Expert Knowledge Elicitation (EKE) : Potato

INTRODUCTION

Agriculture is currently faced with many challenges, such as climate change, loss of biodiversity, crop pests, and diseases, which can all directly compromise agricultural crop yield, quality, and health. In addition, inadequate agricultural practices, and the current increase in global exchange of agricultural commodities (such as seeds, harvested products) contribute to increased pest and disease risks. Although significant pest and disease risk analysis has been done throughout the world, there are still significant gaps in our knowledge. For example, methods of pest and disease risk analysis differ from one location to another and one research team to another. These methods often do not simultaneously consider cropland and host availability, climate change, pathogen and pest invasion, global increase in trade of agricultural commodities, and willingness and input of stakeholders into the analysis. These factors make modeling of the global risk of pest and pathogen invasion difficult. Consequently, prediction is inefficient for finding locations that are particularly important for monitoring and mitigation.

Because sometimes a database with consistent data is not available, we can collect data from expert knowledge (Expert Knowledge Elicitation (EKE)) as a rapid and efficient way to acquire baseline data. That is why we initiated this project to develop a platform (a Rapid Risk assessment Meta-Tool (R2 Meta-Tool)) that would allow any expert around the world to set up a quick and efficient survey of experts (EKE). This meta-tool would allow an organizing expert to collect data from other experts to evaluate the risks of pests and diseases in a specific location. This platform would have the advantage of standardizing pest and pathogen risk analysis methods and assembling effective questions for comparison of locations globally. It would also allow experts in any domain to connect with those in complementary domains for more inclusive disease risk assessment. Finally, it would allow food security experts to have the best available data for modeling global risks of the most dangerous pests and pathogens.

We are conducting this expert knowledge elicitation (EKE) exercise to design and validate questions that will be available in our meta-tool, and we would like to invite you to participate. This exercise will take place in several countries around the world in order to build an efficient, interdisciplinary, intercultural and inclusive R2 meta-tool.

INFORMED CONSENT

This survey is conducted by the Consultative Group for International Agricultural Research (CGIAR) and University of Florida.

We would like to interview you for this study. The information and insights we collect from you are for research purposes only. We will use this information and insights to inform our research only. It will otherwise remain confidential, and your name and organization will not be explicitly or implicitly identified in the analysis produced by our team. We anticipate no risks to your participation in this interview/discussion.

Participation in this interview/discussion is voluntary and you may refuse to participate, discontinue the interview/discussion at any time, or skip any question you do not want to answer.

We are kindly requesting you to complete the 20-30 minute questionnaire.

CONTACTS
If you have any questions or concerns, please contact Romaric Mouafo-Tchinda (rmouafotchinda@ufl.edu), Berea Etherton (betherton@ufl.edu), or Karen Garrett (karengarrett@ufl.edu)

1. Please confirm your consent to participate in the survey

   Mark only one oval.

   - ◯ Yes
   - ◯ No

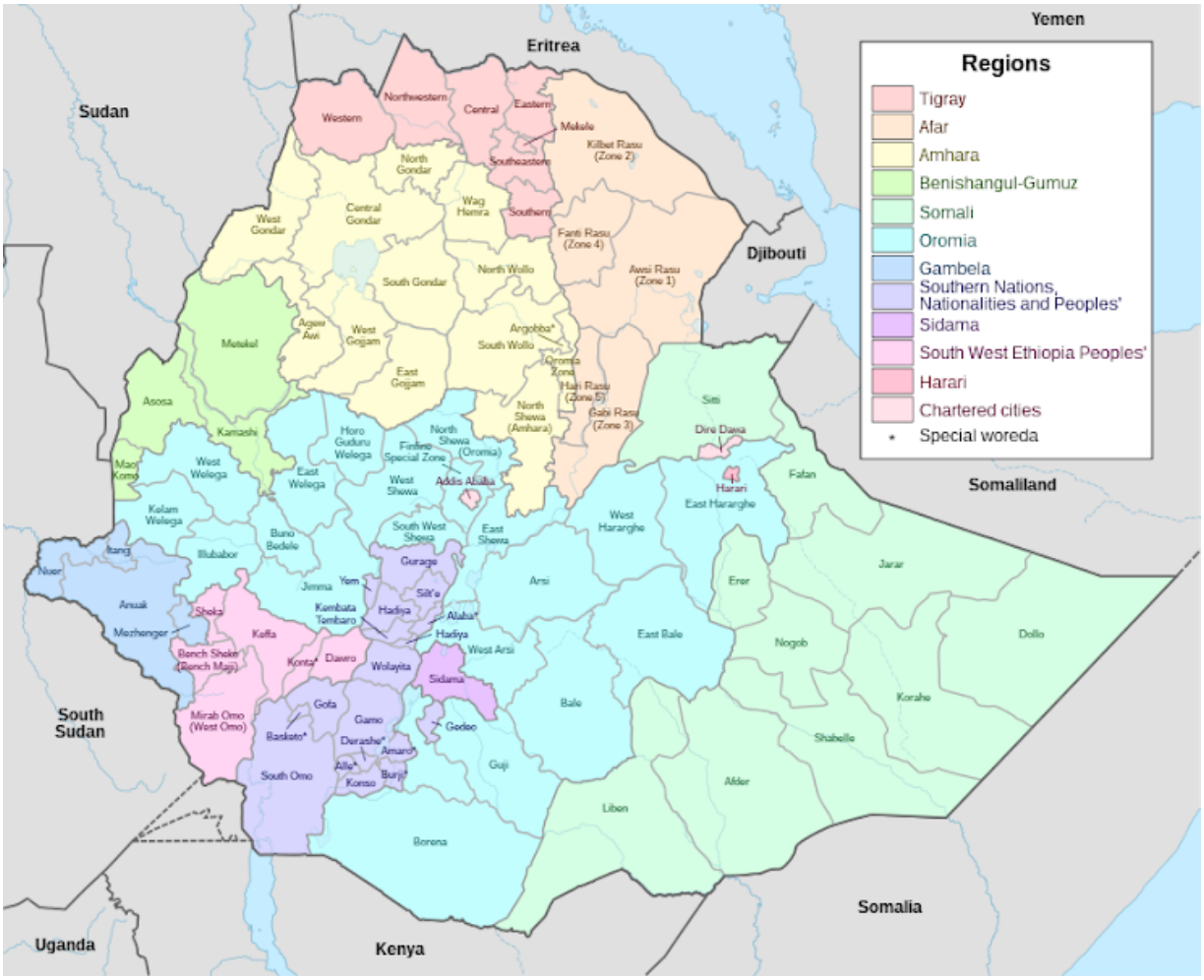
2. Would you like to remain anonymous, or would you like to be acknowledged for your participation in this survey?

   Check all that apply.

   - ☐ I would like to remain anonymous
   - ☐ I would like to be acknowledged (if yes, please write your name below in "Other")
   - ☐ Other: _____

Characterizing the Experts (tick all that apply)

3. 1. Which regions do you represent as an expert? Please select the answer reflecting your years of experience as an expert in your field in each region (tick all that apply)



Mark only one oval per row.

	0 years (no experience)	0-3 years	4-7 years	8-10 years	> 10 years
Tigray	◯	◯	◯	◯	◯
Afar	◯	◯	◯	◯	◯
Amhara	◯	◯	◯	◯	◯
Benishangul-Gumuz	◯	◯	◯	◯	◯
Somali	◯	◯	◯	◯	◯
Oromia	◯	◯	◯	◯	◯
Gambela	◯	◯	◯	◯	◯

Southern Nations, Nationalities and Peoples'					
Sidama					
Southwest Ethiopia Peoples'					
Harari					
Addis Ababa					
Diredawa					

4. 2. Which of the following best summarizes your experience as an expert?

Check all that apply.

- [ ] Seed Systems/Breeder
- [ ] Pest and Pathogen Management
- [ ] Agronomist/horticulture
- [ ] Social sciences
- [ ] Other: _____

5. 3. Which of the following best summarizes your affiliate institution? (tick all that apply)

Mark only one oval.

- ◯ Public
- ◯ Private
- ◯ NGOs
- ◯ Other: _____

6. 4. What is your gender?

Mark only one oval.

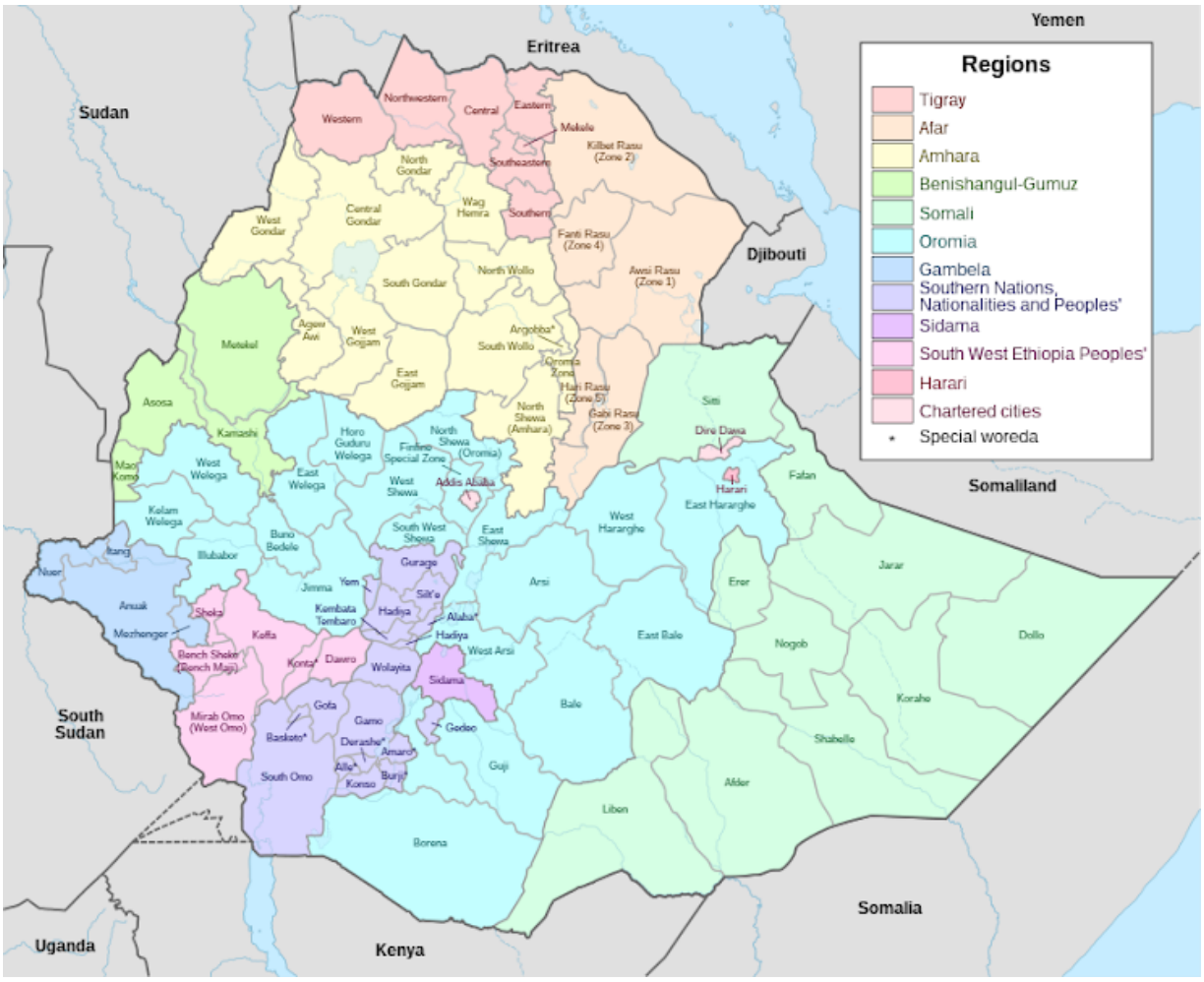
- Male
- Female
- Prefer not to say
- Other: _____

7. 5. Name of your organization

_____

Characterizing the Grower Population

8. 1. Indicate what proportion of each region are potato growers (tick all that apply)



Mark only one oval per row.

	0-25%	26-50%	51-75%	76-100%	Unsure
Tigray	⬭	⬭	⬭	⬭	⬭
Afar	⬭	⬭	⬭	⬭	⬭
Amhara	⬭	⬭	⬭	⬭	⬭
Benishangul-Gumuz	⬭	⬭	⬭	⬭	⬭
Somali	⬭	⬭	⬭	⬭	⬭
Oromia	⬭	⬭	⬭	⬭	⬭
Gambela	⬭	⬭	⬭	⬭	⬭

Southern

Nations, Southern Nationalities and Peoples' Southwest Ethiopia Peoples' Sidama					
Sidama					
Harari					
Addis Ababa					
Diredawa					

9. 2. For each region, indicate the most common highest level of education completed by potato growers according to your experience.

Mark only one oval per row.

	Primary School	Secondary School	University	Unsure
Tigray	◯	◯	◯	◯
Afar	◯	◯	◯	◯
Amhara	◯	◯	◯	◯
Benishangul-Gumuz	◯	◯	◯	◯
Somali	◯	◯	◯	◯
Oromia	◯	◯	◯	◯
Gambela	◯	◯	◯	◯
Southern Nations, Nationalities and Peoples'	◯	◯	◯	◯
Southwest Ethiopia Peoples'	◯	◯	◯	◯
Sidama	◯	◯	◯	◯
Harari	◯	◯	◯	◯
Addis Ababa	◯	◯	◯	◯
Diredawa	◯	◯	◯	◯

10. 3. What percentage of potato growers are women in each region?

Mark only one oval per row.

	<25%	25-50%	51-75%	>75%
Tigray				
Afar				
Amhara				
Benishangul-Gumuz				
Somali				
Oromia				
Gambela				
Southern Nations, Nationalities and Peoples'				
Southwest Ethiopia Peoples'				
Sidama				
Harari				
Addis Ababa				
Diredawa				

11. 4. Is the potato considered as a woman's crop (crop grown by women for family food rather than for sale)?

Mark only one oval per row.

	Yes	No	Unsure
Tigray	◯	◯	◯
Afar	◯	◯	◯
Amhara	◯	◯	◯
Benishangul-Gumuz	◯	◯	◯
Somali	◯	◯	◯
Oromia	◯	◯	◯
Gambela	◯	◯	◯
Southern Nations, Nationalities and Peoples'	◯	◯	◯
Southwest Ethiopia Peoples'	◯	◯	◯
Sidama	◯	◯	◯
Harari	◯	◯	◯
Addi Ababa	◯	◯	◯
Diredawa	◯	◯	◯

12. 5. What percent of potato growers are within the following age groups? (tick all that apply)

Mark only one oval per row.

	< 20%	20 - 40%	40 - 60%	60 - 80%	> 80%
Children <18 years					
Youth from 19 to 35 years					
Adults from 36 - 65 years					
Adults from > 65 years					

13. 6. Estimate the percentage of potato growers who received a formal training in each region.

Mark only one oval per row.

	<20%	20-40%	41-60%	61-80%	>80%
Tigray					
Afar					
Amhara					
Benishangul-Gumuz					
Somali					
Oromia					
Gambela					
Southern Nations, Nationalities and Peoples'					
Southwest Ethiopia Peoples'					
Sidama					
Harari					
Addis Ababa					
Diredawa					

14. 7. Potato crop corresponds to which agricultural system in each region?

Mark only one oval per row.

	Subsistence	Commercial	Both
Tigray	◯	◯	◯
Afar	◯	◯	◯
Amhara	◯	◯	◯
Benishangul-Gumuz	◯	◯	◯
Somali	◯	◯	◯
Oromia	◯	◯	◯
Gambela	◯	◯	◯
Southern Nations, Nationalities and Peoples'	◯	◯	◯
Southwest Ethiopia Peoples'	◯	◯	◯
Sidama	◯	◯	◯
Harari	◯	◯	◯
Addis Ababa	◯	◯	◯
Diredawa	◯	◯	◯

15. 8. Which potato varieties are grown in each geographical area? (tick all that apply)
Note: Please scroll right to see all options

Check all that apply.

	Bubu	Bulle	Gera	Gorebella	Guasa	Wechecha	Menagesha	Gud
Tigray	☐	☐	☐	☐	☐	☐	☐	☐
Afar	☐	☐	☐	☐	☐	☐	☐	☐
Amhara	☐	☐	☐	☐	☐	☐	☐	☐
Benishangul-Gumuz	☐	☐	☐	☐	☐	☐	☐	☐
Somali	☐	☐	☐	☐	☐	☐	☐	☐
Oromia	☐	☐	☐	☐	☐	☐	☐	☐
Gambela	☐	☐	☐	☐	☐	☐	☐	☐
Southern Nations, Nationalities and Peoples'	☐	☐	☐	☐	☐	☐	☐	☐
Southwest Ethiopia Peoples'	☐	☐	☐	☐	☐	☐	☐	☐
Sidama	☐	☐	☐	☐	☐	☐	☐	☐
Harari	☐	☐	☐	☐	☐	☐	☐	☐
Addis Ababa	☐	☐	☐	☐	☐	☐	☐	☐
Diredawa	☐	☐	☐	☐	☐	☐	☐	☐

16. 9. Please note other popular potato varieties are grown in each geographical area of expertise

    e.g:

    1. Tigray: ....

    2. Afar: ...

17. 10. Please estimate the national annual production of tubers (tons) :

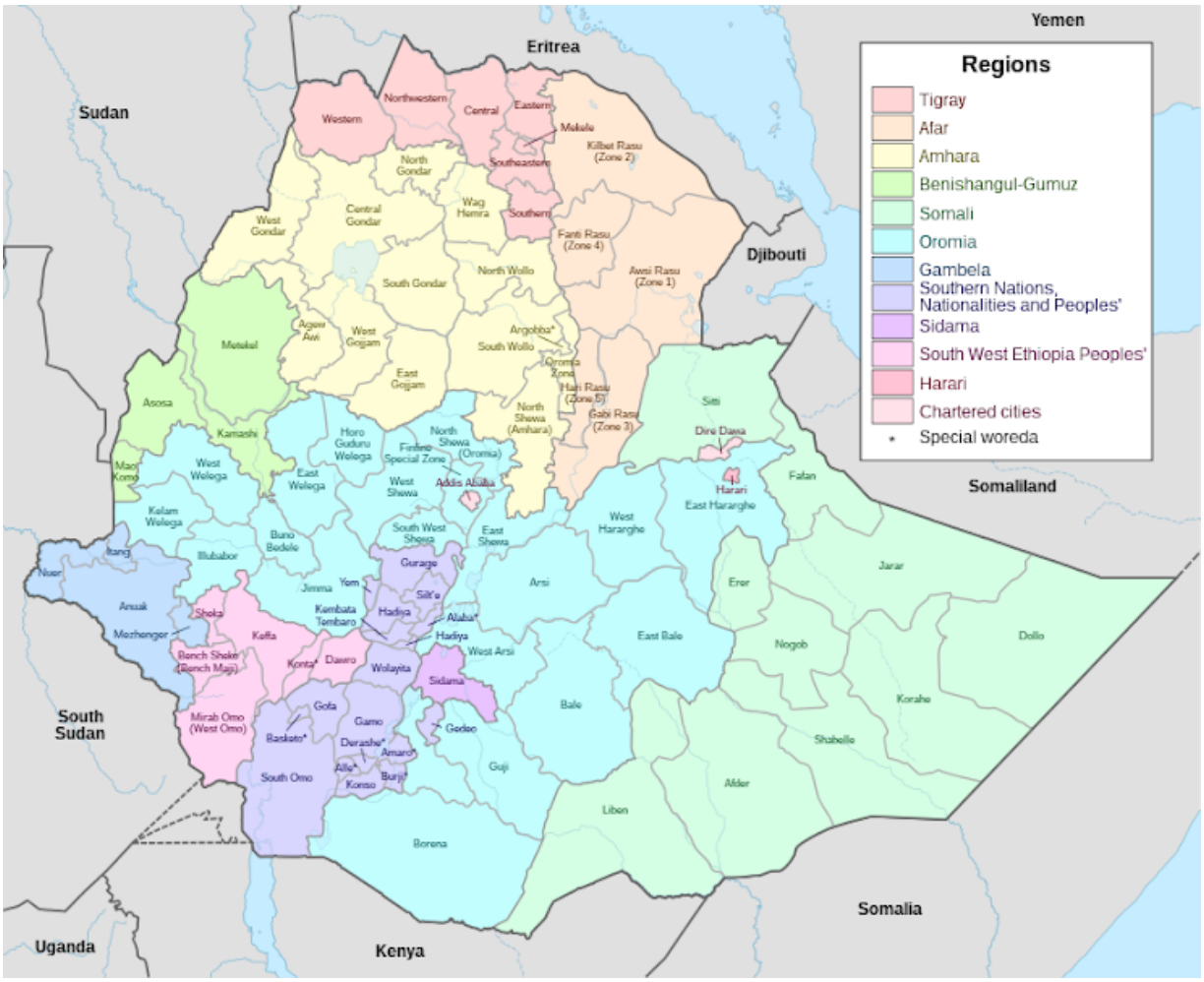
18. 11. Please estimate the annual percentage of yield loss **(from both abiotic, biotic, and socioeconomic factors):**

    Mark only one oval.

    - <15%
    - 15-30%
    - 31-45%
    - 46-60%
    - 61-75%
    - >75%

Reporting the Most Critical Pests, Pathogens, and Diseases

19. 1. Based on your experience, which pests and diseases are present in each region? (tick all that apply)
Note: Please scroll right to see all options



Check all that apply.

	Common Scab (Streptomyces)	Early blight (Alternaria)	Fusarium Dry Rot (Fusarium)	Black Dot (Colletotrichum)	Silver Scurf (Helminthosporium)	F
Tigray Tigray	☐	☐	☐	☐	☐	
Afar Afar	☐	☐	☐	☐	☐	
Amahara Amahara	☐	☐	☐	☐	☐	
Benishangul-Gumuz Benishangul-Gumuz	☐	☐	☐	☐	☐	
Somali Somali	☐	☐	☐	☐	☐	

Oromia	☐	☐	☐	☐	☐
Gambela	☐	☐	☐	☐	☐
Southern Nations, Nationalities and Peoples'	☐	☐	☐	☐	☐
Sidama	☐	☐	☐	☐	☐
Southwest Ethiopia Peoples'	☐	☐	☐	☐	☐
Harari	☐	☐	☐	☐	☐
Addis Ababa	☐	☐	☐	☐	☐
Diredawa	☐	☐	☐	☐	☐

20. 2. Top 5 most damaging potato pests (including both insect pests and animal pests) and diseases.

e.g.:

Top 5 pests : ....

Top 5 diseases: ...

21. 3. Please estimate the percentage of annual yield loss **due to pests and diseases**

Mark only one oval.

- 0-5%
- 5-10%
- 10-15%
- 15-30%
- 31-45%
- 46-60%
- 61-75%
- >75%

22. 4. Which management strategies do farmers use against these potato pests and diseases? (tick all that apply)

Check all that apply.

- [ ] Use of healthy seeds
- [ ] Use of resistant varieties
- [ ] Discarding/Removing of diseased crop
- [ ] Use of plant extracts
- [ ] Fungicide applications
- [ ] Incorporation of organic matter into the soil
- [ ] Integrated Pest Management
- [ ] Other: _____

23. 5. Based on your experience, how effective are the following pests and diseases control strategies?

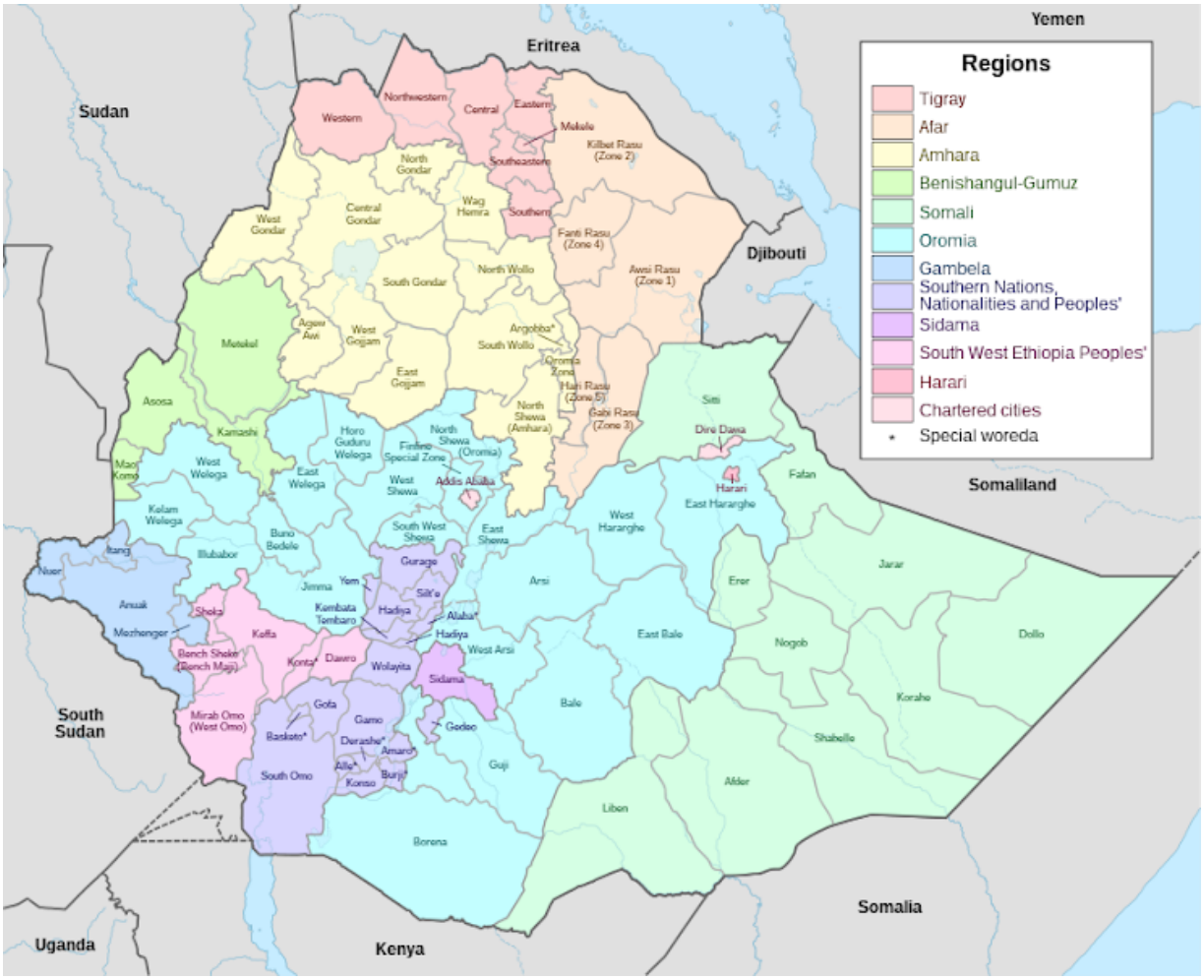
Mark only one oval per row.

	Not at all effective	Not very effective	Moderately effective	Highly effective	Completely effective
Use of healthy seeds					
Use of resistant varieties					
Discarding/Removing of diseased crop					
Use of plant extracts					
Fungicide applications					
Incorporation of organic matter into the soil					
Integrated Pest Management					

Assessing Certified Seed Distribution

Note: *in this survey, with* ***'seed'*** *we refer to different types of* planting material *(cuttings, tubers, suckers, stakes, stems, vines)*

24. 1. According to your experience, what is the source of seed in each region? (tick all that apply)



Check all that apply.

	Personal seed	Neighbors	Local market	Non-governmental organizations	Governmental distributors
Tigray	☐	☐	☐	☐	☐
Afar	☐	☐	☐	☐	☐
Amhara	☐	☐	☐	☐	☐
Benishangul-Gumuz	☐	☐	☐	☐	☐
Somali	☐	☐	☐	☐	☐
Oromia	☐	☐	☐	☐	☐

Gambela

Gambela	☐	☐	☐	☐	☐
Southern Nations, Nationalities and Peoples'	☐	☐	☐	☐	☐
Sidama	☐	☐	☐	☐	☐
Southwest Ethiopia Peoples'	☐	☐	☐	☐	☐
Harari	☐	☐	☐	☐	☐
Addis Ababa	☐	☐	☐	☐	☐
Diredawa	☐	☐	☐	☐	☐

25. 2. According to your experience, what percentage range best describes the contribution of formal (F) and informal (I) trade of potato seeds in each region? (tick all that apply)

Note:

Formal (F): obtain from certify governmental distributors, non-governmental organizations

Informal (I): obtain from Personal seed, Neighbors, Local market, uncertified seed producers

Mark only one oval per row.

	0% F & 100% I	1-25% F & 75-99% I	26-50% F & 50-74% I	50-74% F & 26-50% I	75-99% F & 1-25% I	100% F & 0% I
Tigray						
Afar						
Amhara						
Benishangul-Gumuz						
Somali						
Oromia						
Gambela						
Southern Nations, Nationalities and Peoples'						
Sidama						
Southwest Ethiopia Peoples						
Harari						
Addis Ababa						

Diredawa						

26. 3. What potato pest and diseases are of primary concern for seed degeneration in your country? (tick all that apply)

Check all that apply.

- [ ] Common Scab (Streptomyces spp.)
- [ ] Early blight (Alternaria solani)
- [ ] Fusarium Dry Rot (Fusarium spp.)
- [ ] Black Dot (Colletotrichum coccodes)
- [ ] Silver Scurf (Helminthosporium solani)
- [ ] Black Scurf and Rhizoctonia Canker (Rhizoctonia solani)
- [ ] Pink Rot (Phytophthora erythroseptica) and Pythium Leak (Pythium spp.)
- [ ] Late Blight (Phytophthora infestans)
- [ ] Potato Virus Y (PVY)
- [ ] Potato leafroll virus (PLRV)
- [ ] Potato aphids
- [ ] Grey mould (Botrytis)
- [ ] Potato root or potato cyst nematodes (Globodera)
- [ ] Wireworms (Agriotes)
- [ ] Bacterial Wilt

27. 4. What is the severity of seed degeneration within each region? (tick all that apply)

Mark only one oval per row.

	0-10%	11-25%	26-50%	51-75%	>75%
Tigray					
Afar					
Amhara					
Benishangul-Gumuz					
Somali					
Oromia					
Gambela					
Southern Nations, Nationalities and Peoples'					
Sidama					
Southwest Ethiopia Peoples'					
Harari					
Addis Ababa					
Diredawa					

28. 5. What strategies are applied to manage the risk of potato seed degeneration in Ethiopia? (tick all that apply)

Check all that apply.

	Using resistant or tolerant varieties	Using formal/semi-formal seed, certified seed	On-farm management of seed	Post-harvest management of seed for the next season
Tigray	☐	☐	☐	☐
Afar	☐	☐	☐	☐
Amhara	☐	☐	☐	☐
Benishangul-Gumuz	☐	☐	☐	☐
Somali	☐	☐	☐	☐
Oromia	☐	☐	☐	☐
Gambela	☐	☐	☐	☐
Southern Nations, Nationalities and Peoples'	☐	☐	☐	☐
Sidama	☐	☐	☐	☐
Southwest Ethiopia Peoples'	☐	☐	☐	☐
Harari	☐	☐	☐	☐
Addis Ababa	☐	☐	☐	☐
Diredawa	☐	☐	☐	☐

29. 6. Based on your experience, how effective are the following seed degeneration control strategies?

Mark only one oval per row.

	Not at all effective	Not very effective	Moderately effective	Highly effective	Completely effective
Using resistant or tolerant varieties	◯	◯	◯	◯	◯
Using formal/semi-formal seed, certified seed	◯	◯	◯	◯	◯
On-farm management of seed	◯	◯	◯	◯	◯
Post-harvest management of seed for the next season	◯	◯	◯	◯	◯

30. 7. Based on your experience, do these management strategies solve the seed degeneration problem?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Sometimes
- ◯ Unsure

31. 8. Which potato varieties are resistant/tolerant to seed degeneration in Ethiopia?

32. 9. Which on-farm management strategy growers are using against seed degeneration? (tick all that apply)

Check all that apply.

	Removal and destruction of symptomatically infected plants	Fertilization	Pesticides, like fungicides and insecticides	Irrigation	Solanization	Optimal Planting Times	Ur
Tigray	☐	☐	☐	☐	☐	☐	
Afar	☐	☐	☐	☐	☐	☐	
Amhara	☐	☐	☐	☐	☐	☐	
Benishangul-Gumuz	☐	☐	☐	☐	☐	☐	
Somali	☐	☐	☐	☐	☐	☐	
Oromia	☐	☐	☐	☐	☐	☐	
Gambela	☐	☐	☐	☐	☐	☐	
Southern Nations, Nationalities and Peoples'	☐	☐	☐	☐	☐	☐	
Sidama	☐	☐	☐	☐	☐	☐	
Southwesy Ethiopia Peoples'	☐	☐	☐	☐	☐	☐	
Harari	☐	☐	☐	☐	☐	☐	
Addis Ababa	☐	☐	☐	☐	☐	☐	
Diredawa	☐	☐	☐	☐	☐	☐	

33. 10. Which post-harvest management strategy growers are using against seed degeneration? (tick all that apply)

Check all that apply.

	Pesticides (fungicides, insecticides, etc.)	Selection of healthy seeds by eye	Cold Storage	DLS	Heat
Tigray	☐	☐	☐	☐	☐
Afar	☐	☐	☐	☐	☐
Amhara	☐	☐	☐	☐	☐
Benishangul-Gumuz	☐	☐	☐	☐	☐
Somali	☐	☐	☐	☐	☐
Oromia	☐	☐	☐	☐	☐
Gambela	☐	☐	☐	☐	☐
Southern Nations, Nationalities and Peoples'	☐	☐	☐	☐	☐
Sidama	☐	☐	☐	☐	☐
Southwest Ethiopia Peoples'	☐	☐	☐	☐	☐
Harari	☐	☐	☐	☐	☐
Addis Ababa	☐	☐	☐	☐	☐
Diredawa	☐	☐	☐	☐	☐

Determining the Trade Paths of Seed, Harvested Products, and Agricultural Materials

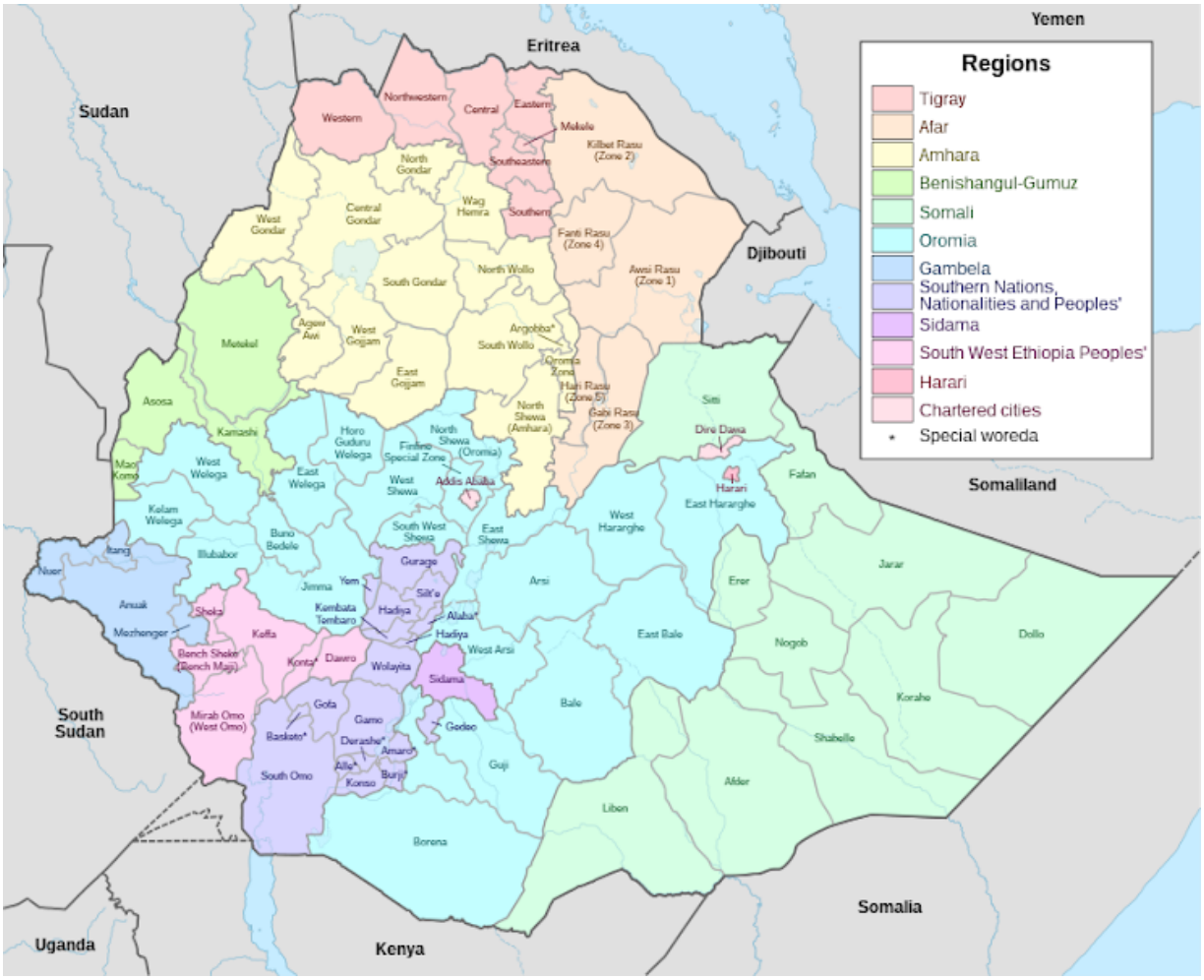
Note: *in this survey, with* ***'seed'*** *we refer to different types of* planting material *(potato tubers, suckers, stakes, stems, vines)*

34. 1. Considering informal trade, please tick the boxes if trade of SEED (*potato tubers, suckers*) exists between each region.

Note: Please consider that the regions in the rows are the sources and those in the columns are the sinks.

Tick all boxes that apply, including when intra-regional trade is involved

Please scroll right to see all options



Check all that apply.

	Tigray	Afar	Amhara	Benishangul-Gumuz	Somali	Oromia	Gambela	Sout Nati Natior and P
Tigray Tigray	☐	☐	☐	☐	☐	☐	☐	☐
Afar Afar	☐	☐	☐	☐	☐	☐	☐	☐
Amhara Amhara	☐	☐	☐	☐	☐	☐	☐	☐
Benishangul-								

Benishangul-Gumuz	☐	☐	☐	☐	☐	☐	☐	☐
Somali	☐	☐	☐	☐	☐	☐	☐	☐
Oromia	☐	☐	☐	☐	☐	☐	☐	☐
Gambela	☐	☐	☐	☐	☐	☐	☐	☐
Southern Nations, Nationalities and Peoples'	☐	☐	☐	☐	☐	☐	☐	☐
Sidama	☐	☐	☐	☐	☐	☐	☐	☐
Southwest Ethiopia Peoples'	☐	☐	☐	☐	☐	☐	☐	☐
Harari	☐	☐	☐	☐	☐	☐	☐	☐
Addis Ababa	☐	☐	☐	☐	☐	☐	☐	☐
Diredawa	☐	☐	☐	☐	☐	☐	☐	☐

35. 2. Considering informal trade, please tick the boxes if trade of HARVESTED PRODUCTS exists between each region

Note: Please consider that the regions in the rows are the sources and those in the columns are the sinks.

Tick all boxes that apply, including when intra-regional trade is involved

Please scroll right to see all options

Check all that apply.

	Tigray	Afar	Amhara	Benishangul-Gumuz	Somali	Oromia	Gambela	Sout Nati Natior and P
Tigray Tigray	☐	☐	☐	☐	☐	☐	☐	☐
Afar Afar	☐	☐	☐	☐	☐	☐	☐	☐
Amhara Amhara	☐	☐	☐	☐	☐	☐	☐	☐
Benishangul-Gumuz Benishangul-Gumuz	☐	☐	☐	☐	☐	☐	☐	☐
Somali Somali	☐	☐	☐	☐	☐	☐	☐	☐
Oromia Oromia	☐	☐	☐	☐	☐	☐	☐	☐
Gambela Gambela	☐	☐	☐	☐	☐	☐	☐	☐
Southern Nations, Nationalities and Peoples' Southern Nations, Nationalities and Peoples'	☐	☐	☐	☐	☐	☐	☐	☐
Sidama Sidama	☐	☐	☐	☐	☐	☐	☐	☐
Southwest Ethiopia Peoples' Southwest Ethiopia Peoples'	☐	☐	☐	☐	☐	☐	☐	☐
Harari Harari	☐	☐	☐	☐	☐	☐	☐	☐
Addis Ababa Addis Ababa	☐	☐	☐	☐	☐	☐	☐	☐
Diredawa								

Diredawa	☐	☐	☐	☐	☐	☐	☐	☐

36. 3. Please tick the boxes if there is exchange of AGRICULTURAL EQUIPMENT (machetes, tractors, motor pumps) and movement of farm workers between each region.

Note: Please consider that the regions in the rows are the sources and those in the columns are the sinks.

Tick all boxes that apply, including when intra-regional exchange is involved.

Please scroll right to see all options

Check all that apply.

	Tigray	Afar	Amhara	Benishangul-Gumuz	Somali	Oromia	Gambela	Sout Nati Natior and P
Tigray Tigray	☐	☐	☐	☐	☐	☐	☐	☐
Afar Afar	☐	☐	☐	☐	☐	☐	☐	☐
Amhara Amhara	☐	☐	☐	☐	☐	☐	☐	☐
Benishangul-Gumuz Benishangul-Gumuz	☐	☐	☐	☐	☐	☐	☐	☐
Somali Somali	☐	☐	☐	☐	☐	☐	☐	☐
Oromia Oromia	☐	☐	☐	☐	☐	☐	☐	☐
Gambela Gambela	☐	☐	☐	☐	☐	☐	☐	☐
Southern Nations, Nationalities and Peoples' Southern Nations, Nationalities and Peoples'	☐	☐	☐	☐	☐	☐	☐	☐
Sidama Sidama	☐	☐	☐	☐	☐	☐	☐	☐
Southwest Ethiopia Peoples' Southwest Ethiopia Peoples'	☐	☐	☐	☐	☐	☐	☐	☐
Harari Harari	☐	☐	☐	☐	☐	☐	☐	☐
Addis Ababa Addis Ababa	☐	☐	☐	☐	☐	☐	☐	☐
Diredawa								

Diredawa	☐	☐	☐	☐	☐	☐	☐	☐

37. 4. Which type of agricultural commodities does Ethiopia trade with the neighboring countries? (tick all that apply)

Check all that apply.

- ☐ Seeds (potato tubers)
- ☐ Harvested products
- ☐ Agricultural materials (machetes, tractors, motor pumps)
- ☐ Other: _____

38. 5. How are most of these trades?

Mark only one oval.

- ◯ Formal
- ◯ Informal
- ◯ Both
- ◯ Other: _____

39. 6. Considering informal trade, which agricultural commodities or farm workers move from Ethiopia to the neighboring countries? (tick all that apply)

Check all that apply.

	Eritrea	Djibouti	Somalia	Sudan	South Sudan	Kenya
Seeds (potato tubers, suckers)	☐	☐	☐	☐	☐	☐
Harvested products	☐	☐	☐	☐	☐	☐
Agricultural equipment (machetes, tractors, motor pumps)	☐	☐	☐	☐	☐	☐
Farm workers	☐	☐	☐	☐	☐	☐

40. 7. Considering informal trade, which agricultural commodities or farm workers move from neighboring countries to Ethiopia? (tick all that apply)

Check all that apply.

	Somalia	Djibouti	Eritrea	Kenya	Sudan	South Sudan
Seeds (potato tubers, suckers)	☐	☐	☐	☐	☐	☐
Harvested products	☐	☐	☐	☐	☐	☐
Agricultural equipment (machetes, tractors, motor pumps)	☐	☐	☐	☐	☐	☐
Farm workers	☐	☐	☐	☐	☐	☐

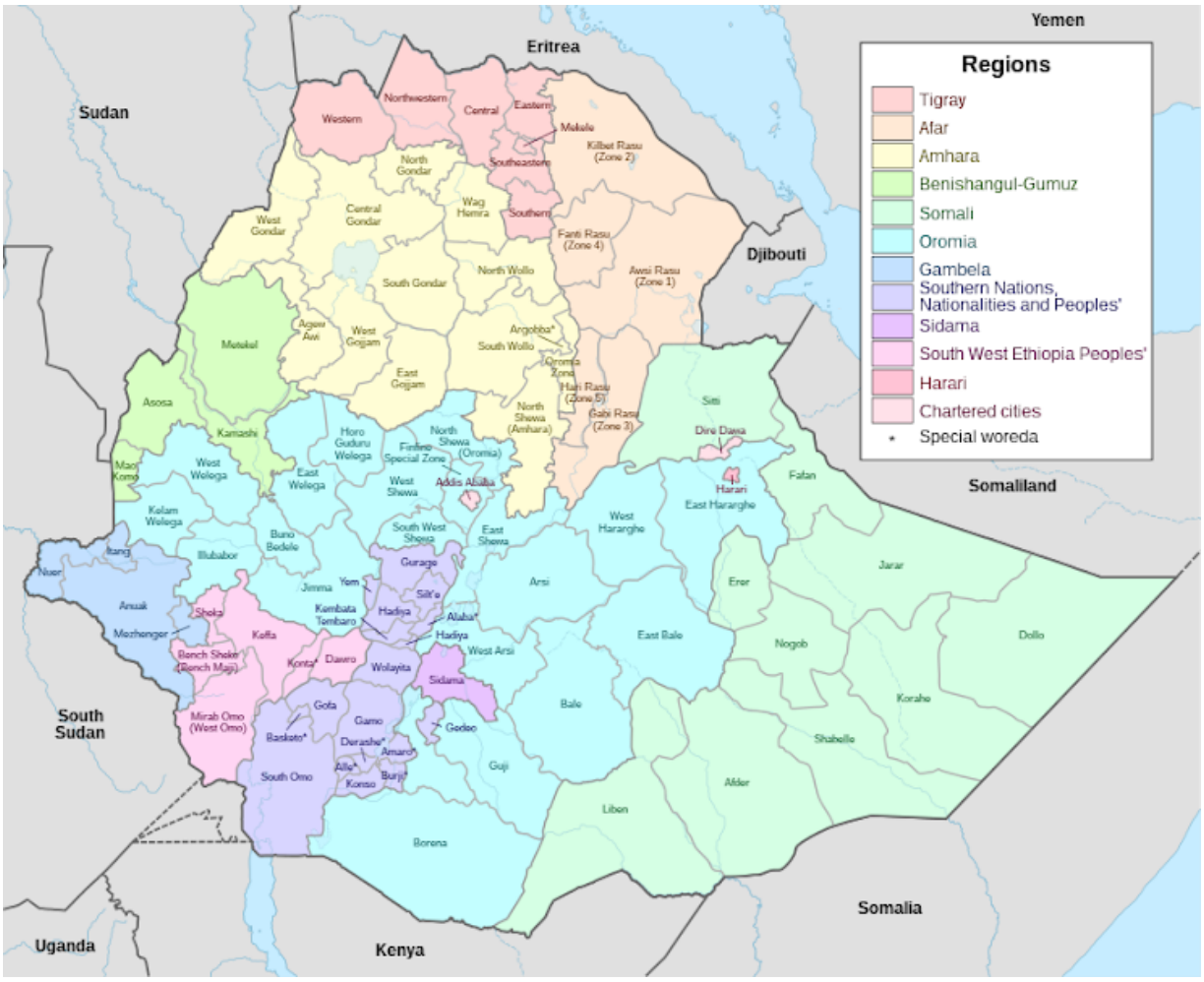
INA Parameters for Bacterial Wilt

Potato
production in Ethiopia is threatened by the spread of **bacterial wilt, caused by the *Ralstonia solanacearum* species complex.** Bacterial wilt is moved primarily through the informal trade of seed potato, where it has the potential to move across Ethiopia and into neighboring and trading countries. In this section, we utilize the Impact Network Analysis framework, an R tool designed by Dr. Karen Garrett in collaboration with CGIAR Roots, Tubers, and Bananas, with the goal of analyzing the social and epidemic networks that impact disease spread and establishment. This tool takes in epidemic and social parameters and simulates potential epidemic scenarios and identifies regions that may be ideal candidates for management intervention.
The
following questions are designed to create a parameter list for the Impact Network Analysis framework in R.

41. 1. How many years have you been working with *Ralstonia solanacearum*?

42. 2. On a scale of 1-10, with 1 being not confident and 10 being very confident, how confident are you with your knowledge on *Ralstonia solanacearum* in potato

43. 3. What percent of potato growers produce potato seed for market sale/trade?



Mark only one oval per row.

	<10%	11-25%	26-50%	51-75%	>75%
Tigray	◯	◯	◯	◯	◯
Afar	◯	◯	◯	◯	◯
Amhara	◯	◯	◯	◯	◯
Benishangul-Gumuz	◯	◯	◯	◯	◯
Somalia	◯	◯	◯	◯	◯
Oromia	◯	◯	◯	◯	◯
Gambela	◯	◯	◯	◯	◯

Southern Nations

Southern Nations Sidama					
Southwest Ethiopia Peoples Sidama					
Southwest Ethiopia Peoples Harari					
Addis Ababa Harari					
Diredawa Addis Ababa					
Diredawa					

44. 4. How many seasons is potato seed stored before it is traded on the market

Mark only one oval per row.

	<1 season	1 season	1-2 seasons	>2 seasons
Tigray				
Afar				
Amhara				
Benishangul-Gumuz				
Somalia				
Oromia				
Gambela				
Southern Nations				
Sidama				
Southwest Ethiopia Peoples				
Harari				
Addis Ababa				
Diredawa				

45. 5. Could incomplete reporting be a major issue for identifying regions with bacterial wilt?

Mark only one oval.

- Yes
- No
- Unsure

46. 6. Assuming cost and availability was **not** an impacting factor, how likely would growers be to adopt bacterial wilt management strategies (e.g. certified seed, raising soil pH, resistant varieties, pesticide usage)?

Mark only one oval per row.

	Likely to adopt	Somewhat likely to adopt	Somewhat unlikely to adopt	Unlikely to adopt	Unsure
Tigray					
Afar					
Amhara					
Benishangul-Gumuz					
Somalia					
Oromia					
Gambela					
Southern Nations					
Sidama					
Southwest Ethiopia Peoples					
Harari					
Addis Ababa					
Diredawa					

47. 7. In the absence of bacterial wilt management, how likely is the establishment of bacterial wilt for each regions?

Mark only one oval per row.

	Likely	Somewhat likely	Somewhat unlikely	Unlikely	Unsure
Tigray	◯	◯	◯	◯	◯
Afar	◯	◯	◯	◯	◯
Amhara	◯	◯	◯	◯	◯
Benishangul-Gumuz	◯	◯	◯	◯	◯
Somalia	◯	◯	◯	◯	◯
Oromia	◯	◯	◯	◯	◯
Gambela	◯	◯	◯	◯	◯
Southern Nations	◯	◯	◯	◯	◯
Sidama	◯	◯	◯	◯	◯
Southwest Ethiopia Peoples	◯	◯	◯	◯	◯
Harari	◯	◯	◯	◯	◯
Addis Ababa	◯	◯	◯	◯	◯
Diredawa	◯	◯	◯	◯	◯

48. 8. Between which regions is communication regarding potato seed systems and bacterial wilt management common? (please check partner regions where communication is common)
Note: Please scroll right to see all options

Check all that apply.

	Tigray	Afar	Amhara	Benishangul-Gumuz	Somali	Oromia	Gambela	Sout Nati Natior and P
Tigray	☐	☐	☐	☐	☐	☐	☐	☐
Afar	☐	☐	☐	☐	☐	☐	☐	☐
Amhara	☐	☐	☐	☐	☐	☐	☐	☐
Benishangul-Gumuz	☐	☐	☐	☐	☐	☐	☐	☐
Somali	☐	☐	☐	☐	☐	☐	☐	☐
Oromia	☐	☐	☐	☐	☐	☐	☐	☐
Gambela	☐	☐	☐	☐	☐	☐	☐	☐
Southern Nations, Nationalities and Peoples'	☐	☐	☐	☐	☐	☐	☐	☐
Sidama	☐	☐	☐	☐	☐	☐	☐	☐
Southwest Ethiopia Peoples'	☐	☐	☐	☐	☐	☐	☐	☐
Harari	☐	☐	☐	☐	☐	☐	☐	☐
Addis Ababa	☐	☐	☐	☐	☐	☐	☐	☐
Diredawa	☐	☐	☐	☐	☐	☐	☐	☐

Thank you!

49. Do you have any additional comments to share with us about this study or ways to improve future surveys?

50. Would you like to receive a summary of the results of this study?
If you do, please provide your name and an e-mail address to which we can send the results: