

Key informant analysis for climate-smart agriculture practices in Tra Hat Village, Vietnam

Working Paper No. 280

CGIAR Research Program on Climate Change,
Agriculture and Food Security (CCAFS)

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RESEARCH PROGRAM ON
**Climate Change,
Agriculture and
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Abstract

This paper presents the results of key informant interviews conducted in Tra Hat Climate-Smart Village (CSV) in Vietnam. The interviews aimed to further assess the climate-smart agriculture (CSA) practices that farmers wanted to adopt on their farms, as well as the factors and barriers for adoption. Results of the household surveys conducted in Tra Hat CSV were considered on this paper as well. Altogether, the results of the interviews and surveys would serve as a guide to implement the prioritized CSA practices and out-scale them in Bac Lieu Province. Majority of key informants stated that rice production must be prioritized because it is the main livelihood of farmers in Tra Hat CSV. Rice production could be complemented with animal husbandry, provided that its market is stable and the focus points on sanitation treatment. Home gardens emerged as another CSA practice that farmers preferred on their farms. Farmers considered economic and environmental benefits for prioritizing these CSA practices. In contrast, farmers did not prioritize leaf color charts and salt-tolerant rice varieties for their perceived unsuitability in their village. In terms of CSA technologies, farmers expressed their willingness to undergo trainings and attend demonstration trials to learn them. The technologies and practices prioritized by the farmers can be integrated into a CSA portfolio to foster farmer uptake and adoption. Participation of local government authorities, farmer cooperatives, and the private sector could then boost the portfolio's scaling potential.

Keywords

key informant interview; rice production; adoption; participatory prioritization; climate change.

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Acronyms

CSA	climate-smart agriculture
CSV	Climate-Smart Village
CCAFS	CGIAR Research Program on Climate Change, Agriculture and Food Security
CGIAR	Consultative Group on International Agricultural Research
DARD	Department of Agriculture and Rural Development
PPS	Plant Protection Sub-division
VBS	Village Baseline Study
HH	household
P	Phosphate
N	Nitrogen
LCC	leaf color chart
AWD	Alternate Wetting and Drying
KI	key informant
SA NA	Situation Analysis and Need Assessment
DONRE	Department of Natural Resources and Environment
PC	People's Committee
WS	winter-spring
SA	summer-autumn
AW	autumn-winter
QLPH	Quan Lo-Phung Hiep
MRD	Mekong River Delta
1M5R	1 Must-5 Reduction

Introduction

The objective of the key informant (KI) interviews was to explore in more depth the climate-smart agriculture (CSA) practices that were selected by farmers in the workshops on the prioritization of CSA practices and results from the Household (HH) surveys at Tra Hat Climate-Smart Village (CSV). Particularly these interviews were used to discuss factors that affect the adoption of CSA practices. The results will be used to find an implementation pathway for CSA practices and methods to out-scale them in Bac Lieu province.

Design of questionnaire

The questionnaire was prepared based on the objectives described above. The questions were informed from the previous baseline survey that was conducted in 2014 during the Organization Baseline Survey (OBS) (Phong et al. 2014). The focus of the questionnaire was to draw out the different organizations' functions in relation to the implementation of CSA technologies. This includes understanding which organizations are: financing capital and providing credit; guiding policy; marketing and disseminating information; and providing technical training. The purpose of the interviews was also to understand the implementation pathways for deploying CSA technologies and which organizations at which levels (i.e., province, district, commune, and village) are involved.

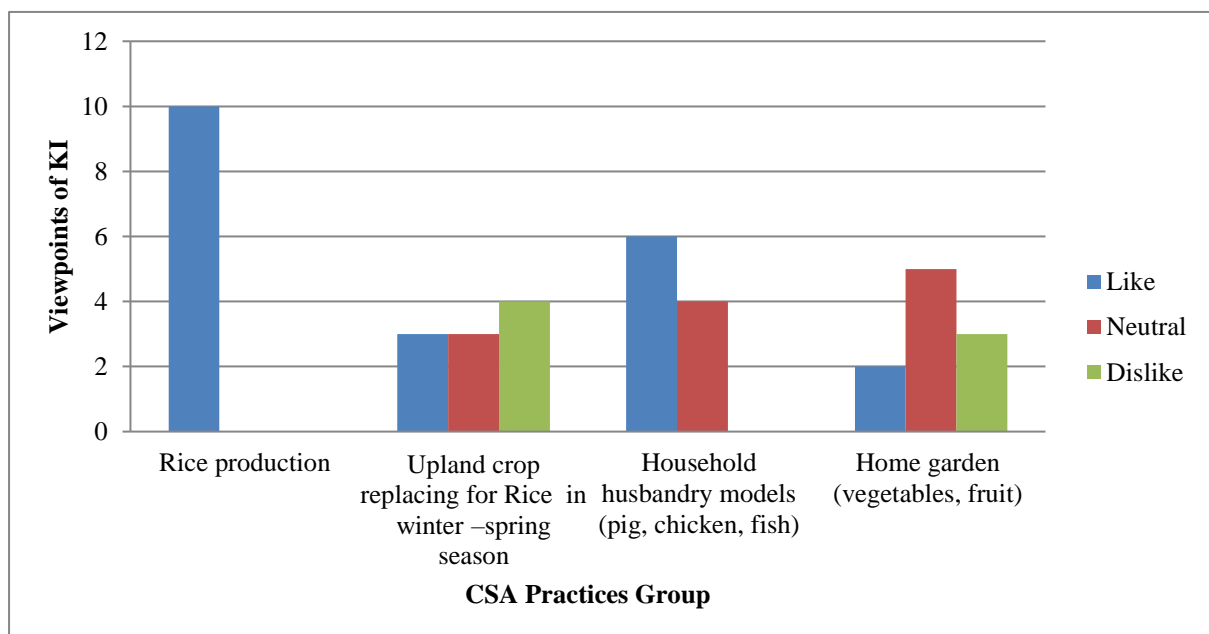
A list of key informants was selected from the OBS report on the Situation Analysis and Needs Assessment (SA NA) 2014. Ten key informants were selected from organizations listed in Table 1. This table also lists all information provided by organizations that are related to the dissemination of CSA practices. We refrain from using personally identifying information for privacy reasons.

Table 1. Information for KI interview at organizations

No.	Interviewed Organization	Information collected
1	Bac Lieu DARD	<ul style="list-style-type: none"> - Dissemination of new technologies - Agriculture plan and development - Market information - Infrastructure for agricultural production
2	Head of Sub DARD at Vinh Loi District	<ul style="list-style-type: none"> - Transfer technology in district - Irrigation and drainage - Food security - Information related to climate change - Cropping systems - Market for output - Selection of cropping system model - Factors affecting application of agricultural technique
3	President or Vice president of People's Committee of Vinh Loi district	<ul style="list-style-type: none"> - Rural development at local community and Tra Hat CSV - Program of restructuring cropping system in district - Agricultural support program
4	Office of Natural Resource and Environment Vinh Loi district	<ul style="list-style-type: none"> - Pollution in agricultural production and solutions - Production and climate change adaptation - Strategies for improvement of environment in agricultural production
5	Station of Extension, VinhLoi district	<ul style="list-style-type: none"> - Agricultural models, extension activities. - Technical service
6	Veterinary station, Vinh Loi district	<ul style="list-style-type: none"> - Disease and treatment - Husbandry - Food security - Climate change
7	Head of Plant Protection SubDivision VinhLoi district,	<ul style="list-style-type: none"> - Information of crop development and plan protection - Technical transfer for agricultural production - Environmental problem in agriculture production - Disease and treatment
8	President of Chauthoi commune	<ul style="list-style-type: none"> - Actual agriculture production and planning - Natural resource management - Food security - Climate change
9	Staff in charge of land and agriculture - Chau Thoi commune	<ul style="list-style-type: none"> - Information of crop development and plant protection -Management of agriculture production - Food security - Soil and water environmental problem in agriculture production
10	Famer Union - Tra Hat CSV	<ul style="list-style-type: none"> - Information of crop development and plant protection - Criteria for selection of agriculture production - Help in instruction for new technology
11	Women Union Bac Lieu province	Gender issue in dissemination of techniques
12	Women Union at ChauThoi or Tra Hat (optional)	Gender issue in dissemination of techniques

Results and discussions

Figure 2.1 presents the preferences of farmers regarding CSA practices. Most KIs agreed rice production is a priority in the study area, since it is the main livelihood for HH in the village. Six KIs felt upland crops can be replaced with rice in WS) season, but four other KIs did not agree due to lack of irrigated water in dry season, lack of experience, lack of labor, and no market. Most KIs agreed with animal husbandry models in HH. However, they advised the models should be upgraded piggeries or raising chickens with a focus on sanitation treatment. Animal husbandry is a key source of food security for every HH in the village and a main source of income for HH, besides rice production, as long as the market is stable. Only three KIs disliked home gardens (vegetable, fruit tree) but the others believed these are important sources of daily food for HH and cannot be neglected.



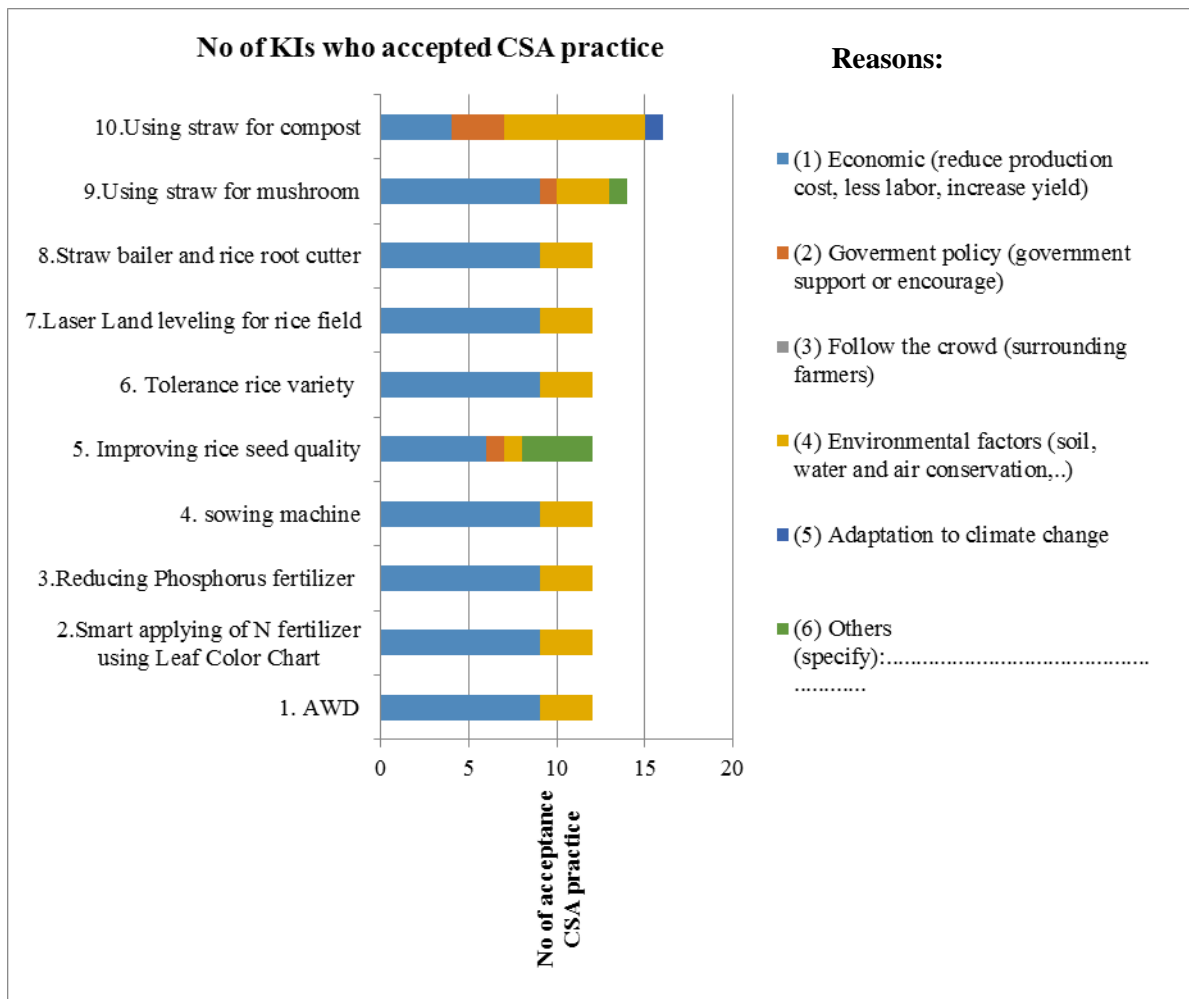
Source: KI interview, 2015

Figure 1. Farmer preferences for CSA practices

Figure 2 shows most KIs accepted the results of participatory prioritization of CSA practices. The popular reasons were economic factors (such as lower production costs and higher yield). Most environmental factors that affected CSA practices also concerned KIs. Using straw to make compost fertilizer or using straw for making mushroom were the most preferred methods to use straw. The KIs believed these techniques were feasible if the straw could be collected by a baler machine.

Improving the traditional rice seed (Tai Nguyen) quality was also important by KI. Improved rice seed follows the policy guidelines of "one must do (use certified seed), five reductions (reduce seed rate,

pesticide, fertilizer, water, and post harvest losses)" (1M5R) which is supported by the local government and is also important for maintaining the original gene source of traditional rice varieties.



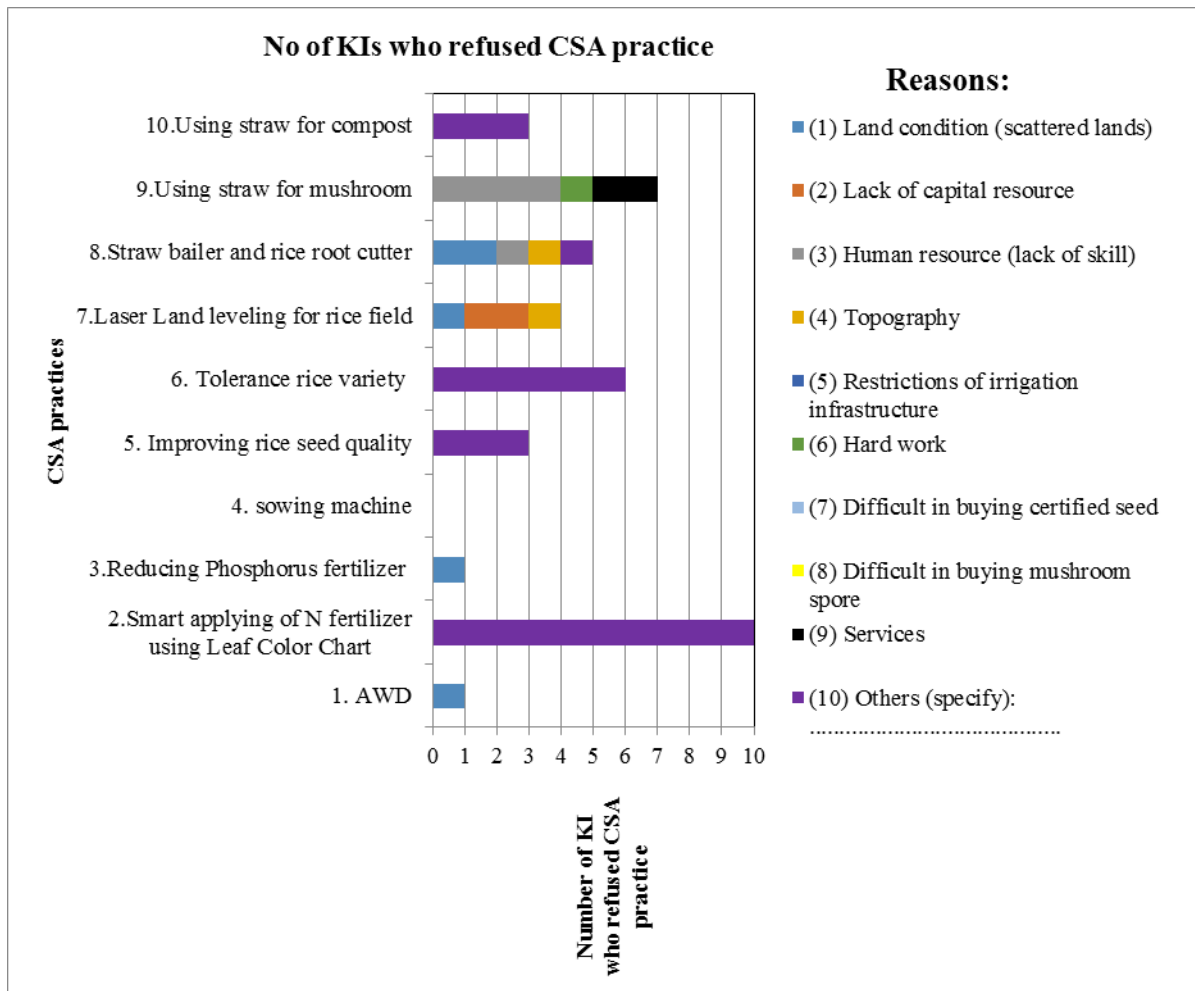
Source: KI interview, 2015

Figure 2. Number of KI's support for implementing CSA practices in rice production

Among the ten prioritized CSA practices in rice production, KI's reported difficulties that prevented them from applying these technologies. Figure 3 illustrates the responses that hinder adoption of different CSA practices. Most KI's thought the leaf color chart (LCC) was not applicable in Tra Hat climate smart village (CSV) because all farmers have excellent experience in diagnosing Nitrogen (N) deficiency and they have not needed the LCC.

More than half of the KI's advised that salt-tolerant rice variety would not be needed in Tra Hat CSV because salinity intrusion was not a problem in the study area since there is a good canal and sluice system of Quan Lo-Phung Hiep (QLPH) to protect the rice production. However, they did not consider

future scenarios in which the sea water level rises higher than the canal system is able to protect the rice production area from salinity intrusion.



Source: KI interview, 2015

Figure 3. Number of KI's refused implementing CSA practices in rice production

Several KIs commented that making compost from straw needs a few weeks for decomposition and an area for storing straw bale is also needed which they currently don't have. KIs also commented that improving the traditional seed variety requires more development for field application and the process is timely, as it needs several seasons before purified seeds are available on the market. KIs mentioned that the storage of the original seed gene source to be of interest. Using straw for mushroom production requires more labor than other uses of straw and the market is not yet developed. However, KIs recognized the high profitability potential in mushroom production.

Conditions for implementing the CSA technology

Table 2 shows the opinions of KIs regarding the enabling conditions necessary for implementing the first five prioritized CSA technologies in rice production.

Table 2. KI opinions regarding enabling conditions for implementing the first five prioritized CSA technologies in rice production

Land laser levelling	<ul style="list-style-type: none"> • Training, demonstration trial • Apply on fallow land in dry season • Cooperative could apply this for all commune • Suitable for 2R of Tra Hat because one fallow duration in dry season • Applying suitable for large and adjacent fields, simultaneously • It needs cooperation and network • District has to the program for CSA; create a linkage between farmers and authorities • Encourage farmers to obtain their agreement about boundaries of their fields • It is suitable for this area because it's 2R; however, it is difficult to move the machine long distances
Sowing machine	<ul style="list-style-type: none"> • Need training, support and demonstration trial on large field model at Vinh Loi (cooperative, agriculture office) • May not suitable for heavy clay soil • Establish the production area for producing rice seeds • More demand if applying on large field model
P reduction	<ul style="list-style-type: none"> • Need training, demonstration trial • Propaganda, training, applying for one single fertilizer • Suitable for this area
AWD	<ul style="list-style-type: none"> • Training, demonstration trial • Financial support for training • Propaganda, training • Land should be leveled, need training • Can be applied for Tai Nguyen rice crop, and for modern rice crop in SA
Baler	<ul style="list-style-type: none"> • Need to build supply chain for straw mushroom production, including linkage between famers, middle man, supportive organizers and buyers • Provide information and appeal to private sector for investing in baler machine, the project support to buy machine • Local authorities will provide the service, buy straw, and service for taking care baling rice straw on farmer's field • Farmers will rent the machine or pay the full service to the local authorities • Collaborate with farmers, and the practice should link to mushroom production • Develop link between farmers, buyers, and traders

Most KIs felt positive and had many insights when discussing about machinery related practices such as land laser levelling, sowing machine, and straw baler machine. Currently, the development of mechanization in Bac Lieu Province has been slower than in nearby provinces such as Soc Trang and Vinh Long. All KIs suggested that support for demonstration trials is necessary for the implementation of new CSA practices.

For expensive machines such as laser levelling or baler, KIs recommended a feasible way for cooperation between the machine owners, farmers and local authorities. This includes the investment by local authorities, private sector companies, and farmers cooperatives to manage contracts and maintain machines to provide services to farmers. Farmers would then pay for the services on their field only.

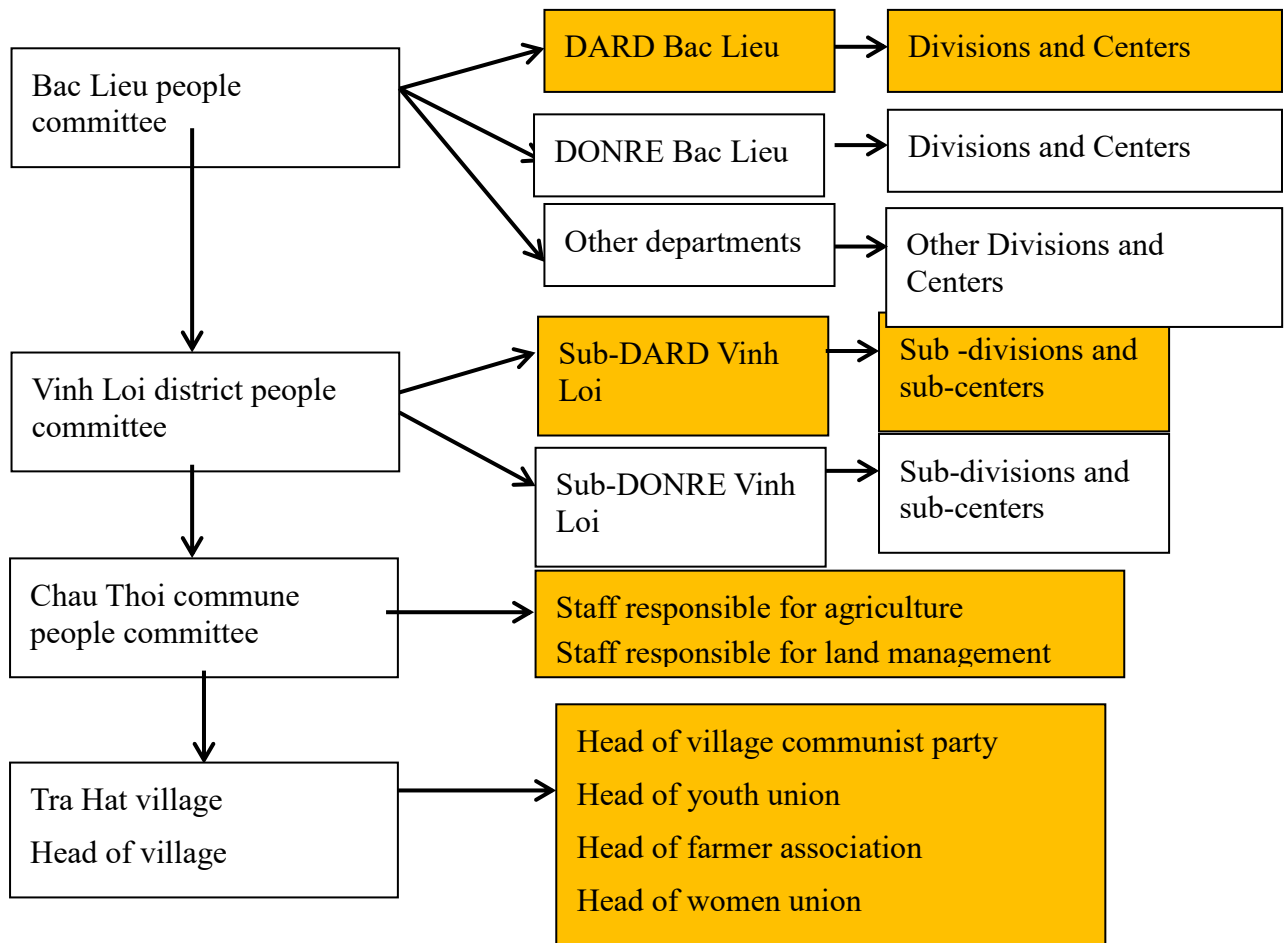
Dissemination of CSA practices should link to other promoted agricultural practices through a bundled package that will encourage farmers and the community to implement such practices. The integrated links between consecutive CSA practices will maximize the benefit in rice production and this needs to be demonstrated and shown to farmers for them to adopt new practices.

Structure of organizations enabling CSA implementation

Figure 4 shows the structure of administrative offices in Bac Lieu Province which relate to the implementation of CSA practices. The People's Committee (PC) is the main administrative office at the provincial, district, commune and village levels. At each administrative level, there are lateral technical offices as follows:

Divisions and centers

- Plant Protection Division
- Livestock Husbandry and Animal Health Division
- Irrigation Division
- Rural Development Division
- Forest Protection Division
- Aquaculture Division
- Fishery Exploitation and Protection Division
- Agricultural Seed Center
- Clean Water and Environmental Sanitation Center
- Agriculture and Aquaculture Extension Center



Source: OBS, 2014

Figure 4. Organization landscape map for implementation pathway of CSA practices

Figure 5 shows the results of the implementation pathway using an organizational landscape approach. The numbers between circles represent the administrative level of organizations related to CSA practices. The direction of arrows indicate the interaction between the different organizations (organization type represented by the color of the box). The dashed arrows represent individual activities. Solid color arrows represent combinations of different activities. Although an organization can have more than one function, it is evident that the link is top down with the direction of arrows always pointing from a higher level of administration to a lower level.

Bac Lieu PC and DARD were two important offices in providing policy, funding, training technique and coordination for implementing a CSA practice. The Department of Natural Resource and Environment (DONRE) was also important in implementing CSA practices if it relates to environmental issues, such as surface water pollution in animal husbandry (piggery, chickens, or ducks). In Bac Lieu,

the role of some volunteer organizations, such as the women's union, is important in disseminating CSA practices, especially those related to sanitation activities in the village through a waste cleanliness program.

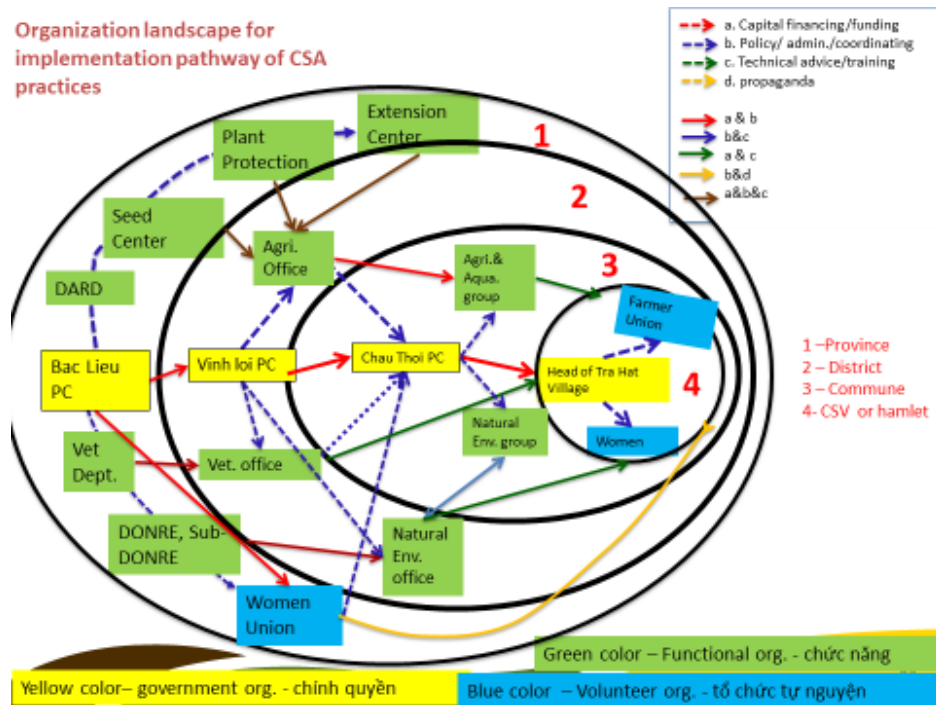


Figure 5. Organization landscape map for dissemination of CSA techniques/ practices in Bac Lieu Province

Conclusion

Twelve in-depth KI interviews were conducted for the purpose of reviewing CSA practices selected by farmers in the workshops and surveys on prioritization of CSA practices. The KIs expressed their opinions on the potential of different CSA practices in rice production in Tra Hat CSV. The focus was on the CSA practices: AWD, reduced fertilizers (N, P), using straw to make compost fertilizer. KIs strongly recommended the CSA techniques: mechanized straw baler and laser land leveling.

Integrating the CSA techniques and practices into a bundled sequence of promoted best practices is advised to increase farmer acceptance and adoption. This is especially advised to be promoted through demonstration plots and farmer trials. Replacing upland crops with WS rice crop was rejected for reasons of market risk (input, output), no experience, no labor, and lack of irrigated water in dry season.

Improving the traditional rice seed (Tai Nguyen) quality was also viewed as important because it can be bundled together with the promotion of best practices of the "1M5R" policy supported by the local government. KIs also thought this is important for maintaining the original gene source of traditional rice varieties.

Other non-rice related CSA practices that KIs discussed included: HH husbandry model (raising chickens and pigs), sanitation treatment, and home garden (vegetable, fruit tree). These were chosen based on farmers' experience, habits, potential for high income, and because these are mainly for HH consumption and the food/nutritional security of the community.

In line with responses reported from the farmer HH survey, local authorities mention that economic benefits was the main reason for adopting a CSA practice. These included higher yields, lower production costs, or new sources of income. Environmental factors were also a consideration in adopting a CSA practice.

Most KIs advised that the dissemination of CSA practices should include the participation of local authorities, private sector, and farmer cooperatives. It is recommended that they invest in the procurement and maintenance of laser levelling and straw baling machinery and provide contracted services to farmers. The direction of dissemination was quite clearly a top down approach from the provincial level down to the village level. Although a stakeholders' validation workshop is needed to determine the out-scaling potential of the prioritized CSA practices in other regions, these results provide robust foundations for subsequent activities.

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APPENDICES

Appendix 1. KEY INFORMANT QUESTIONNAIRE

CCAFS site: Tra Hat, Chau Thoi, Vinh Loi, Bac Lieu

Designed by Ngo Dang Phong

A. GENERAL INFORMATION

Name of organization:

Address:

Name of respondent:

Position/function in organization:

Male/female:

Date of interview:

Duration of the interview:

Objective of KI interview:

- To introduce climate smart agriculture (CSA) technologies/practices that are prioritized by farmers through Workshop on “Participatory prioritization of CSA” as well as the household survey at Tra Hat CSV. The CSA practices are categorized into two groups: (i) rice production (Alternate Wetting and Drying (AWD), Correct N fertilizer applying Leaf Color Chart – LCC, P fertilizer reduction, land laser leveling, reduction of amount of rice seeds and increasing quality of seedling using sowing machine, collection of straw on rice field using baler machine, using straw for mushroom production, using straw for making compost with Tricoderma and improving cropping rice system by applying an alternative crop in winter-spring season (sesame, soybean)), (ii) production models in household area, such as raising pig, raising yellow catfish, raising yellow catfish and frog in the same pond, raising chicken, using water hyacinth to make compost for planting dragon fruit. These household production models have not only contributed to household income but also reduced livelihood risks.
- For those prioritized CSA practices/technologies or agricultural household production models that were selected from the participatory priority workshop, the Key Informant interviews were carried out with the aim to evaluate the dissemination abilities of these CSA practices in Bac Lieu Province in terms of aspects: (1) Technique, (2) Price – Market, (3) Policy and (4) Capital resources and which organizations or actors will do or link with any among aspects

B.1. From your point of view, how do you evaluate below production models?

B.1.1 Model	B.1.2. Attitude towards production systems (1-3) (*)	B.1.3. Reasons
B.1.1.1 Rice production		
B.1.1.2 Upland crop replacing for Rice in winter –spring season		
B.1.1.3 Household husbandry models (pig, chicken, fish)		
B.1.1 Home garden (vegetables, fruit)		

(*) (1) Needed (2) Likely (3) Unlikely

B.3. Production model in HH area

B.3.1 Model	B.4.5 Importance of models (1-3) (x)	B.2.3. Reasons of implementing the model (*)	B.3.4 Reasons of refusing to implement the model (**)	B.4.2 Saleability of product (1-3)(xx)	B.4.3 Price stability (1-3) (xxx)	B.4.4 Profits/ Benefits (iv)
B.3.1.1 Raising pig						
B.3.1.2. Raising yellow catfish						
B.3.1.3. Raising chicken						
B.3.1.4 Raising yellow catfish + frog						
B.3.1.5 Using water hyacinth to make compost for planting dragon fruit						

(x) (1) Not at all important (2) Moderately important (3) Important

You can choose more than one option:

(*) (1) Habit of farmers in production.
profit

(2) High

- (3) Influence of Ongoing projects
- (4) Recommendations of local government
- (5) Others (specify):.....
- (**) (1) Natural and physical condition (soil, water) (2) Disease
 (3) Economic factors (Low price, no market) (4) Difficult in buying qualified breed
 (5) Lack of labor (6) Lack of capital resource
 (7) Others (specify):.....
- (xx) (1) Difficult (2) Moderate (3) Easy
- (xxx) (1) Unstable (2) Moderate (3) Stable
- (iv) (1) Economic profitability (2) Environmental benefits
 (3) Having economic profitability without environmental benefits
 (4) Others (specify):.....

B.5. CSA technologies/practices for rice production

B.5.1. Technology/practice	B.5.2 Have you had any information about the practice?		B.5.3. If yes, how do you know about the practice? (1-3) *	B.5.4 Is the practice popular in Tra Hat village?		B.5.5 Do you want to implement the practice?		B.5.6 Reasons of implementation (1-6)**	B.5.7 Reasons of refusing to implement (1-10)***	B.5.8 Importance of the practice (1-3)****
	Yes	No		Yes	No	Yes	No			
5.1.1 Alternate wetting and drying										
5.1.2 Leaf Color Chart (N fertilizer saving)										
5.1.3 P Fertilizer Reduction										
5.1.4 Sowing machine										
5.1.5 Improved certified seed for rice production										
5.1.6 Salt-tolerant rice variety and short duration										
5.1.7 Laser leveling										
5.1.8 Baler machine										
5.1.9 Using straw for making mushroom										

5.1.10 Using straw for making compost with Trichoderma										
--	--	--	--	--	--	--	--	--	--	--

(*) (1) Listened or seen (2) Trained (3) Implemented

You can choose more than one reason:

- (**) (1) Economic factors (reduce production cost, less labor, increase yield)
- (2) Government policy (government support or encourage)
- (3) Follow the crowd (surrounding farmers)
- (4) Environmental factors (soil, water and air conservation,..)
- (5) Adaptation to climate change
- (6) Others (specify):.....

You can choose more than one reason:

- (***) (1) Land condition (scattered lands) (2) Lack of capital resource
- (3) Human resource (lack of skill) (4) Topography
- (5) Restrictions of irrigation infrastructure (6) Hard work
- (7) Difficult in buying certified seed (8) Difficult in buying mushroom spore
- (9) Services (10) Others (specify):
- (****)(1) Not at all important (2) Moderately important (3) Important

B.5.9. Applying land laser levelling can save production cost, increase the yield and get more the environmental benefits. Laser levelling would be appropriately applied in Tra Hat village in the condition for the 2R regions (SA season and late AW season) in which one season is fallow without cultivating (dry season after winter-spring season). Rental rate for laser levelling machine is about 5-10 million dong/ha and farmers can recover capital investment after 3 seasons.

B.5.9.1. From your point of view, what is the relative importance of laser leveling in rice production?

- Unnecessary Moderate Necessary

B.5.9.2. What is the ability of applying and disseminating laser leveling technology in the village?

- Difficult Moderate Easy

B.5.9.3 What are the necessary conditions for implementing the technology?

.....

B.5.10 Sowing machine has been implemented in many regions of Vietnam. This technology can reduce input costs by 3,860,000 dong/ha, increase the yield by 0.09 ton/ha and increase profit by 4,265,000 dong/ha.

B.5.10.1. From your point of view, what is the relative importance of sowing machine in rice production?

- Unnecessary Moderate Necessary

B.5.10.2. What is the ability of applying and disseminating sowing machine in the village?

- Difficult Moderate Easy

B.5.10.3. What are the necessary conditions for implementing the technology?

.....
B.5.11. Water plays an essential role in specific growth stages of rice. Alternate wetting and drying (AWD) technique has been implemented in many countries in the world as well as in some regions of Mekong river delta like An Giang and Bac Lieu provinces in 2004 and 2011 respectively. This practice can reduce water consumption as well as increase rice yield.

B.5.11.1. From your point of view, what is the relative importance of AWD practice in rice production?

- Unnecessary Moderate Necessary

B.5.11.2. What is the ability of applying and disseminating AWD practice in the village?

- Difficult Moderate Easy

B.5.11.3. What are the necessary conditions for implementing the practice?
.....

B.5.12. Applying the LCC can calculate the right amount of N fertilizer needed by rice at specific growing stage, save the input costs and reduce GHG emission.

B.5.12.1. From your point of view, what is the relative importance of LCC practice in rice production?

- Unnecessary Moderate Necessary

B.5.12.2. What is the ability of applying and disseminating LCC practice in the village?

- Difficult Moderate Easy

B.5.12.3. What are the necessary conditions for implementing the practice?
.....

B.5.13. Applying P fertilizer rate of 20-40 kg P₂O₅ can save input costs and reduce the P fertilizer surplus accumulated in soil.

B.5.13.1. From your point of view, what is the relative importance of P fertilizer reduction in rice production?

- Unnecessary Moderate Necessary

B.5.13.2. What is the ability of applying and disseminating P fertilizer reduction in the village?

- Difficult Moderate Easy

B.5.13.3. What are the necessary conditions for implementing the practice?
.....

B.5.14. Burning rice straw after harvesting

Consecutive burning rice straw will lead to the increase in GHG emission and air pollution.

B.5.14.1. From your point of view, what is the reason of burning rice straw?

- Easy Save labor force short time between 2 seasons Others (specify):.....

B.5.14.2. If farmers do not burn the rice straw, how do they use rice straw after harvesting?

- Selling it to trader Using straw for mushroom production at home
 Using it for husbandary Using straw for making compost
 Others (specify):.....

B.5.14.3. What is the ability of applying and disseminating baler machine in the village?

- Difficult Moderate Easy

B.5.14.4. What is the best way to introduce the baler machine to farmers?

- Provide information and appeal to private sector for investing in baler machine
 Local authorities will provide the service
 Trader
 Others (specify):.....

B.5.14.5. What are the disadvantages of mushroom production? (underlying options: difficult in straw collection/many labors/high cost/ lack of mushroom spore with high quality/ high skill requirement/ protected environment and clean water/space for straw storage using for mushroom production)

Other reasons:

B.5.14.6. From your opinion, where are the markets for mushroom? (underlying options: wholesale market/ markets near the village / trader/restaurant/ company).....

C. CSA implementation pathways

D.1 Among introduced technologies or models, what has your organization been relating to?

D.1.1. Techonology/Practice	D.1.2 Does your organization have any function that related to the technology? X (yes)	D.1.3 If yes, what function do your organization relate to? (*)	D.1.4 How does the direction of implementation pathway for deploying the CSA ? (**)	D.1.5 What are the other organizations link with the considered CSA?	Note
A. Rice production					
5.1.1 AWD					
5.1.2 N Fertilizer saving – LCC					
5.1.3 P Fertilizer reduction					
5.1.4 Improved certified seed for rice production					
5.1.5 Improved certified seed for rice production					
5.1.6 Salt-tolerant rice variety and short duration					
5.1.7 Lase leveling					
5.1.8 Baler machine					
B. Production models in HH area					
5.1.9 Using straw for making mushroom					
5.1.10 Using straw for makingcompost with Trichoderma					
5.1.11 Raising pig					
5.1.12 Raising yellow catfish					
5.1.13 Raising yellow catfish + frog					
5.1.14 Raising chicken					
5.1.15 Rasing duck					
5.1.16 Using water hyacinth to make					

compost for planting dragon fruit					
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* (1) Capital financing/supporting
organizations to participate

(2) Policy/Guiding/ coordinating

(3) Technical instruction/training

(4) Propaganda

** (1) Province → District → Commune → Village

(2) Province -> District -> Village

(3) Province -> Village



RESEARCH PROGRAM ON
**Climate Change,
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