

## ISQAPER 4<sup>th</sup> and final gender equality and diversity report

4th reporting period: 30-4-2019 - 30-4-2020

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## Summary

The ISQAPER project shows clearly how the combined insight of an online tool, supporting worldwide information flows adapted to local situations, and the participatory way to develop this tool with the local stakeholder groups, leads to a practical result and new ideas for follow up and improvement with gender balance and gender diversity as guiding project principles.

The gender goal in ISQAPER has been to analysing gender aspects in project organization and actions to improve soil quality status and derive practical and policy recommendations for the soil environmental footprint in Europe and China. The approach is through inventory, analyses with indicators, and promote awareness with communication.

Statistical diagrams show here the differences among European and Chinese men and women stakeholders. Gender aspects are being addressed by looking proportionally for gender related diversity in opinions about the Soil Quality Application (SQAPP) tests and the Agricultural Management Practice (AMP) demonstrations at the study sites. Because women are less in numbers in agricultural ownership, they are often less involved in developments and less heard in their opinion.

Therefore, the women responses are proportionally compared with the men's responses. In ISQAPER the percentages show a lot of similarities concerning the proposed AMP's, such as the need for "Knowledge and Subsidies". The 'Motivation for action on soil improvement' however, is by all respondents, but most by European men, the interest for: "Soil quality and soil fertility", women mentioning here more often: "Education; No pesticides; Good food quality, and; Health", and concerning the SQAPP improvement, the women are proportionally more interested in the "Recommendations in the SQAPP" than the men. The "Yield improvement and economic motivation" is proportionally more often mentioned by the Chinese respondents, Chinese women prefer: "More information about fertilization advice in the SQAPP". These can be called 'gender aspects' from the content of the soil quality research.

The gender equality helps to be aware and realize a gender balance. And it is the gender diversity, or the differences in responses of men and women to take into account and that make the total picture on soil quality improvement, agricultural management practices and the soil quality application, more complete and the inclusive solutions more societal relevant.

## 1. Introduction

The gender goal in ISQAPER is to analysing gender aspects in project organization and actions to improve soil quality status and derive practical and policy recommendations for the soil environmental footprint in Europe and China. The overall target of the project is, to develop the Agricultural Management Practices (AMP's), for improving the advice in sustainable farming, and with the Soil Quality Application, (SQAPP) as practical and supportive tool.

This gender equality and diversity report gives an overview on the gender equality iSQAPER staff in the entire project, including the 4<sup>th</sup> reporting period. Also it gives the gender disaggregated data from the different phases in the SQAPP tests with the stakeholders; in the design phase, what do they expect from the SQAPP, what would be useful information about the soil for their agricultural planning?

When the project started, the gender equality policy in the EU Horizon 2020 programme, noted that: Gender is an overarching, cross-cutting issue and is mainstreamed in each of the different parts of the EU Work Program, ensuring a more integrated approach to research and innovation. It is about fostering a gender balance in research teams, in decision making and integrating the gender dimension in research and innovation content. The expected impact of the policy is the increase of the scientific quality and societal relevance of produced knowledge, technologies, and innovations by integrating an in-depth understanding of both genders' needs, behaviours, and attitudes. It also contributes to the production of goods and services better suited to potential markets. (EC 2016/2020)

The EU Gender equality Strategy 2020-2025 that was launched in March this year, has even more ambition to get to gender equality stating that: "Gender equality is a core value of the EU, a fundamental right, and key principle of the European Pillar of Social Rights. It is a reflection of who we are. It is also an essential condition for an innovative, competitive and thriving European economy. In business, politics and society as a whole, we can only reach our full potential if we use all of our talent and diversity. Gender equality brings more jobs and higher productivity—a potential which needs to be realised as we embrace the green and digital transitions and face up to our demographic challenges." (EC 2016/2020).

To reach the iSQAPER goal in analysing gender aspects in improving soil quality status, a three steps approach is used, consisting of:

- (I) a search for data (inventory, Section 2),
- (II) analysis of the data (indicators, Section 3),
- (III) and exchange the data (communication, Section 4).

The data are about the gender balance among the project staff in numbers and in positions, and about the stakeholders in numbers, their type of stake and role in the project and their input and feedback for the SQAPP and AMP development. The conclusions and recommendations are in Section 5.

## 2. Inventory results

The data inventory is about gathering the numbers, roles and opinions about sustainable AMP's and the use of the SQAPP of men and women among the ISQAPER staff and stakeholders and the changes in the past 5 project years, gathered through questionnaires, interviews and discussion. The data for gender equality within the project context, can be distinguished in the level of organisation and the level of content. In ISQAPER the inventory is more than one questionnaire, it was done in several steps along with the sprints, the software development of the SQAPP, in different ways throughout the project.

The organisation is operationalized in the numbers of men and women in the project staff, the diversity in their project roles (2.1) and the numbers of stakeholders involved in the different questionnaires together with the SQAPP sprints (2.2).

The gender perspective in the content of the research, is worked out in Section 3 on Indicators.

In the 4<sup>th</sup> project period new data were gathered from the demonstration events at the study sites, to show and learn from the stakeholders about the Agricultural Management Practices (AMP's) and the next (3<sup>rd</sup>) version of the application (SQAPP) (2.3).

### 2.1 Staff

Here are the numbers from the staff involved in iSQAPER from 2015-2020, checked on gender balance, diversity in positions and changes within the project context. In putting together the iSQAPER consortium, a gender-sensitive approach was followed. Female scientists have been involved since proposal inception and are prominently represented in at least 14 out of 26 partner institutes. Every reporting period the numbers and the functions of the staff were being checked on changes and equality. The last questionnaire on staff numbers was send on March 17 this year.

In total numbers, the staff is well balanced. Compared to the first reporting period, new people were contracted, some staff finished their input, in total 3 more women and 21 men less, total staff number dropped from 171 total staff with 44% women in 2015, to 153 total staff with 52% women in 2020. (Tabel 2.2.1)

iSQ Staff	women	men	total	% women
2015-2016	76	95	171	44
2016-2018	78	98	176	44
2018-2019	81	83	164	49
2019-2020	79	74	153	52

Table 2.2.1 ISQAPER staff

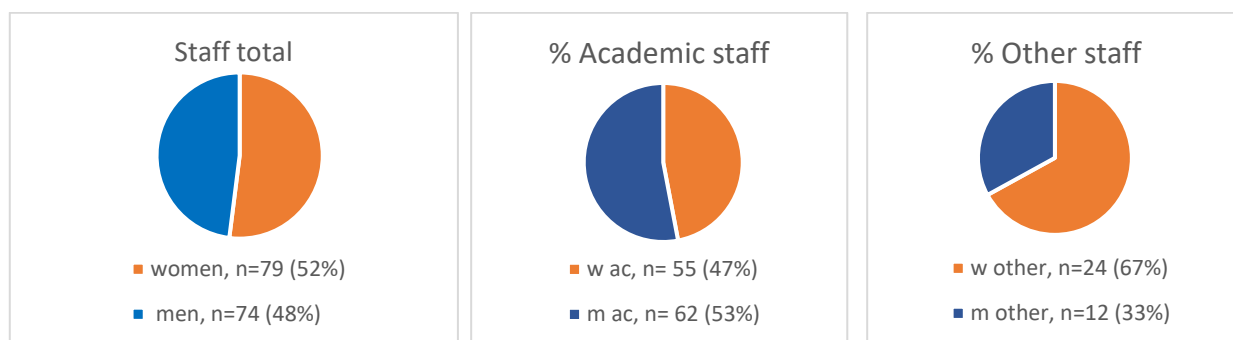


Figure 2.2.2. Total staff, academic and other staff from ISQAPER, 4<sup>th</sup> RP, May 2019- May 2020

When looking at the type of positions of the 2020 ISQAPER staff, making a difference in academic staff, (78% of the total staff), with 55 women (47% of academic staff), and 62 men (53% of the academic staff), total number academic staff is 117, and total number other staff, like laboratory or administrative assistants, is 36 (22% of the total staff), 24 (67%) women, and 12 (33%) men, making the total staff reasonably balanced. This 4<sup>th</sup> period on average, more men and women were contracted in the “other staff” (All numbers see **Annex 1**)

The academic staff in the project started in 2016 with 144 persons, 58 (40%) women and 86 (60%) men academic, 27 other staff, 18 (67%) women and 9 (33%) men. For the women one sees a shift to more experienced researchers (position 3, in grey) throughout the project, for the men one sees a drop in numbers in all positions, only a little more supportive staff (Figure 2.2.3).

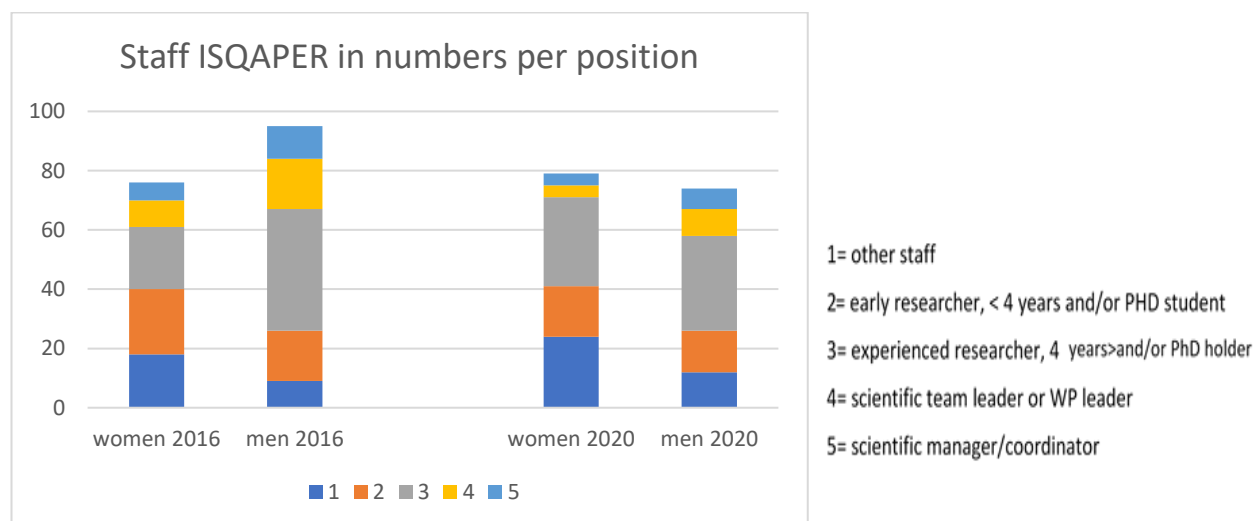


Figure 2.2.3 Staff 2016-2020, the numbers refer to the positions

nrs	1	2	3	4	5
men 2016	9	17	41	17	11
women 2016	18	22	21	9	6
men 2020	12	14	32	9	7
women 2020	24	17	30	4	4

%	1	2	3	4	5
% men 2016	33	44	66	65	65
% women'16	66	56	34	35	35
% men 2020	33	45	52	69	64
% women '20	67	55	48	31	36

Table 2.2.2 Numbers women and men per position

Table 2.2.3 Percentage men and women position

## 2.2 Stakeholders and SQAPP sprints

The Soil quality application (SQAPP) was developed during the project. Huge databases were involved to make the tool worldwide useful for different pedo climatic zones, including China, as worked out in WP 2, 3 and 4. To make a useful application for land management options and keeping the soil in a good condition and quality, the study site stakeholders were involved in different ways and different stages of the project and the development of the application (WP5). The stakeholder input and feedback was necessary to understand their needs, their stake in the project and their uses and, their expectations of an application, give their opinions and use the information for the next sprint in the SQAPP development.

The stakeholder involvement in these SQAPP developments began with an identification phase, a broad - gender disaggregated- questionnaire amongst stakeholders at the study sites. In the first reporting period an inventory was being done amongst stakeholders to know their expectations from the SQAPP, these gender disaggregated data were analysed and reported in Milestone 5.1 and in the first gender equality report. The

data were useful for the first software development of the SQAPP, also called a 'sprint'. Although the women respondents were only 17 % (35 from 204) of the total, there were some proportional differences as the interviewed women relatively showed more interest in soil threats, soil types, education and environmental protection, as the men being interviewed. (ISQAPER '19, RP1). In the second reporting period AMP and SQAPP testers were selected among the stakeholders and presented in poster sessions, these were only 19 % women (20 out of 106 total). Another approach for the feedback was chosen.

In the 3<sup>rd</sup> project reporting period, WP5 gathered gender disaggregated stakeholder data with an online questionnaire with feedback from the 1<sup>st</sup> SQAPP version. These data were analysed in D5.1, (CDE, 2019), and because but these data are gathered gender disaggregated, an analysis could be made, as explained in the third gender equality report. In this data gathering, from a sample of SQAPP testers, the total numbers of testers was lower, than the total number of stakeholders, but the percentage of involved women was higher, 37% (32 women, n=87). Quantitative tests on gender significance were done. The responses show some gender significance, although small, it helps to show some gender nuances, and the need to keep monitoring with gender disaggregated data. There were also several other feedback researches at the study sites, for example in Estonia and an MSc research in Albaida region in Spain, combining a gender disaggregated questionnaire with a SQAPP field test. (WUR, 2018). The SQAPP was not available in a Chinese version at the time of the testing, so this feedback is from the European ISQAPER study sites. The feedback is described in the 3<sup>rd</sup> gender equality report. (ISQAPER 2019, 3<sup>rd</sup> RP)

In the 4<sup>th</sup> reporting period, gender disaggregated data were gathered at the demonstration events at the study sites, with 33 % women, (73 from 220 total). (See more results in 2.3)

Here, the stakeholder feedback is being summarized in three moments:

1. 2015 Stakeholders were consulted by the study site staff,
2. 2018 SQAPP test results stakeholder questionnaire
3. 2019 Demonstration event proposed AMP's and SQAPP development

	Stakeholders	Men	Women	Not known	Total	% Women
	ISQAPER 2015	169	35	30	234	17 (n=204)
	feedback SQAPP 2018	55	32	2	89	37 (n=87)
	demonstration events 2019	147	73		220	30 (n=220)

Table 2.3.1 Numbers stakeholder in 3 feedback questionnaires

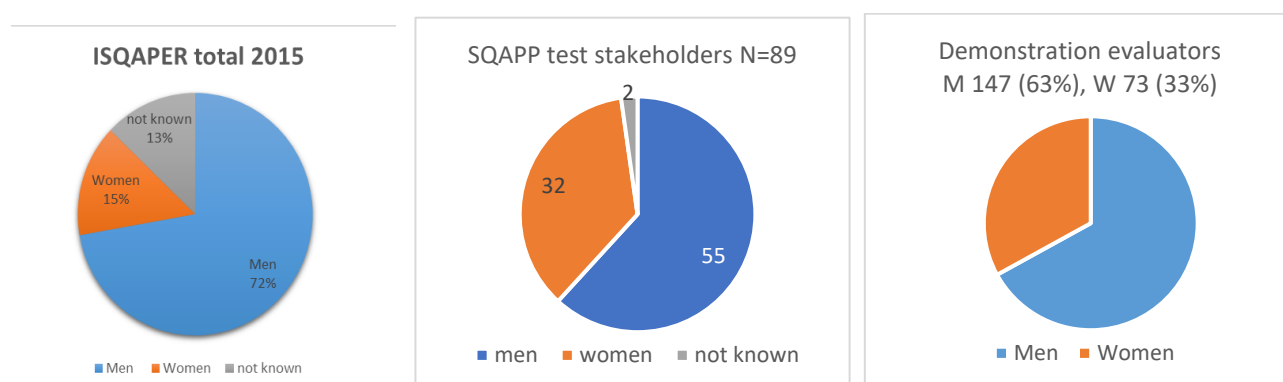


Figure 2.3.1. Stakeholders numbers from three feedback questionnaires; the women, are reflected in orange, the men in blue, grey respondents refer to not knowing the gender, not filled or a group.

## 2.3 Demonstration events

For the demonstration events in 2019, on Agricultural management practices (AMP's) and the Soil Quality Application (SQAPP), a questionnaire for the stakeholders was organized, by WP9 (Medes) together with 9 European and 2 Chinese study sites (See Annex 2). There were nine open questions, the first two were about the gender (man or woman) and the role (afterwards categorized as researcher, farmer, technician and student), of the respondent (2.3.1.). The numbers were in total (table 2.3.1):

Q1, Feedback at demonstration events	m	W	
Eur	97	58	155
Ch	50	15	65
	147	73	220

Table 2.3.1. Stakeholder feedback numbers at demonstration events

The numbers per study site and the pedo climatic zones where they are situated are in Annex 2.

### 2.3.1 Roles

When we differentiate the roles from the men and women stakeholders the total number of roles is 233, 76 performed by women 157 by men, 13 more roles than number of persons interviewed (220), because 10 men and 3 women had 2 roles. (table 2.3.2.)

SQAPP demonstration events, numbers stakeholder respondents									
roles SH	research		farm		technician		student		
	men	women	men	women	men	women	men	women	
EU	21		31		13		42		107
EU		22		5		16		18	61
		43		36		29		60	168
Ch	27		13		10				50
Ch		7		5		3			15
		34		18		13			65
									65
									233

Table 2.3.2. Stakeholder feedback numbers roles

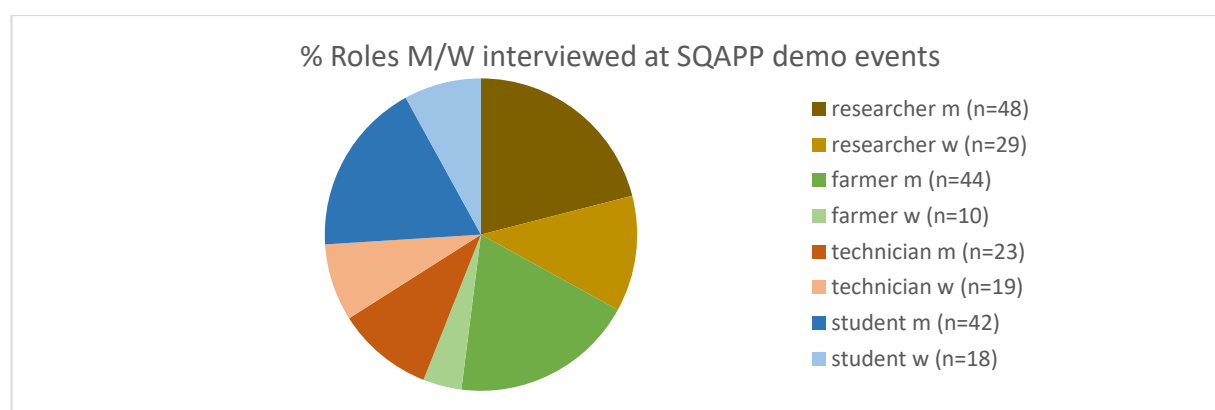


Figure 2.3.1. Division of roles stakeholder feedback at demonstration events

### 2.3.2 Results per question

After gender (Q1) and role (Q2), the other questions about the demonstration events were as follows:

Q3 What actions do you take (in your job or otherwise) to protect the soil?;

Q4 What is your motivation to these actions?;

Q5 What would enable you to do more?;

Q6 What prevents you from doing more?;

Q7 For the agricultural management practice -of the (demonstrated) AMP- to be widely adopted in this area, what issues would have to be addressed?;

Q8 What aspect of the SQAPP interests you most?;

Q9 Are there any improvements or changes you think should be made to SQAPP to make it a tool that you would use regularly?

In the following part are the results per question. In the figures, the responses of the European men are in blue, European women in orange, Chinese men in grey and Chinese women in yellow. The n= the number of responses per question per type of respondent. The differentiation in roles is made in the responses to Q7 on the AMP and visualized per role in Annex 4, and the responses of some Chinese stakeholders in their roles, are described in 3.5.

#### Q3 What actions do you take to protect the soil?

The action to protect the soil, that the respondents take, are summarized in: “No tillage, Plant cover, Crop rotation”, for almost one third of the European men (n= 94) and for one fifth of the European women (n=53) and one fifth of the Chinese men (n=52). Of the Chinese women respondents, (n=16) one third mention: “Soil research”, and a few mention: “Organic fertilisation”. “Education” is mentioned by 11 of the European women, in the Chinese responses it is said as: “Promote green technology”, mentioned by 14 of the Chinese men and two women. The category “Other” has less than 4 responses per category on “Legislation”, “Learning” and “No action”. In the analysis, the outcomes for EU and China were separated, see Annex 3.

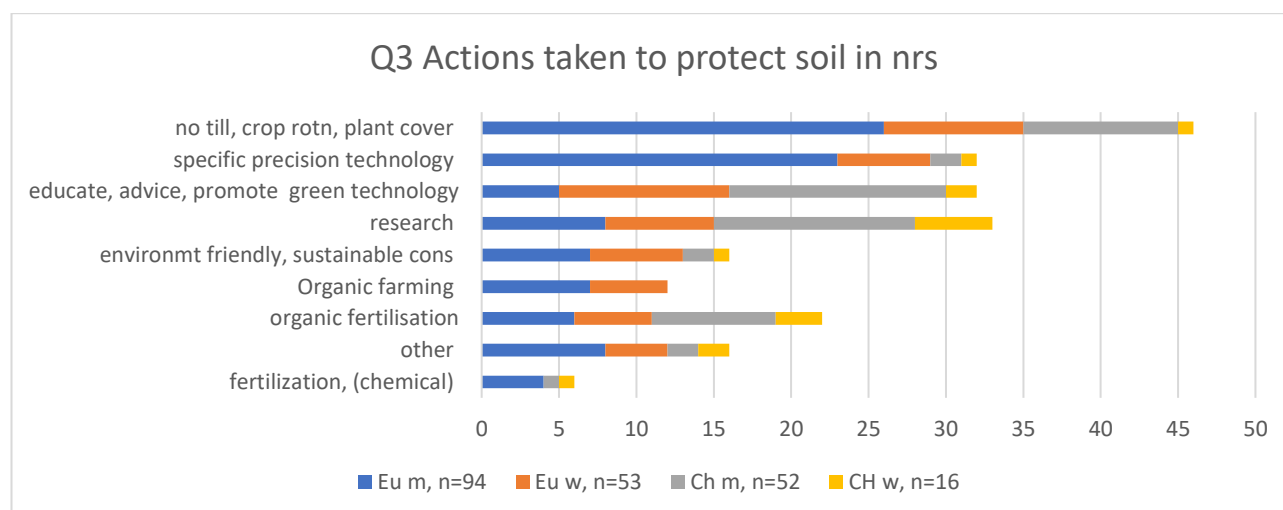


Figure 2.3.2. Actions taken to protect the soil in numbers

#### Q4 What is your motivation to your actions to protect the soil?

The most mentioned motivation to the actions is: “Soil quality and Soil fertility” (mentioned 64 times, of which 60% by the European and Chinese Men); second is: “Economic, Improve the yield, Crop management and Income” (60 times, of which 60% Chinese men and women respondents), and third is: “Sustainability, Soil protection against threats and Biodiversity” (54 times of which 85% is by European men and women).



The category “Other” here is a combination of low numbers in “work, research, policy, subsidy, nothing, and water protection” (See figure 2.3.3.)

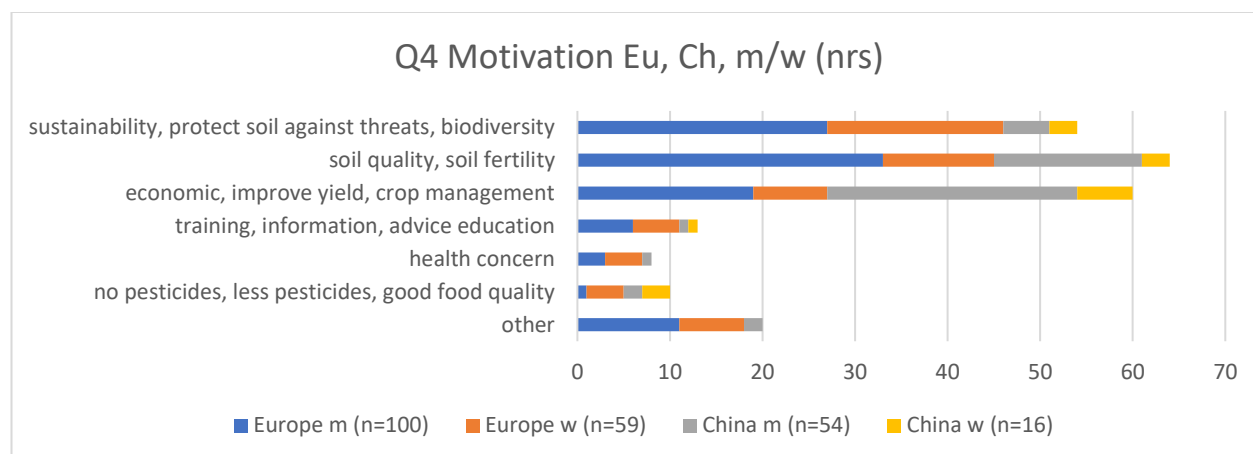


Figure 2.3.3. Motivation to protect the soil (numbers)

A different picture is given when the numbers are counted in percentages, the “No or less pesticides” and “Good food quality” are a minor issue in numbers, but these are more interesting in percentage, where it is about 80 % mentioned by women. Of the category: “Sustainability, protection of soil against threats and more biodiversity” 60% is a combination of European and Chinese women. (Figure 2.3.4.)

The picture per category (Chinese men, Chinese women, European men, European women) shows this proportional or different prioritization in motivation in percentages. This is further explained in section 3 about indicators.

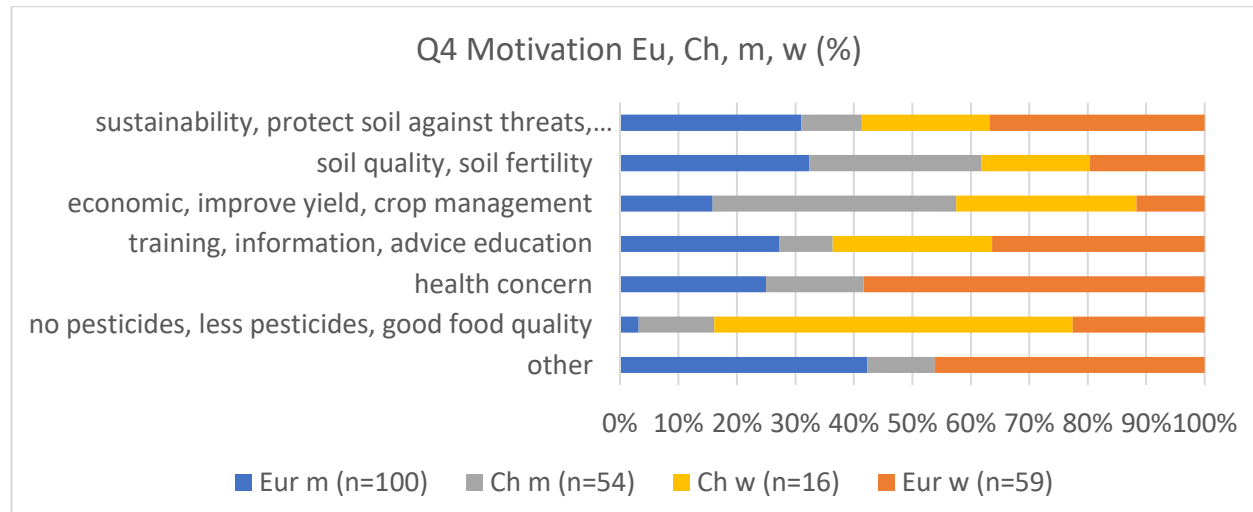


Figure 2.3.4. Motivation to protect the soil in percentages

## Q5 What would enable you to do more?

Looking for more: “Knowledge and information”, are mostly the European stakeholder responses here (total 30 men and 17 women), of whom from 9 farmers (7 men and 2 women) 9 technical advisors (5 women , 4 men), 10 researchers (6 men, 4 women) and 19 students (13 men, 6 women), where Chinese are more looking for: “Training and Advice”, (total 19 men and 8 women) of whom farmers (8 men and 4 women) and also agro-technicians (2 women, 3 men) and researchers (8 men, 2 women). If you look at the totals proportionally for the choices for: ‘What enables one to do more to protect the soil?’(Q5), there are some differences in

nuances Chinese women were slightly more into: “Training and Advice” where the Chinese men show slightly more interest in: “Improved technologies”. The European women mentioned more: “Knowledge and Information gathering”. All respondent groups mention the need for: “Supportive subsidies and Policies” to make the change. (Figure 2.3.5.)

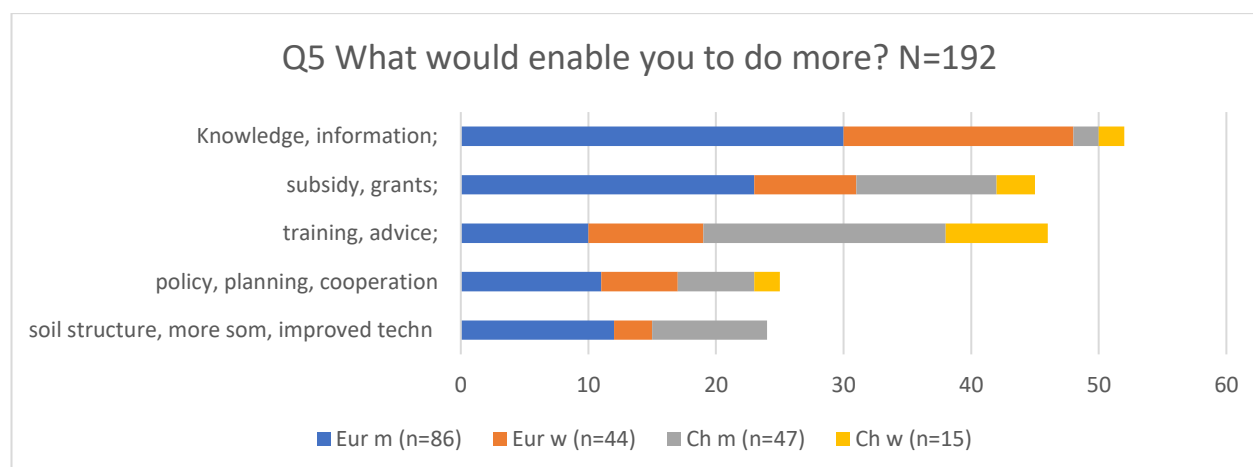


Figure 2.3.5. Q5: What would enable you to do more to protect the soil? (in numbers)

#### Q6 What prevents you from doing more?

In summary the conclusions from the responses to Q6 are: one fourth of all responses, from China and Europe, men and women, refer to: “Money, Lack of support, Uncertainty of income”; European men and women, refer more to “Knowledge” that prevents them from doing more, Chinese men and women refer also to “No cooperation and Lack of knowledge and acceptance of farmers” and the need to have “Better yields (to do more organic and to lower costs)”. And, less in numbers, but mentioned by all respondents, is a “Lack of technical advice” and “The law”. (Figure 2.3.6a)

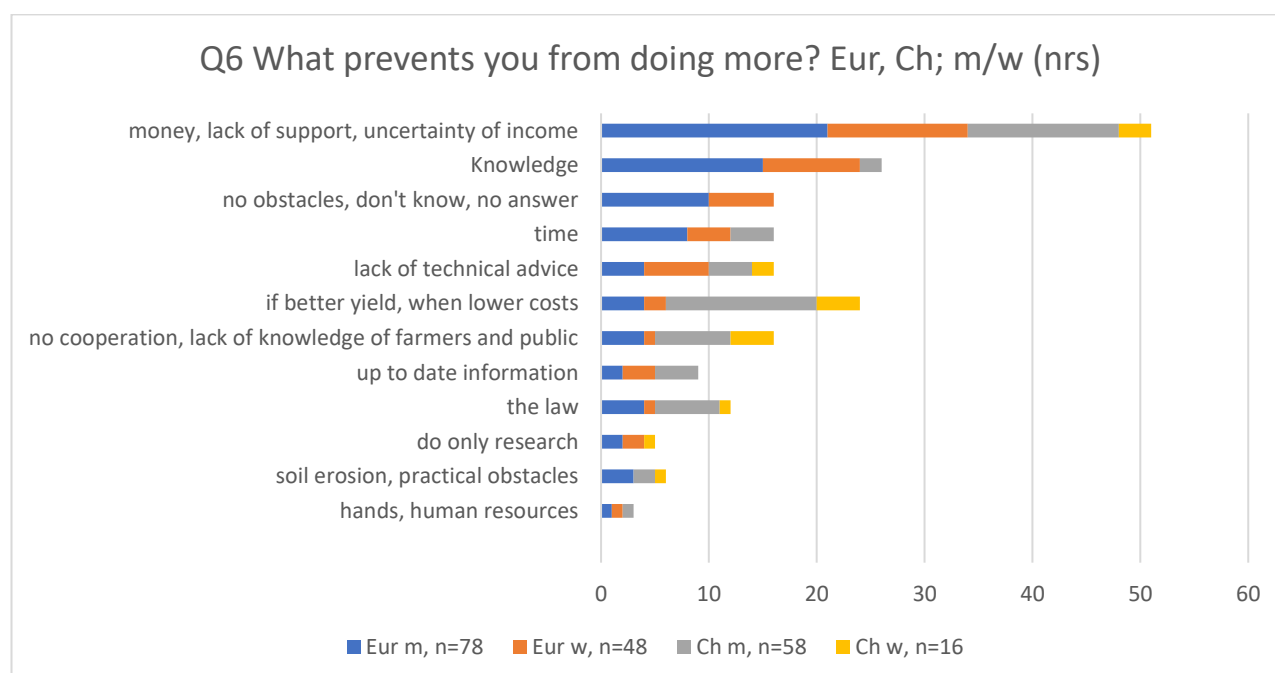


Figure 2.3.6a Responses to Q6: “What prevents you from doing more”(numbers)

To see the different priorities, the responses are also in percentages and visualised in mountains of aspects to be crossed. (Figure 2.3.6b.)

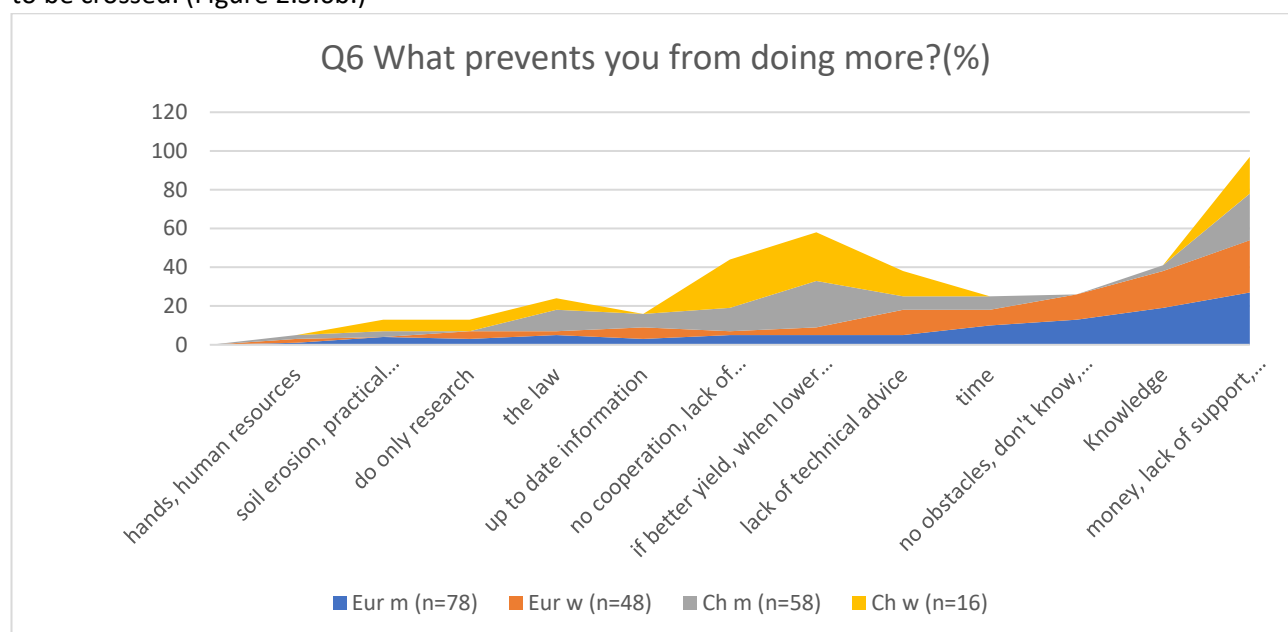


Figure 2.3.6b. Responses to Q6: “What prevents you from doing more” (percentages)

### Q7 Issues to be solved for wider adoption

In the responses to the question: For the agricultural management practice (AMP) to be widely adopted in this area, what issues do you think would have to be addressed? The responses were compared between Europe and China among the roles: farmers, researchers, technicians and advisors. Several times, more than one answer was given to the question. Most farmers name “Training and Guidance” and “Policies and Subsidies”. (Figure 2.3.7)

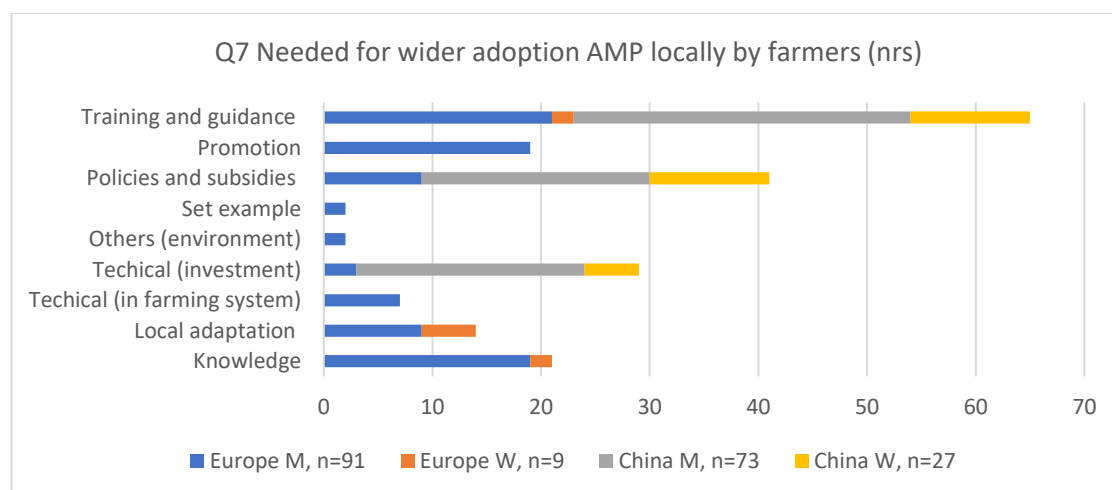


Figure 2.3.7 responses farmers (numbers)

Chinese researcher, technical advisor as well as farmer (men and women) mention more “Policy and Subsidies” than the European respondents with similar roles.

European and Chinese men researcher want more: “Technical incorporation in the farming system”, and Chinese men mention more: “Technical need of investment” (especially farmers), also “Training and Guidance”. “Knowledge” is mentioned by Chinese researcher men only.

Chinese women researchers mention: “Environment, and Knowledge for local adaptation”, European women and men also. European women are more explicit about: “Local adaptation” of the AMP’s

The responses are visualized per topic, per role and for Europe and China separately in Annex 4.

### Q8 What aspect of the SQAPP app interests you most?

In the context of a demonstration meeting with the SQAPP (stakeholders) most European men and women are interested in the data on: “Soil quality and soil property”. The: “Real time soil data and free data”, are the most important for the Chinese men and women, farmers as well as agro technicians and researchers. Some said: “I understand the quality of my land better.”

In numbers the European respondents, women slightly more than men, value the “Recommendations” high. In proportions in the next section (figure 3.4.3), this is shown more clearly. Mentioned recommendations here are “How to improve soil quality, to protect from soil threats, erosion, know the water holding capacity, irrigation needed, how to protect the environment, prepare soil for orchards”. In the “other” category are remarks included such as: “Easy to use, fast, strong database”. (Figure 2.3.8.)

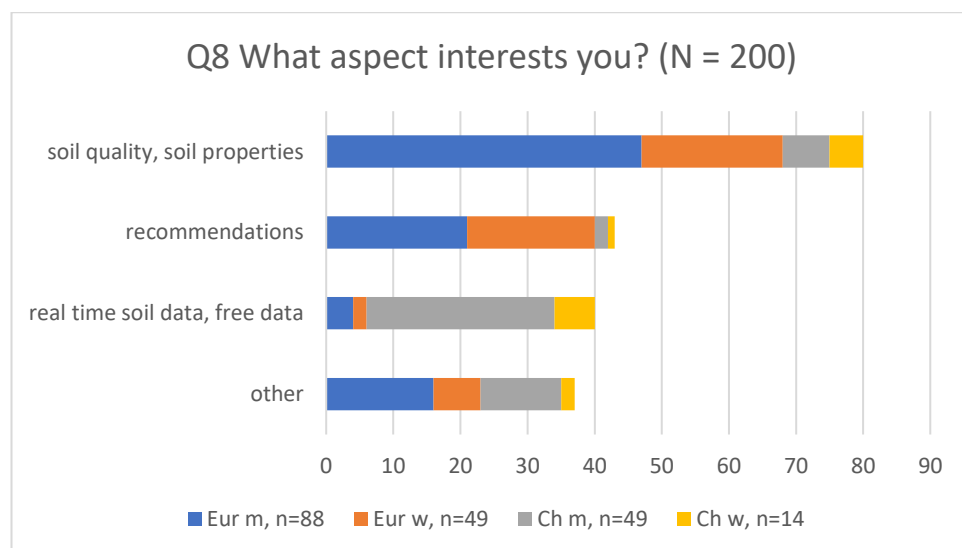


Figure 2.3.8. Q8; What aspect of the SQAPP interests you? (Numbers)

### Q 9 SQAPP improvement

For the SQAPP improvement in general, the SQAPP is well received. Highest scores in Europe and China by men and women for improvement are on the: “Local versions, Chinese version, local language, local data”. For the Chinese the: “Free, update and open data” are important, they want more: “Accurate positioning data and crop data” and Europeans want more: “Recommendation on organic farming”. (Figure 2.3.9.)

Extra remarks for SQAPP improvements were: “Include data protection, when uploading privacy sensitive local farm data in the SQAPP”, and; “To add satellite crop view tot the SQAPP”.

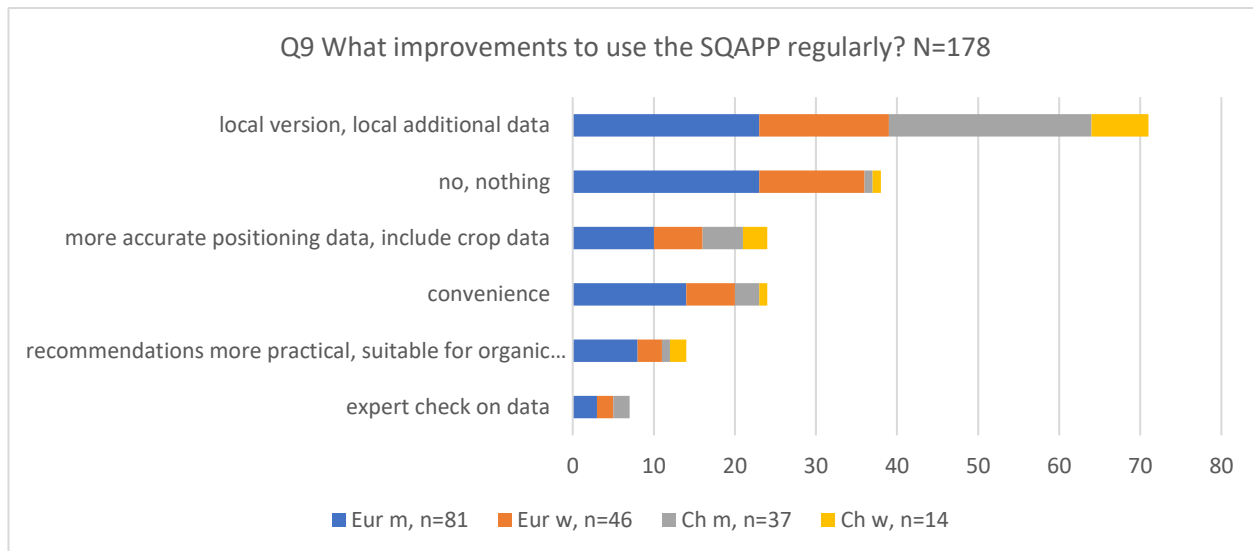


Figure 2.3.9. Q9: What improvements would make you use the SQAPP regularly? (Numbers)

The diversity about the SQAPP improvement and shows more differences between China and Europe, than between men and women from the same continents. European men mention: “More convenience in SQAPP” needed. Chinese women look for practical “Recommendation on fertilization”, this is better visible in proportion comparisons (paragraph 3.4).

### 2.3.3 Conclusion gender aspects

In summary the respondents, the study site stakeholders; researchers, advisors, farmers, men and women, from Europe and China, are all interested in the sustainability of the soil quality, the graphs show some (gender- and continental related) nuances. In conclusion to the responses of the demonstration events one can say that the actions taken by respondents to protect the soil (Q3), are the AMP’s “No till, crop rotation, plant cover, etc.” and “Research” (all), “Precision technology” (most European men) as well as “Education” (European women and Chinese men),; “Sustainable consumption and Organic farming” (most European men and women).

The motivation to protect the soil (Q4) is “Soil quality, soil fertility, yield improvement”, (more in Chinese responses) but also “Sustainability, soil protection and biodiversity, (more in European responses). The gender aspects here are especially seen in the difference in the motivation to protect the soil between mentioning “Yield improvement and soil fertility” by men and “Soil protection against threats and no or less pesticides” by women.

More “knowledge and subsidies” are needed to improve soil quality action from these study sites (Q5,6). The issues to be solved for wider adaptation of the AMP (Q7), was analysed per role, all say the “Need for policies and subsidies”, farmers want more “Training and guidance”, women look for “Local adaptation” of the AMP’s. Concerning the interest for the SQAPP, (Q8) for most of the Chinese it is the “Actual data” and for all, the: “Soil quality and soil properties information”. For improvement of the SQAPP (Q9), more “Local data” was mentioned by all respondents.

The gender aspect in these results, for example looking at the gender priorities mentioned in the Q4 Motivation, “Soil quality and yield” are more mentioned by men, where the women mention more “Education and Training” and “Non-pesticides and Good food”. In Q8 on the interest for the SQAPP, the women are most in favour of the “Recommendations”. In Q9 Chinese women look for more “Fertilization advice”.

### 3. Indicators

For ISQAPER, the goal is to integrate soil quality information. The perspective of gender equality and diversity on soil quality improvement is explained here with indicators. An indicator is a way to measure a goal. In this section, it is shown how the differences in opinions about approaching the soil quality, the nuances in gender diversity, can be measured with indicators and visualized with percentages, graphs and colours.

The introduction gives a definition for soil quality indicators and gives examples for sustainable development and gender equality indicators in the United Nations Sustainable Development Goals (3.1).

The target of ISQAPER to have gender equality in the project organization, can be monitored with gender numbers, and with the percentages of men and women as a proportion of the total, and also, with the “type of position” of men and women in percentages, as an indicator. (3.2).

For the content of the ISQAPER research, to analysing gender aspects, the gender diversity is measured, as the difference in responses between men and women, in relation to the questions on soil sustainability in agriculture. The diversity is measured in numbers and percentages, to check if there is a subject specifically stressed by men or women. To enable to measure the gender diversity, the data that are gathered have to be gender disaggregated. The results from the feedback to the second version of the SQAPP (in the 3<sup>rd</sup> RP), showed some gender significance concerning soil biodiversity and soil acidification. (3.3).

At the demonstration events in this 4<sup>th</sup> RP, the questions were about the uses and future possibilities for improving the soil quality considering AMP's and the SQAPP. The responses were open and categorized afterwards. In the analysis of the diversity among the responses was then looked at differences between China and Europe, between men and women and, in some questions, between their roles: researchers, farmers and advisors. Or, briefly, categorized between the involved continents, gender and roles. The responses were compared by numbers, percentages and indicators, measuring the aspects and, made visible and open for discussion through graphs and figures and similar colours per response category (3.4).

The open questioning gives room for qualitative data, here the Chinese feedback from the men and women farmers, agro technicians, government officials and researchers, are described as short stories from the Chinese subtropical zones, Quiyang and Suining (3.5).

#### 3.1 Introduction

In measuring soil quality, *“Ideal indicators should: correlate well with ecosystem processes; integrate soil physical, chemical, and biological properties & processes; be accessible to many users; be sensitive to management & climate; be components of existing databases; be interpretable”* (Doran and Parkin, 1996; Soil-quality 2011). This is also the approach in ISQAPER.



For the worldwide sustainable development goals (UN SDG's 2020), the United Nations have developed many indicators to enable countries to show their progress, among which is gender equality (goal 5), with the target (5.1), to end all forms of discrimination against women. The indicator for that, is the legal framework to promote and monitor gender equality per country. For sustainable agriculture and food security, is another UN development goal (goal 2) with target, 2.4: *By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality, the indicator here is: (2.4.1) Proportion of agricultural area under productive and sustainable agriculture.* A combined UN goal for gender equality in agriculture, has the target to, *the right to land ownership*, with the indicator 5.A.1 (a): *Proportion of total agricultural population with ownership or secure rights over agricultural land, by sex; and (b) share of women among owners or rights-bearers of agricultural land, by type of tenure.*

FAO works on these numbers for 2020. In the 1<sup>st</sup> ISQAPER gender equality report is stated; "in most of our case study site countries between 20% and 29% of the agricultural holders are women. In Estonia, it is 36% and in Switzerland and in the Netherlands, it is less than 9%.". The indicator used here is (FAO 2020):

$$\text{Proportion of female agricultural holders} = \frac{\text{Female agricultural holders}}{\text{Total agricultural holders}} \times 100$$

### 3.2 Gender equality in staff positions

For the organization of the project, a gender indicator next to the numbers, is the type of positions of women and men. One can see a shift to more experienced researchers (position 3) throughout the project for women, compared to the men, who have less experienced researchers in ISQAPER in 2020 than in 2016. For men there is a drop in numbers, (see paragraph 2.2), but in percentage, except from the change among the experienced researchers, the gender division of positions generally has not changed. (Figure 3.2.1).

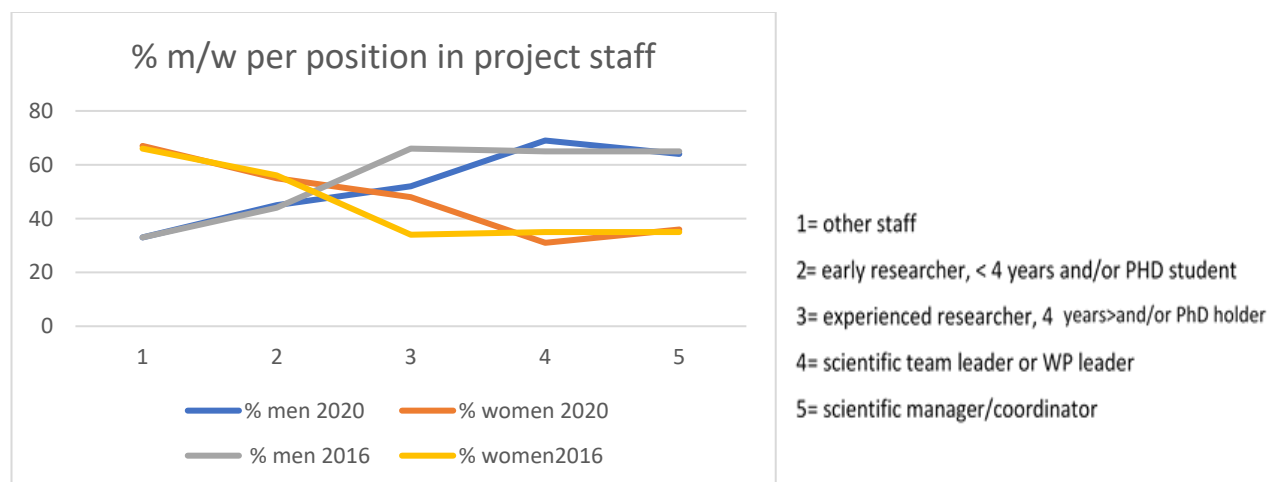


Figure 3.2.1 Picture of the gender balance in positions in percentages in ISQAPER 2016-2020

The indicator here is: *Proportion of women in ISQAPER staff* =  $\frac{\text{Number of women per position}}{\text{Total number per position}} \times 100$

The figure shows the combination of this proportion of women with the similar proportion for men (total men divided by total staff number), spread by the 5 positions, and comparing both indicators in the 1<sup>st</sup> and 4<sup>th</sup> reporting period of the project. This figure is related to the organization of the project.

### 3.3 Significance in the content

For the content of the research, a gender significance test on diversity was done for all of the responses in the 3<sup>rd</sup> RP, in the SQAPP feedback. Gender significance is a measure for a gender aspect. Here, 2/3 of the responses, were appropriate for a Mann-Whitney-test, used for ordinal variables. And 1/3 t-test (with numerical values and yes/no answers). The questions were tested on significance of difference between the responses from women and men, of them, 2 showed significance, this is the question: “How relevant are the **proposed soil threats** within the local context? [Soil biodiversity]”. Also “How relevant are the **proposed soil threats** within the local context? [Soil acidification]”. The women are proportional more positive about the relevance of the proposed soil threats on biodiversity and soil acidification in the local context. Women respond between “very relevant and relevant” and men respond between “relevant and irrelevant”. Most of the other questions have differences in responses, but these are not proven gender significant. It is not clear from the qualitative information (remarks) whether biodiversity or acidification has gender specific attention.

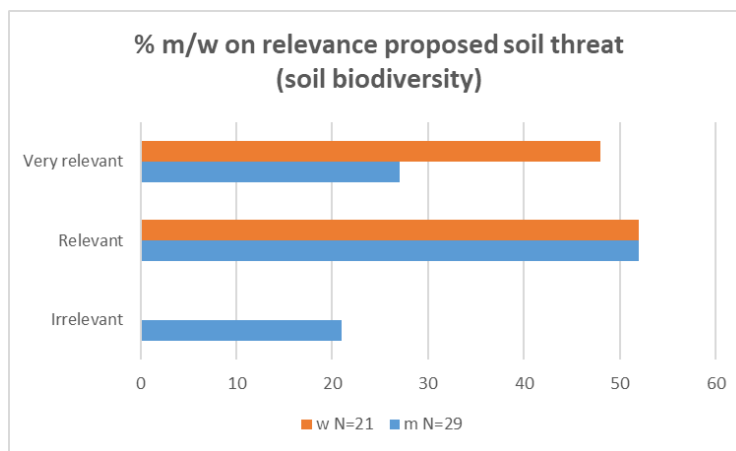


Figure 3.3.1 Relevance of proposed soil threat: soil biodiversity/acidification by gender (percentages)

This is about a content related indicator;

*Proportion of women on relevance proposed soil threat [biodiversity] =*

$$\frac{\text{number of women responses (r)}}{\text{total of women responses (r + i + vr)}} \times 100$$

r = relevant; (r+i+vr) = “relevant + irrelevant + very relevant”,

compared with the sum of the same divisions for men, taking their total responses, which included “very relevant” “relevant” and “irrelevant” as visualised in figure 3.3.2.

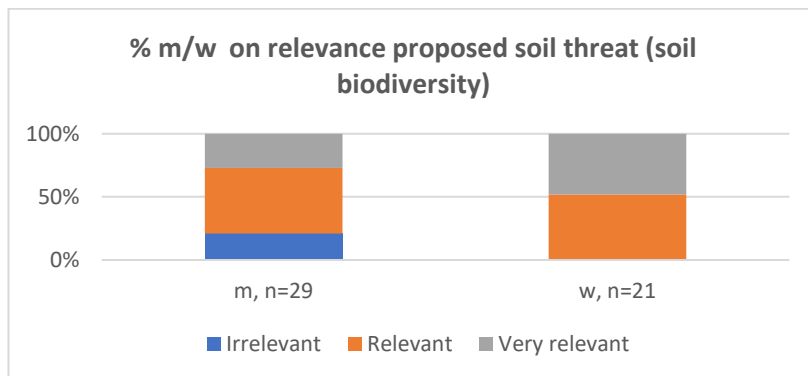


Figure 3.3.2 Same data as figure 3.3.1, showing per respond the percentage per gender



Three of the gender significances that appear, are related to the question about the relevance of the proposed soil threat within the local context. In several aspects there is something that women find it more relevant than men among these respondents. Still none of the other mentioned aspects to the question of relevance of the proposed soil threats (water and wind erosion, compaction, salinization nor contamination), show any gender significance in the responses.

Therefore one could say that the significance draws attention, it show a gender aspect, in a sense that “the proposed soil threat within the local context-bio diversity and acidification” are proportional more relevant according to women than according to men among respondents. A few more gender significances appear when the responses of advisors and researchers were tested as a user group separately: Significance among researchers can be found concerning the question: How relevant are the **proposed soil threats** within the local context? [Soil organic matter decline] and [soil nutrient depletion], women researchers find it very relevant to relevant and the men researchers find it relevant to irrelevant. It is further explained in the 3<sup>rd</sup> report and on the website as attachment to deliverable 5.1. on stakeholder feedback. (ISQAPER 2019)

### 3.4 Gender diversity for soil quality

Considering all the aspects of circumstances, numbers, etc. throughout the project it was noticed that there are similarities and nuances in the opinions of men and women, referring to indicators showing different needs or motivations to have a good soil quality (protection). To make these nuances visible, the responses are made comparable in percentages and colours. The responses to the demonstration events in the study sites in the last project period, for sustainable AMP's and the SQAPP as a tool, were divided over four respondent categories: men and women from Europe and from China. And for some questions a division was made among the roles of the stakeholders; the farmers, researchers, advisors/technicians (and students in the European study sites). The different categories help to get a complete picture for soil improvement approach, with in this context gender being the leading category for the analysis. The responses to the different questions are being discussed here.

To the question: **What actions do you take to protect the soil? (Q3)**, the answers were in highest numbers in total (and mentioned by both genders): “No till, Crop rotation, Straw returning technology, and “Research”. European women mentioned most: “Education” and Chinese women: “(Organic) Fertilization”, indicating their priorities, worked out in proportions to their totals and made visible in comparable colours in **Annex 3**.

**What motivates you to act to protect the soil quality? (Q4)** Most responses here were: “Soil quality and soil fertility”; most Chinese (men and women) mention: “Yield”; and European (men and women): “Soil protection and Biodiversity”.

Looking proportional at the gender priorities mentioned here; “Soil quality, Soil fertility and Yield”, are more mentioned by men, where the women mention; “Education and Training, Non-pesticides and Good food”, in higher priorities than the men. The biggest category for European women is: “Sustainability, Biodiversity and Protect the soil against threats”; for Chinese women and for Chinese men: “Yield improvement”. “No pesticides and Good food quality” are proportionally higher prioritized by both European and Chinese women.

When visualizing the priorities between motivation of men and women from European and Chinese study sites, the following figure appears, here one can see the gender nuances (and continental nuances) better. Here it is not about numbers in itself, but about proportions, themes in numbers in relation to totals, see figure 3.4.2.

### Q4 Motivation to protect soil; Feedback at demonstration event SQAPP

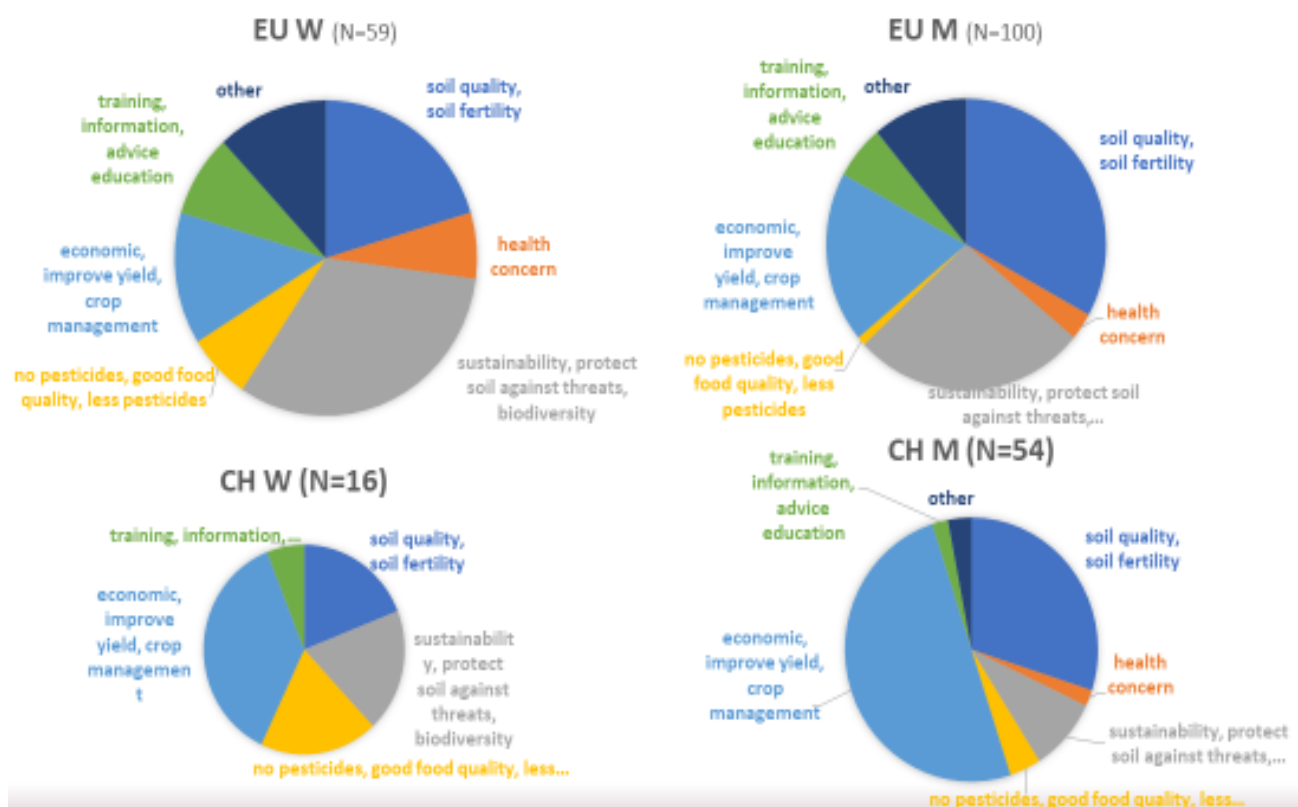


Figure 3.4.2 Priorities in motivation to protect the soil at demonstration events AMP's and SQAPP (%)

**What would enable you to do more (to protect the soil)? (Q5)** European priorities are most: "Knowledge and Information", Chinese men and women most: "Training and Advice", and all mention: "Subsidies", Chinese men are also mention: "Improved technologies" here.

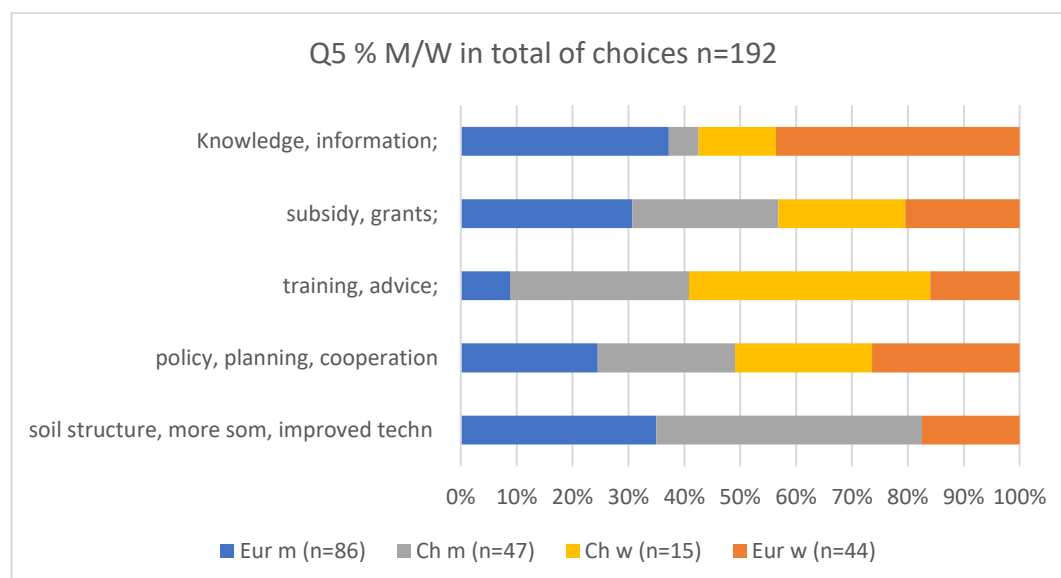


Figure 3.4.3. Q5 in proportion to the other categories: What would enable you to do more? (percentages)

**What prevents the Chinese and European women and men from doing more (Q6)** is: “Lack of money, Promotion, Funds, and Uncertainty of income”, say all categories, and: “Better yields, need for lower costs (of seeds and organic fertilizer); Lack of knowledge and cooperation from farmers”, mentioned most by Chinese stakeholders. (figure 2.3.6 a and b).

**To adopt the (demonstrated) AMP widely in this area, what issues have to be addressed? (Q7)** “Training, Guidance, Policy, Subsidy, Knowledge and Promotion”, are being mentioned by all. Chinese women mention “Environment”, European women and men also. European women are more explicit than men about: “Local adaptation of the AMP’s”. European and Chinese men researcher want more: “Technical incorporation in the farming system”, and Chinese men mention more: “Technical need of investment” (especially farmers), also “Training and Guidance”. “Knowledge” is mentioned by Chinese researcher men only. See responses to Q7 per role in Annex 4.

**Q8 What aspect of the SQAPP interests you?** When looking at the gender priorities, in percentages, one gets this type of figure, see figure 3.4.3. It shows the proportion of the responses per category (Categories are here: European men, European women, Chinese men and Chinese women) to the selected interests for the SQAPP. Also, one sees here that the European and the Chinese women together find the “Recommendations” more important than the European and Chinese men together.

The indicator here is: *Proportion of women responses* =  $\frac{\text{Number women type of response}}{\text{Total number of women responses}} \times 100$

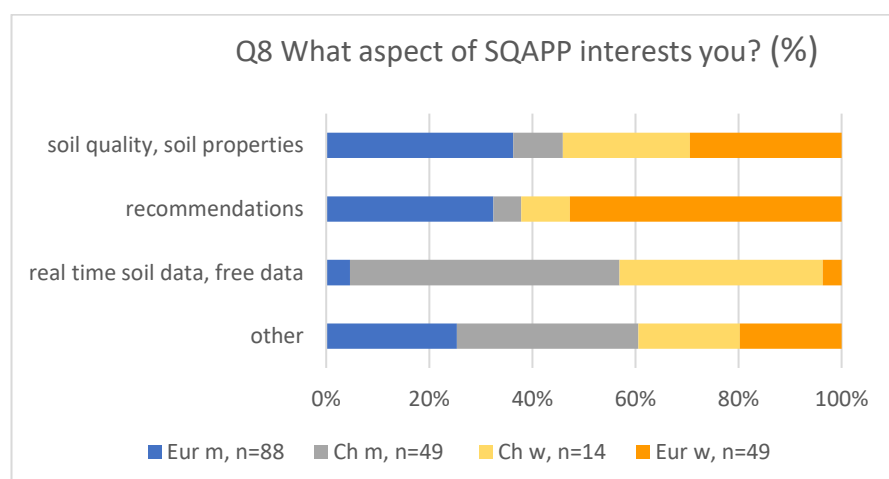


Figure 3.4.3. What do respondents find interesting from the SQAPP in percentages

Mentioned recommendations here are "How to improve soil quality, to protect from soil threats, erosion, know the water holding capacity, irrigation needed, how to protect the environment, prepare soil for orchards". In the "other" category are remarks included such as: “Easy to use, fast, strong database”. (The numbers are in section 2, figure 2.3.8.)

To **Q9; What improvement to the SQAPP would make you use it more regularly?** In China most desire an own version with free data, (the android version is there, but was not available at the moment of the AMP demonstrations,) also in the different European study sites, local versions were advised, some mention convenience, Chinese women look for more fertilization advice, and several respondents think the SQAPP is fine like it is. By separating the answers in European women-Chinese women-European men- Chinese men, and by colouring the similar answers in comparable colours, one can see the differences in priorities, as follows;

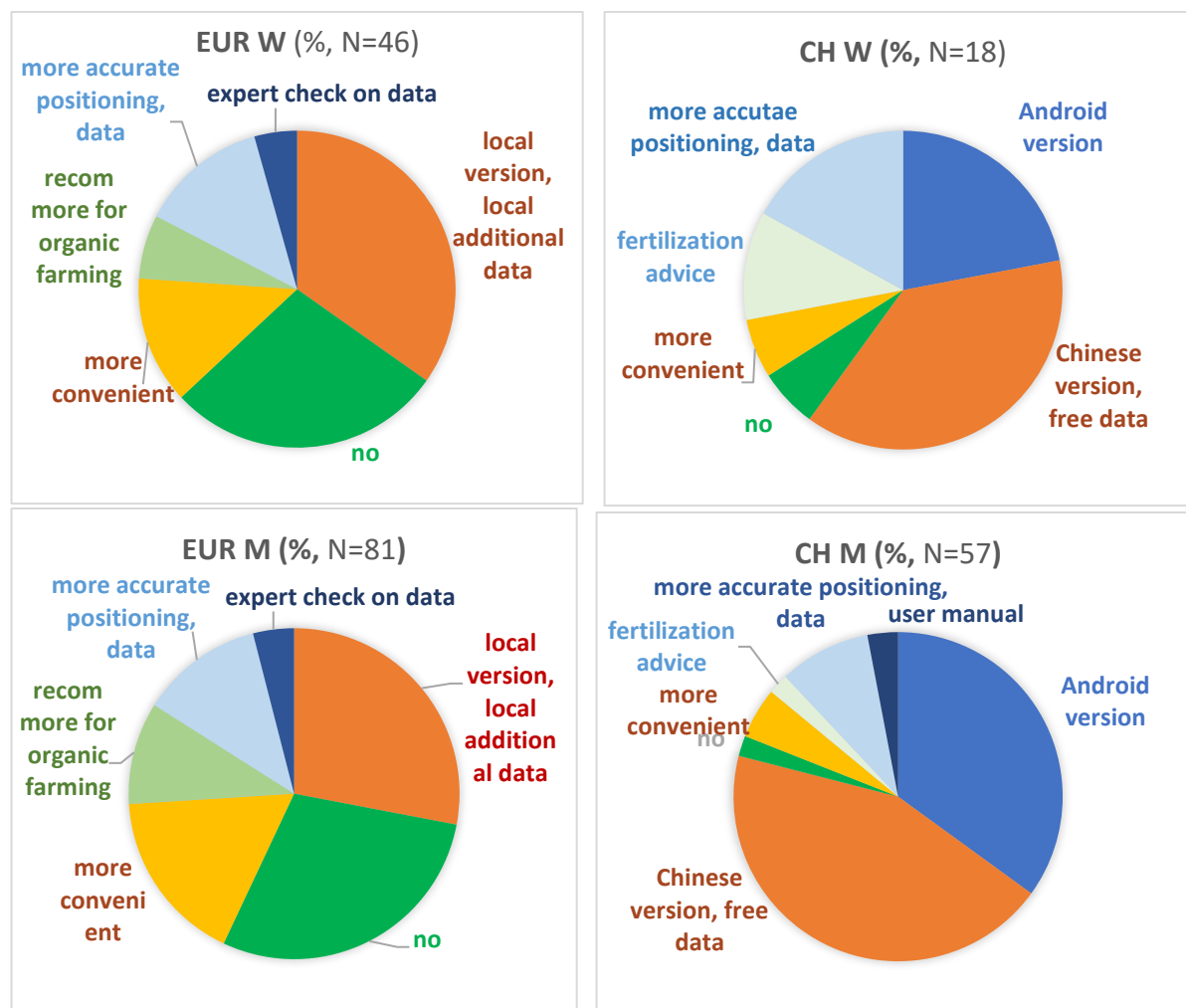


Figure 3.4.4. Q9: What improvement to the SQAPP would make you use it more regularly? (percentages)

In conclusion, with the graphs and the colours per subject it is easier to see the differences in priorities. The combination of the priorities give a broader perspective on the needs.

Proportional comparisons show better the gender differences, but also differences among other categories. Some gender aspects from this section are:

(Chinese women) Fertilization advice (SQAPP) and training and advice for soil improvement;

(European women) Local additional data and recommendations (SQAPP) and more knowledge to enable to do more for soil improvement;

(Chinese men) free data (SQAPP) and improved technologies needed to improve the soil, and;

(European men) more convenience and recommendation to organic farming (SQAPP) and soil quality, soil fertility as motivation to improve the soil.

The same method could be used per pedo climatic zone or per role. But when the numbers are smaller, the outcomes become more arbitrary. Therefore the combination with qualitative data is very helpful.

### 3.5 Gender aspects in Chinese study sites

To get a better view on the perspectives behind the numbers, some qualitative explanations are given from the two study sites from China. Suining (study site 12), purple soil, mid-subtropical zone, and the red soil, mid-subtropical zone Quiyang (study site 11), had 43 and 22 interviews respectively, in total there were 50 men (27 scientists, 13 farmers and 10 technicians or technical advisors) and 15 women (7 scientists, 5 farmers and 3 technicians). These numbers for Chinese women are very small, to make their ideas better visible, they are written here.

Two women agro technicians from near Quiyang, say they want to promote sustainable land use management, reduce fertilizer input and increase crop yield the other wants green manure cultivation techniques for soil quality, and reduce chemical fertilizer. To be able to do more they need financial support, policy support and technical support, also they mention that, the acceptance by farmers to transform is low, it needs more promotion and publicity, improved mechanization. SQAPP therefore can provide fertilization advice, and it can be uploaded any time. They hope the SQAPP can be made compatible with Android or that a Chinese version can be developed. The 7 agro technician men from the same area had actually similar responses as the women, with some specifications in the techniques like straw returning, control field acidification and conservation tillage.

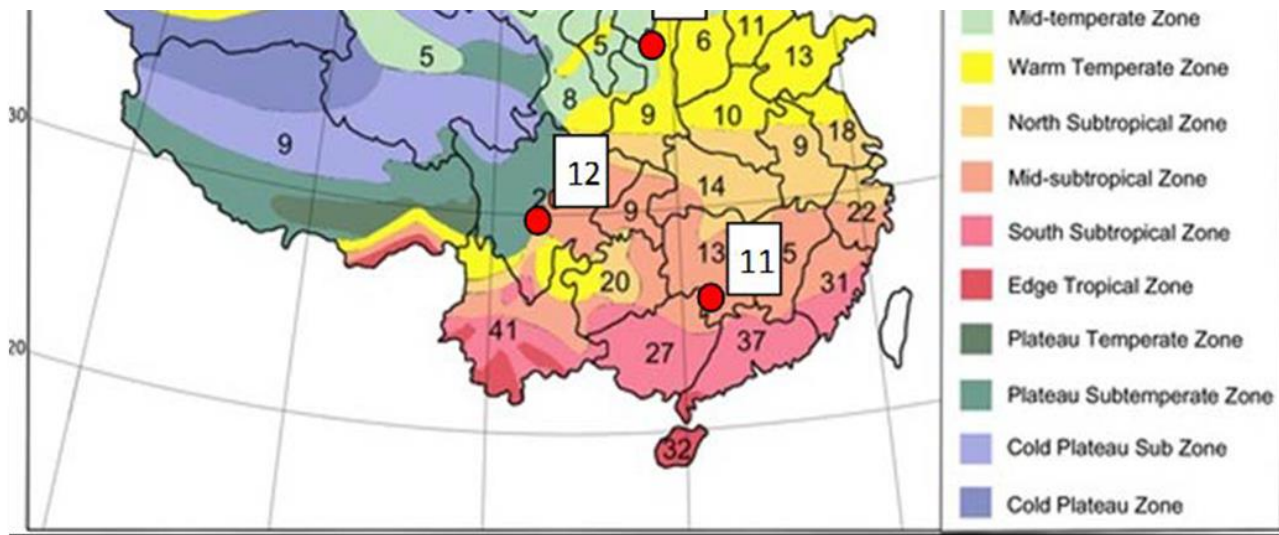


Figure 3.5

The two women farmers say they protect the soil with the straw returning and applying organic fertilizer or chicken manure. With those actions they want to save costs and increase their income. One needs a machine to smash the straw, the other needs guidance on farm management. There is no solution for the disease on corn crop and for the other organic fertilizer is too expensive, she hopes organic fertilizer will get cheaper to have it wider adapted in the area. The other wants more guidance of a technician for adopting of AMPs in the area. Both see the quality of their area in the SQAPP, looking for a more convenient and Chinese version. The nine farmer men from the same area showed little nuances in their responses, they also apply protective tillage, straw returning and green manure. Mostly to increase crop production and soil fertility. They ask for management support on fertilizer use and reduction of heavy metals in the soil. Organic fertilizer is takes more time and effort to apply, result is not clear. They want more mechanization but need revenues (financing). They need training, policy support, and subsidy. They also would like to have a Chinese or android version of the SQAPP and add that it has a lot of information which is updated, real time and can be looked at any time.

The two government officials (men) are doing the control of acidification and want to promote new technologies for soil fertility to help farmers. For that, they need new technologies. Low efficiency of green manure planting and insufficient water resources in the farmland should be solved. One mentions that the farmers do not trust the new technologies and that there is a lack of field infrastructure. Policies and financial support are necessary to improve the quality of the land together with the farmers. About the SQAPP both say it needs a Chinese version and should be compatible with Android. It interests them that the App can be positioned globally and that it can guide the farmers to fertilize in real time.

Six women researchers are acting on soil protection either by studying organic farming, nutrient regulation and change with fertilizer reduction for sustainable soil use, control acidification and increase crop yield, and by promoting straw returning. They say that they need more exchange with farmers that use fertilizer excessively, to apply theory to practice, for promotion of theory, policy support and subsidy to farmers is needed. Interesting of the SQAPP in their opinion is that all users can update the data, although it needs more accuracy of positioning and data. For some it would be useful if it could give for specific fertilization advice. The 15 men researchers have similar reasons for what they research and arguments about what prevents them from doing more, for example there are companies producing fertilizer that are not suitable for the soil type, there is lack of knowledge of rational fertilization by farmers, and they opt for more cooperation between researchers, fertilizer manufacturers and farmers; and more government policies and subsidies are needed.

From Suining two of the three farmer women use organic fertilizer and farmyard manure to protect and fertilize the soil and increase the yield. The third woman farmer says she uses chemical fertilizer to increase the yield. She is at the demonstration to get more advice on fertilization, she mentions soil acidification as barrier to do more. The farmer women using organic fertilizer say that they need more professional guidance, the price of organic fertilizer is high, they hope for more mechanization and subsidies. The advantage of the SQAPP for all three is to view the soil data in real time, at any time and they all ask for a Chinese version of it and compatibility with Android. Among the men farmers also three use organic methods to protect the soil like: protective tillage, crop rotation, straw returning and commodity manure. One uses chemical fertilizer, he technical training and advice. He admits the practical use of the SQAPP because the data can be viewed any time, also says that a Chinese version should be developed. The organic farmers also look for yield (and income) increase, one wants to reduce soil disease (with crop rotation), they need guidance for the use of organic fertilizer, a lower price for organic fertilizer and more policy allowance, subsidy and mechanization to reduce force. The remarks on the SQAPP are the same (Real time, Android and Chinese version).

The woman from agro-government wants to support fertilizer reduction technology, to reduce heavy metal soil pollution and help farmers increase their income. She looks for fertilizer ratios of different farm land. There is however low cooperation of farmers. Subsidies and new technologies for farmers would help. SQAPP also Chinese version wanted. From the agro-government men, one is looking for an application on fertilizer technology, he and the other men also want a Chinese version of the SQAPP and compatibility with Android. They also say the price of organic fertilizer is too high, more subsidies and technical training would help and the farmers attitudes towards new technologies should transform.

In summary one can say that the Chinese farmers (women and men) do want more sustainable agriculture, but as long as it is more expensive and their income is low they look for cheaper ways to get their yield. Agro technicians and researchers find it hard to convince the farmers and plea also for subsidy support. The responses written down in this text, are also categorized in the numbers of responses to the questions on the demonstration events. (paragraphs 2.3 and 3.4)



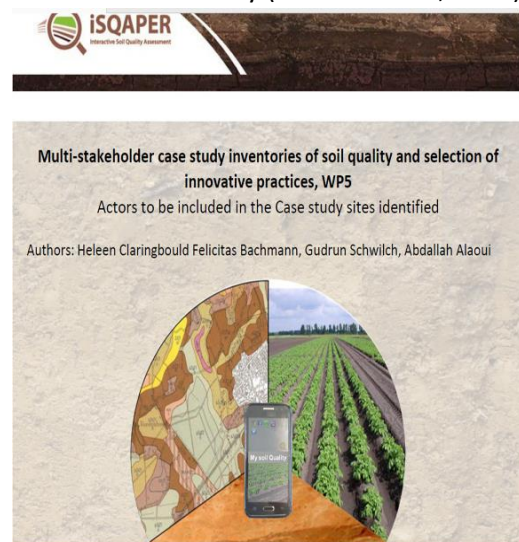
## 4. Communication

The communication was done in different levels, there was the stakeholder involvement and data gathering, where gender equality was always mentioned, because the data help us to show how the balance in numbers between men and women in the project performs. The questionnaires with the stakeholders were done by the study site staff. Other communication was done by explaining the aim and results from gender equality research in the presentations.(4.1) and the idea for more digital support in agriculture like the SQAPP, was launched in the FAO discussion on the relation between sustainable soil management and gender equality (4.2). The 3<sup>rd</sup> part of this section is about gender mainstreaming in environmental sustainability gives a perspective from a farmer woman on “agriculture 3.0” with a healthy soil.

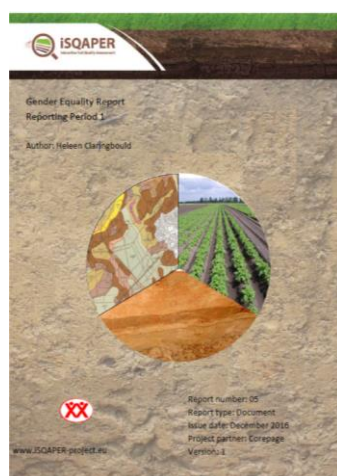
### 4.1 Presentations

At the plenary meetings the ISQAPER participants, work package and study sites leaders and/or staff present their progress and follow up, as was done on the part of gender equality. In France ('15) the gender equality approach was explained, and in Hungary ('16), the first inventory results of stakeholders, are presented and written down in Milestone 5.1.

First plenary meeting, presentation in France ('15); multi stakeholder inventory (Milestone 5.1, 2016)



Presentation in Hungary ('16)



The first gender equality report (2016); Presentation In China ('17) gender equality

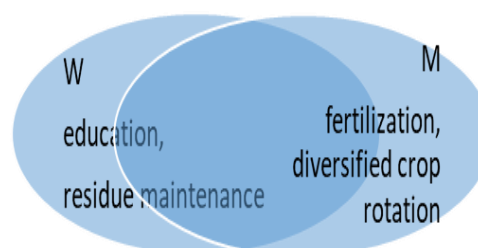
In Estonia ('18), there nuance difference between men and women stakeholders were stressed and the SQAPP selection for test stakeholders was criticized because of the small number (17%) of women involved compared to men.

## Gender diversity in iSQAPER

Heleen Claringbould, Corepage, partner 21

June 2018, Tartu, Estonia

Work package no: 1, 5, 8, 9



Presentation at plenary in Estonia '18

The results are in the second gender equality report, from June '18.

In Slovenia ('19), new stakeholder gender data were presented, retrieved from the stakeholder feedback to the soil quality assessment app (from WP4, UNIBE, CDE) and from the evaluation report from a combined SQAPP questionnaire and field research in Albaida, Spain (from WUR-UMH, 2018). The data were tested on gender significance, to check if there are underlying gender issues, making use of the data that are gathered for feedback to AMP's on soil quality improvement and the supporting tool (SQAPP).

## Stakeholder gender equalities and diversities

iSQAPER staff numbers and results stakeholder feedback.

Heleen Claringbould, Partner 21 COREPAGE



June 2019, Ljubljana, Slovenia

Work package no: 1 and 5



Presentation in Slovenia ('19)



The results from this analysis were presented in the 3<sup>rd</sup> gender equality report in 2019, and as an attachment to the deliverable 5.1 on the website (ISQAPER 2019).

The follow up contained the questionnaires at the AMP demonstration events at the study sites, the Work package on communication (MEDES) gathered the information, including gender disaggregated data. In Crete, Greece march 2019, just before the Corona lock down, it was made possible to present the first results of these data. Interesting to see, is the differences between the EU and the Chinese stakeholders, especially concerning the need for open and local data and some soil quality measurement perspectives like education, biodiversity and fertilization, are more women concerns and yield, crop production, are more concerns by men, so, related to gender. In percentage more women than men, are interested in the recommendations of the SQAPP.

## Gender equality in ISQAPER

### iSQAPER results stakeholder feedback

Heleen Claringbould, Partner 21 COREPAGE 

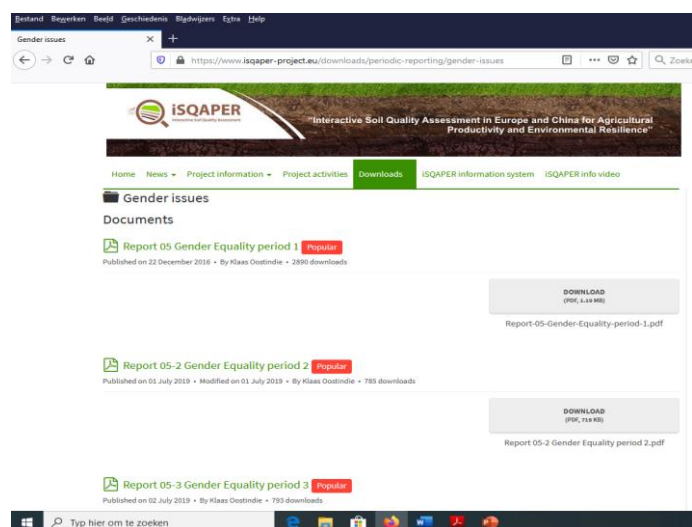
March 2020, Heraklion, Greece      Work package no: 1, 5, 8 and 9





Presentations in Crete, Greece ('20)

The results are given in this 4<sup>th</sup> and final ISQAPER gender equality report.



The gender equality reports are on the website (ISQAPER 2019)

## 4.2 Gender mainstreaming for sustainable soil

In October 2019 there was a discussion at the FAO's Global Forum on Food Security and Nutrition, on mainstreaming gender for sustainable soil management, the Tweet on the ISQAPER website says: *In the FAO's Global Forum on Food Security and Nutrition, iSQAPER suggests that the universal appeal of online information, such as the soil quality SQAPP, can play a role in promoting women's contribution to sustainable soil management and conservation.*

Here a summary of a few questions and the answer about the SQAPP is given as it was published on the FAO website, (FAO 2019).

### **What are the main gender-based constraints, including unequal gender relations and discriminatory norms that hinder sustainable soil management and contribute to soil degradation?**

*A gender based constraint in soil management is juridical and/or cultural, when there are laws that discriminate on gender with regard to access to land ownership or inheritance or rules that discriminate on access to (agrarian) schools, jobs, loans, funds, buildings, or on salaries. Often the European laws and public rules are not (any more) discriminating on gender, but the practice still is, as often mentioned the “normal” situation, such as women have to do the household without payment, or women are thought not able or willing to run a farm. It contributes to soil degradation in the way that soil management misses the gender balance or better: the gender diversity, for a sustainable land management approach, but is a male dominated (more focus on the land use and its profits, despite of the soil threats), where a more future based, female minded approach (for healthy soils, its conservation and the importance of soil biodiversity, and preventing soil threats) could bring a better balance.*

### **What practical solutions and approaches could help overcoming such barriers?**

*To have a balance of women and men in sustainable soil management, women should be more attracted to this field and some gender related issues should become societal issues solved by juridical, institutional and practical flexible appointments (or rules). Which also shows that gender inequality is a bigger problem, but about sustainable soil, one can for example build a generous (digital) floor to exchange knowledge from the different gendered perspectives (economic growth and quality -biological, chemical and physical healthy soils-). And support for more women to become empowered for positions in sustainable farm management.*

*To maintain soil quality and soil biodiversity, and for reasons of human health and reproductivity, we should focus on more sustainable, biological solutions, solutions that could make the organic farming increase, instead of producing chemical fertilizers, insecticides and plastics, for temporary higher yields, losing soil quality in the meantime. For soil quality and human health, more strict norms are needed for amounts, type, and mixtures of chemicals for yield improvement, as well as for example, frequency of use.*

### **How can the promotion of gender equality and women's empowerment contribute to sustainable soil management and conservation? Which interventions at policy and project/field level are of utmost priority? What are some potential entry points for success?**

*Entry points for success are sustainable soil management and conservation courses on the internet, and through soil information exchange mobile phone applications (for example SQAPP, for soil quality*

assessment and monitoring, see: <http://www.isqaper-is.eu/new-standards>) for everyone, where the future is designed with subjects that may attract women as well as men, (biodiversity in agriculture, natural fertilizer, combinations with new energy), both men and women are needed to make sustainable- or “organic” farming bigger. To gather more women in soil management and conservation, they should be attracted with issues of their interest, supplied with funds that help them to work on their ideas and offered support from women advisors that might be sensitive to their questions. Not to separate the world, but to make it more equal, since women are a minority in soil and agricultural management, they could use extra incentives, for example: Require involvement of women from applicants when distributing extra loans or subsidies to start a sustainable soil management or conservation practice, or an organic farm.(FAO 2019).

#### 4.3 Gender perspectives on environment and agriculture

At the global forum on Environment for the Organisation for Economic Cooperation and Development (OECD), 5-6 March 2020, on: ‘Mainstreaming gender and empower women for environmental sustainability’ the OECD coordinator for inclusive growth, supports a gender equality policy and, says that they are now looking how the costs within OECD are divided among gender/children, and they are working on an action plan to prevent vulnerabilities.



In the same forum, it was mentioned that the way how women are marketed is a gender aspect. It was questioned about the circular economy: How well are women equipped for roles in circular markets? How can we recognise the people impact from the shifts to circular economy? And: How will we recognize the gender impact to the digital economy? For this it will be relevant to recognize and appoint indicators. To record development activities that target gender equality as a policy objective, the “gender equality policy marker” is used by DAC (Development Assistance Committee) members as part of the annual reporting. The marker is a qualitative statistical tool of their development activities to the DAC, to indicate for each aid activity whether it targets gender equality as a policy objective.

The DAC gender equality policy marker is based on a three-point scoring system, to qualitatively track the financial flows that target gender equality. This allows the OECD to identify gaps between DAC donors' policy commitments and financial commitments. The marker strengthens the transparency and accountability in development financing for gender equality and women's rights. (OECD 2020).

Gender and environment was a topic in several bigger institutional fora: OECD, FAO, EIGE, they all make use of statistical data on gender equality (gaps) in relation to economical, political, health and educational settings. What perspectives can be suggested, about agriculture and environment, that are the best for both and for its surrounding society.

An interesting perspective came from an interview that started about the SQAPP, with a Dutch woman farmer, who used to be a medical doctor.

*"We used to spray the mays as a routine, a common practice, nowadays I first ask the question do we have to spray the mays, and what do we exactly have to spray? Fertilizer injections are not good for the soil.*

*You can compare it with medicines', in a normal routine we easily talk about an operation; while we could ask (as a doctor and ask the patient) weather it is really necessary, what are the risks, what happens if I do not operate? Twenty percent of the operations appear to be not necessary.*

*These days everything is about yield, "shelve life" and quantity, social economic aspects, instead of respect for vitality and the value of health. Better care also means a better taste, but it seems like one doesn't care about quality. Is money your aim or a means to a higher life quality? We want to talk about true pricing, at the moment there is no relation between the price of the product and the price of the supermarket.*

*The farmer needs a revenue model. If you make the farmer put a hedge, except from the costs, it takes part of the farmland. Better start with a sustainable worldview, what would be an optimum for living systems together? We need to optimize the agriculture, an agricultural system 3.0, where processes are in coherence with another, to make them healthy.*

*Vitality is essential here, it helps against diseases and plagues, as with the human body, we can learn a lot from the microbiome, which are on our skin, in our intestines, in our brains, the more variety, the more healthy and immunity against disease attacks it creates. There are soil biota. There are initiatives looking more closely at them. What is necessary for a healthy soil with balanced farming?*

This interview tells us to look from the broader, more holistic, perspectives to agriculture and the way we use the soil. That except from yield improvement, on the longer term the soil health and the human health is a perspective that is at stake. It is a point of view that is not specifically in line with the need for increased use of chemical fertilizer and pesticides that decrease the healthy soils. Maybe one does not need to slow down, but change the intention and the measures for agricultural yields. The sustainable Agricultural Management Practices are a good example. The broader visionary picture should help to change governmental support towards more organic, soil-and human health, gender diverse and future-proof agricultural management and soil improvement.

## 5. Conclusions and policy recommendations

The gender goal in ISQAPER, is reached in a way that gender aspects are being appointed, in improving the soil quality status and sustainable agricultural management. They are analysed by a three steps approach, being (1) an inventory in different stages, gathering gender disaggregated data, (2) analysing numbers, percentages and priorities, as indicators to show gender equality and diversity aspects and, (3) promoting gender equality and -diversity awareness through communication. The results from these steps are:

### **(1) Inventory:**

Throughout the project between 171 and 153 men and women worked as ISQAPER staff, with less men in the last part of the project, and an increasing percentage of women respectively from 44% to 52%. The type of position changed only in the percentage of the experienced researcher men, which was less than in the beginning of the project and the percentage of experienced researcher women was higher than in the beginning.

The stakeholders showed an increasing percentage of involved women. Where stakeholders in the 1<sup>st</sup> SQAPP inventory in total were 234 in number, 17% women, for the SQAPP feedback to implement a 2<sup>nd</sup> or B-version, there were 89 stakeholders, 37% women, and; at the demonstration events from the AMP's and the SQAPP feedback to implement a 3<sup>d</sup> version were 220 respondents, farmers, advisors, policy makers, students and researchers, of whom 30% women in the different roles.

The conclusion for the results of the demonstration events, is that the AMP's and SQAPP were well received for soil improvement by the stakeholders. The gender aspects here are most visible in the difference in the 'Motivation to protect the soil'; where "Yield improvement and soil fertility", are mentioned most by men, and; "Soil protection against threats, health and no or less pesticides" and more "Education and Training" by women. These results are measured with indicators.

### **(2) Indicators:**

Indicators help to make the analyses of the diversity in the approaches by men and women in their different stakeholder roles, and show the gender aspects in the content. The gender nuances in the first inventory in ISQAPER, are given by women that mention the need for "Education" proportionally more and "Fertilization" is mentioned more by men.

Also in the stakeholder feedback test for the SQAPP development, the gender significance shows a gender aspect it, in a sense that "the proposed soil threat within the local context-bio diversity and acidification" are proportional more relevant according to women than according to men among respondents.

The results of the gender diversity from the demonstration events at the study sites are made visible with figures and colours in proportional comparisons. There are a lot of similarities in the responses, but here the focus is on the differences in priorities, it shows: "Biodiversity, Sustainability and Protection of soil against threats", more in the motivation of women. A division between Chinese and European study site respondents show the following gender aspects (proportional):

(Chinese women) "Fertilization advice" (SQAPP) and "Training and advice" for soil improvement;  
(European women) "Local additional data" and "Recommendations" (SQAPP) and "More knowledge" to be enabled to do more for soil improvement;  
(Chinese men) "Free actual data" (SQAPP) and "Improved technologies" to improve the soil, and;  
(European men) "More convenience" and "Recommendation to organic farming" (SQAPP) and "Soil quality, soil fertility" as motivation to improve the soil.

By separating the subjects per respondent category, the gender aspects are visible as well as the priorities in the different continents. The combination of these subjects or aspects from different perspectives, give a broader insight in the needs and expectations from the stakeholders.

### **(3) Communication:**

For the awareness to the relation of gender equality and soil quality, and gender diversity and soil quality, were made: statistics, graphs, as well as interviews, text in social media, discussion, yearly presentations and four reports, one for each reporting period in ISQAPER. Gender aspects together with SQAPP development and stakeholder participation, were made visible and possible through to the cooperation with the study site partners and WP4, WP5, WP6 and WP 9, doing the stakeholder SQAPP feedback and AMP demonstration events, gathering stakeholder data in a gender disaggregated way. Also WP8 on policy advice, supporting the recommendations on gender equality and diversity for the (European) agenda's to finally reach the sustainable development goals.

The returning gender equality presentations and reporting had impact in the discussions and mobilization within the ISQAPER team, and the remarks helped to improve the focus on the gender aspects in the content of the project research. And the stakeholder feedback helped to improve the SQAPP that in turn, proved to support the needs for women and men in different continents and pedo climatic zones.

Discussion platforms and interviews on "Women and environmental -and agricultural- sustainability" also bring us to the conclusion that: A more organic, gender diverse and future-proof perspective on agriculture helps to work together towards a healthy soil, and societal relevant agricultural management.

## ISQAPER gender equality policy recommendations

1. A policy on **gender equality** should stress also **gender diversity**, because apart from a gender balance in the organization and gender awareness in the research content, gender diversity focusses at different perspectives to the content from men and women. Gender diversity makes the voices from men and women heard and visible.
2. **Gender disaggregated data** from project **stakeholders** should be gathered and analysed as an essential approach to get this broad gender perspective (including gender diversity) also in other projects or research on soil improvement and AMP's. Qualitative data are essential, but quantitative data show evidence. From the ISQAPER results it appears that the opinions about AMP's are more region (or culture) related (EU compared to China) than gender related, however women from both regions seem to have little more concern about pesticides and sustainability compared to the men from their region.
3. The Soil Quality application (SQAPP) is, and should be promoted as, a good example of an **open source** to men and women farmers and advisors equally, the final version also includes pesticide information. **SQAPP** dissemination follow up with **information and training support** would be helpful to farmer men and women to give them knowledge about their soil, recommendations to sustainable agricultural management practices and the consequences of their fertilization and pesticide uses.
4. The data were tested on **gender significance**, making the outcome reliable in numbers. It is a way to check if there are underlying gender issues or **aspects**. On the base of this, a design for follow up research can be made. Although there are differences, no hard scientific conclusions are drawn, and more specific research is required.
5. The SQAPP might be more appropriate for use by advisors and researchers, if the farmer is not educated. But, if the farmer understands the app, she or he could use the app to compare the advice and draw his or her own conclusion about the soil management approach. Therefore **demonstration and information sessions** for both men and women farmers are advised. It helps, when the SQAPP will be used as a tool to open up discussion on improvement and use of sustainable AMP's for soil management, that are not exhausting the soil for use in the future.



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- (UN SDG's 2020) <https://sustainabledevelopment.un.org/sdg5> And sdg2, targets and indicators



## Annex 1: Institute staff numbers and type of positions 4<sup>th</sup> RP

Type of position	Women/ Men		5 W	5 M	4 W	4 M	3 W	3 M	2 W	2 M	1 W	1 M	Tot W	Tot M
1. WU	Nl	2020		1		1	2	1	3	1			5	4
2. JRC	It /Hu													
3. FIBL	Swi	2019			1	1	1		1			1	3	2
4. UNIBE	Swi	2019				1	1	1					1	2
5. UE	Por	2019				1	1	2					1	3
6. UPM	Spain	2019	1			1		2	1	2	3		5	5
7. IEEP	UK, Bel	2019	1	1	1		1	3	2				5	4
8. MEDES	It	2020			1		2	1	1				4	1
9. ISRIC	Nl	2019				1	1	3					1	4
10. DLO	Nl	2020				1	3	2	1	1			4	4
11. IA	Pol	2020					1	2					1	2
12. IAES	Es	2020	1					1	1	2	1	1	3	4
13. UL	Slove	2020					3	2		1	4	2	7	5
14. ICPA	Ro	2020					7	2	1		5	1	13	3
15. ESAC	Por	2020		1			1				3		4	1
16. UMH	Sp	2019	1	2	1 2*	2*	2*						2	2
17. AUA	Gr	2019				1		2	1			1	1	4
18. IARRP	Ch	2020		1			3	2	3	5			6	8
19. ISWC	Ch	('18)												
20. SFI SAAS	Ch	2020						2	1	1			1	3
21. Corepage	Nl	2020					1						1	
22. BothEnds	Nl	2019									3	2	3	2
23. UP	Hu	2019				1	2	3	1		4	4	7	8
24. ISS	Ch	2019		1				1		1				3
25. GB	Fr	2020									1		1	
(26. D-sign)	Nl													
Total Women			4		4		30		17		24		79	
Total Men				7		9		32		14		12		74

2\* means 1 person, several roles

1= other staff

2= early researcher, < 4 years and/or PHD student

3= experienced researcher, 4 years>and/or PhD holder

4= scientific team leader or WP leader

5= scientific manager/coordinator

## Annex 2: Number of stakeholders at the study site events

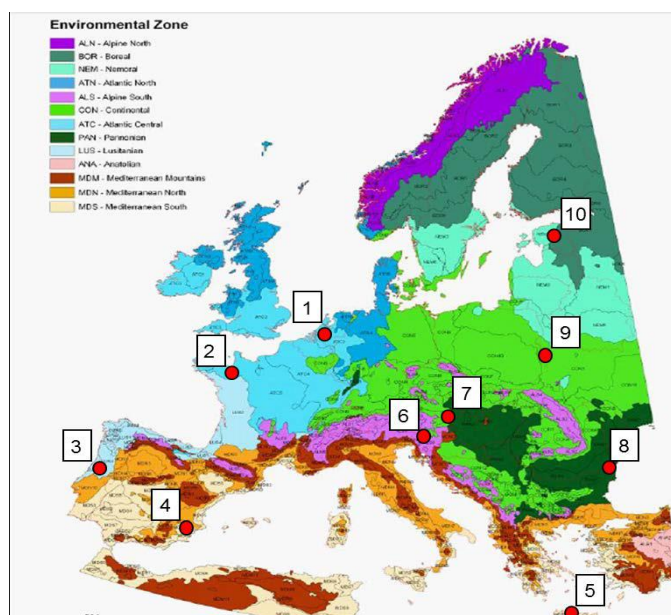
### Combined questionnaire responses on demonstration event AMP's and SQAPP

Numbers: there were demonstration evaluations in 12 study sites, divided over different pedo climatic zones: 10 in Europe and 2 in China

Dissemination event questionnaire responses	nr. men	nr women	nr respondents	Pedoclimatic zone*
1 De Peel, NL	3		3	ATN/ATC
2 Argentré du Plessis, FR	3	1	4	ATC/ LUS
3 Cértima, PT	4	5	9	LUS
4 SE Spain, ES	7	3	10	MDN
5 Crete, GR	12	6	18	MDS
6 Lubljana, SI	12	16	28	MDM / ALS
7 Zala, HU**				
8 Braila County, RO	9	2	11	PAN
9 Trzebieszów, PL	20	7	27	CON
10 Tartumaa, EE	27	18	45	NEM
11 Qiyang, CN	33	10	43	Red soil, South Subtropical
Suining, CN	17	5	22	Calc.Purple soil, South Subtropical
total	147	73	220	
%	67	33	100	

\*Explanation abbreviations pedoclimatic zones ; Map of the European study sites in the pedo climatic zones

ATN = Atlantic North  
 ATC = Atlantic Central  
 LUS = Lusitanian  
 MDN = Mediterranean North  
 MDS = Mediterranean South  
 MDM = Mediterranean Mountain  
 ALS = Alpine South  
 PAN = Pannonian  
 CON = Continental  
 NEM = Nemoral (woodland)  
 ATN = Atlantic North  
 ATC = Atlantic Central  
 LUS = Lusitanian (Coastal zone, warm, pine)  
 MDN = Mediterranean North  
 MDS = Mediterranean South



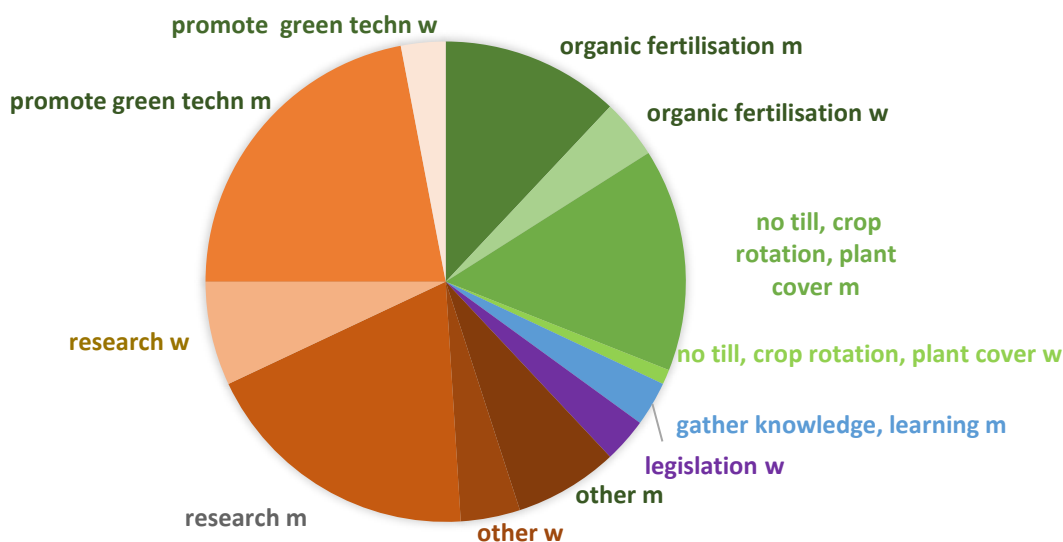
zones

\*\*No feedback to the questionnaire from Hungary, because the app didn't run at the demonstration day

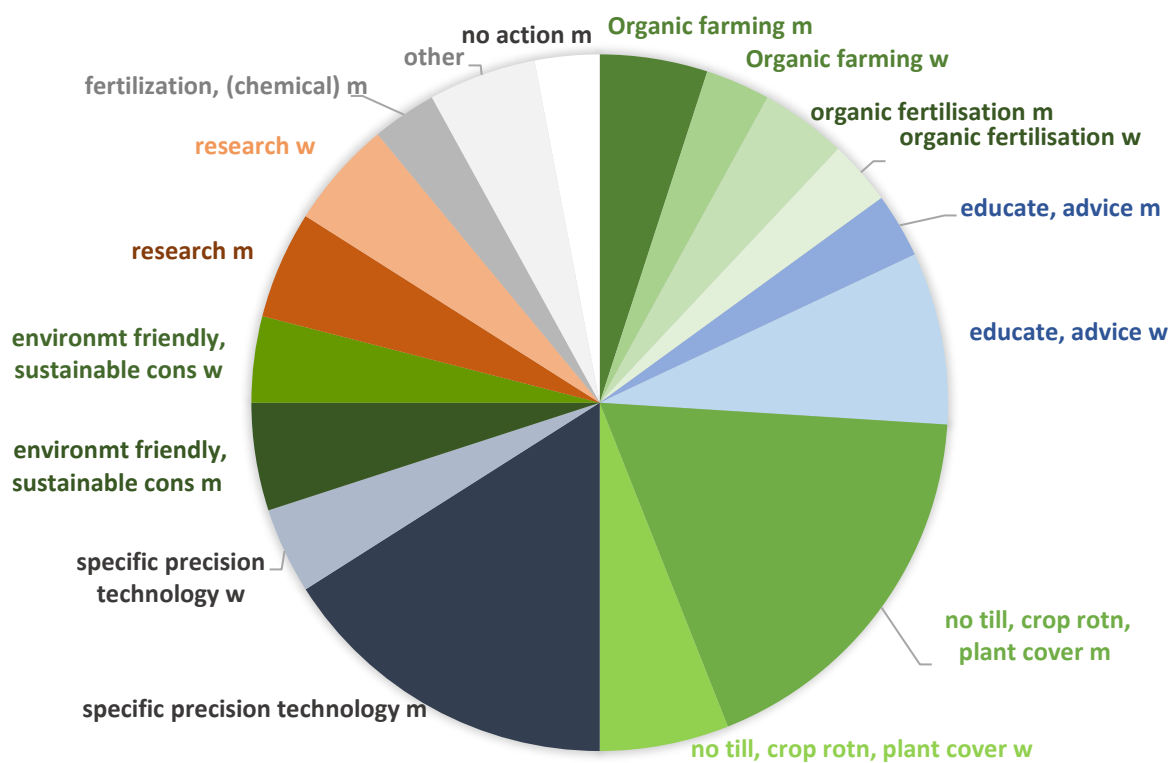
### Annex 3: Demonstration events EU and China: Action on soil protection

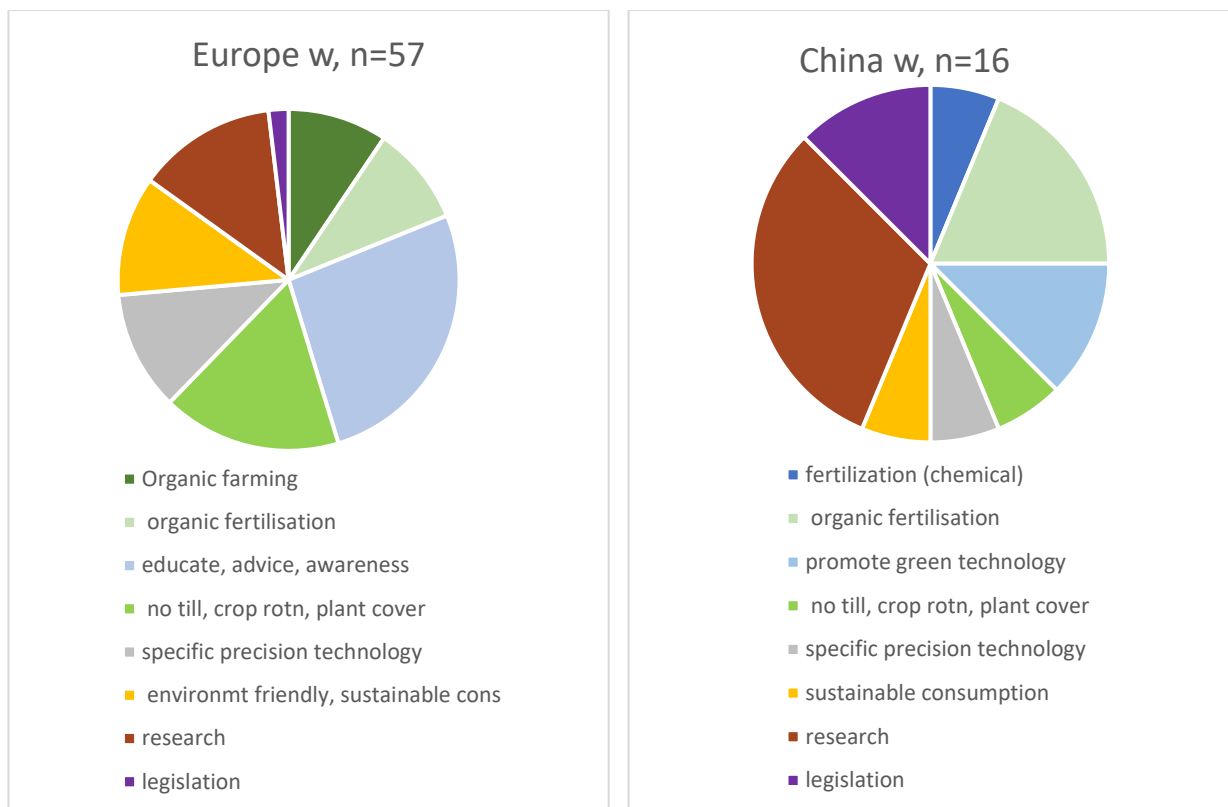
The results are from the study site stakeholders (farmers, technical advisors, and researchers) at the demonstration events in 9 European and 2 Chinese study sites from the ISQAPER project

#### Q3 CHINA ACTION TAKEN TO PROTECT SOIL % N=68



#### Q3 EU ACTION TAKEN TO PROTECT SOIL % N=147



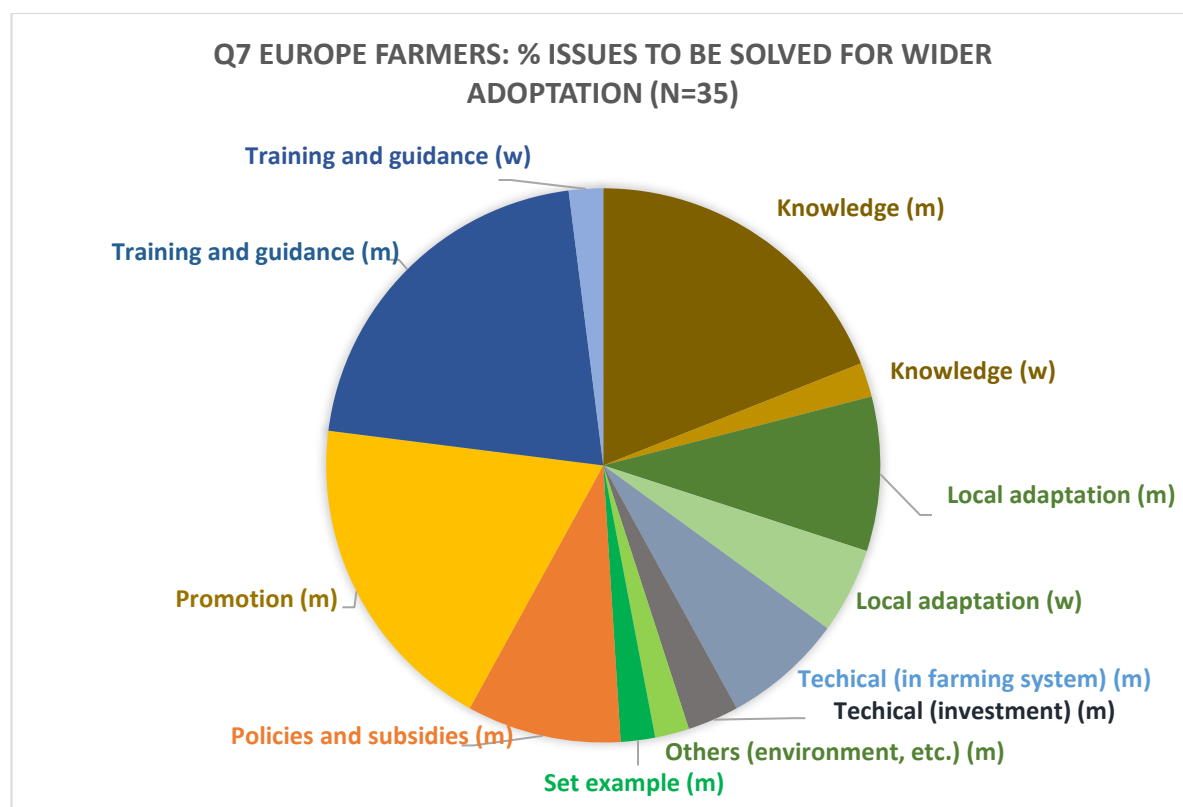
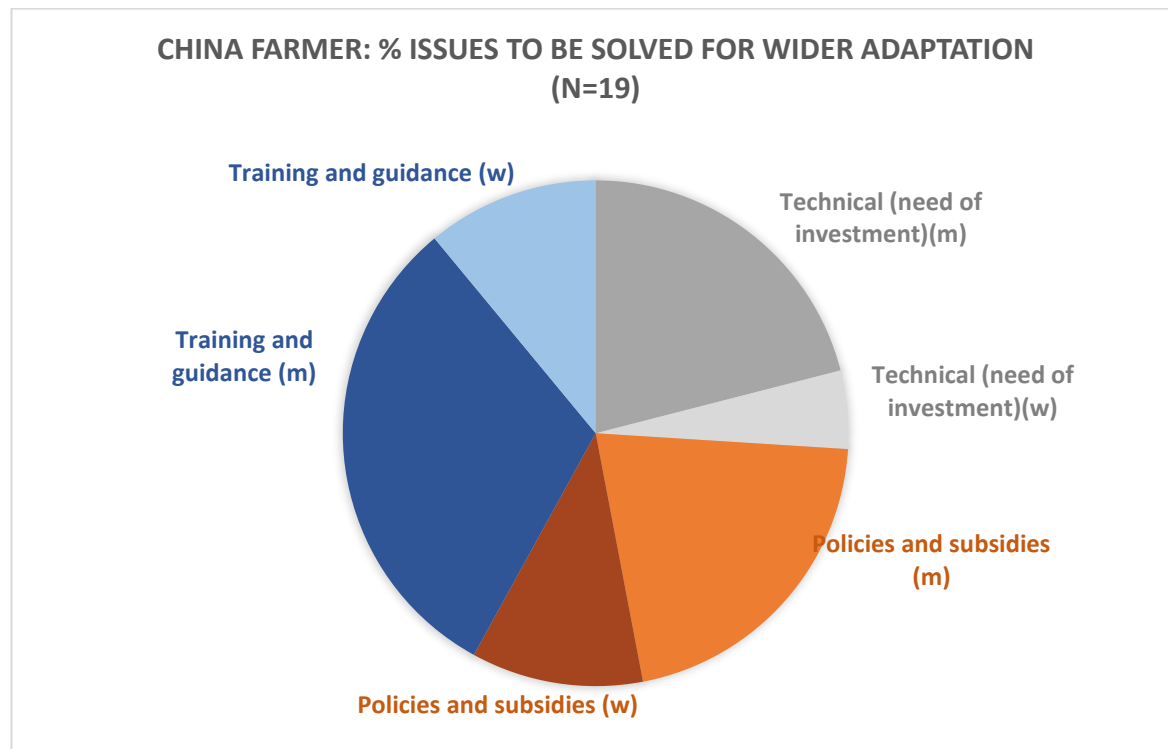


Actions to protect the soil by women from the European and from the Chinese study sites

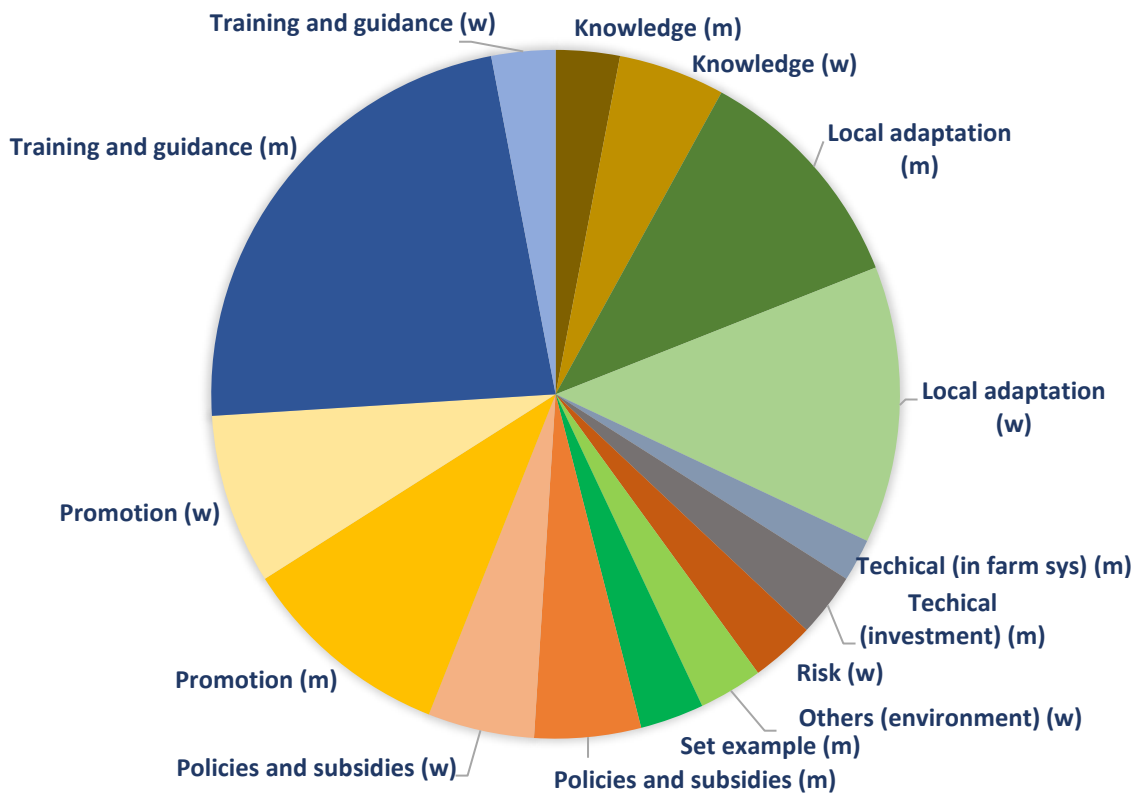
## Annex 4: Issues for wider adaptation by farmer, technical advisor, researcher

The results are from the study site stakeholders (farmers, technical advisors, and researchers) at the demonstration events in 9 European and 2 Chinese study sites from the ISQAPER project.

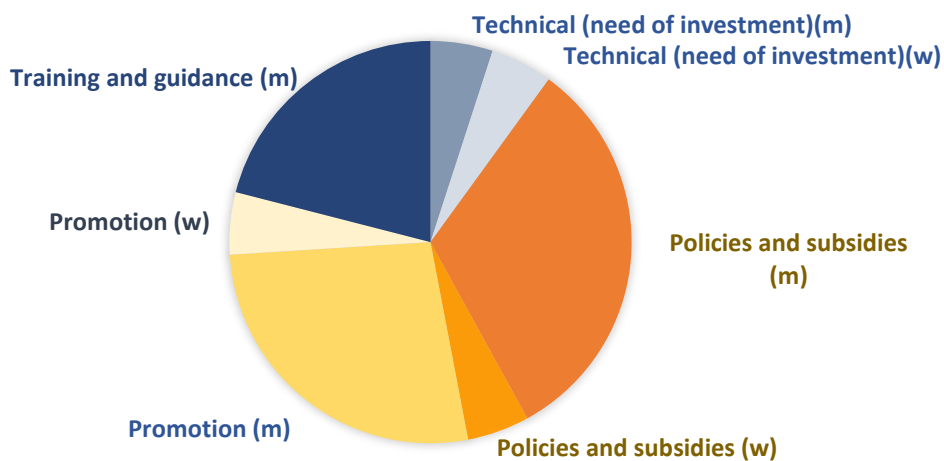
N=number responses, m=men, w=women



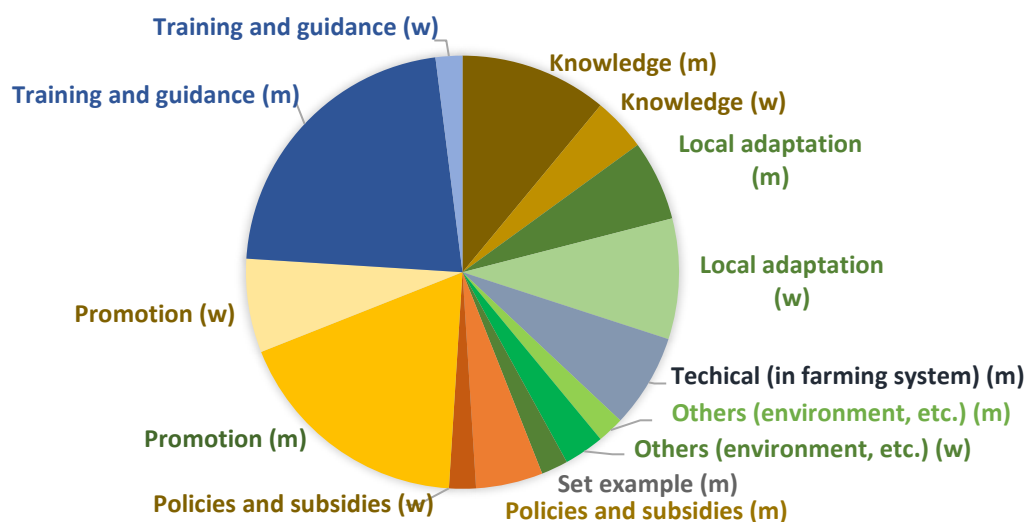
**EUROPE TECHNICAL ADVISORS: % OF ISSUES TO BE SOLVED FOR WIDER ADOPTION (N=24)**



**Q7 CHINA TECHNICAL ADVISOR: % ISSUES TO BE SOLVED FOR WIDER ADOPTION (N=13)**



**Q7 EUROPE RESEARCHERS: % ISSUES TO BE SOLVED FOR WIDER ADAPTATION ( N=43, 15W, 40M)**



**Q7 CHINA RESEARCHER: ISSUES TO BE SOLVED FOR WIDER ADAPTATION  
N=45, 7 W, 38 M**

