

**Addendum to the
Australian Airborne Cal/Val Experiment for SMOS
Workplan**

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Contents

- 1. Document Purpose3
- 2. General Schedule Changes3
- 3. Data Collection4
 - a. Airborne Data4
 - b. Ground Data5
- 4. Annex A – Ground Data Collection Summary.....6
 - a. Team A.....6
 - b. Team B.....20
- 5. Annex B – Airborne Data Collection Summary.....33

1. Document Purpose

This document contains the addendum to the Workplan of the Australian Airborne Cal/Val Experiment for SMOS (<http://www.moisturemap.monash.edu.au/aaces/workplan.php>), undertaken in January/February 2010 in south-eastern Australia. The purpose of this addendum is the update to changes in the field plan and sampling procedures and also to provide an overview of the locations of the ground data. It also provides a quick overview of data gaps in the ground sampling, due to instrument failures.

During the campaign, the main change occurred in the schedule of the field plan, due to two significant storm events taking place throughout this part of Australia in the first and second week of February 2010. This also required a change in the ground data collection procedure for Patch 6.

2. General Schedule Changes

General changes to the schedule occurred for Patches 5, 6, 7, and 10 due to the prevailing weather conditions in the eastern part of the catchment. The first rainfall occurred in the night of the 4th February 2010. The cloud conditions did not allow any flights and subsequent surface conditions did not allow access to the farms of Patch 5. Consequently, sampling was postponed until the 7th February 2010. Eventually this required changes to Patch 6, to which reconnaissance was undertaken by a reduced team and the following sampling was undertaken on the day a part of the team moved to Gundagai and went to Patch 8 for the reconnaissance. Due to the changes in the schedule, no monitoring station was installed at Patch 6 so that Patch 8 could be monitored.

Due to the extreme precipitation events of 12-14 February 2010 in the region of Canberra with close to 200mm of cumulative precipitation, a further change in the schedule was required, so that only one farm of Patch 10 was sampled in the afternoon of the sampling day Patch 9. Moreover, only one base station was installed within Patches 9 and 10, as access to the sites was questionable for the sampling days and it was decided to cover both Patches rather than risking one Patch not to be covered at all.

A summary of the changes to the schedule is presented in Table 1.

Table 1: Schedule for ground monitoring activities. Refer also to Chapter 8 of the Workplan for further details.

Schedule	Actual	Aircrew Flight type	Patch	Ground crew Activity	Patch	Base station
18.01.10	dto	Arrival at study area				
19.01.10	dto			Briefing/Training		Hay
20.01.10	dto	T00	all	Reconnaissance 1/ full "practice sampling" 1	1	
22.01.10	dto	P01	1	SM/Veg sampling 1		
23.01.10	dto	-	2	Reconnaissance 2	2	
25.01.10	dto	P02	2	SM/Veg sampling 2		
26.01.10	dto	-	3	Reconnaissance 3	3	
28.01.10	dto	P03	3	SM/Veg sampling 3		
29.01.10	dto	-	4	Reconnaissance 4	4	
30.01.10	dto	P04	4	SM/Veg sampling 4		
31.01.10	dto	-		Move to Yanco		
01.02.10	dto	-	5	Reconnaissance 5	5	Yanco
02.02.10	dto	T00	all	SM/Veg sampling 5		
05.02.10	07.02.10	P05	5	SM/Veg sampling 5		
06.02.10	dto	-	6	Reconnaissance 6	6	
07.02.10	12.02.10	P06	6	SM/Veg sampling 6		
08.02.10	08.02.10	-	7	Reconnaissance 7	7	
10.02.10	10.02.10	P07	7	SM/Veg sampling 7		
11.02.10	dto	-		Move to Gundagai		
12.02.10	dto	-	8	Reconnaissance 8	8	Gundagai
13.02.10	15.02.10	P08	8	SM/Veg sampling 8		
14.02.10	16.02.10	-	9	Reconnaissance 9	9	
15.02.10	18.02.10	P09	9	SM/Veg sampling 9		
16.02.10	dto	-		Move to Yass		
17.02.10	dto	-	10	Reconnaissance 10	10	Yass
18.02.10	dto	P10	10	SM/Veg sampling 10		
20.02.10	dto	T00	all	SM/Veg sampling 10		
21.02.10	dto			Return to Melbourne		

3. Data Collection

The predetermined locations for the data collection for the vegetation and base stations data required some alterations, due to accessibility and also representativeness of the sites. A detailed overview is presented Annexes A and B for the ground and airborne sampling, respectively.

a. Airborne Data

The S60 thermal infrared camera did not operate at any time. The only remaining technical problems were associated with the upward looking sensors on the sampling days of the first transect flight and Patch 3.

Apart from the changes to the schedule, an additional high-resolution flight was undertaken during the sampling of Patch 5 with two focus farms being covered with flight segments at 1000ft altitude.

b. Ground Data

Annex A includes comments and maps of the ground sampling data. Therefore, only a brief summary is provided in the following.

Detailed locations of the ground sampling locations can be found in Annex A. The sampling during the first transect flight were used as training for the sampling crew. Consequently, the sites were only partially covered on this day. Other data gaps in the spatial representation of the data are due to either instrument malfunctions or soil conditions (soil too hard to insert the sensor without risk of damage).

The destructive vegetation sampling was undertaken at every farm. On days with overcast conditions, vegetation sampling was not possible and was therefore not included in the sampling procedure.

At the start of the campaign, dew samples were not taken, as the plant surfaces were dry. The vegetation samples of the last sampling day could not be measured, as the leaf area scanner failed to function properly.

Finally, the temperature and salinity of Lake Wyangan were observed on each flight day.

4. Annex A – Ground Data Collection Summary

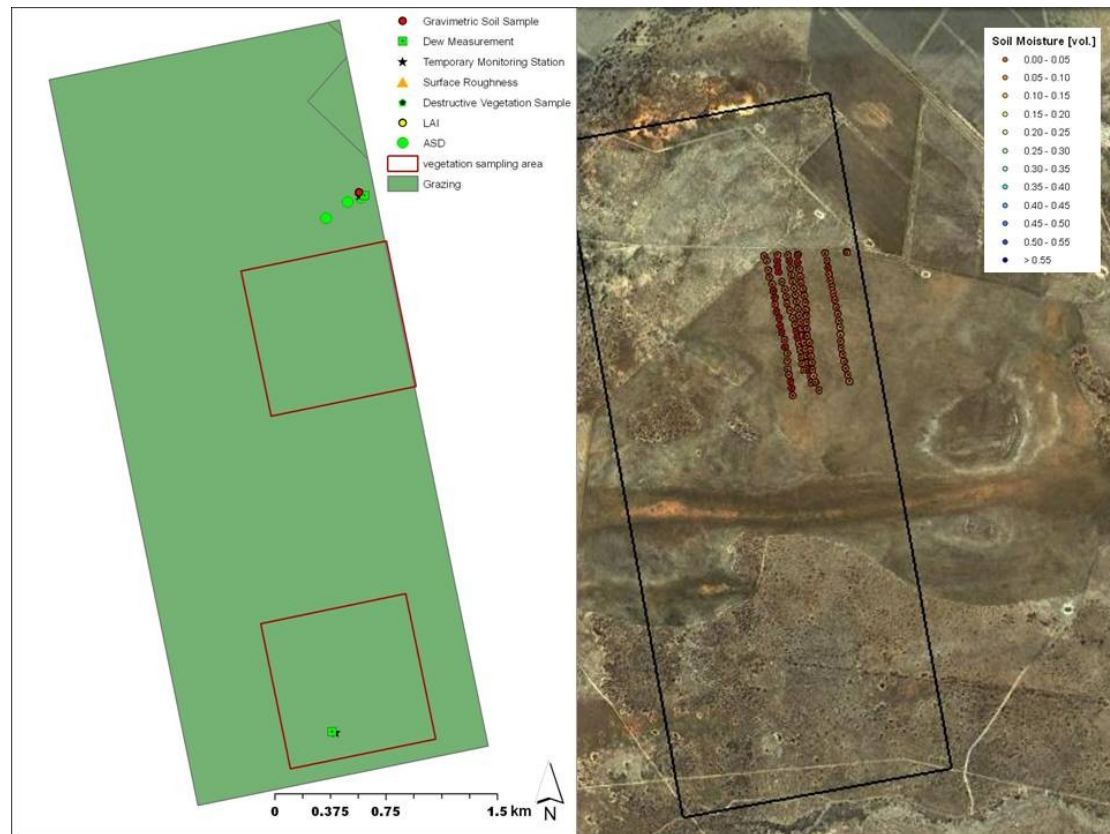
a. Team A

P01F01_Transect

General comments:

Terrain: flat Vegetation: saltbush, some open woodland in the south Soil texture: clay
 Animals: some kangaroos Weather/Soil conditions while soil moisture sampling: hot-dry, very hard soil

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1-6: partly covered	This was the field training day, with the sampling crew testing the instruments along short/parallel transects.
Dew	min of 2 samples per vegetation type	-	Too late in the day
LAI	5 samples + replications per vegetation type	-	Too late in the day
ASD	5 samples + replications per vegetation type	-	Instrument problems, ASD would not initialize
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	2 measurements taken	-
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	-	Samples taken during main sampling day/
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	2 stations installed with complete setup as per plan	TIR installed at northern site

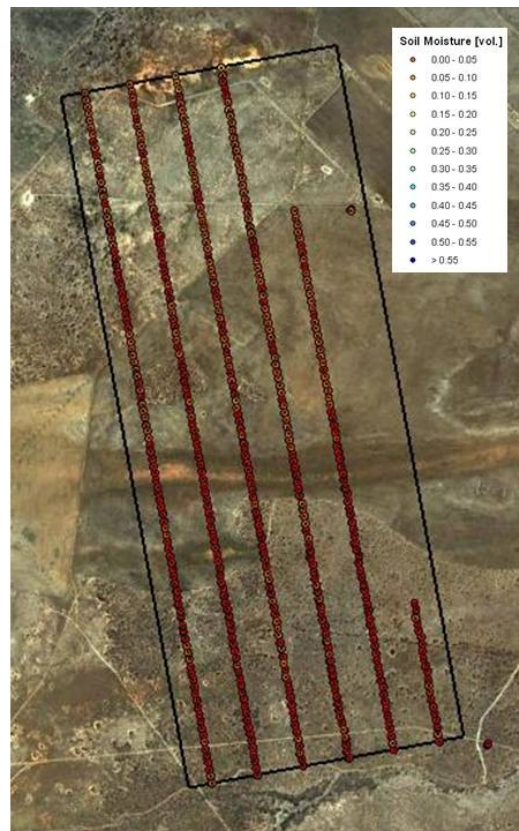


P01F01

General comments:

Terrain: flat Vegetation: saltbush, some open woodland in the south Soil texture: clay
 Animals: some kangaroos Weather/Soil conditions while soil moisture sampling: hot-dry, very hard soil

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1,2,3,4: 100% Line 5: 78% Line 6: 20%	Line 5 sampler had to stop at fence line; Line 6 bent prongs
Dew	min of 2 samples per vegetation type	2 samples taken	no discernible dew
LAI	5 samples + replications per vegetation type	4 samples + replications	-
ASD	5 samples + replications per vegetation type	3 samples + replications + individual soil and plant measurements	-
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	-	Measurements taken during Transect00 day
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	5 samples taken at 2 locations	Conditions very dry throughout
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	2 stations installed with complete setup as per plan	TIR installed at northern site

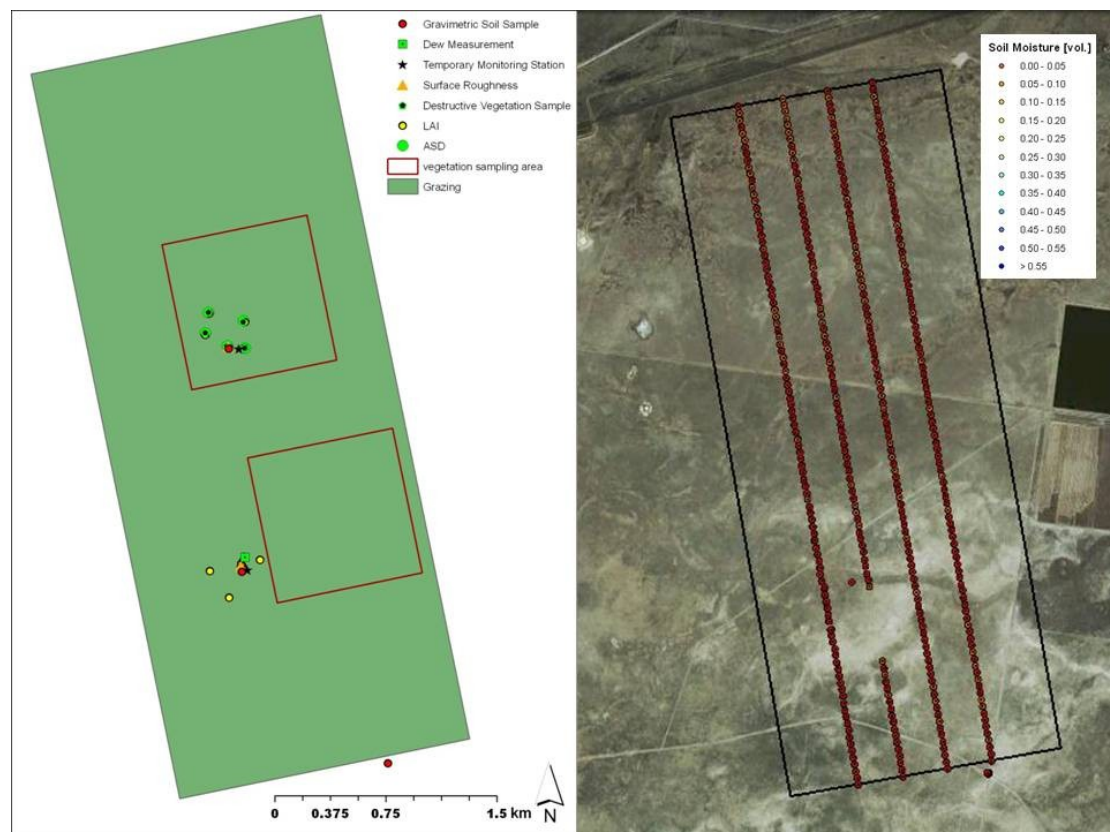


P02F03

General comments:

Terrain: flat Vegetation: saltbush/native grass Soil texture: clay Animals: sheep
 Weather/Soil conditions while soil moisture sampling: hot-dry

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 2,4-5: 100% Line 3: 90%	Connection errors between iPaq & Hydraprobe (poles 1 & 6); same for pole 5, swapped iPaqs 5 & 6 and finished remainder
Dew	min of 2 samples per vegetation type	1 sample taken	no discernible dew; no further dew measurements taken
LAI	5 samples + replications per vegetation type	8 locations + replications	-
ASD	5 samples + replications per vegetation type	5 samples + replications + individual soil and plant measurements	-
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	2 samples taken near the monitoring stations	No spatial variability
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	3 locations with 9 samples	-
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	2 stations installed with complete setup as per plan	TIR installed at southern site. Wiring of temp. sensors at northern site in wrong order (see readme).

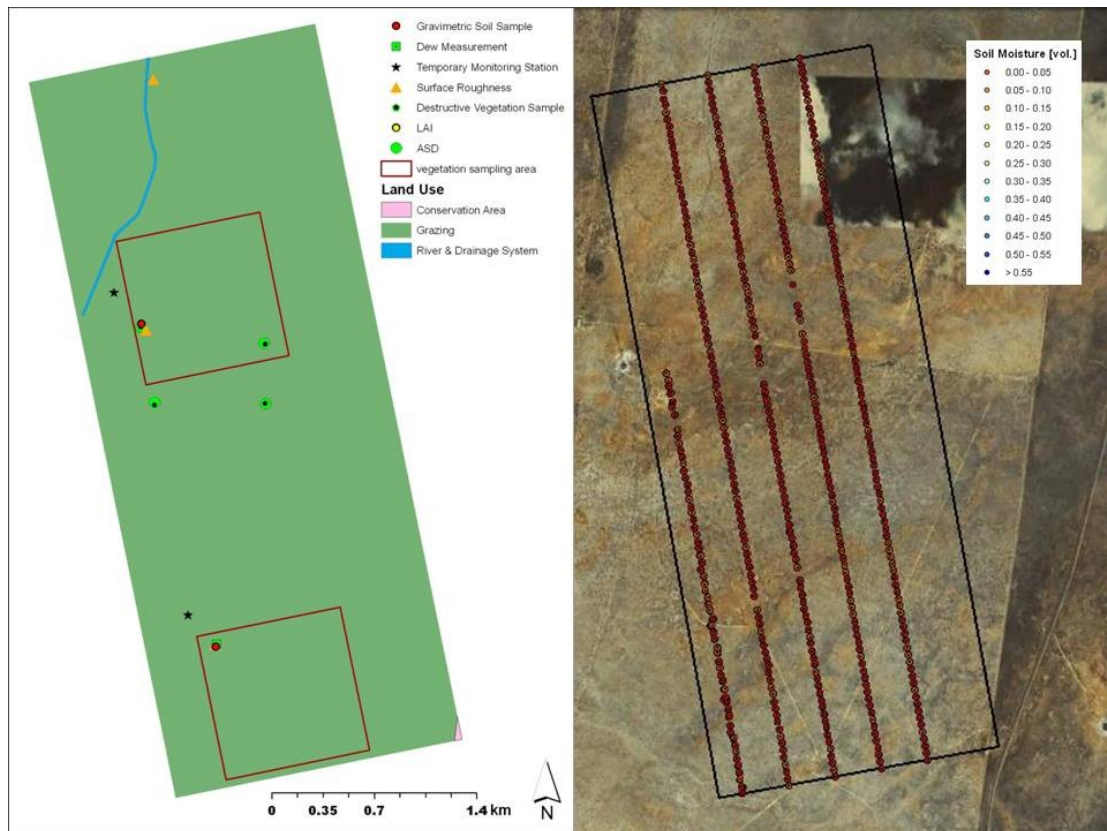


P03F05

General comments:

Terrain: flat Vegetation: saltbush Soil texture: clay Animals: sheep
 Weather/Soil conditions while soil moisture sampling: hot-dry

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1: 60% Line 2-5: 100% Line 6: 0%	iPaq/Hydra connection problems with pole 1; bend prongs for pole 6
Dew	min of 2 samples per vegetation type	1 samples taken as per plan	no discernible dew
LAI	5 samples + replications per vegetation type	8 locations + replications	-
ASD	5 samples + replications per vegetation type	5 samples + replications + individual soil and plant measurements	-
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	3 samples taken across focus farm as per plan	-
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	2 locations sampled	Homogeneous surface and soil conditions throughout
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	2 stations installed with complete setup as per plan	TIR installed at northern site

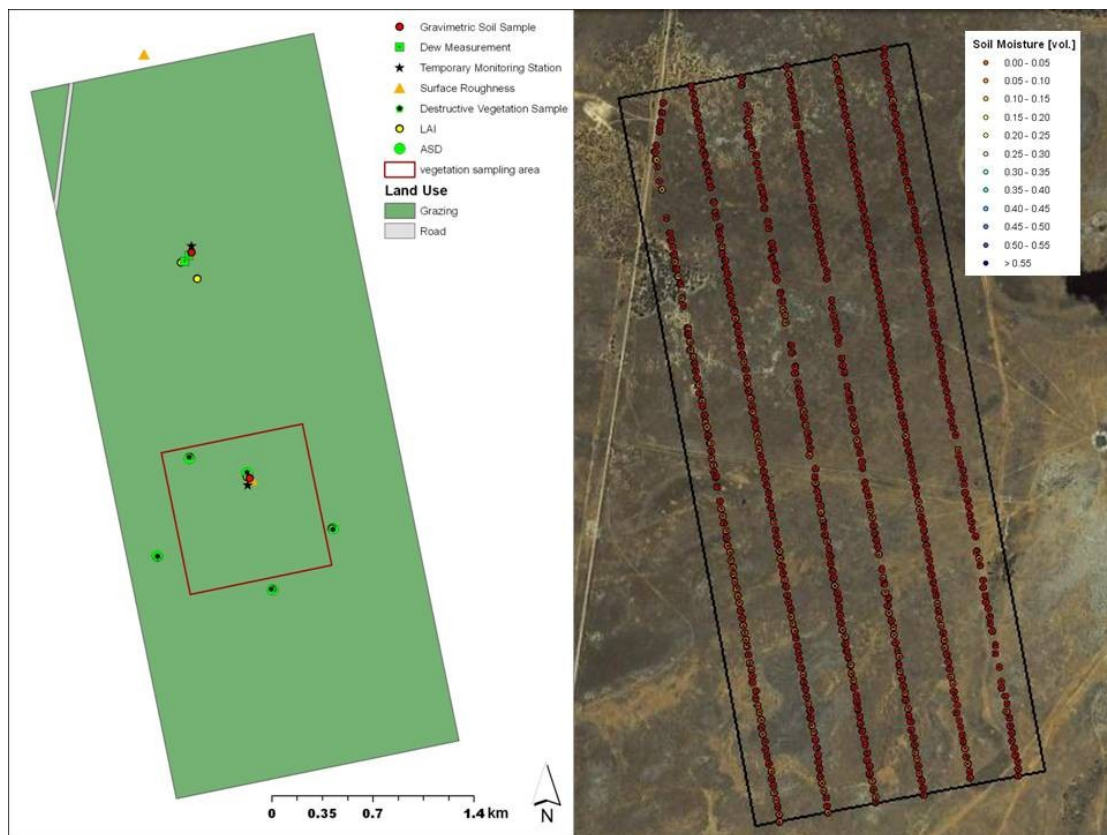


P04F07

General comments:

Terrain: flat Vegetation: saltbush & few trees Soil texture: loam Animals: sheep
 Weather/Soil conditions while soil moisture sampling: hot-dry

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1-6: 98%	Soil at various locations too hard to penetrate with Hydraprobe
Dew	min of 2 samples per vegetation type	1 sample	no visible dew
LAI	5 samples + replications per vegetation type	6 at southern site & 3 at northern site	-
ASD	5 samples + replications per vegetation type	5 samples + replications	-
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	2 samples taken across	No spatial variability
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	7 samples taken across focus farm as per plan	-
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	2 stations installed with complete setup as per plan	TIR installed at southern site

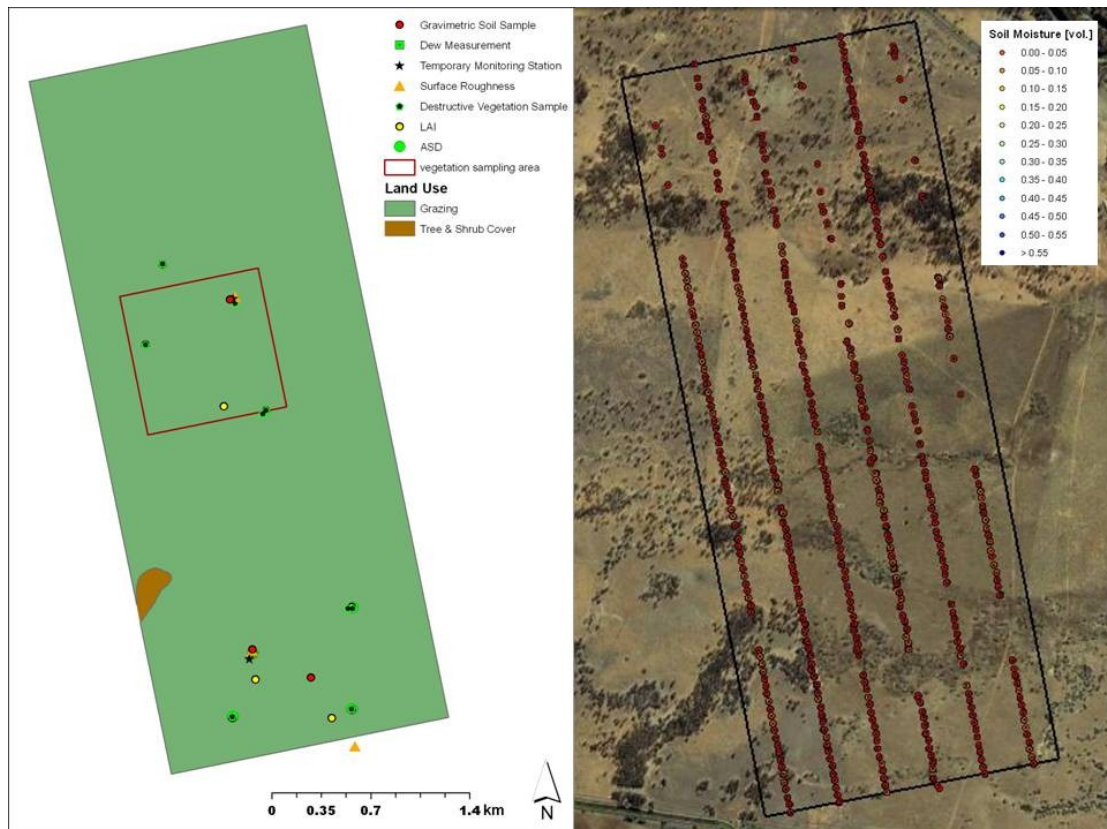


P05F10_Transect

General comments:

Terrain: undulating Vegetation: grass/trees Soil texture: loam Animals: sheep
 Weather/Soil conditions while soil moisture sampling: warm-dry

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1: 76% Line 2: 94% Line 3: 81% Line 4: 68% Line 5: 81% Line 6: 35%	HDAS connection problems for pole 2. Soil very hard at places.
Dew	min of 2 samples per vegetation type	no dew sampled	no discernible dew
LAI	5 samples + replications per vegetation type	4 locations sampled + replications	Total of 13 samples; 4 more locations sampled during patch day
ASD	5 samples + replications per vegetation type	4 locations + replications, plus soil and vegetation samples	4 more locations (south) sampled during patch day
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	3 locations	-
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	6 samples taken	-
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	2 stations installed with complete setup as per plan	TIR installed at northern station.

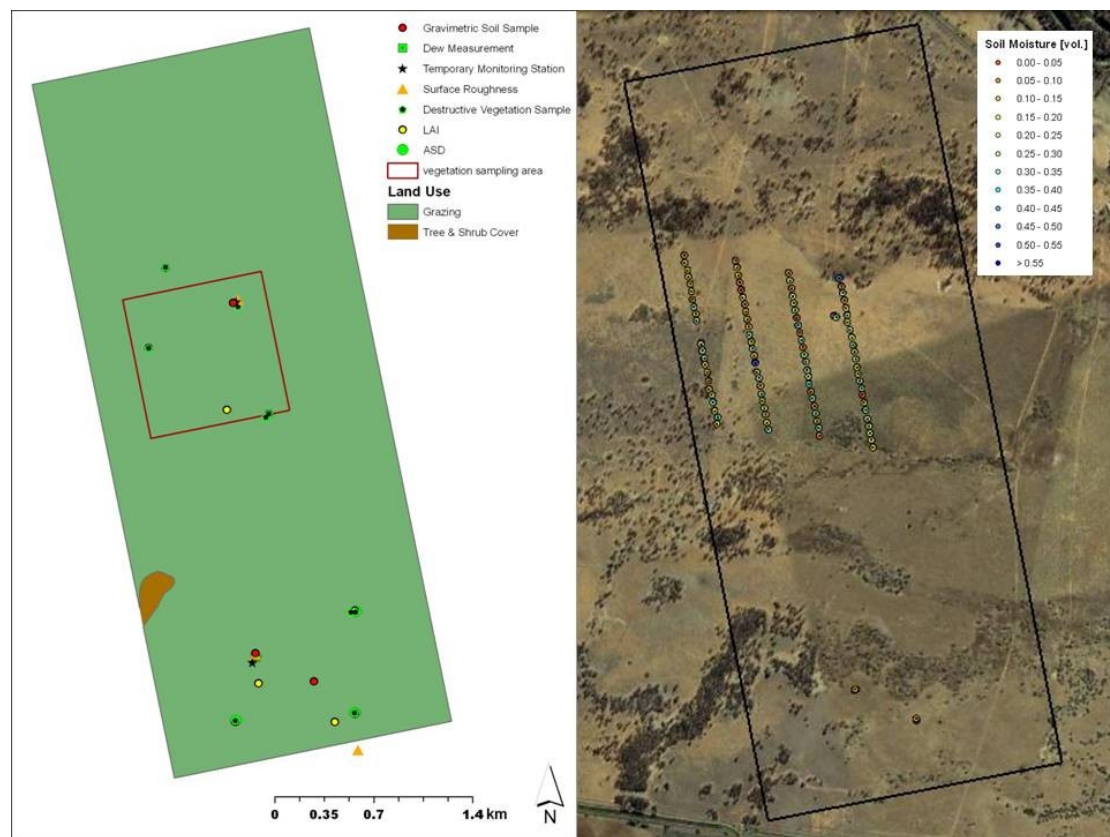


P05F10

General comments:

Terrain: undulating Vegetation: mixed Soil texture: loam Animals: sheep
 Weather/Soil conditions while soil moisture sampling: warm-wet, changing cloud conditions

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Lines 1-4: 25%	Due to standing water, access to the sites limited, only partial coverage with 3 HDAS
Dew	min of 2 samples per vegetation type	no sample taken	no visible dew
LAI	5 samples + replications per vegetation type	4 locations sampled + replications	4 more locations sampled during transect day
ASD	5 samples + replications per vegetation type	4 locations + replications	4 more locations (north) sampled during transect day
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	-	3 roughness measurements taken during transect day
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	6 samples taken in the southern part of the focus farm	Samples taken in the north during the transect day
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	2 stations installed with complete setup as per plan	TIR installed at northern station. Some Thetaprobe problems at northern station after rain.



P06F11

General comments:

Terrain: undulating Vegetation: crops Soil texture: loam Animals: - (grazing are in the very south)
 Weather/Soil conditions while soil moisture sampling: warm-raining

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1&5: 66% Line 2&4: 85% Line 3: 99% Line 6:100%	Incomplete data for line 1,2,4,5 due to major thunderstorm event while HDAS sampling
Dew	min of 2 samples per vegetation type	no samples taken	No data collected because the vegetation team was on reconnaissance at a different farm due to schedule shifts based on previous rain events
LAI	5 samples + replications per vegetation type	no samples taken	
ASD	5 samples + replications per vegetation type	no samples taken	
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	no samples taken	
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	2 samples taken across focus farm	-
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	no station installed	Because of the rain events during this period and changes of flight dates, only HDAS data were sampled at this farm.

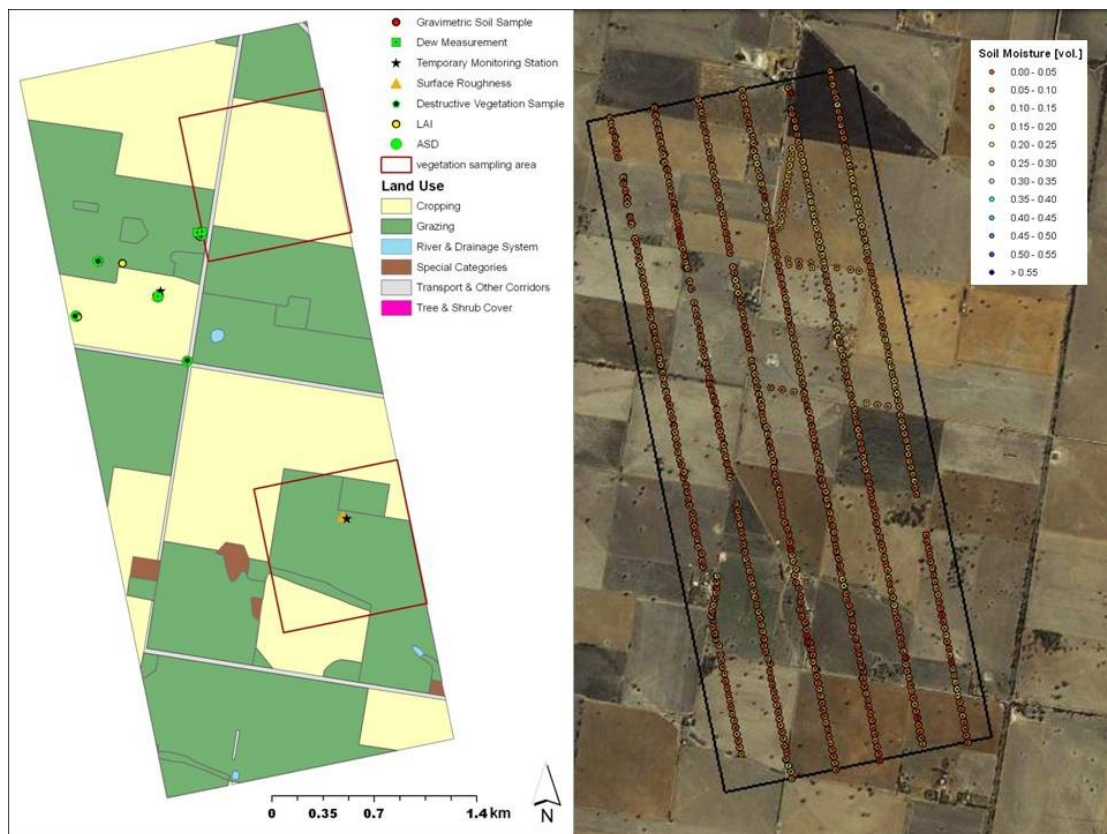


P07F13

General comments:

Terrain: low slopes Vegetation: mixed Soil texture: loam Animals: sheep
 Weather/Soil conditions while soil moisture sampling: warm-moist

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1,6: 95% Line 2,3,5: 98% Line 4: 100%	Homesteads avoided
Dew	min of 2 samples per vegetation type	3 samples taken	-
LAI	5 samples + replications per vegetation type	6 samples + replications	-
ASD	5 samples + replications per vegetation type	5 samples + replications as per plan	-
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	2 samples taken across focus farm	-
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	5 samples taken at 2 locations	-
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	2 stations installed with complete setup as per plan	TIR installed at northern location. Some problems with top Thetaprobe at southern station

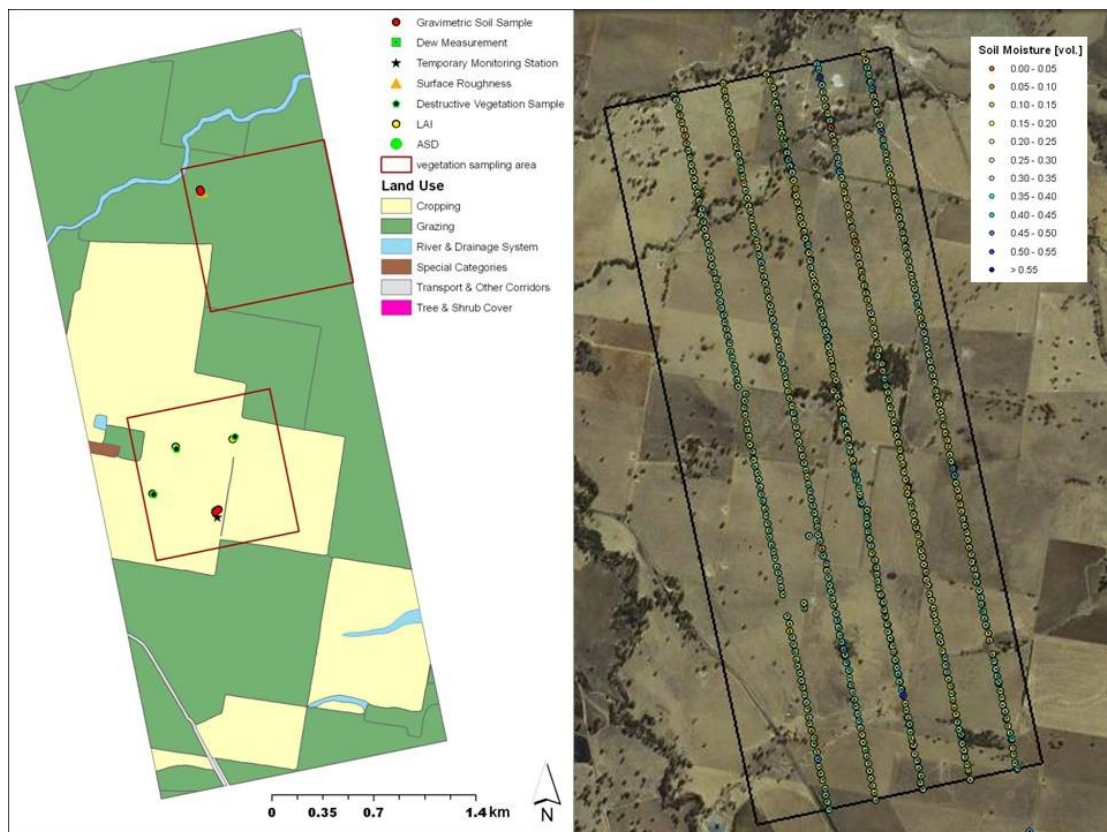


P08F16

General comments:

Terrain: slightly hilly Vegetation: grass/crops Soil texture: sandy loam Animals: sheep
 Weather/Soil conditions while soil moisture sampling: warm-moist/cloudy

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1: 0% Lines 2-6: 99%	Connection problems with probe 1. No measurements taken on line 1.
Dew	min of 2 samples per vegetation type	no dew samples taken	no visible dew
LAI	5 samples + replications per vegetation type	4 locations sampled	All locations near southern monitoring station, due to weather interference.
ASD	5 samples + replications per vegetation type	no ASD data collected	No ASD data collected due to adverse weather conditions
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	1 sample taken	Incoming bad weather front prevented further readings
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	7 samples taken near southern station	1 sample from 25cm depth
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	2 stations installed with complete setup as per plan	No reliable TIR data (protective cap left on sensor). Cable damage to deeper Thetaprobe at northern station, no data.

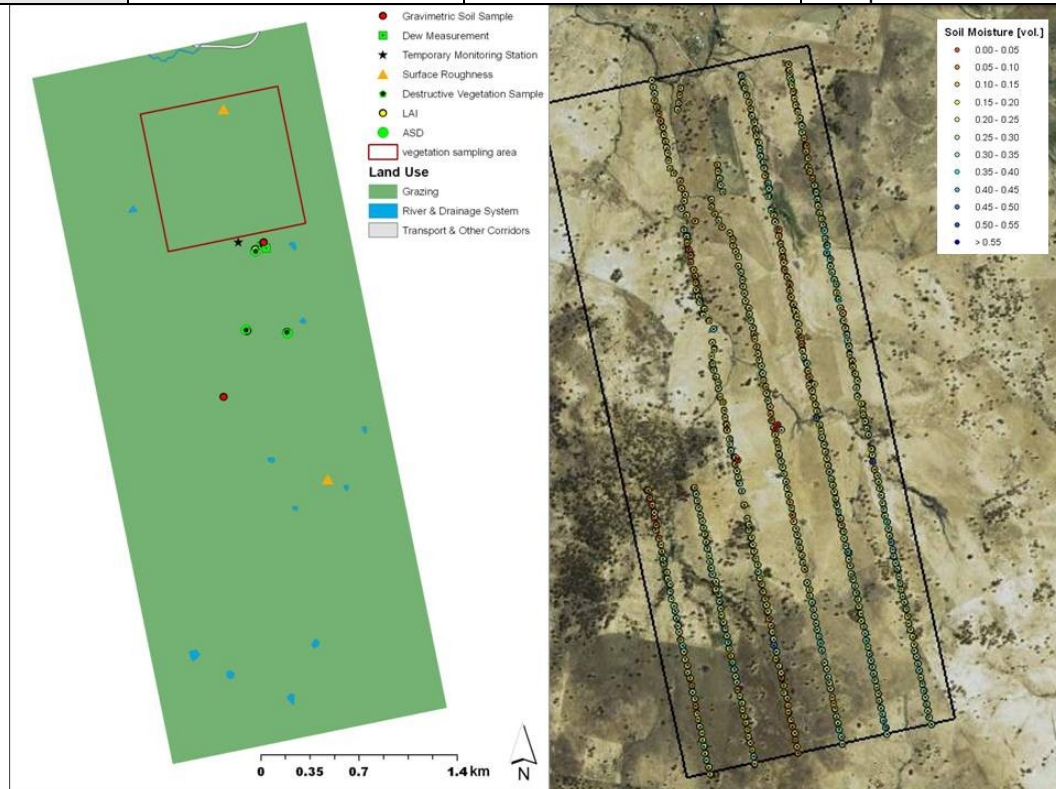


P09F17

General comments:

Terrain: very hilly Vegetation: grass&trees Soil texture: loam Animals: cattle&sheep
 Weather/Soil conditions while soil moisture sampling: warm-moist

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1&2: 45% Line 3: 95% Line 4: 85% Line 6: 99%	Accessibility problems (steep terrain) on lines 1&2. Avoided cattle on line 4. HDAS 1 connection problems, no data collected.
Dew	min of 2 samples per vegetation type	2 samples taken	Rapid evaporation of dew.
LAI	5 samples + replications per vegetation type	4 samples + replications	Accessibility problems for to some locations of the farm, due to previous rain.
ASD	5 samples + replications per vegetation type	4 locations	Due to steep terrain only 4 sites in the northern veg area were collected
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	3 samples taken across focus farm as per plan	-
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	5 samples taken at 2 locations	-
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	1 stations installed with TIR	Other station at site 10. Due to the forced delay (rain) the monitoring stations were split b/w Patches 9&10. Cattle stomped over top thetaprobe.



P10F20

General comments:

Terrain: hilly Vegetation: grass&crops Soil texture: sandy loam
 Animals: cattle&sheep&horses Weather/Soil conditions while soil moisture sampling: warm-moist
 Comment: no sampling undertaken during sampling day due to delay in the sampling schedule, see
 Transect for data information.

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1-6: 0%	See comment
Dew	min of 2 samples per vegetation type	no samples taken	See comment
LAI	5 samples + replications per vegetation type	no samples taken	See comment
ASD	5 samples + replications per vegetation type	no samples taken	See comment
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	no samples taken	See comment
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	no samples taken	See comment
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	1 stations installed	Other station at Patch 9. Due to the forced delay (rain) the monitoring stations were split b/w Patches 9&10.

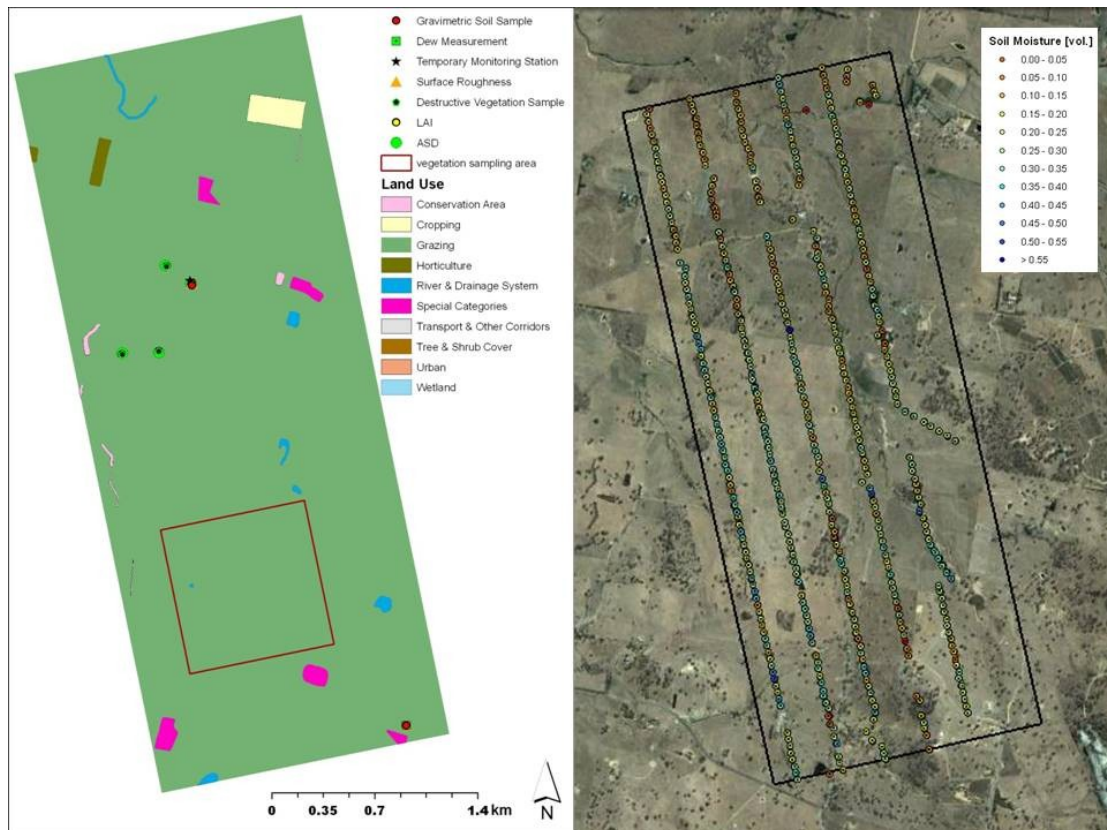


P10F20_Transect

General comments:

Terrain: hilly Vegetation: grass&trees Soil texture: loam Animals: cattle&sheep
 Weather/Soil conditions while soil moisture sampling: warm-moist

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1-3: 96% Line 4: 90% Line 5: 92% Line 6: 2%	Some access problems (bulls, horses) resulted in incomplete data. Connection problem with HDAS 1, only gravimetric data sampled.
Dew	min of 2 samples per vegetation type	2 samples collected	-
LAI	5 samples + replications per vegetation type	5 samples +replications	-
ASD	5 samples + replications per vegetation type	4 locations sampled	All location around the northern station
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	2 measurements taken at different locations	-
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	2 samples taken across focus farm	5 samples collected
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	1 station installed	Other station at Patch 9. Due to the forced delay (rain) the monitoring stations were split b/w Patches 9&10.



b. Team B

P01F02

General comments:

Terrain: flat Vegetation: saltbush Soil texture: clay Animals: sheep
 Weather/Soil conditions while soil moisture sampling: hot-dry

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1,2,4,5: 100% Line 3: 75% Line 6: 0%	Connection problems with HDAS system resulted in incomplete data for line 3 and no data collected for line 6
Dew	min of 2 samples per vegetation type	2 samples taken as per plan	no visible dew
LAI	5 samples + replications per vegetation type	7 samples + replications	-
ASD	5 samples + replications per vegetation type	3 samples + replications	-
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	3 samples taken across focus farm as per plan	-
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	5 samples taken across focus farm as per plan	-
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	2 stations installed with complete setup as per plan	no data available due to logger software problems

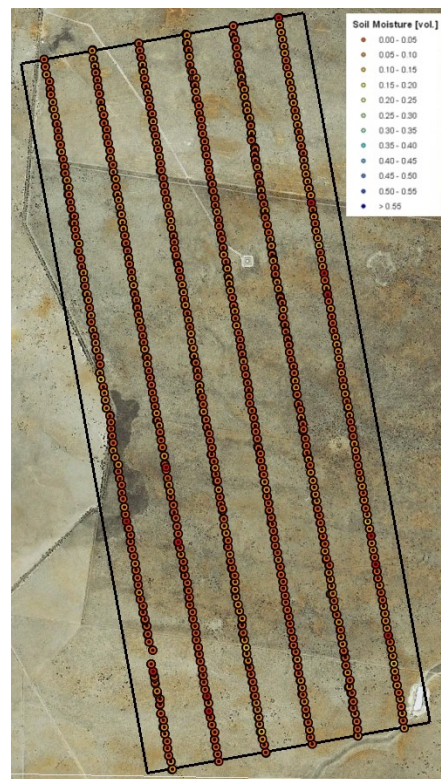


P02F04

General comments:

Terrain: flat Vegetation: saltbush Soil texture: clay Animals: sheep & cattle
 Weather/Soil conditions while soil moisture sampling: hot-dry

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1-6: 100%	-
Dew	min of 2 samples per vegetation type	2 samples taken as per plan	no visible dew
LAI	5 samples + replications per vegetation type	9 samples + replications	-
ASD	5 samples + replications per vegetation type	4 samples + replications	-
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	3 samples taken across focus farm as per plan	-
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	5 samples taken across focus farm as per plan	-
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	2 stations installed with complete setup as per plan	no rain gauge installed at southern station



P03F06

General comments:

Terrain: flat Vegetation: saltbush Soil texture: clay Animals: sheep
 Weather/Soil conditions while soil moisture sampling: hot-dry

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1-6: 100%	-
Dew	min of 2 samples per vegetation type	2 samples taken as per plan	no visible dew
LAI	5 samples + replications per vegetation type	10 samples + replications	-
ASD	5 samples + replications per vegetation type	5 samples + replications	-
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	3 samples taken across focus farm as per plan	-
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	5 samples taken across focus farm as per plan	-
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	2 stations installed with complete setup as per plan	no rain gauge installed at southern station

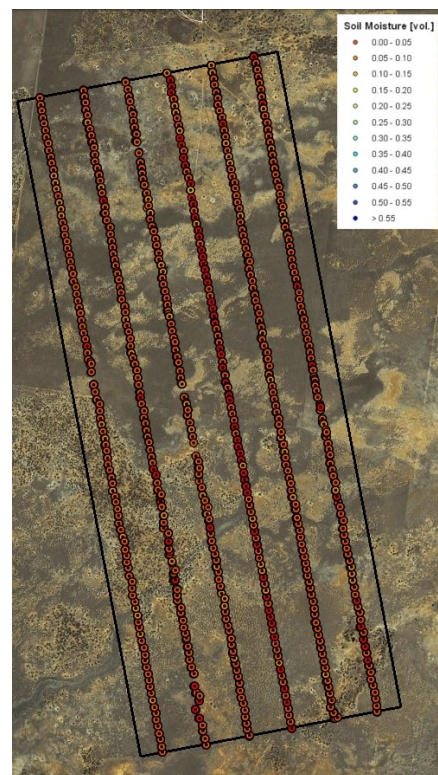


P04F07

General comments:

Terrain: flat Vegetation: saltbush & trees Soil texture: loam Animals: sheep
 Weather/Soil conditions while soil moisture sampling: hot-dry

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1-6: 100%	-
Dew	min of 2 samples per vegetation type	no dew sampled	no visible dew
LAI	5 samples + replications per vegetation type	10 samples + replications	-
ASD	5 samples + replications per vegetation type	5 samples + replications	-
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	3 samples taken across focus farm as per plan	-
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	5 samples taken across focus farm as per plan	-
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	2 stations installed with complete setup as per plan	no rain gauge installed at southern station

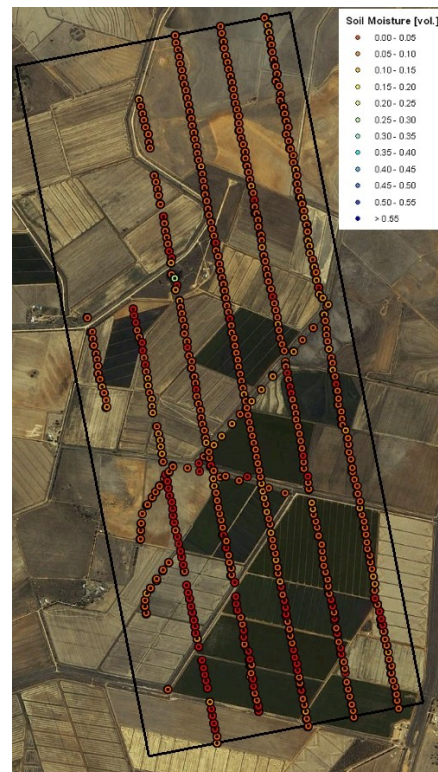


P05F10_Transect

General comments:

Terrain: undulating Vegetation: mixed Soil texture: loam Animals: sheep&cattle
 Weather/Soil conditions while soil moisture sampling: warm-dry

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1: 15% Line 2: 65% Line 3: 95% Line 4-6: 98%	HDAS connection and access problems due to water channels and electric fences resulted in incomplete data for all lines
Dew	min of 2 samples per vegetation type	no dew sampled	no visible dew
LAI	5 samples + replications per vegetation type	8 samples + replications	-
ASD	5 samples + replications per vegetation type	4 samples + replications	-
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	3 samples taken across focus farm as per plan	-
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	9 samples taken across focus farm	-
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	2 stations installed with complete setup as per plan	no rain gauge installed at southern station

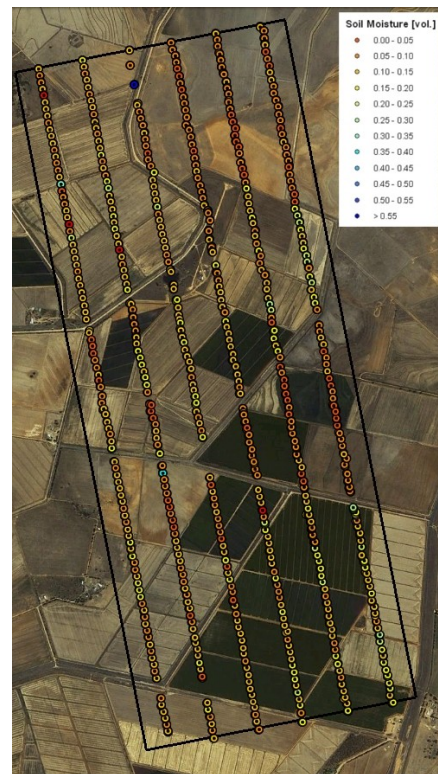
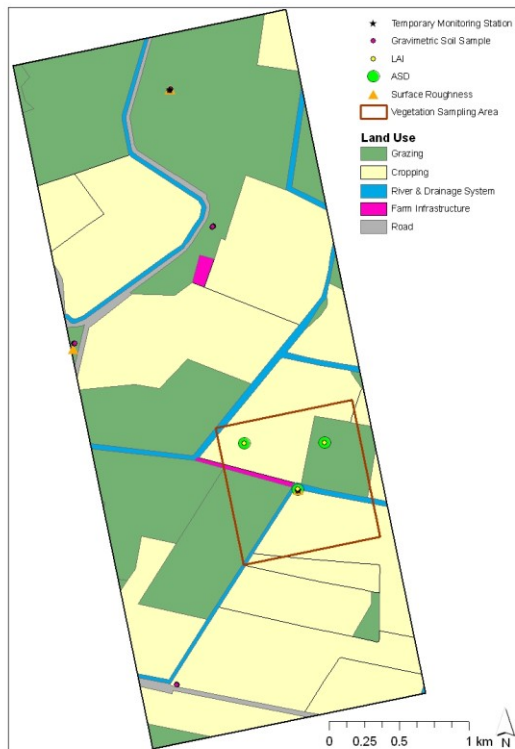


P05F10

General comments:

Terrain: undulating Vegetation: mixed Soil texture: loam Animals: sheep&cattle
 Weather/Soil conditions while soil moisture sampling: warm-wet

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1-6: 98%	Access problems due to water channels and electric fences resulted in incomplete data for all lines
Dew	min of 2 samples per vegetation type	1 sample taken	no visible dew
LAI	5 samples + replications per vegetation type	3 samples + replications	-
ASD	5 samples + replications per vegetation type	3 samples + replications	-
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	3 samples taken across focus farm as per plan	-
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	9 samples taken across focus farm	-
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	2 stations installed with complete setup as per plan	no rain gauge installed at southern station

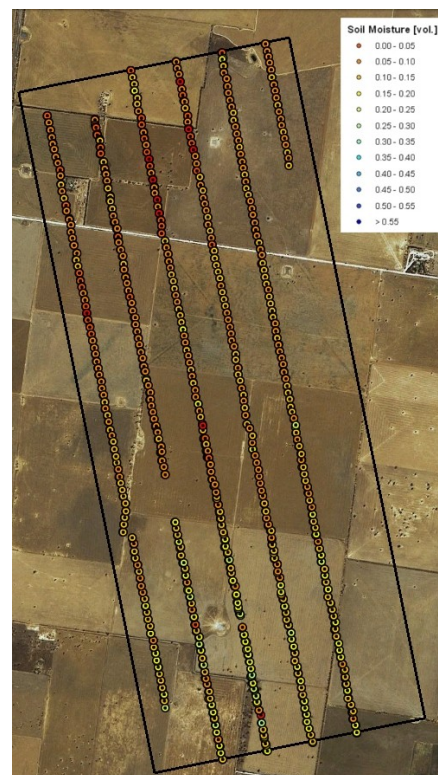


P06F11

General comments:

Terrain: flat Vegetation: crops Soil texture: loam Animals: sheep
 Weather/Soil conditions while soil moisture sampling: warm-raining

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1,2: 92% Line 3-5: 100% Line 6: 20%	Incomplete data for line 1,2,6 due to major thunderstorm event while HDAS sampling
Dew	min of 2 samples per vegetation type	no samples taken	No data collected because the vegetation team was on reconnaissance at a different farm due to schedule shifts based on previous rain events
LAI	5 samples + replications per vegetation type	no samples taken	
ASD	5 samples + replications per vegetation type	no samples taken	
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	no samples taken	
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	3 samples taken across focus farm	-
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	no station installed	-

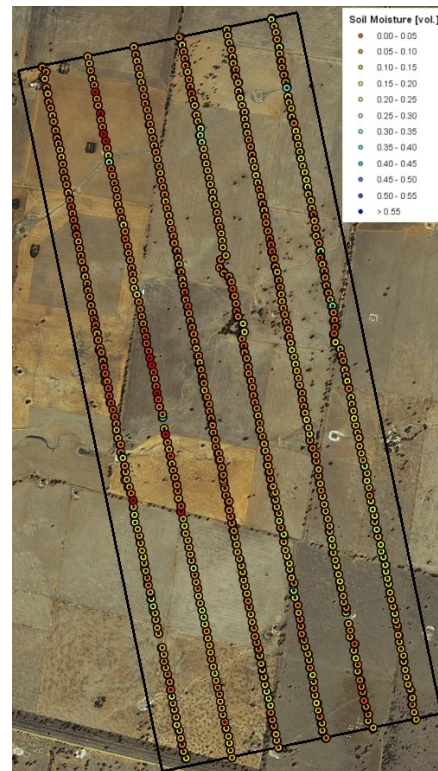


P07F13

General comments:

Terrain: undulating Vegetation: mixed Soil texture: loam Animals: sheep
 Weather/Soil conditions while soil moisture sampling: warm-moist

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1-6: 100%	-
Dew	min of 2 samples per vegetation type	3 sample taken	-
LAI	5 samples + replications per vegetation type	6 samples + replications	-
ASD	5 samples + replications per vegetation type	5 samples + replications as per plan	-
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	3 samples taken across focus farm as per plan	-
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	5 samples taken across focus farm	-
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	2 stations installed with complete setup as per plan	no rain gauge installed at southern station

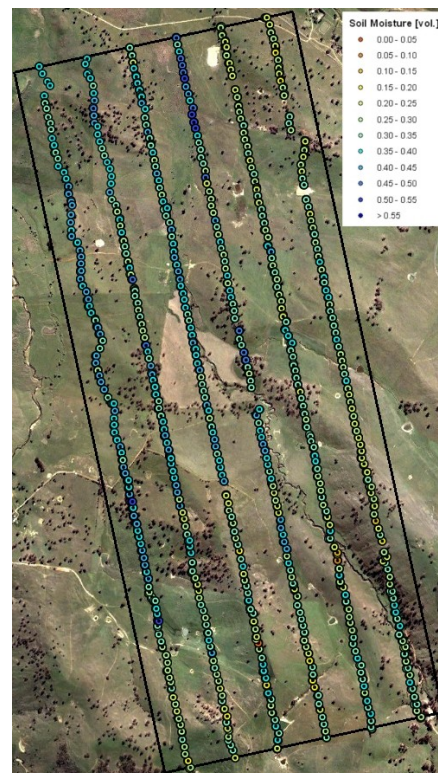


P08F16

General comments:

Terrain: hilly Vegetation: grass Soil texture: sandy loam Animals: cattle
 Weather/Soil conditions while soil moisture sampling: warm-moist

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1-6: 99%	Access problems due to electric fences
Dew	min of 2 samples per vegetation type	no dew samples taken	no visible dew
LAI	5 samples + replications per vegetation type	no LAI data collected	-
ASD	5 samples + replications per vegetation type	no ASD data collected	-
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	2 samples taken across focus farm	-
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	4 samples taken across focus farm	-
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	2 stations installed with complete setup as per plan	no rain gauge installed at southern station

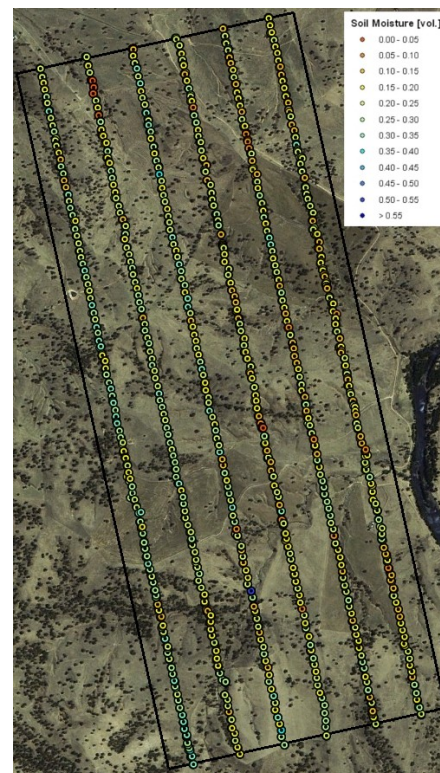


P09F17

General comments:

Terrain: hilly Vegetation: grass&trees Soil texture: loam Animals: cattle&sheep
 Weather/Soil conditions while soil moisture sampling: warm-moist

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1-6: 100%	-
Dew	min of 2 samples per vegetation type	3 samples taken	-
LAI	5 samples + replications per vegetation type	6 samples + replications	-
ASD	5 samples + replications per vegetation type	no ASD data collected	-
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	3 samples taken across focus farm as per plan	-
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	5 samples taken across focus farm as per plan	-
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	1 stations installed without raingauge	-

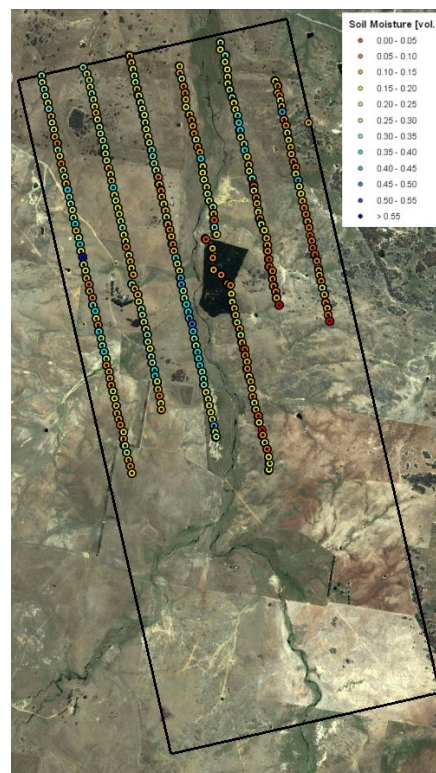


P10F20

General comments:

Terrain: undulating Vegetation: grass&crops Soil texture: sandy loam
 Animals: cattle&sheep Weather/Soil conditions while soil moisture sampling: warm-moist
 Note: sampling coincident with descending SMOS overpass in the afternoon

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1,3,4: 60% Line 2: 55% Line 5,6:40%	HDAS sampling has been cut short due to sunset and darkness
Dew	min of 2 samples per vegetation type	no samples taken	-
LAI	5 samples + replications per vegetation type	2 samples +replications	-
ASD	5 samples + replications per vegetation type	no ASD data collected	-
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	2 samples taken across focus farm	-
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	2 samples taken across focus farm	-
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	1 stations installed	-

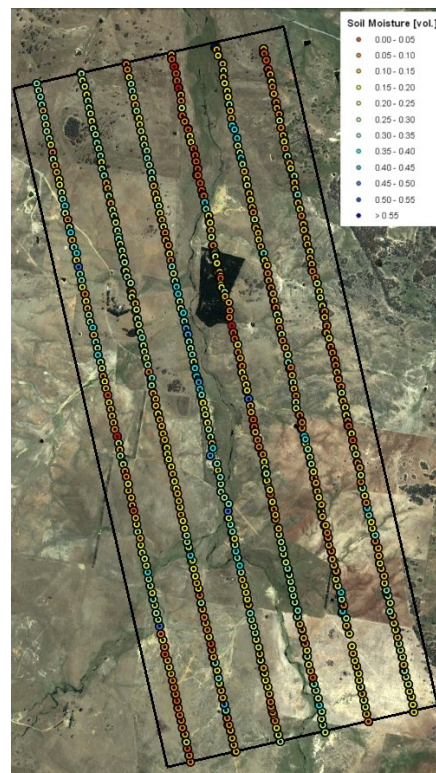


P10F20_Transect

General comments:

Terrain: hilly Vegetation: grass&trees Soil texture: loam Animals: cattle&sheep
 Weather/Soil conditions while soil moisture sampling: warm-moist

Ground Sampling	Sampling Strategy in work plan/theory	Sampling Strategy in field/practice	Comment
HDAS	6x5km lines, 330m apart from each other, 3 HDAS measurements every 50m per line	Line 1-5: 100% Line 6: 99%	Access problems resulted in incomplete data for line 6
Dew	min of 2 samples per vegetation type	4 samples collected	-
LAI	5 samples + replications per vegetation type	2 samples +replications	-
ASD	5 samples + replications per vegetation type	no ASD data collected	-
Surface Roughness	min of 3 different locations with 2 lots of consecutive readings in N-S and E-W orientation	2 samples taken across focus farm	-
Soil Gravimetric Sample	min of 5 samples across the 2x5km farm	2 samples taken across focus farm	-
Monitoring Station	2 stations per farm each equipped with: 1 rain gauge, 1 leaf wetness, 4 temperature and 2 soil moisture sensors; 1TIR at one station	1 stations installed	-



5. Annex B – Airborne Data Collection Summary

Flight	Date (local)	Description
T00	20/01/2010	- upward VNIR/SWIR not logged as it was connected wrongly.
P01	22/01/2010	As planned
P02	25/01/2010	As planned
P03	28/01/2010	- upward sensor was not working
P04	30/01/2010	As planned
T01	02/02/2010	As planned
P05	07/02/2010	- delayed because of rainfall. Original flight date was 05/02/2010 - Flight includes Yenda farm and also Rob's study area
P06	12/02/2010	- delayed to fly over P07 which has more monitoring sites first. Original flight date was 05/02/2010 - Yenda farm included
P07	10/02/2010	As planned - Yenda farm included
P08	15/02/2010	-delayed because of rainfall. Original flight date was 13/02/2010 - Yenda farm included
P09	18/02/2010	- delayed for 3 days because P08 took place in 15/02/2010 - Yenda farm included
P10	18/02/2010	- As there were two flights for this day (P09-P10), there was no fly over calibration lake for P10 due to the darkness. - Yenda farm included
T02	20/02/2010	As planned - Yenda farm included

* Lake Wyangan was used for calibration purpose through the campaign.

** Thermal camera didn't work. This happened for all flights during the campaign.