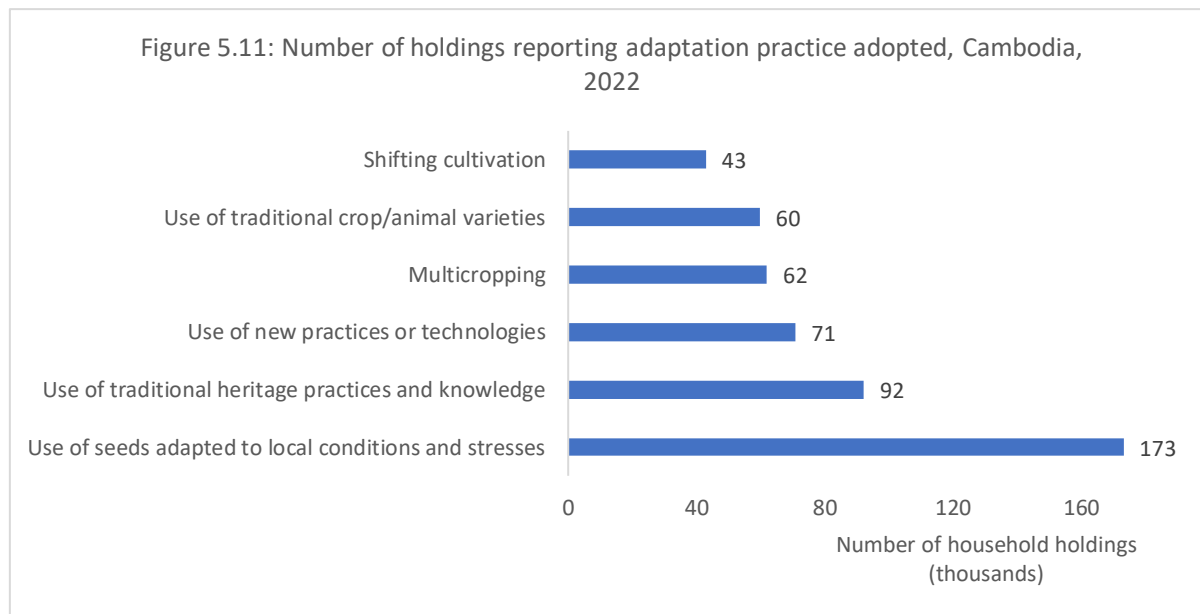


Source: Cambodia Agriculture Survey 2022 (CAS 2022) Selection of Thematic Maps; NIS-MOP, MAFF 2024.

In most cases, holdings responded that they had not fully recovered from the most severe shocks which had affected them. In particular, in the Tonle Sap Lake zone, 129,000 holdings reported that they had not recovered compared to only 54,000 which had. The Plain zone was the only zone in which more holdings had fully recovered than had not. Furthermore, in

228,000 out of 311,000 cases, holdings reported that they were not better able to cope with severe shocks than before.

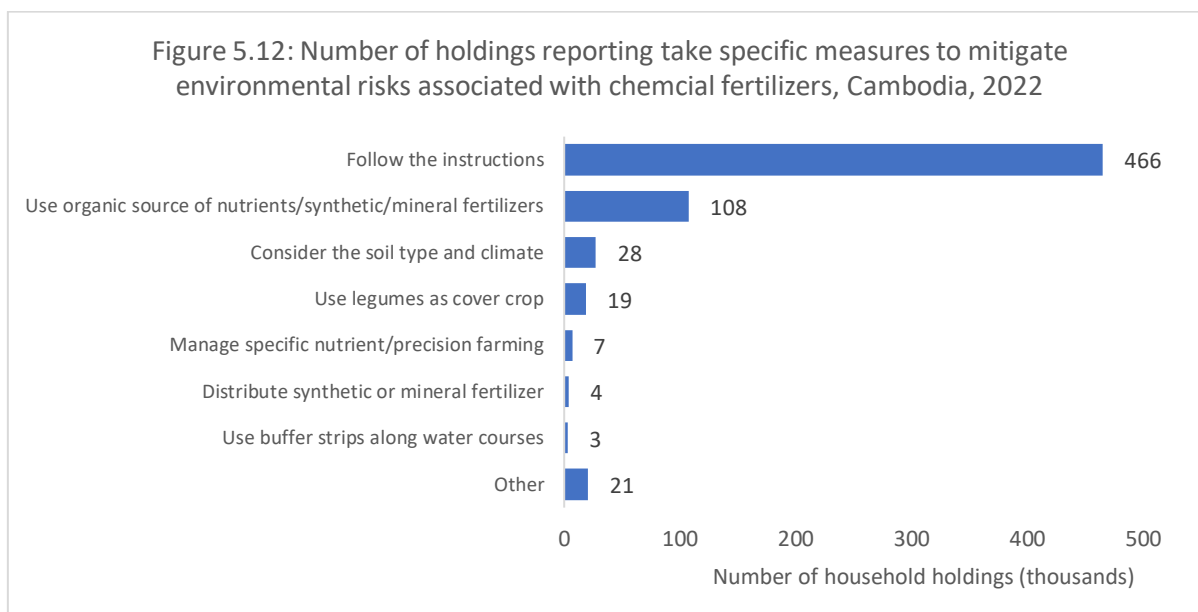
At the same time, 349,000 (approximately 19% of all agricultural holdings) reported that they had applied adaptation practices. These mechanisms include the use of seeds adapted to local conditions and stresses, use of traditional heritage practices and knowledge, use of new practices or technologies, multi-cropping or shifting cultivation.



Source: CAS 2022

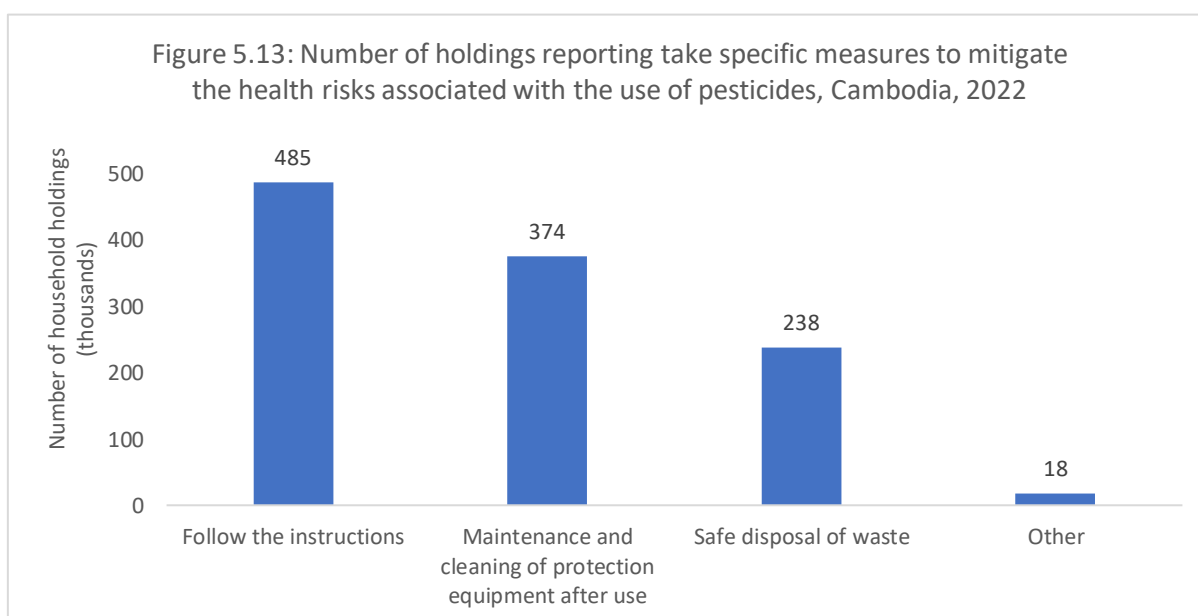
## Fertilizers and Pesticides Impacts

The use of fertilizers and pesticides can have a significant impact on the environment. In Cambodia, most holdings use fertilisers and pesticides in agriculture, only 9% (174,000 holdings) did not use any fertilisers. Overall, chemical fertilisers are used more frequently than organic fertilisers. Urea was reported as being used in 735,000 holdings and NPK in 610,000, the third most used chemical fertiliser DAP was still used by 298,000 holdings. In comparison the most used organic fertiliser, solid manure, was used by 527,000 holdings, vegetable materials or compost by only 33,000 and bio stimulant by 30,000 holdings. Pesticides were also used by many holdings. Herbicide (liquid) was the most commonly used type of pesticide, used by 579,000 holdings, insecticides were the second most common used by 411,000 holdings and herbicide (solid) was used by 114,000 holdings. 64% of holdings using chemical fertilisers reported understanding of the environmental risks associated with excessive use or misuse of the product. Of the holdings using chemical fertilisers 39% reported taking specific measures to mitigate the environmental risks. Of possible mitigation measures, two measures were used much more frequently than others, following protocols as per extension services or retail outlet directions or local regulations, not exceeding recommended doses, was followed by 466,000 holdings and use of organic source of nutrients alone or in combination with synthetic or mineral fertilisers was used by 108,000 holdings.



Source: CAS 2022

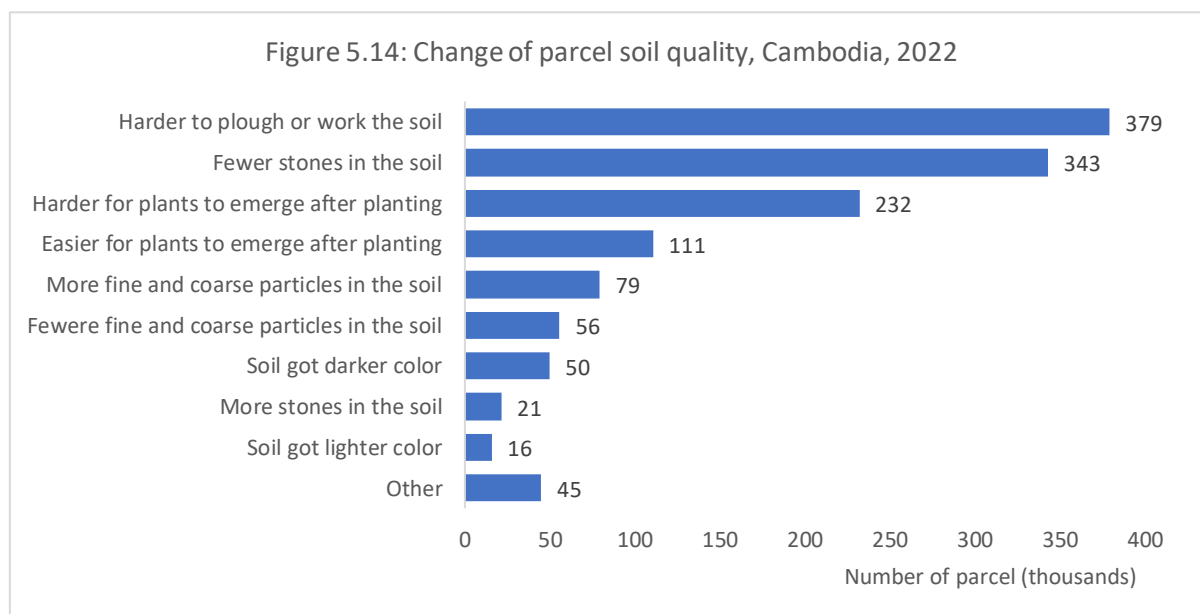
74% of holdings using pesticides reported understanding of the environmental and health risks associated with excessive use or misuse of the product. Of the holdings using pesticides 57% reported taking specific measures to mitigate health risks whilst 48% took specific measures to mitigate environmental risks. A variety of measures were taken to mitigate the health risks including adherence to label directions for use (485,000 holdings), maintenance and cleaning of protection equipment after use (374,000 holdings) and safe disposal of waste (238,000 holdings). Similarly, a variety of measures were taken by holdings to mitigate environmental risks, adherence to label directions was the most cited measure (424,000 holdings), followed by maintenance and cleansing of spray equipment after use (179,000 holdings) and using one pesticide no more than two times or in a mixture in a season to avoid pesticide resistance (51,000 holdings).



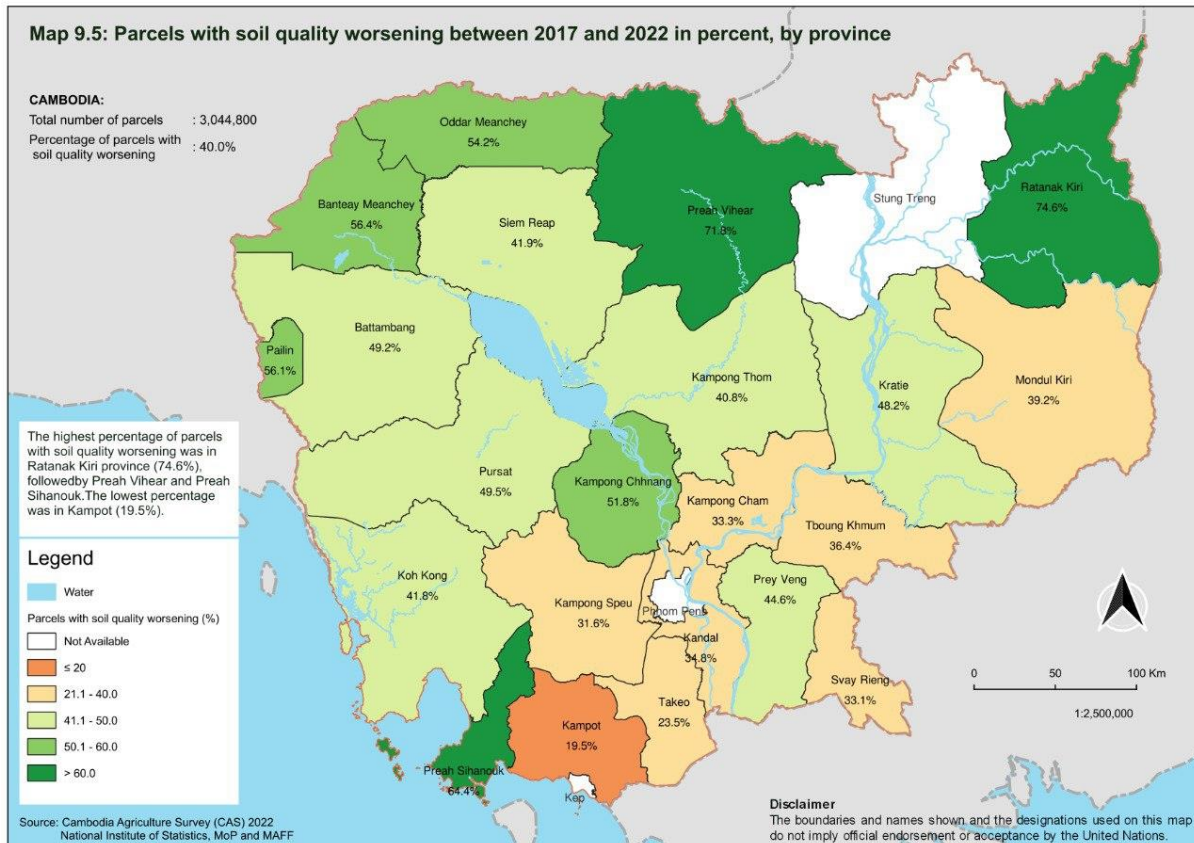
Source: CAS 2022

## Soil Quality

Soil quality change is the process of changing the ability of land to be used for various purposes. This change can be good or bad, it depends on human activities, nature and the environment. In Cambodia, it is observed that approximately 40% of parcels were reported to have had their soil quality worsen between 2017 and 2022 compared to only 7% which reported that it had improved. The most reported changes in the soil quality itself were that the soil was harder to plough or work (19% of parcels), that there were fewer stones in the soil (18% of parcels) and that it was harder for plants to emerge after planting (12% of parcels). Furthermore, various soil degradation threats were reported by holdings, in particular, a reduction in soil fertility was noted in 25% of parcels and soil erosion was noted in 14%.

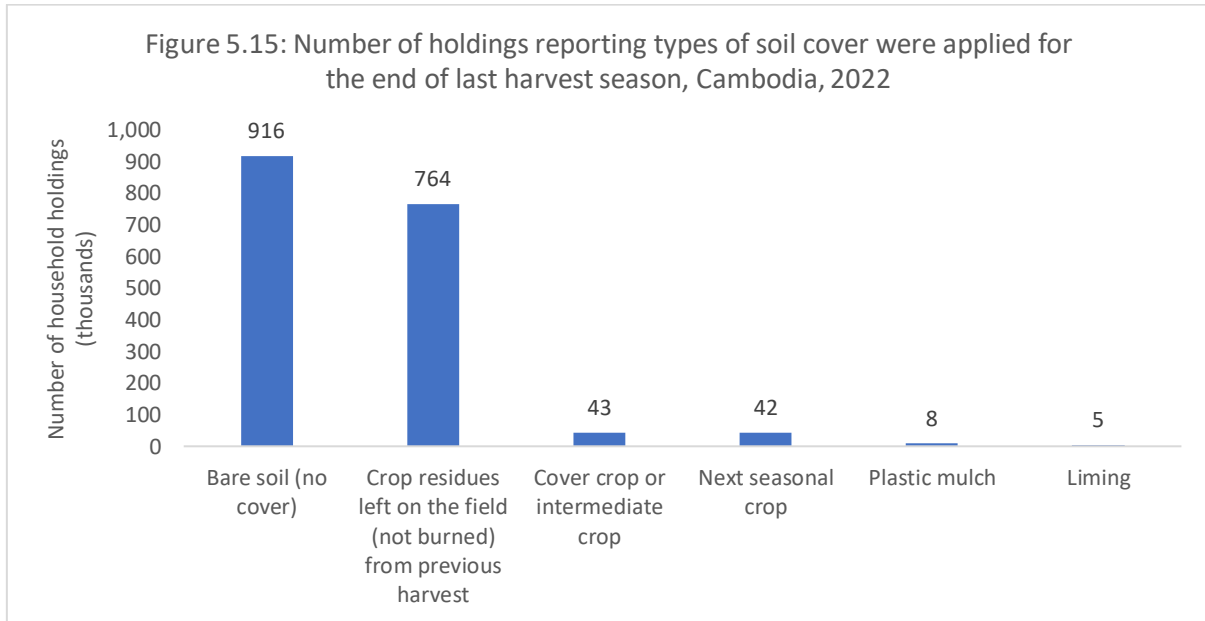


Source: CAS 2022



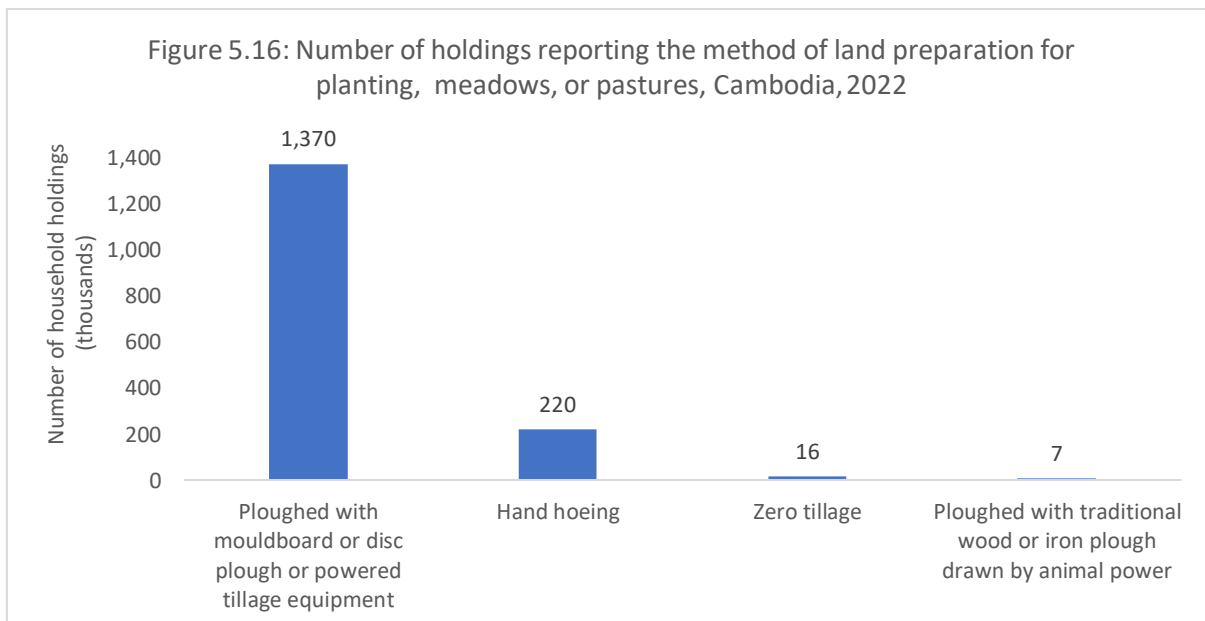
Source: Cambodia Agriculture Survey 2022 (CAS 2022) Selection of Thematic Maps; NIS-MOP, MAFF 2024.

The main factors that cause soil degradation are excessive use of fertilizers and pesticides. Approximately 41% of agricultural holdings used crop residues left on the ground to cover their soil, other soil cover practices were not practiced commonly, 49% of the holdings did not practices any cover at all. Among those using crop residues, the majority covered all of their land areas dedicated to crops, meadows and pastures with the residue.



Source: CAS 2022

When planting, 74% of agriculture holdings ploughed with mouldboard or disc plough or powered tillage equipment whilst an additional 12% used hand hoeing. Few holdings used minimum or zero tillage.

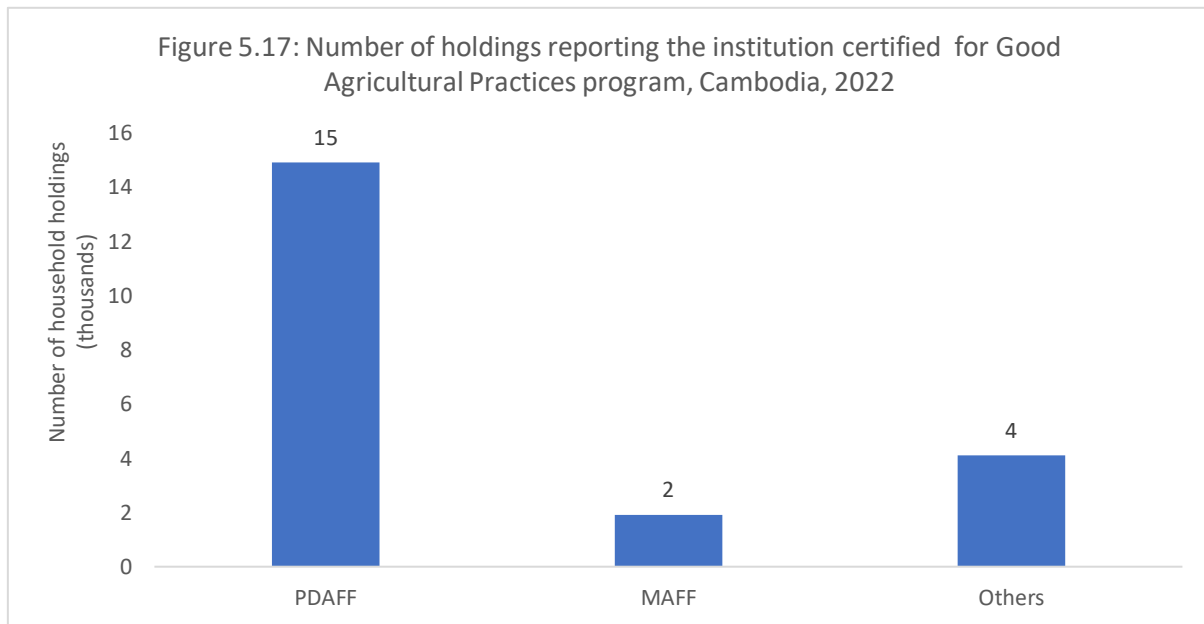


Source: CAS 2022

## Good Agricultural Practices (GAP)

Of Cambodia's total agricultural holdings, only 1% (21,000 agricultural holdings) participated in the Good Agricultural Practices Program, however, an additional 340,000 expressed interest in joining the program. The Provincial Department of Agriculture, Forestry and Fisheries and

the Ministry of Agriculture, Forestry and Fisheries are important national institutions that can certify that they have implemented the Good Agricultural Practices program.



Source: CAS 2022