



Summary Report

09/06/2009

Reducing greenhouse gas emissions in the grain and sheep industries in the upper Wimmera catchment

This summary report provides an overview of the project and benchmarking activities of the 14 farm greenhouse gas audits conducted during the project.



Project Funded by Project Platypus in association with



Australian Government

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SUMMARY REPORT

REDUCING GREENHOUSE GAS EMISSIONS IN THE SHEEP AND GRAIN INDUSTRY IN THE UPPER WIMMERA CATCHMENT

Project Description

This project aimed to increase understanding of greenhouse gas accounting in sheep and grain industries in the Upper Wimmera Catchment through capacity building and promotion of opportunities for reducing and sequestering greenhouse gas emissions within agriculture and forestry. The demonstration of greenhouse gas accounting calculators and models for sheep and grain and forestry activities was also a key objective of the project.

Project Activities

The following steps were taken to enable the successful completion of the project aims and objectives:

- A workshop on the background to climate change and greenhouse gas accounting (EAS)
- The collection and collation of farm records required for the inventory (Project Platypus)
- Facilitated discussion and refinement of the farm records required for baseline estimation (Project Platypus)
- The application of the relevant DPI calculators leading to an estimate of on-farm GHG emissions (EAS)
- The application of the National Carbon Accounting Toolbox to estimate sequestration in eligible areas of environmental plantings and agroforestry (EAS)
- Final discussions with the landholder on the nature of the data input and the proposed format of the output of the inventory (Project Platypus)
- The completion of the baseline report and action plan (EAS)
- A final project participant workshop to explain the report outcomes and listed actions (EAS)
- The dissemination of project outcomes (Project Platypus)

Summary of Outcomes

Approximately 30 landholders participated in the first workshop, of which 14 agreed to participate in the on-farm inventory process. All 14 farmers provided the required information and received a detailed farm greenhouse gas inventory and reduction action plan. Throughout the process those involved increased their understanding of the science and policy of climate change and how it relate to their on-farm activities. They also gain an improved understand of the potential implications to their business from the introduction of the proposed Carbon Pollution Reduction Scheme.

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PROJECT APPROACH

The general project approach included the following steps:

- Greenhouse gas capacity building workshop
- Guidance on Monitoring for recruited landholders
- Audit of farm baselines and development of inventories and action plans
- Project Finalization Workshop
- Information Dissemination

Greenhouse gas capacity building workshop

An initial capacity building workshop was held at the Crowlands Hall on 6th February 2009. This workshop was open to the Project Platypus network and attracted over 30 participants from a wide range of farming industries (sheep, grain, mixed, horticulture). The workshop was facilitated by Environmental Accounting Services Pty Ltd and covered the main areas of:

- Climate Change and Greenhouse Gas Emissions
 - Challenges in Australian Agriculture
 - Livestock and grain production
 - Forest areas and biodiversity plantings
- Greenhouse Gas Accounting
 - Australian Agriculture Accounting Methodology
- Defining the Boundary and Source/Removal Activities
 - Estimating emissions and removals
- Farming and Carbon: Finding a Balance
 - Reducing Emissions – Targeting Key Sources
 - Reducing Emissions – Identifying Opportunities

The session focused on explaining to the participants the requirements for conducting a farm greenhouse gas audit and providing brief exposure to the available calculators that can assist in completing the inventory. Project Platypus staff were given guidance on how to conduct audits and the specific information required so they could use their established relationships to help landholders through the process of collecting data to complete their

audit. This guidance also included data sheets which assisted landholders to collect and report the required data for the farm inventory process.

Guidance on monitoring for recruited landholders

Following the initial workshop, landholders were invited to participate in a detailed audit of their on-farm greenhouse gas emissions. A total of 14 landholders took up the offer and were provided with information packs including data tables to complete. Assistance in filling out these tables was provided by Project Platypus staff who visited the individual landholders to offer support.

Audit of farm baselines and development of inventories and action plans

Once the data was collected, Project Platypus staff forwarded the data onto EAS staff to develop the farm greenhouse gas inventory. The inventory objectives were:

- to identify and quantify the sources and sinks of greenhouse gases within the farm boundary
- to identify potential target areas where emissions can be reduced

The Victorian Department of Primary Industries (VicDPI) Sheep and Grains calculators were used together to estimate the emissions within the farm boundary and the National Carbon Accounting Toolbox was used to estimate carbon uptake by trees planted since 1990.

These calculators and models conform to the approach used in the National Carbon Accounting System and can be reliably used to represent potential liabilities and opportunities available to landholders under the framework of the Carbon Pollution Reduction Scheme (CPRS).

Energy emissions (i.e. emissions from electricity and fuel consumption) were also estimated where data was provided. In many cases energy data was not complete; contractor fuel for cropping operations was not always provided for example. Energy emissions will not form part of any CPRS on-farm liability (i.e. they are upstream emissions) and in this study generally represented less than 5% of total farm emissions and were therefore not pursued if missing.

To ensure farm emissions were compared on an equivalent basis, energy emissions were excluded from the benchmarking process. Where information was provided, actions for reducing emissions from energy were offered in the action plans.

Each of the 14 landholders who participated in the detailed farm audit were issued with a detailed report. This report provided them with farm greenhouse gas emissions for 2007/08, benchmarking themselves against the other participants, and providing them with possible actions to reduce their emissions. Some advice was also provided on how the proposed CPRS would impact their business given the current design elements. Finally each farmer

was given the opportunity to attend a project closing workshop to have any questions about the results answered by EAS and Project Platypus staff.

Finalization Workshop

The final workshop was held on the 28th May 2009. The workshop allowed farmers to have questions answered about their reports and to provide feedback about the project's success. Generally there was positive feedback about the way in which the project was run and the level of information provided. Those that attended the workshop were keen to revisit the process again next year to continue monitoring their emissions and also strengthen the activities of the Climate Change group established under Project Platypus.

Information dissemination

A range of activities have taken place or are planned, to disseminate information about this project. These include:

- Summary report written for public disclosure
- Fact sheets prepared by Project Platypus
- Project summary published in Project Platypus newsletter
- Presentation of project results at 4 field days in Gippsland related to similar projects
- Participation in Victorian DPI Carbon Toolkits in Agriculture network
- Presentation on the project results at the Changing Climate, Changing Communities, 31st July, held by the International Association for Public Participation

FARM GREENHOUSE GAS INVENTORIES COMPLETED

Description of Properties

A total of 14 properties were involved in the development of detailed greenhouse gas inventories. These properties ranged in size from as large as 3600 ha down to 30 ha and were a mix of livestock and mixed enterprises with smaller properties having trees only (i.e. no agricultural activities) (Figure 1).

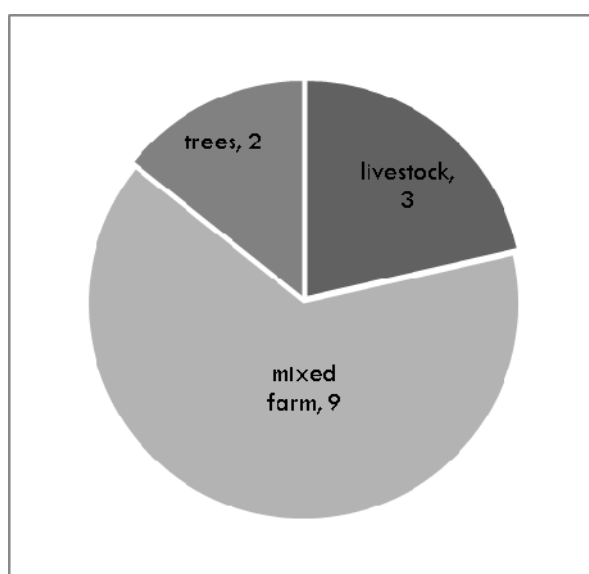


Figure 1: Types of farm activities for which inventories were developed. Two properties had trees only, three properties had livestock activities and trees planted since 1990, nine properties were classified as mixed farming systems, of which four were sheep/beef/crop/tree enterprises, four were sheep/crop/tree enterprises and one was a sheep/crop enterprise.

Operational Boundary

The detail of physical inputs, outputs and emissions sources and sinks considered on each property was restricted to a simple format as possible to allow direct comparison between properties (Figure 2). As discussed above, while energy data was requested it was not always provided or easily available and was therefore not included in benchmarking.

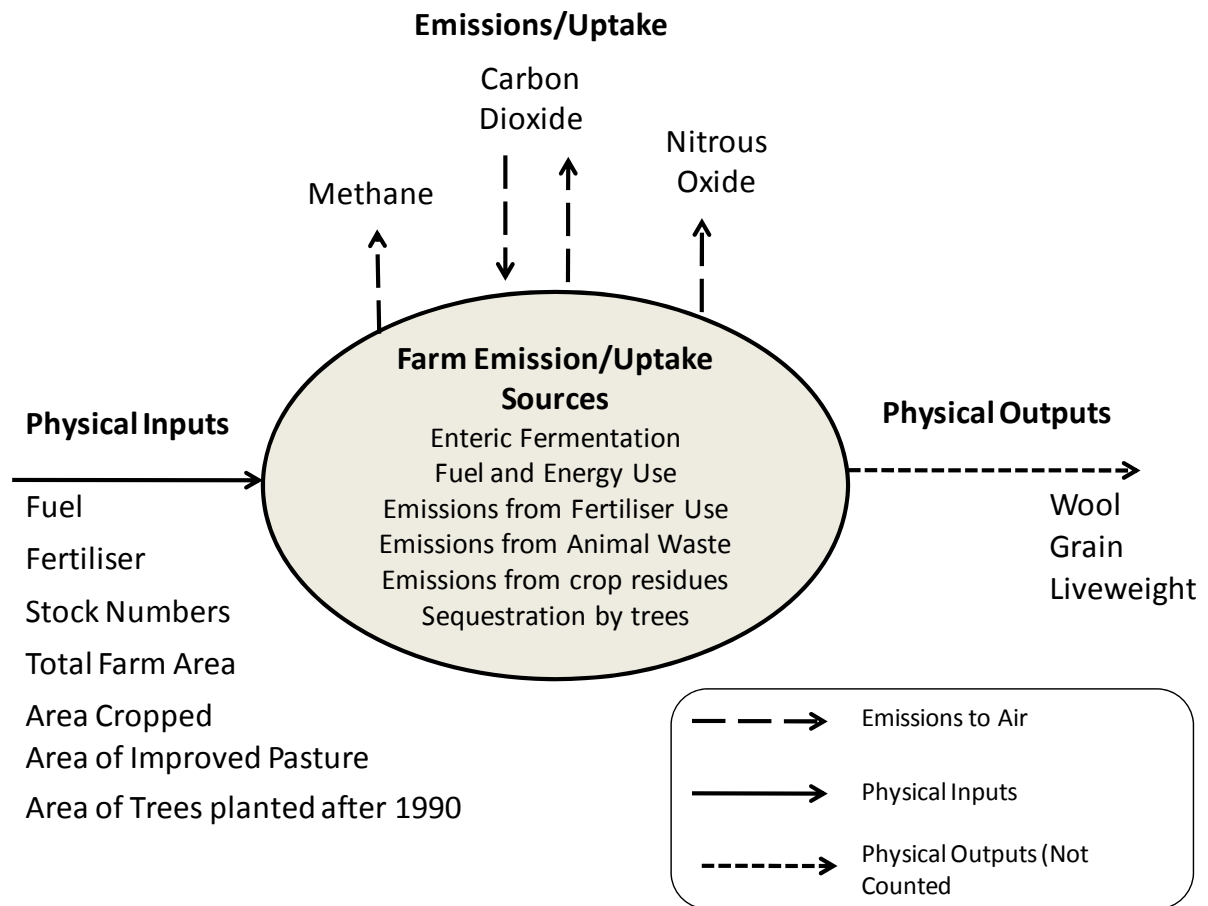


Figure 1: Description of farm inventory inputs (left) considered, the activities from which emissions are generated (inside grey circle), the greenhouse gases considered (dashed arrows to and from the atmosphere) and the farm outputs (right) that make up the inventory and the metrics used to report the farm emissions.

BENCHMARKING

The data collected from the 14 farm participants is provided in the following tables. Table 1 lists data related to the farm size and activity. Nine farms were mixed livestock and grain, three farms were livestock and two smaller farms participate to gain an estimate of the carbon sequestered by the trees planted since 1990.

Table1: Farm data for fourteen participating farms

Number	Farm System	Total Farm Area (ha)	Area Cropped (ha)	Area Livestock (ha)	Area Trees (ha)	Head of Sheep (average)	Head of Beef (average)	Crop Yields (t)	Clean Wool (t)	Liveweight Sheep (t)
1	mixed	3200	172	2925	103	10161	0	201	31	138
2	mixed	800	60	733	7	3329	64	75	10	66
3	mixed	540	290	227	23	660	0	674	2	32
4	mixed	654	24	620	10	2390	77	10	6	55
5	livestock	485	0	461	24	2106	0	NA	7	15
6	livestock	29	0	21	8	37	0	A	0	0
7	trees	76	0	0	35	0	0	NA	NA	NA
8	mixed	445	87	347	11	3200	85	216	21	100
9	mixed	1053	44	993	16	3793	62	286	8	75
10	trees	36	0	0	4	0	0	NA	NA	NA
11	livestock	590	0	580	10	2839	0	0	12	50
12	mixed	3600	200	3270	130	7194	0	200	26	237
13	mixed	850	160	690	0	2715	0	448	8	32
14	mixed	2280	507	1743	29	7412	0	1059	24	54

The data in Table 1 indicates the wide variety of farming enterprises that participated in the project. Properties ranged in size from 3600 ha down to 29 ha and with sheep numbers from over 10,000 head down to 37 head. All farms, except one, had some area of environmental planting since 1990 that could be used to reduce gross farm emissions (Table 2).

As expected emissions from enteric fermentation of sheep was generally the largest on-farm emission source. To many farmers surprise emissions from grain production were comparatively small. In most cases carbon uptake by trees on the farm made a note worthy reduction in gross emissions and many farmers were interested in understanding what area of trees would be required to fully offset the sheep, grain and beef emissions estimated.

Table 2: Greenhouse gas emissions information

Number	Farm System	Emissions Energy (tCO ₂ -e)	Emissions Sheep (tCO ₂ -e)	Emissions Grain (tCO ₂ -e)	Emissions Beef (tCO ₂ -e)	Uptake Trees (tCO ₂ -e)	Gross Emissions (tCO ₂ -e)	Total Net Emissions (tCO ₂ -e)
1	mixed	12	1614	6	0	-274	1620	1346
2	mixed	15	506	1	103	-11	610	599
3	mixed	39	91	19	0	-52	110	58
4	mixed	13	355	0	160	-31	515	485
5	livestock	9	307	0	0	-92	307	215
6	livestock	0	5		0	-24	5	-19
7	trees	0	0	0	0	-207	0	-207
8	mixed	15	512	7	139	-51	658	607
9	mixed	22	565	6	101	-52	672	620
10	trees	0	0	0	0	-4	0	-4
11	livestock	6	430	0	0	-48	430	382
12	mixed	51	1295	10	0	-238	1305	1067
13	mixed	19	417	5	0	0	422	422
14	mixed	89	1163	33	0	-141	1196	1055

Rather than simply comparing gross and net farm emissions, farm metrics were established and compared to benchmark participants. The metrics used included emissions/hectare, emissions/head sheep, emissions/head beef, emissions/tonne clean wool, emissions/tonne liveweight sheep, emission/tonne grain (Table 3, Figure 3-9).

Table 3: Benchmarking data

Number	Farm System	tCO ₂ -e / ha	tCO ₂ -e / sheep	tCO ₂ -e / beef	tCO ₂ -e / t sheep		
					tCO ₂ -e / t clean wool	liveweight	tCO ₂ -e / t grain yield
1	mixed	0.42	0.16	NA	53	12	0.03
2	mixed	0.75	0.15	1.61	53	8	0.02
3	mixed	0.11	0.14	NA	40	3	0.03
4	mixed	0.74	0.15	2.08	61	6	0.04
5	livestock	0.44	0.15	NA	41	20	NA
6	livestock	-0.64	0.14	NA	NA	NA	NA
7	trees	-2.72	NA		NA	NA	NA
8	mixed	1.36	0.16	1.64	25	5	0.03
9	mixed	0.59	0.15	1.62	67	8	0.02
10	trees	-0.11	NA		NA	NA	NA
11	livestock	0.65	0.15	NA	36	9	NA
12	mixed	0.30	0.18	NA	50	5	0.05
13	mixed	0.50	0.15	NA	56	13	0.01
14	mixed	0.46	0.16	NA	49	22	0.03

Figure 3: Net emissions per hectare

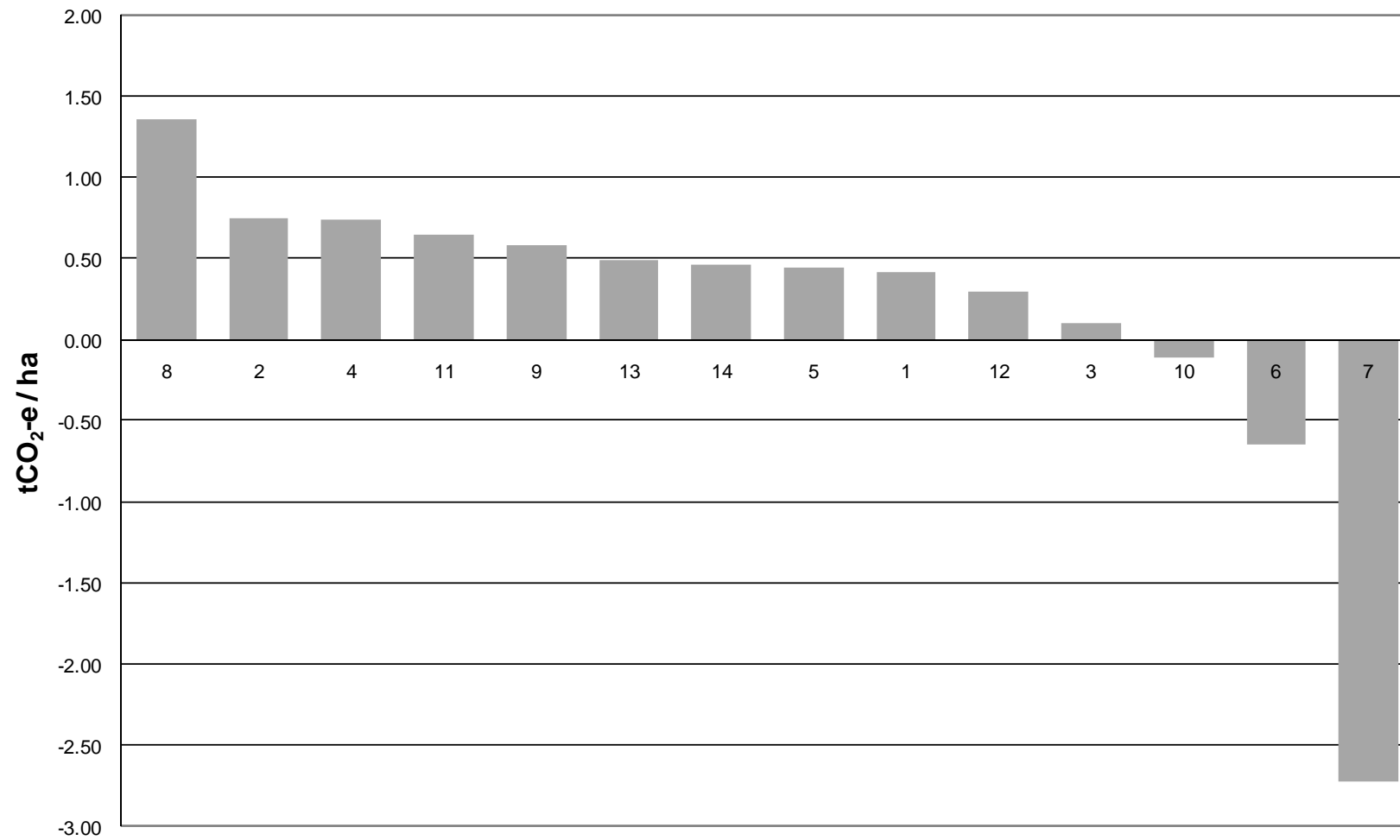


Figure 4: Emissions per head of sheep

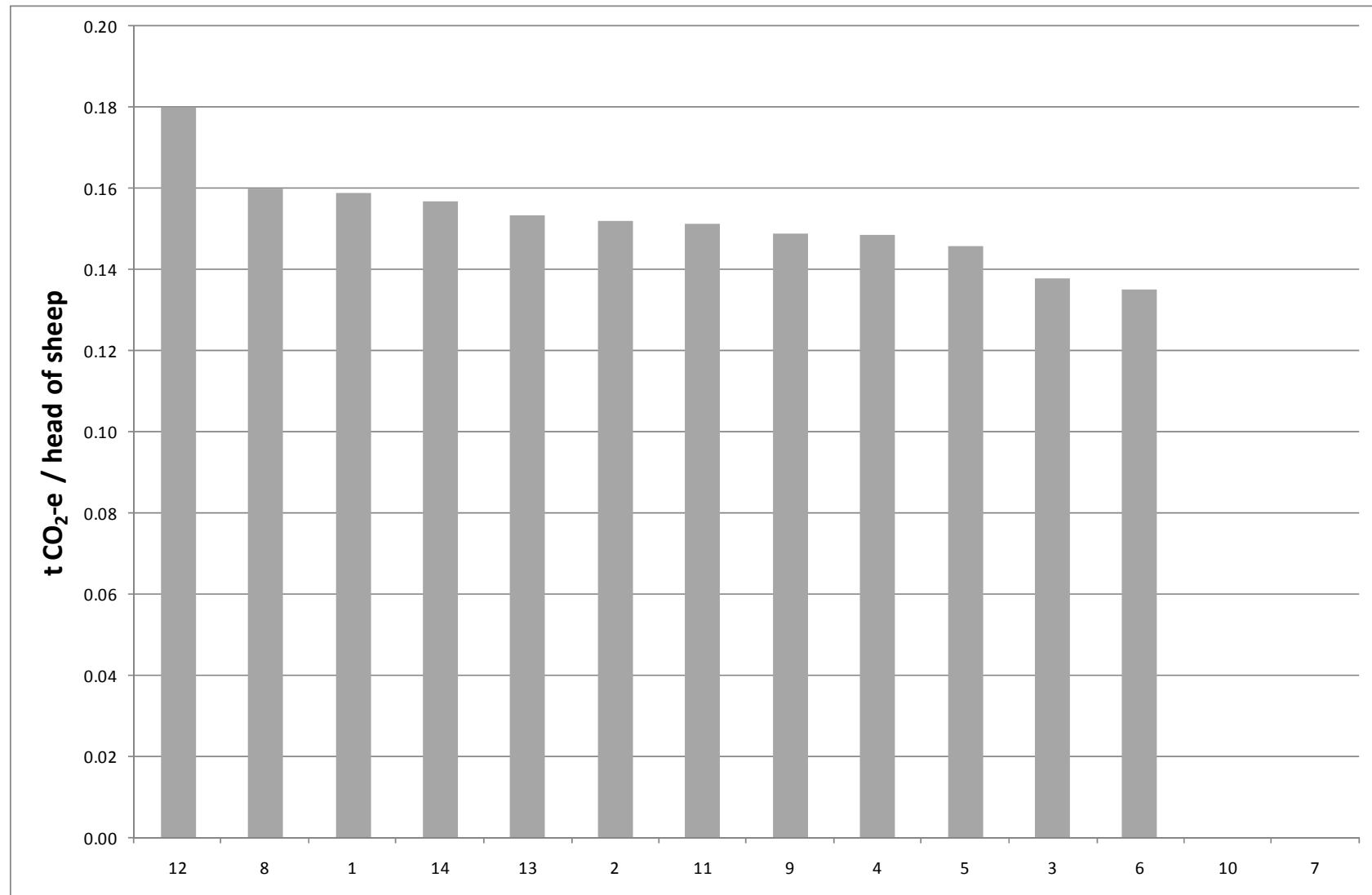


Figure 5: Emissions per head of beef

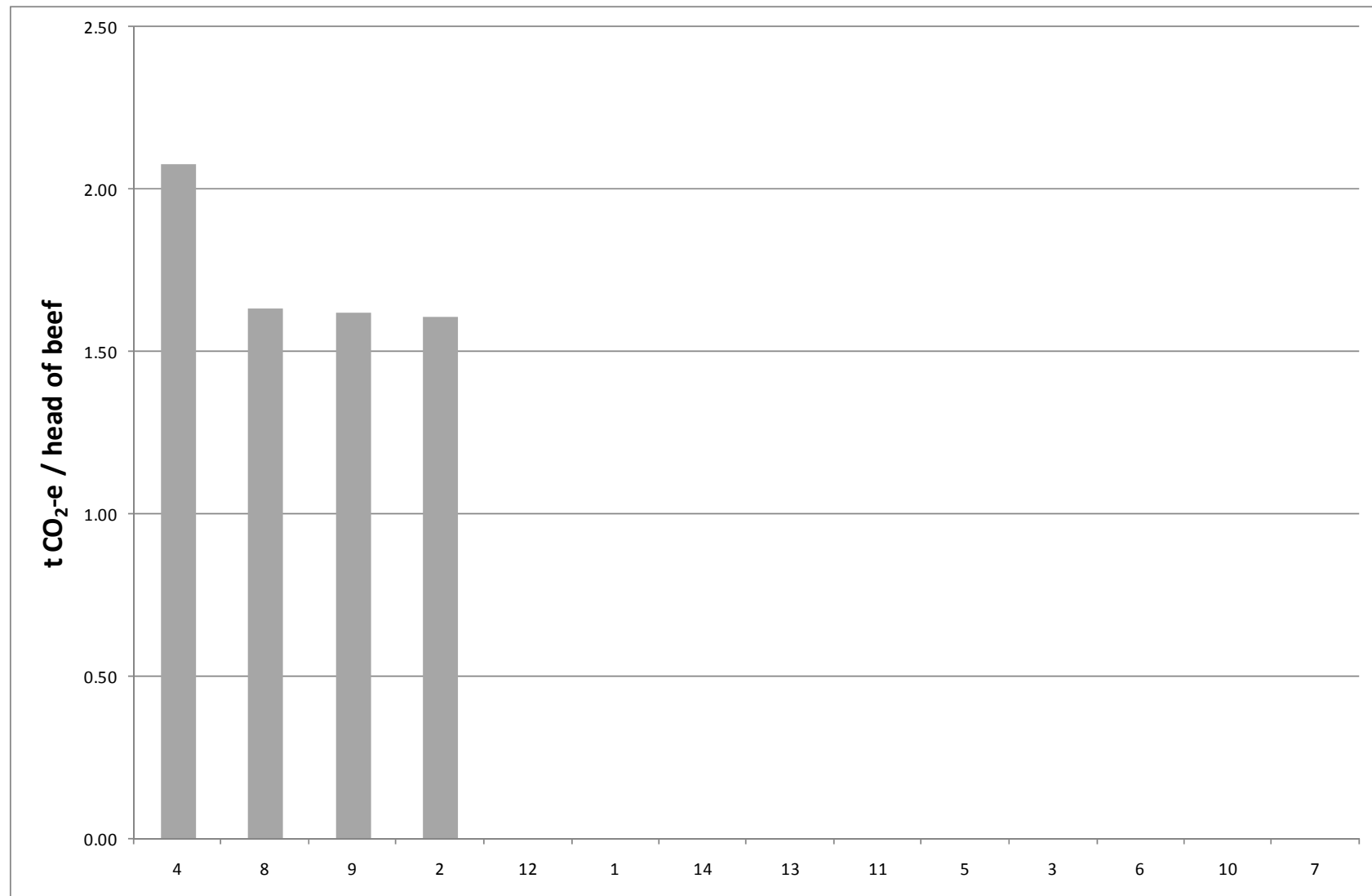


Figure 6: Emission per tonne of clean wool

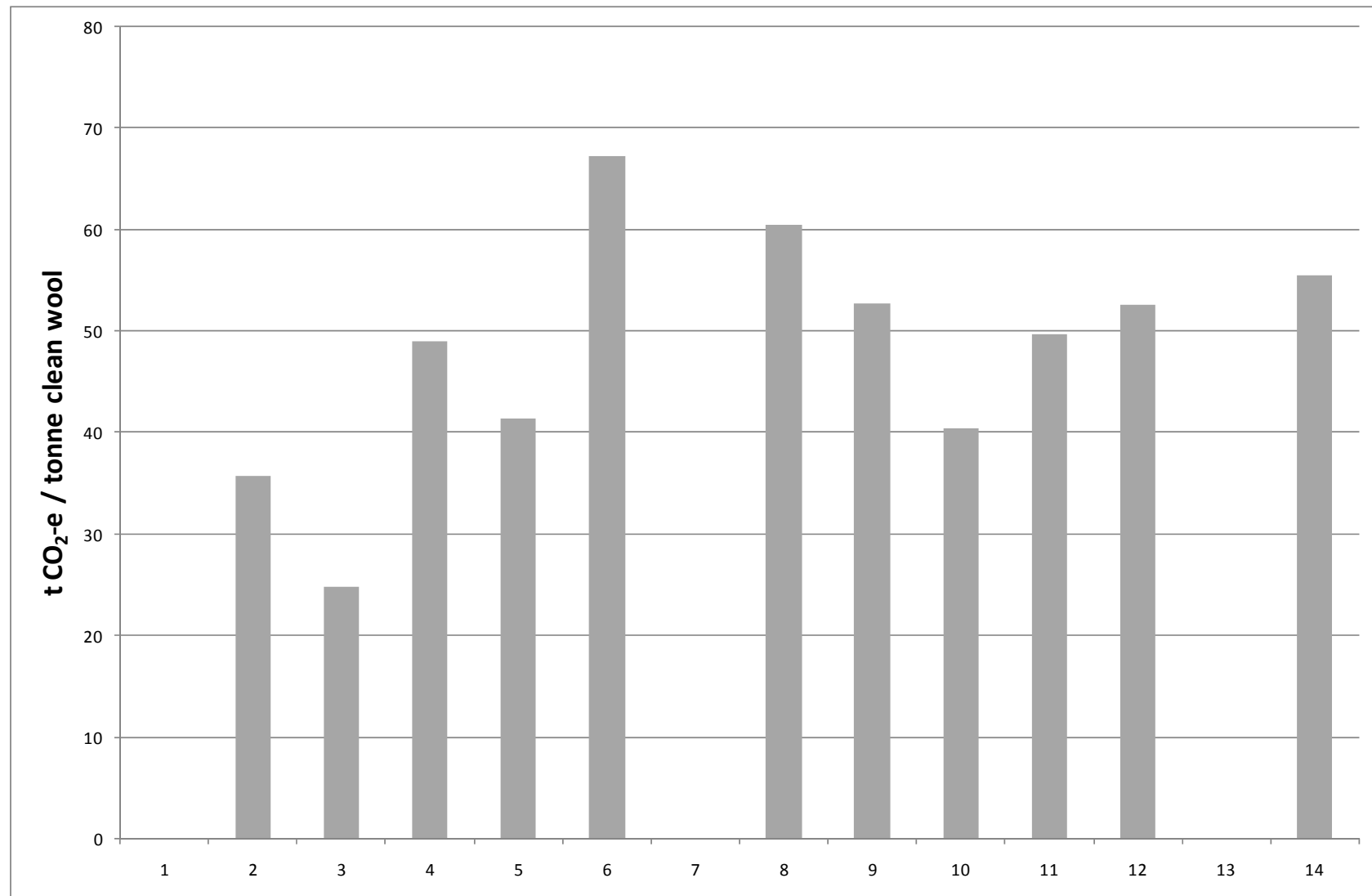


Figure 7: Emissions per tonne of liveweight (sheep)

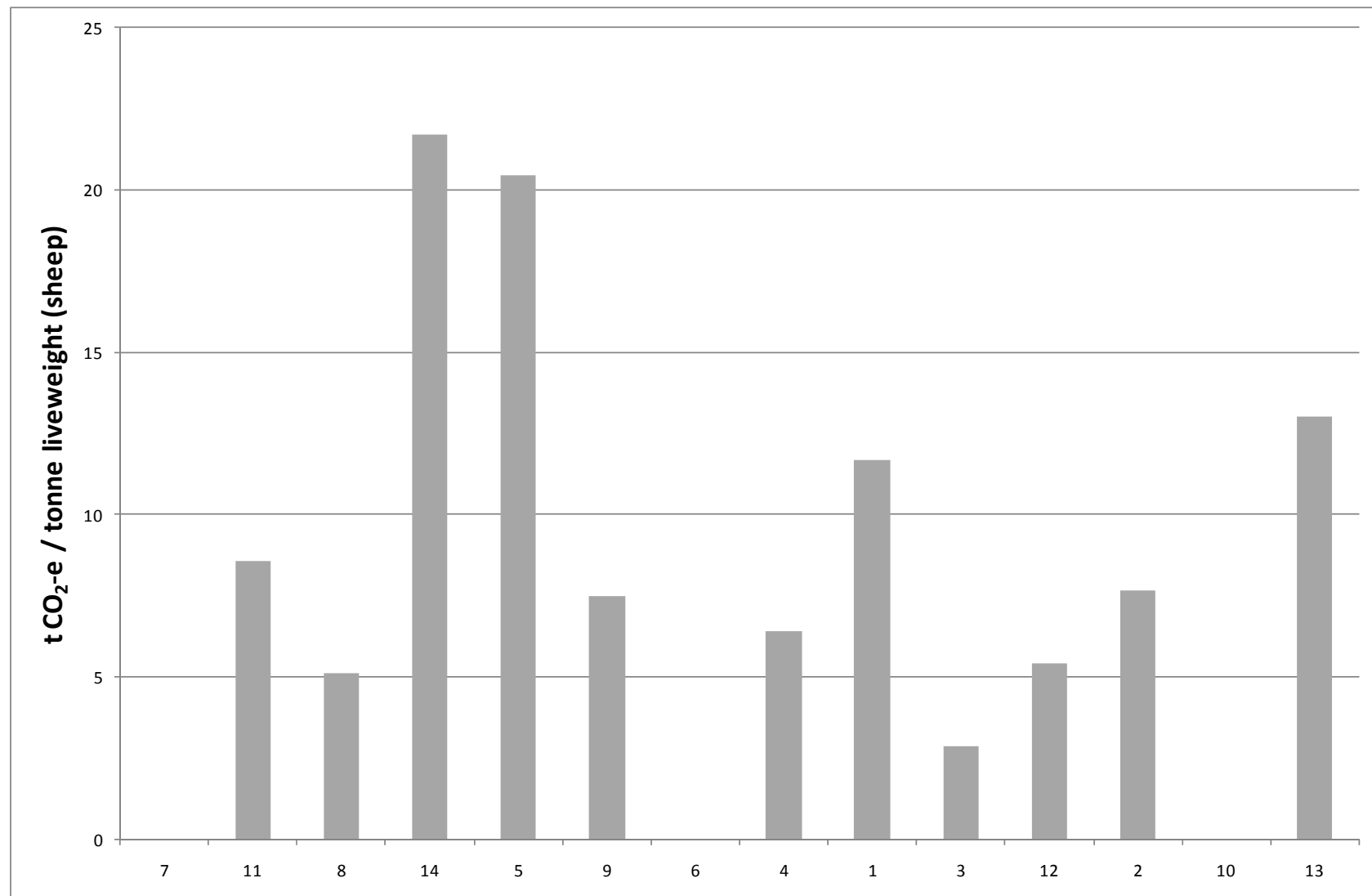


Figure 8: Emissions per tonne of grain

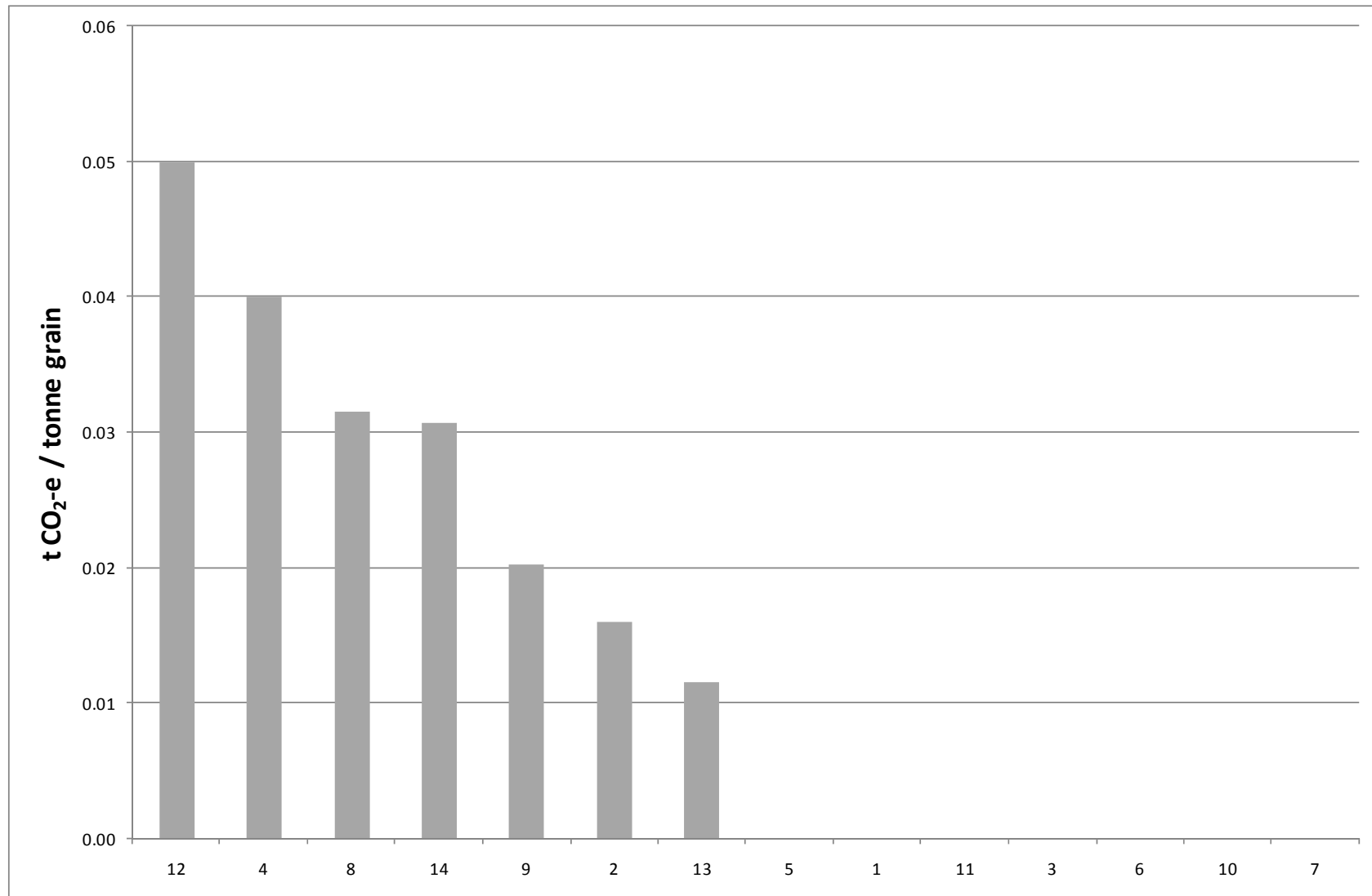
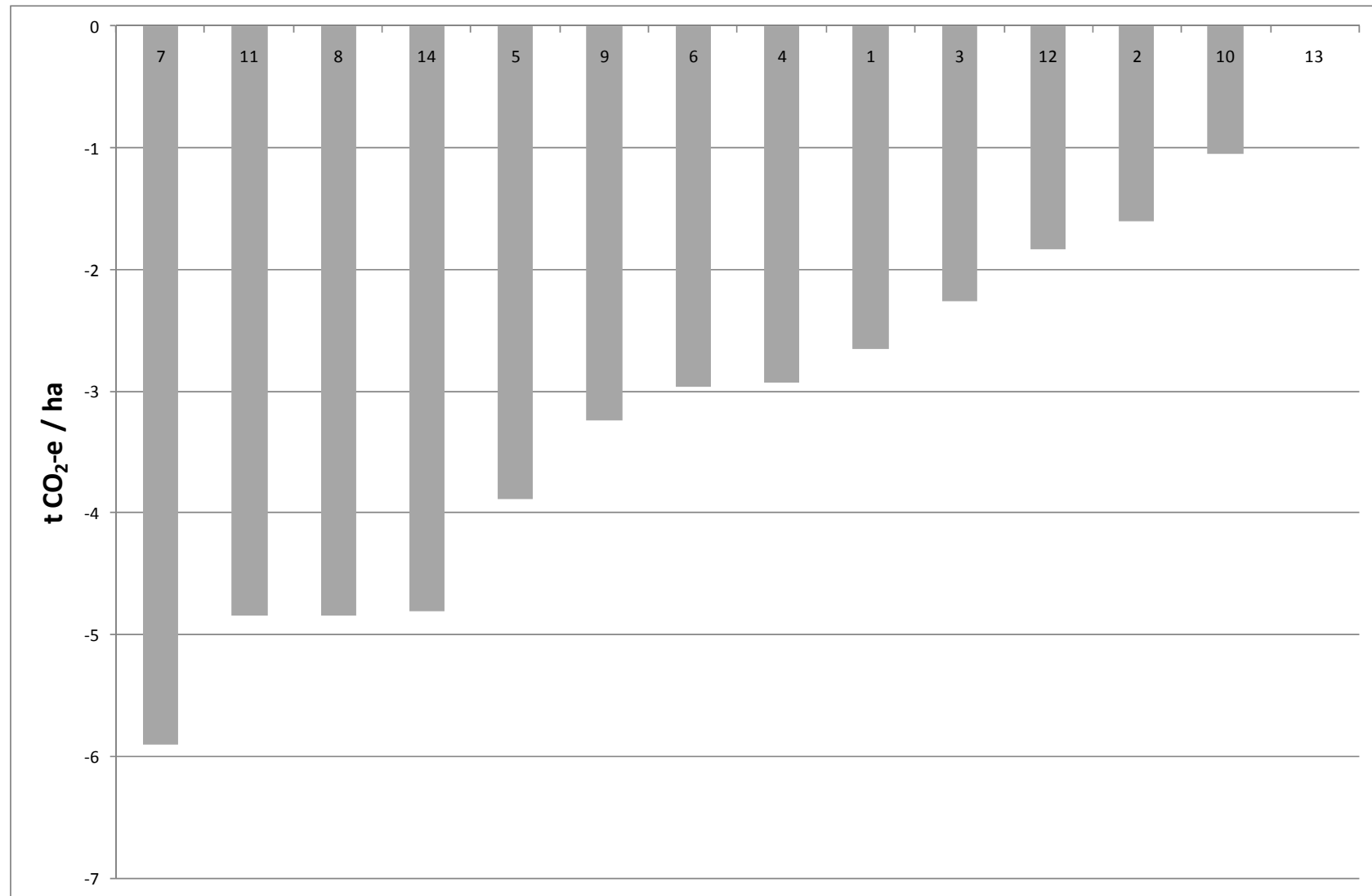


Figure 9: Sequestration per hectare of trees



CONCLUSION

This project achieved a number of outcomes for farmers in the Upper Wimmera Catchment.

Firstly participants in the workshops gained a more detailed understanding of the science and policy behind climate change and how it directly impacts them at the farm level. Those who went on to conduct a full farm audit increased their capacity to potentially report emissions in the future and to monitor reductions made through identified actions.

The diverse farming enterprises were benchmarked on greenhouse gas emissions for the first time in the region allowing them to put their activities in context with other local farming enterprises.

The project enhanced enthusiasm by participants to continue the tracking and reduction/abatement of emissions in the future. It also highlighted the practical implications of the proposed introduction of the Carbon Pollution Reduction Scheme (CPRS) at the farm level and prompted confidence in voicing their concerns and formulating a policy position through the Project Platypus network.