Rain4Africa: Apps for farmers
Grain Industry Apps workshops
06 February 2018

Prof Sue Walker
Terry Newby

Introduction

- Farmers make decisions about when to plant maize every growing season.
- Many factors influence such a decision
  - past experience;
  - current information;
  - climatic conditions;
  - logistics & availability of inputs.

In Rain for Africa (R4A) project, a mobile phone 'Planting App' has been developed

- to address gaps in information available to small-scale farmers in South Africa.

Objectives of R4A

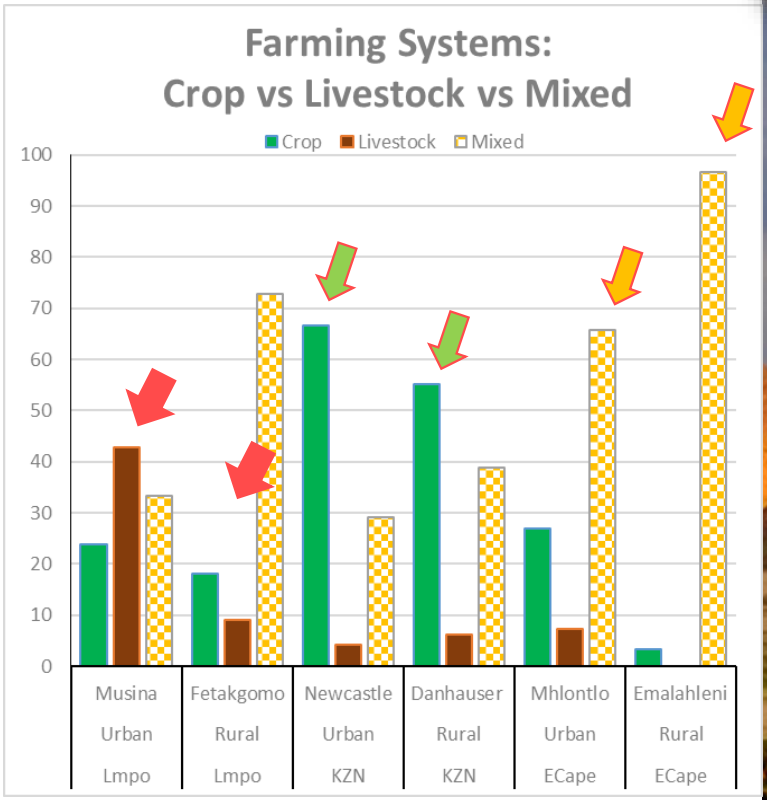
- Use best available weather & agricultural data to provide a timely service to small-scale farmers (125,000 & 50% women) via cellular technology using applications.
- Develop smartphone application: (10% improvement)
  - Provide planting / sowing advice
  - Spraying advice against pests and diseases
  - Weather forecast
  - Collect rainfall data = crowdsourcing.
- Form sustainable business.


Reach 125.000 small holder farmers via the R4A Mobile apps
Easy access to climate and weather information for users
Provide FREE decisions support to:
Increase food production >10%
Reduce use of resources >10%

Farming Systems

- **Limpopo:** Many farmers with livestock (>75%)
- **KZN:** Cropping dominant in both rural & peri-urban areas (>90%).
- **E-Cape**: Mixed farming systems dominant (60-90%)

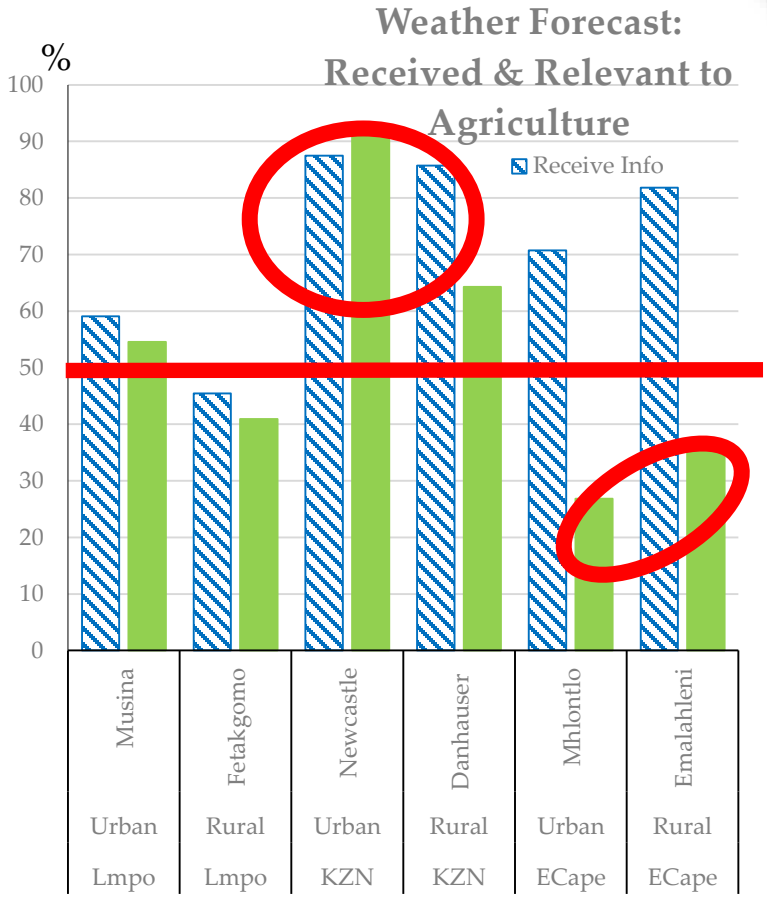
=> Need specific tailored forecasts for livestock & crop farmers



Availability & Relevance Weather Info

- **Limpopo:** *More urban* (>50%) *than rural* farmers (<50%) both receive & understand climate info usefulness.
- **KZN** farmers receive (>80%) & have better knowledge of importance of weather info than other provinces
- **E-Cape:** low awareness of relevance of weather info to agriculture (<40%).

Many requested more specific information related to their own farming operations.



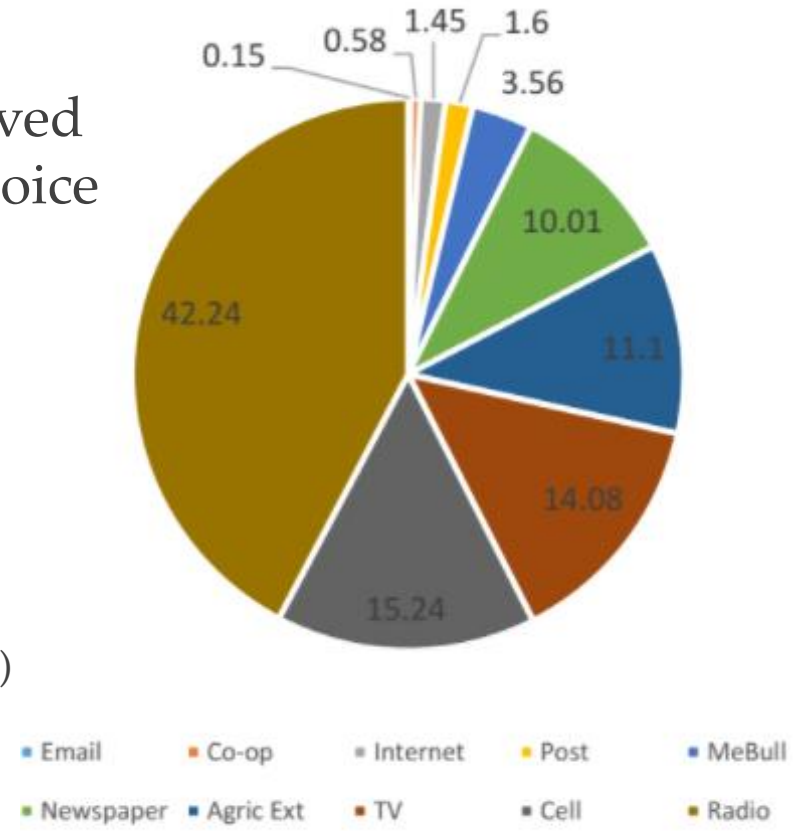
Media Source for Weather Forecast

2014/15 (DAFF project):

Limpopo farmers received weather forecasts 1st choice via:

- Radio: 42%
- Cell: 18%
- TV: 14%
- Agric Ext: 11%
- Newspaper: 10%

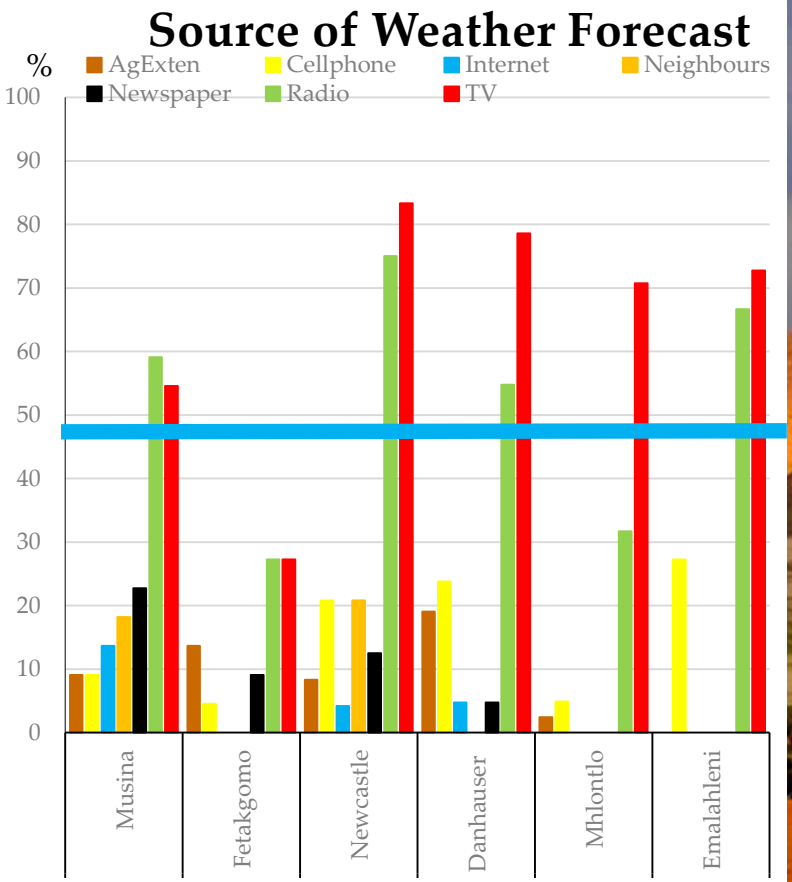
(From workshop survey 2014/15)



Media Source of Weather Forecast

2017 (R4A project):

- TV & Radio most popular media all 3 provinces.
- Peri-urban farmers generally have more opportunities to obtain weather info (all provinces)
- Cell phone appear to be gaining popularity (except Limpopo)



Language Preferences

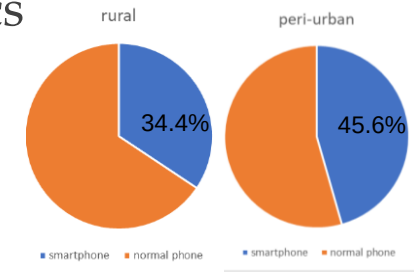
- Preference for mother tongue as 1st choice
- 2nd choice English (23%) (apart from Eastern Cape & Limpopo).
- 3rd choice English (31%) & Afrikaans (26%)

Table 1 Famers preferred 1st language of weather forecast communication (Phahlane et al., 2015).

Language	1st Language Choice		2nd Language Choice		3rd Language Choice	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Setswana	622	45.07	280	20.29	47	3.41
Sepedi	524	37.97	257	18.62	12	0.87
Tshivenda	107	7.75	60	4.35	103	7.47
Xitsonga	75	5.43	80	5.80	33	2.39
isiXhosa	21	1.52	49	3.55	31	2.25
English	12	0.87	317	22.97	428	31.04
Afrikaans	7	0.51	240	17.39	359	26.03
isiZulu	7	0.51	69	5.00	71	5.15
isiNdebele	4	0.29	13	0.94	1	0.07
Shona	1	0.07				
Sesotho			15	1.09	178	12.91

Compare SSF: rural vs peri-urban

Small-scale Farmers different characteristics



- in peri-urban areas:
  - slightly older (by 6y),
  - higher level of formal education
  - more have access to a smart phone (>11%).
- Others only simple cellular telephone without internet connection
  - this limits availability of weather forecasts.
- In many areas, reported difficulties:
  - with internet connection and
  - data transfer was expensive

Limits opportunities for use of Apps, so also develop USSD service

R4A services for farmers

- Smartphone application:
  - Weather based farm advice
  - Farm management guidance
  - Weather information
- USSD service
  - Farm advice
- Principle for small scale farmers:
  - Farmers gain credits for regular provision of weather observations
  - R4A provides farmers with advice and weather information

Communication methods

- Delivered via cellular telephone:
  - For smart phone – use “app” or website
  - For simple phone – use interactive “USSD”

    (Unstructured Supplementary Service Data)
- Targeting both farmers and extension:
  - Free system via feedback credits
  - Individual subscription
  - Commercial subscription
  - Government bulk subscription

Benefits for farmers

- Availability of valuable information
  - Planting advisories
  - Weather information
- More effective and proactive crop management
- Improved food production

R4A-App: for Maize farmers

- Farm guidance and advisories based on the **best** weather forecasts
- Earn **credits** by submitting your weather observations
- **8 languages:**
  - English, Sepedi, Sotho, Tsonga, Tswana, Venda, Xhosa, Zulu

R4A-App: for Maize farmers

USSD for simple phones

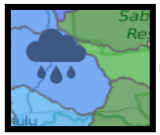
- Register via sms as farmer or via extension
- Dial a simple short code
- Receive localized weather based planting advisories
- Earn credits by submitting your weather observations

App: smart android phones:

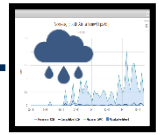
- Register w GPS location
- Weather based farming advice
- Available in 6 languages
- Rainfall measurements
- Weather observations
- Earn credits by submitting your weather observations
- General farm guidance

Weather-based farm advice

Historic rainfall



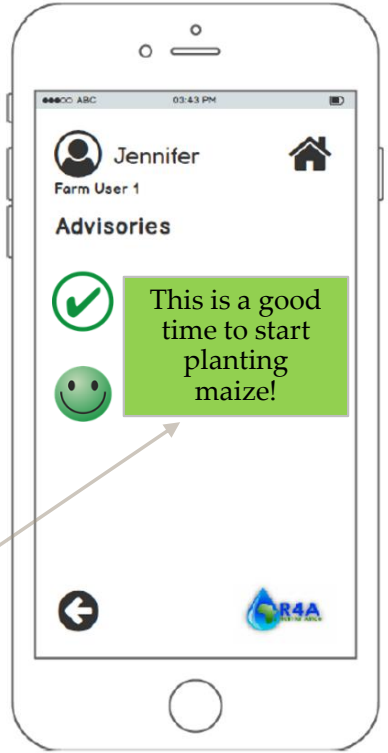
Future rainfall



Maize planting time!

Sufficient rainfall is detected.
More rain is forecasted.

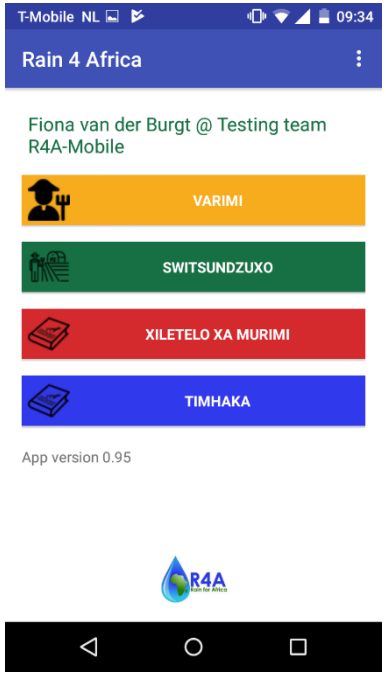
You can start planting maize!

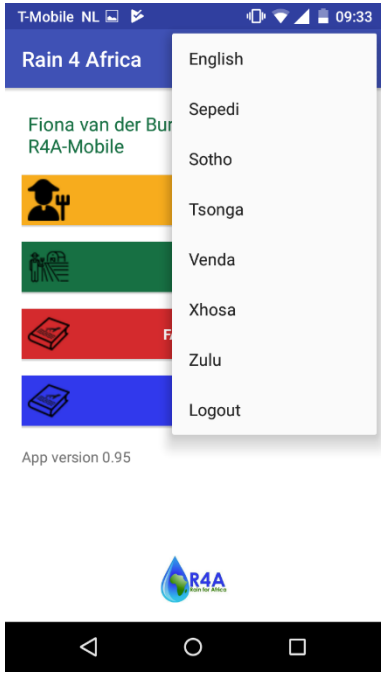



R4A
Rain for Africa
Every Raindrop counts
1 Smartphone App, 4 functionalities, 8 languages

DEMO version

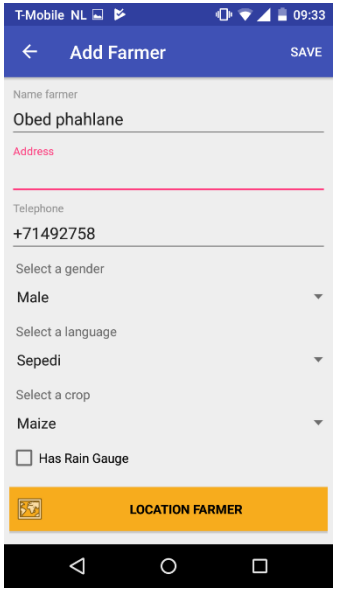
- Available in **multiple languages**





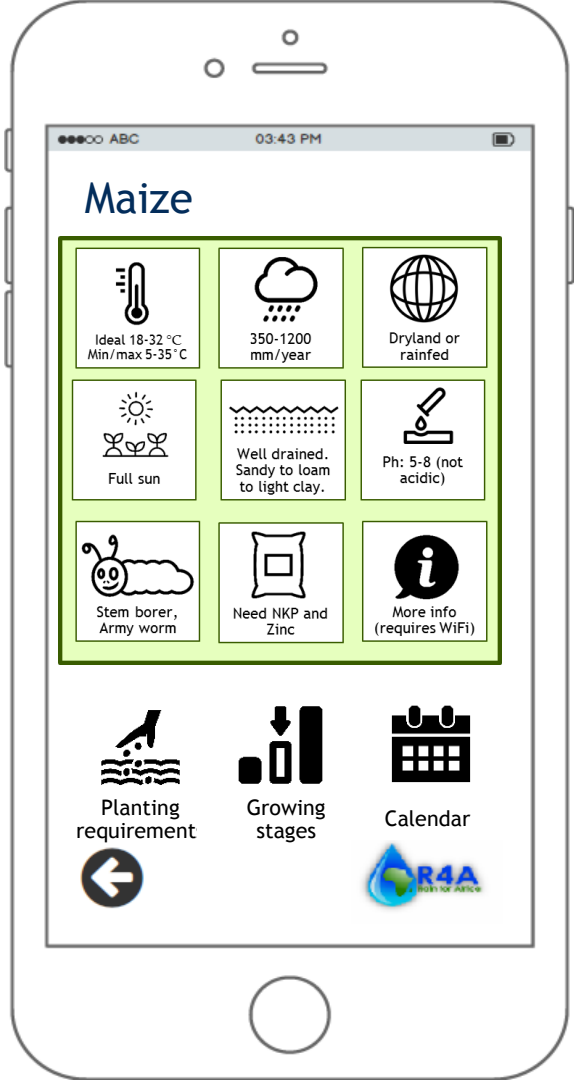
Register farmers

- When farmers are registered at their location they get the **best and most localised information**



Farm guidance

- General information about maize

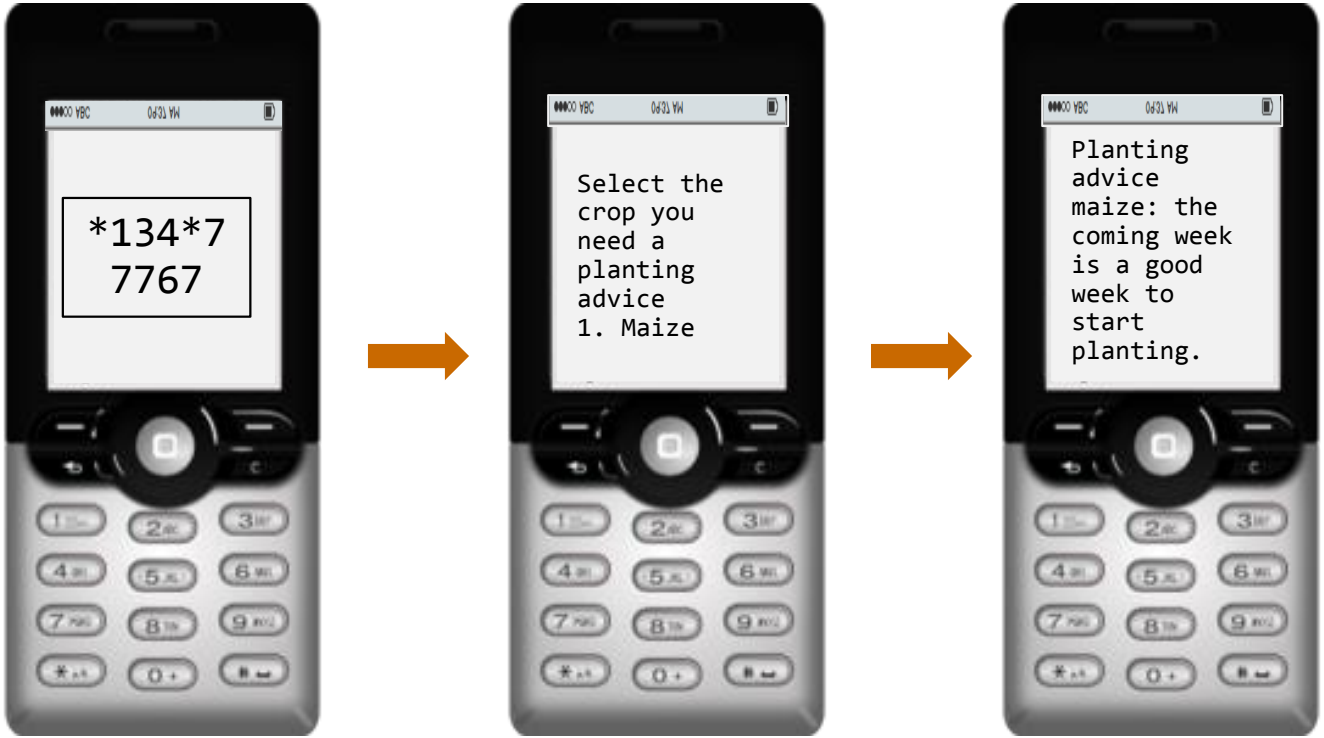



R4A
Rain for Africa
Every Raindrop counts
USSD service: feature phones, multiple language plant advice

R4A-USSD: for Maize farmers

- For feature phones!
- Weather based planting advise
- Dial a simple number, and receive localized advisories
- Available in multiple languages

Weather based farm advice



R4A
Rain for Africa

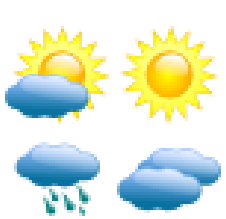
Crowdsourcing

Objectives of R4A data collecting component:

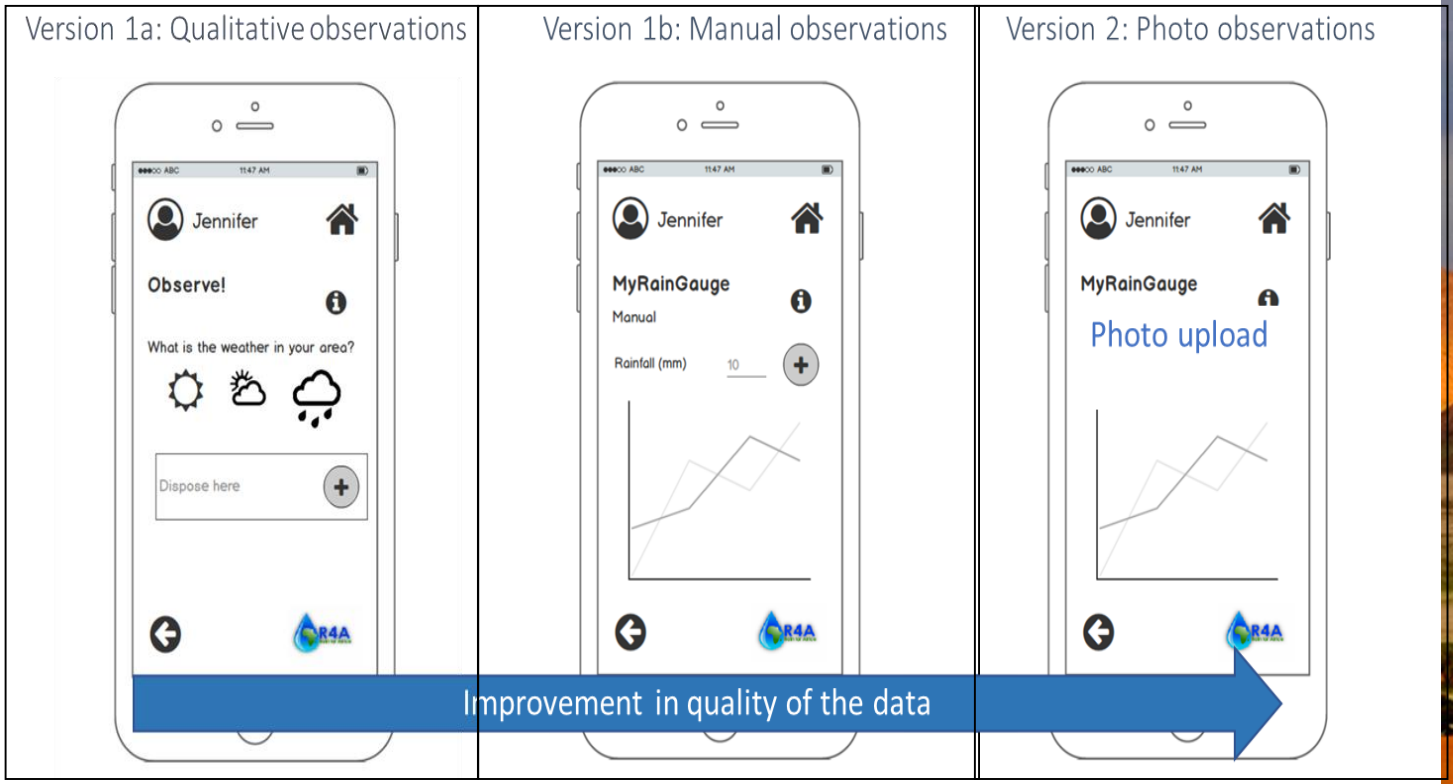
- To empower small-scale farmers (SSF) improve farm management by using weather info.
- To engage SSF & extension in R4A project.
- To improve weather data quality by providing local info to weather forecasters

Crowdsourcing

- Farmers & extension register for use
- Contact database with:
  - Cell phone number for farmer or extension worker
  - Coordinates = specific location of farm
  - Rainfall measurements
  - Credits accumulated
- Collect weather info via:
  - Qualitative observation using symbols
  - Manual measured rainfall amounts
  - Possible use electronic device
    - ‘sound’ or ‘photo’
- Provide local info to weather forecasters

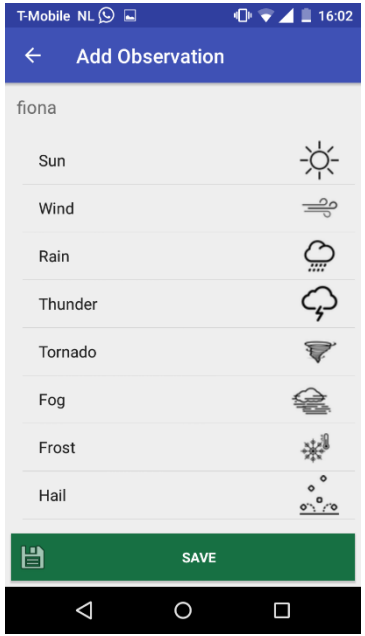


Collection of weather data



Weather observations

- Earn **credits** by submitting weather observations on a daily basis.



The South African Weather Service will use your observations to validate and improve their forecasts!

South African Weather Service

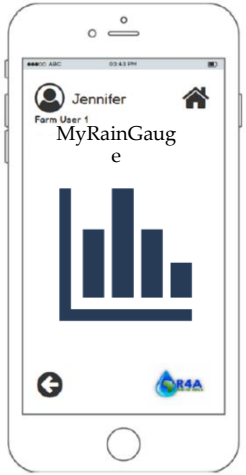
ISO 9001 Certified Organisation

R4A Rain for Africa

Rainfall Measurements from rain gauge

- Keep track of local rainfall in your own gauge

+



=

Knowledge about sufficient rain for healthy crops

Credit system

- To incentivise users to make observations.
- Incentives include:
  - **Direct reward for using app** = only gain access to app functions after submit observation.
  - **Indirect reward** = earn credits used to 'buy' an upgrade with additional functions & information.
  - **Commercial reward** = earns credits use to 'buy' other services like airtime or seeds/fertiliser sponsored by outside entity via partnership.
  - **Competition** = credits as benchmark for allocating an award. e.g. R4A farmer of month or year.

Conclusion

- Preliminary results show that farmers need specific local weather information to assist in farm decision making.
- Farmers can benefit from weather forecast with additional information relevant to their farming activities.
- Examples:
  - Planting dates related to rainfall – from observed & forecast.
  - Spraying opportunities related to weather conditions.
- R4A 'App' provides:
  - Useful tool to integrate maize growth and development info;
  - Current seasonal & short-term weather forecasts;
  - Planting date & spraying opportunities & recommendations to farmers for their specific location.
  - Opportunity to collect local rainfall by crowd-sourcing.
  - Extension workers with App to assist farmers to access information for their own locations.

Acknowledgements

- ARC-ISCW
- SA Weather Service and R4A Netherlands Partners
- NSO (Netherlands Space Office) G4AW for funding
- Farmers & Extension for cooperation

R4A
Rain for Africa


R4A
Rain for Africa
Every Raindrop counts
Thank you for your attention