Question	Asker Name	Answer	Answer Name
thank you for flagging Animal-source foods as key to nutritional development. Critics have called out ASF for 'negative climate and conservation effects'. Can you speak to that?	marydean purves		
What policies and other efforts are necessary to make better use of existing financial flows in agricultural water investment going forward?	Isatou Sarr		
What are effective approached to prioritise investments that modernise existing water infrastructure over investing in new infrastructure?	Isatou Sarr		
How can policymakers help ensure that these investments consider trade-offs and ensure that they are sustainable?	Isatou Sarr		
Nicole is speaking about SS irrigation financed by farmers themselves. what country/ies specifically?	marydean purves	live answered	Nicole Lefore
What could be done to address the lingering data gaps necessary to identify investment needs in agricultural water and target the scaling up of financing?	Isatou Sarr	Studies over the past 10-15 years show that large areas of Africa and some parts of South Asia have more individual farmers investing in their own irrigation compared to land areas covered by publicly funded schemes. In many of those cases, it is not mechanized, but high labor and manual irrigation. The literature on this is often under 'small scale', 'household' or farmer-led irrigation.	Nicole Lefore

In writing the text Developing Smallholder Agriculture: A Global Perspective the largest and most technical chapter was on Irrigation, based on work in Egypt and Pakistan as large system, plus work in Sri Lanka, Malawi, and Tanzania as well as other. It takes a very pragmatic approach to irrigtiaon. I uploaded the chapter to my website with the link: https://agsci.colostate.edu/smallholderagriculture/wp-content/uploads/sites/77/2024/01/Chapter-8-Irrigation.pdf	Dick Tinsley		
Can global aquifers sustain high levels of expansion of small-scale irrigation (or any scale for that matter)?	John Engels	linked to this: are there any significant risks of creating salinity problems or repeating the arsenic problems that farmers face in parts of Bangladesh and India?	Paul Wagstaff
Can global aquifers sustain high levels of expansion of small-scale irrigation (or any scale for that matter)?	John Engels	Aquifer sustainability/exploitation is highly localized, some aquifers can be used for irrigation sustainably. However, the water resource needs to be monitored for both quantity (to assess and monitor recharge) and quality (particularly from the increase in use of agro-chemicals).	Nicole Lefore

Nicole: can you provide more details on what small scale irrigation equipment is cost effective - and what is not? drip kits, sprinklers, rain guns, petrol pumos, foot pumps, ...	Paul Wagstaff	Petrol/diesel pumps, solar pumps, sprinklers, and rope/water pumps have all been assessed and found to be profitable - in so far as it is high value crops and farmers have the market links to off takers. I have seen guns in fields but not seen studies, it seems emerging and not yet common. Foot pumps have been studied and found as profitable, but have limits on land area and require high labor input, which limits demand by farmers. Rural labor is often limited and expensive, so farmers prioritize reduced labor. Cost effectiveness is often more related to the output markets.	Nicole Lefore

Nicole: can you provide more details on what small scale irrigation equipment is cost effective - and what is not? drip kits, sprinklers, rain guns, petrol pumos, foot pumps, ...	Paul Wagstaff	We have sold over 400,000 lowcost manual irrigation pumps in Sub Saharan Africa (in 16 countries) and found that over 70% of them are still being used after 5 years. Farmers are selling fruit and veg in the off-seasons and making high profit margins. The type and design of pump is critical for determining if they work well, but farmers using them are making very large priofits asnd feeding will over a million people with fruits and vegetables. They recover their investments in 6-9 months and many invest in upgrading to solar pumps. Studies (RCTs) have shown large reductions in child stuntting and increases in mental and physical health and empowerment of women. So we know that humen powered pumps can have a huge positive impacts on the poorest in SSA as a first step into irrigation and out of poverty. See www. kickstart.org and https: //shambamaisha.ucsf.edu/ for more information.	Martin Fisher
Nicole: can you provide more details on what small scale irrigation equipment is cost effective - and what is not? drip kits, sprinklers, rain guns, petrol pumos, foot pumps, ...	Paul Wagstaff	Thanks Martin, we should have another session on Kickstarter's experience and successful private sale of a huge number of pumps!	JOhn Scicchitano

Could you please share the link to the study Nicole mentioned about irrigators having improved nutrition and resilience outcomes?	Anonymous Attendee	https://ilssi.tamu.edu/files/2023/03/ILSSI-Brief-Nutrition_INTERACTIVE_031723.pdf	Nicole Lefore
Thank you Nicole for great presentation.	Staford Francis Mwambola	live answered	Michael Saltz
Thank you Nicole for great presentation.	Staford Francis Mwambola	Where you able to determine the farm sizes which payed back in less than two years?	Staford Francis Mwambola
I Nicole, please the subtitle in french. I'm francophone	Mamadou Sarra	Hello! Unfortunately, we do not have live translation in other languages at this time.	Michael Saltz
To Nicole's point about SSI farmers already in the 'better income range' Poverty Lab has found i the past that this isn't such a problem as perceived, as these 'middle level' groups tend to pull others up…	marydean purves	live answered	Michael Saltz
Is there any rsults about the value of mony of using solar power in irrigation comparing with income?	Osama Alkhalaf	The link to the brief - which includes the references to the scientific studies: https://ilssi.tamu.edu/files/2023/03/ILSSI-Brief-Nutrition_INTERACTIVE_031723.pdf	Nicole Lefore
Is there any rsults about the value of mony of using solar power in irrigation comparing with income?	Osama Alkhalaf	thank you so much, but the link is not woking	Osama Alkhalaf
Nicole's reference to women being more risk averse is spot on — because they have so much to account for at the HH level, and they can so easily lose everything	marydean purves	live answered	Michael Saltz

Smallholder farmers getting access to solar irrigation system could be so expensive, study has shown that repayment has been a huge challenge for these farmers. Could you consider other source of irrigation for smallholder farmers such as manual irrigation pumps. farmers could make enough money very quickly, then have enough savings and then could upgrate to solar system of irrigation.	Ademola Festus	Studies so far have shown that payments are manageble, especially where terms are set for smallholder farmers, such as payment at harvest with only small payments in between.	Nicole Lefore
When promoting water pumps what are you doing to insure there is an adaquate water supply to use the pumps, you are implying that anyone can use a pump. That is usually not true, and you can easily exhaust the water supply.	Dick Tinsley		
will you also discuss water harvesting techniques? And techniques to retain water / prevent run-off (e.g. earth-smiles)?	Roland Steinmann		
Did the innovation attraccted youth in farming as we see in the shared photos in this presention?	Staford Francis Mwambola	There is interest and we see youth getting access to land to develop irrigation. However youth face many of the same constraints as women farmers - they lack documented financial history in order to qualify for asset-based finance. We see some potential for youth in terms of irrigation as a service, and for services within the irrigated production sector, not only in directly irrigating themselves.	Nicole Lefore
What specific opportunities aree available for women and youth in the agriculture, water and energy nexus in Africa?	Thomas Poole		

Nicole, very happy to see the mechanization innovation lab. It is critical for advancing smallholder farmers and off-setting the dietary energy balance. You might appreciate the recent article I prepared reflecting over my 50 years of assisting smallholder communities. the link: https: //agsci.colostate.edu/smallholderagriculture/wp-content/uploads/sites/77/2023/03/Reflections.pdf	Dick Tinsley		
My question is from Ms. Nicole Lefore, what specific problems were not addressed previously that your lab planning to address?, another question that, how profitable is agricultural production for the subsistence farmers on those countries that they could pay back the solar system credit?. thank you	Saboor Rahmany	Nearly all irrigators are commercial - they cannot get the cash income needed to invest in irrigation equipment and in other inputs at subsistence level. Those tend to be homestead gardens at very small scale, in which households use the produce for own consumption. Even on public irrigation schemes, farmers are expected to pay for O & M and other services, so it requires commercial approach.	Nicole Lefore
What is meant byt "nutrition-sensitive mechanization"? Can you give examples please?	Julie SAGE		
Hi, how will you try to scale with financial institutions? No examples of developing adapted services with them like leasing products with solar irrigation equipment?	Sigrid Meijer	excellent point	marydean purves

Hi, how will you try to scale with financial institutions? No examples of developing adapted services with them like leasing products with solar irrigation equipment?	Sigrid Meijer	This will be a priority under the IL for Irrigation and Mechanization Systems. Several solar irrigation companies are now entering into the irrigation as a service/service provision market. This appears to have some potential, but we will examine scalability.	Nicole Lefore
You found from your study that small holders were able to pay back the cost of Irrig equipment within 2-3 years. what was the avearge size of holding? were they solely crop farmers? where they beneficiaries of external input (fertilizer/chemicals) supports?	Mure Agbonlahor	We looked at plot sizes from about .25 - 2 hectares, using different sizes of solar pumps and petrol/diesel pumps. These were vegetable farmers: leafy greens, carrots, egyptian spinach, amaranthus, etc. We did not find the same returns on crops such as maize or cowpea. They were NOT beneficiaries of other forms of support. We looked at farmers who were working entirely on their own investments. In fact, many women prefer that fertilizer access is not with subsidy or support, because it makes it more difficult for them to get.	Nicole Lefore
What is the role of evidence based data as it relates to agriculture, water and energy nexus?	Thomas Poole		
Thanks Nicole. Great presentation	Mure Agbonlahor	Thank you for listening in, Mure.	Nicole Lefore
I think due to global warming, in Nigeria will need accurate rain predictions to help farmers have knowledge about when to plant there crops	SHINKU Theophilus		

One of the biggest issues I've encountered is Bore Hole Drilling everywhere with no limitations regarding how many drilling holes are located because it not only drains the ground water but causes "Cones of Depression." Also, as far as I know, once taps of water is opened, people think it's "free", so it increases the waste of precious water.	Lesley Byrne	Borehole drilling and groundwater management is one of the primary policy issues that requires urgent attention. Currently very few countries in the Global South are monitoring boreholes or groundwater use, even in areas where there are policies.	Nicole Lefore
Talking about India, the country has done elaborate work on groundwater resource assessment by agroclimatic regions and watersheds. Of course, there are huge problems in regard to managing groundwater exploitation. What is the situation in African countries. Looks like, overexploitation of groundwater is not yet an issue in African countries. Any comments? Thanks.	Ramesh Deshpande	Huge issue, but evidence is poorly documented - for example, monitoring of water tables is very limited.	Carl Wahl
Agriculture is the large consumer of fresh water for obvious reason. However, the growing population and the alarming CC are threatening water availability to it. How do you think we can achieve the Millennium Development goals given the issue of CC impact is not taken due attention and population is still increasing at alarming rate. This is a challenge and could not be easily answered.	Samuel Dagalo Hatiye		
How can we integrate agroecological practices and irrigation?	Shruti Patel		
Note that poor farmers in the sub-Saharan Africa are paying off for CC impact without any contribution for the same. These farmers need to be supported from the developed nations who generate a huge concern of CC. Is that not? But so far, there is nearly none, on ground, except cyclic conferences on CC.	Anonymous Attendee		

How can panelists envision and propose effective strategies for achieving sustainable water use in agricultural expansion within countries like Liberia, which possess extensive arable forest land? Considering the context of the Sustainable Development Goals, what specific measures and policies should be emphasized to balance agricultural growth with responsible water management and environmental conservation	Sylvester W Taylor		
Water smart looks very much like Conservation Agriculture. Can you please delineate the differences?	Carl Wahl		
If farmers manage both rainfed and irrigated lands, which system is the most productive, and which get priority in management?	Dick Tinsley		
Is WSA another formulation of Conservation Agriculture? what's the difference	Marcelin Tonye Mahop	Broadly speaking WSA includes Soil Smart, Rainfall Smart and Irrigation Smart dimensions. What she described was mostly the Soil Smart angle, which is very aligned with conservation agriculture. It is also the easiest to achieve and lowest cost, so largest bang for the buck.	peter wright
Re WSA Practices -- these technologies are captured just two words: Conservation Agriculture. See FAO definition of Conservation. There is a lot of literature on this subject on FAO websites. Will it be okay call WPAs as Conservation Agriculture?	Ramesh Deshpande	My thoughts too	Emily Rutto

How do the panalists see the importance of a Multiple Water Use Systems (MUS) that plan for multiple uses of water in crop agriculture, livestock, and domestic use? Luke Colavito, Senior Economist, iDE	Luke Colavito		
How much of your innovations are more labor intensive in an environment that has severe labor shortage, with diets that limited the workday to only a couple hours of diligent effort? Full day of agronomic field work requires <4000 kcal/day when most smallholder only have access to 2500 kcal/day	Dick Tinsley		
Have you done any cost/benefit on	Bob Rabatsky		
Marie-Soleil: the crop residue mulching looks great. I assume that in the trial areas there was no significant competition from livestock for crop residues.	Paul Wagstaff		
How are farmers engaged in the Collaborative Evidence Building?	Amos Yesutanbul		
Have you done cost/benefit on wsa system. Labor intensivity, herbicide use increases, etc?	Bob Rabatsky		
30% of harvest reduction is caused by water stress in Central America region.	Flavio Linares		
Considering the timeframe for soil health improvement and the increase management burdens, what are the lessons CRS has learnt about increasing adoption of WSA practices?	Carl Wahl	Two that I think of are the importance of secure land rights (either ownership or use) to be able to benefit from the longer term benefits; secondly the utility in traditionally based community shared labor practices and what can be done to promote them.	peter wright

Considering the timeframe for soil health improvement and the increase management burdens, what are the lessons CRS has learnt about increasing adoption of WSA practices?	Carl Wahl	Great question. At CRS we are actually seeing that farmers can have tangible benefits from WSA practices in 1-2 agricultural seasons. In a visit to our programs in El Salvador, I asked farmers about what were the first changes they experienced in applying WSA practices. The immediate answer from almost all was income – both from increased yields but also reduced expenditures on fertilizer. Marie also has data on how WSA has led to reduced fertilizer use. In trying to expand uptake, we are trying to maximize felt impacts on yield and even water availability, but also connecting farmers to markets and improving their marketing skills to ensure that WSA practices lead to increased income. We also see that farmer-to-farmer advice and connection supports uptake. Hope that answers your question and happy to discuss further.	Lori Pearson
Considering the timeframe for soil health improvement and the increase management burdens, what are the lessons CRS has learnt about increasing adoption of WSA practices?	Carl Wahl	Thanks Lori - any evidence of non-subsidized adoption?	Carl Wahl
General question: Is smallholder farming system profitable?	Kitinya Kirina		

How do you incentivize smallholders to shift to more efficient water saving technologies such as drip irrigation in countries (such as several countries in the Middle East and North Africa where farmers typically use flood irrigation? The current flood irrigation practices utlize about 80 percent more water than more efficeint sytems such as drip and under the current sytems water is not metered and is available free of charge - but with climaate change ter resources are declining and demand for water is rising along with population growth.	Peter Boone		
Can you tell us more on the community and digital extension? Amos, FIDEP Foundation, Ghana	Amos Yesutanbul		
Wonderful presentaion on WaSA practice for rainfed agriculture. Hope have similar focus on WaSA on irrigated farms.	Abebaw Kebede		
What is the role can the international community play as it relates to water smart Agriculture?	Thomas Poole	One can be raising the awareness of donors to the importance of investing in soil management as a cost effective means of increasing production from green water, in contrast to the high costs of investing in irrigation.	peter wright
Tree legume contour hedges that can be cut or trimmed are important. Establishment by seed plants rather than cuttings of Gliricidia give deeper roots and less water competition. However seeds are few and standard guidelines not good for pretreatment to enable water uptake of seeds. Which establishment methods were recommended and used? I did and published research on improved low-cost tree legume establishment.	Torsten Mandal	Torsten - suggest looking up the Inga agroforestry systems.	Carl Wahl

Where can I get reliable information about acquifer depletion information for Zimbabwe?	Francis. Moyo		
A question for Marie-Soleil Turmel - In the bar graph where you showed water productivity (kg grain/ha/mm water) versus rainfall, it looks like productiviy is higher in wet years than in relatively drier years. Granted you only have data for just a few years, is there any conecern about autocorrelation in your data? .	Pierre-Andre Jacinthe	Would someone be justified to argue that improvement in crop yield was due to rainfall and not climate-smart farming practices?	Pierre-Andre Jacinthe
A question for Marie-Soleil Turmel - In the bar graph where you showed water productivity (kg grain/ha/mm water) versus rainfall, it looks like productiviy is higher in wet years than in relatively drier years. Granted you only have data for just a few years, is there any conecern about autocorrelation in your data? .	Pierre-Andre Jacinthe	Water smart agriculture should give greater benefit in a dry year than in a good year. When rainfall is sufficient there is less benefit from WSA, moreso in dry years.	peter wright
Peter, you are right. How implement incentives for smallholders to continue WSA or other good practices. Option: a. Payments for ecosystem services in the place or farm management. b. National Policies c. others, market incentives, d. carbon credits.	Flavio Linares		
Do we any available financial support systems for categories of farmers especially small holder farmers in Sub Saharan Africa including Nigeria due.to factors such as climate change and drought?	Solomon Oyeniran		
how climate change will determined the water use efficiency in horticulture crops	Ravindran Chandran		
How can link water management practices to agricultural trade as it relates to gender inclusiuon?	Thomas Poole		

What about handling flooding that is increasing with CC?	Martha Saldinger		
Supporting irrigation infrastructure maintenace is great but the most forgotten one is water managment at field level which have siginificant impact on productivity, soil health, production quality---. What is USAID plan in supporting in such area?	Abebaw Kebede		
Are there success stories/case studies of private enterprises accelerating access to irrigation? Sunculture comes to mind, having accessed signficant growth capital. Is private sector investment in such companies a cost effective opportunity to provide access to irrigation?	JOhn Scicchitano		
Dr. Lefore: Can you say more about mechanization solutions?	John Riggan		
The link worked for me.	Martha Saldinger		
How about thinking Moisture Smart Agriculture? This way, the concept extends to postharvest loss management as well. For low moisture content (dry) foods, high moisture content is rather culprit for value management.	Peetambar Dahal		
nicole kindly send me mail to ravindran. c@tnau. ac.in, i would like to invite you for upcoming international event in Tamil Nadu, India in precision horticulture	Ravindran Chandran		

Managing landscape approach is indeed challenging -- it requires not only community involvement but also coordination and convergence among various government departments, agencies, and above all the banks? Also, landscape approaches require huge longer term investments --across land uses such as grasslands, wastelands, waterbodies, agroforestry and forestry ofter at very high slopes. Is USAID in Africa actively promoting landscape approaches? If so, what is its experience?	Ramesh Deshpande		
Landscape level water managment is thlong term solution for sustainable water security and enviromental sustainablity. The return from such intervention is somehow slow , need user collabration, workable policy, ----. short term project life, need for intensive labour requirement at the start, land tenure isse, ---are still challenges. How you manage those challenge in your project?	Abebaw Kebede		

yes, we do see this and are exploring how to document it. The WSA team, during the pandemic, and now ongoing, launched a media campaign around WSA practices through radio programming, WhatsApp messaging and even a call in number for technical advice. A study at the end of the campaign interviewed farmers regarding the influence this messaging had on their own approaches and found that the majority of listeners adopted at least 1 WSA practice. The audience was of course much wider than the immediate program beneficiaries, though I am not sure how the study captured or not any difference between the general audience for the messaging and program participants. Happy to follow up on that.	Lori Pearson	sorry that was meant for Carl Wahl on the question of non-subsidized adoption	Lori Pearson
What is an average/typical investment for a farmer?	alison hall		
There is a major difference between Anthropocene Linear thinking which is Western European versus Indigenous knowledge.	Lesley Byrne		
kindly send all question and answer discussed today in participated email	Ravindran Chandran	We will be sending out a full post event package!	Michael Saltz