

Questions for farmers:

1. Farmer ID	
2. Years of schooling?	
3. What is your level of education?	a) No formal education b) Literate c) Primary d) Secondary e) College f) University
4. What is your farming experience?	
5. Are you the owner of land or farmer for the land?	a) Tenant b) owner c) Both
6. What is your farm size?	
7. Where is the location of your farm along Mungi canal	a) Head b) Middle c) Tail

8. What difficulties do you face in warabandi turn?	a) Less water, does not fulfil my crop demand b) It is fixed and not flexible, does not compatible with demand period c) Creates discussion among neighbours d) Any other
9. What do you do with your warabandi water when you do not need it in your turn?	a) Exchange with neighbour b) Sell it to another farmer c) I have big farm I use it all d) I store it e) Any other
10. Is there an issue for discussion between you and neighbours on warabandi canal water distribution?	A) Yes B) NO

11. How would you rate the changes in your area since last decade?

	Improved/Increased	Not changed	Worse/decreased	Don't know	Remarks
Amount of canal water					
Groundwater table					
Quality of ground water					
Land/soil salinity					
Issue for discussion for water distribution in warabandi system					

12. How do you decide when to irrigate your field?	a) By observing soil dryness b) Taking soil in hand c) Observing plants d) Every 7 days e) Observing High temperature f) Soil moisture sensor Any other
13. After how many days do you decide to irrigate (interval of irrigation for cotton)?	a) After 7 days b) Depends on weather c) Depends on soil condition d) Other
14. How do you decide how much water you need to apply (for cotton)?	a. We fill the field by water b. Fill the furrow depth by water c. According to seed type d. Any other
15. Do you want a change in turn of warabandi water distribution from 7 days?	A) Yes b) No

16. Have you heard having a water storage pond at farm (for storing warabandi water when you do not need It and use it when you need)?	A) Yes b) No	
17. What barriers would stop you for having/trying to have a pond for warabandi water storage at your field/farm? (the main purpose is to store water when you do not need and use it when you need) Please rate from 1 to 5 1 the barrier has no effect on implementation of pond, 2 has mild effect 25%, 3 moderate effect 50%, 4 has very important effect 75% 5 is the barrier utmost important to implement this measure	Barriers	Rate
	I do not know much about it (low awareness)	
	I Exchange turns with neighbours which is easier option than pond	
	I depend more on tube well water	
	I have lack of information and knowledge how it works	
	I lack financial resource for it	
	It will be hard to maintain and operate	
	I am afraid that it will not work/I am not open to new changes	
	others	

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18. Have you heard about soil moisture sensors?	A)Yes b) No	
19. Would you be willing to try this farming practice?	A)Yes b) No	
20. What barriers would stop you using a soil moisture sensor? Please rate from 1 to 5 1 the barrier has no effect on implementation of sensor, 2 has mild effect 25%, 3 moderate effect 50%, 4 has very important effect 75% 5 is the barrier utmost important to implement this measure	Barriers	Rate
	I do not know much about it (low awareness)	
	I fear that soil moisture sensor does not work/ not open to changes	
	I have lack of information and knowledge how it works	
	I have lack of financial resource for it	
	It will be hard to maintain and operate it for long time	
	Others	

21. Can you afford the 40 % of drip price, while government covers 60% of the cost?	A)Yes b) No	
22. Do you consider drip method a good option for cotton in your farm?	A)Yes b) No	
23. Do you think a combination of drip (to use less water) with a pond (to store warabandi water) and soil moisture sensor (to know when to irrigate) will be useful to make warabandi flexible and you do not need to use ground water anymore)?	A)Yes b) No	
24. Which obstacles would hinder you in getting a combination of drip, soil moisture sensor and pond? So	Barriers	Rate
	Low awareness	

<p>warabandi water is enough for you, there is no need to pump ground water anymore.</p> <p>Please rate from 1 to 5</p> <p>1 the barrier has no effect on implementation of pond, sensor, drip</p> <p>2 has mild effect 25%,</p> <p>3 moderate effect 50%,</p> <p>4 has very important effect 75%</p> <p>5 is the barrier utmost important to implement this measure</p>	Lack of information and training how it works	
	Lack of financial resource for it	
	Hard to maintain and operate it	
	Economically not feasible for farmer	
	Fear that it does not work	
	Others	

25. How would you use the water if you have more water available from warabandi turn?	<p>a) Growing cash crops</p> <p>b) Cultivating fallow land</p> <p>c) Growing high water-intense crops</p> <p>d) Other</p>
26. Would you be willing to participate in a joint experimentation in part of your field along with farmer, scientist and farmer organization to improve water saving?	a) Yes b) No
27. Please rank from 1 to 5 (5 is most important and 1 is least important) which organization is most useful to you in regards to better water usage suggestions?	<ul style="list-style-type: none"> • Punjab irrigation department • On farm water management department (Agri Department) • Successful farmers • Membership of farmer organization • Any others

Questions for Academicians and Government officials:

1. ID No:		
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2. What problems do farmers face in warabandi system?	a) less water, does not fulfil the crop demand b) it is rigid not flexible, does not compatible with demand period c) creates discussion among neighbours d) Any other	
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3. What Barriers would stop farmers for having/trying to have a pond for warabandi water storage at his field/farm (store water when they do not need and use it when you need)? Please rate from 1 to 5 1 the barrier has no effect on implementation of pond, 2 has mild effect 25%, 3 moderate effect 50%, 4 has very important effect 75% 5 is the barrier utmost important to implement this measure	Barriers	Rate
	Low awareness	
	Exchange turns with neighbours is easier option than pond	
	Dependability more on tube well water	
	Lack of information and training how it works	
	Lack of financial resource for it	
	Hard to maintain and operate it	
	Fear that it does not work/not open to new changes	
	others	

4. Would soil moisture sensor help farmers on good irrigation timing?	a) Yes b) No	
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5. What Barriers would stop farmers for using soil moisture sensor? Please rate from 1 to 5 1 the barrier has no effect on implementation of soil sensor, 2 has mild effect 25%,	Barriers	Rate
	Low awareness	
	Fear that soil moisture sensor does not work/ not open to changes	
	Lack of information and training how it works	

3 moderate effect 50%, 4 has very important effect 75% 5 is the barrier utmost important to implement this measure	Lack of financial resource for it	
	Hard to maintain and operate it for long time	
	Others	
6. Do you consider a combination of drip (to use less water) with a pond (to store warabandi water) and soil moisture sensor (to know when to irrigate) will be useful to make warabandi flexible and farmers do not need to use ground water anymore)?	a) Yes b) No	
7. Which barriers would stop farmers in getting a combination of drip, soil moisture sensor and pond? So they do not need to pump ground water anymore Please rate from 1 to 5 1 the barrier has no effect on implementation of pond, drip, sensor 2 has mild effect 25%, 3 moderate effect 50%, 4 has very important effect 75% 5 is the barrier utmost important to implement this measure	Barriers	Rate
	Low awareness	
	Lack of information and training how it works	
	Lack of financial resource for it	
	Hard to maintain and operate it	
	Economically not feasible for farmer	
	Fear that it does not work/not open to new changes	
	Others	