Teagasc National Farm Survey:

The Sustainability of Small Farming in Ireland

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1. EXECUTIVE SUMMARY

- The Teagasc National Farm Survey (NFS) is a survey of farms in Ireland, whose Standard Output exceeds €8,000. It therefore excludes the smallest farms in Ireland. In this report results from a survey of farms in Ireland whose standard output is less than €8,000, hereafter referred to as ***Small Farms*** is presented. All of these small farms are categorised as Cattle and Sheep farms. The results of this survey of small farms are compared with results from a subsample of the 2015 Teagasc NFS. The subsample comprises of farms categorised as Cattle and Sheep farms, hereafter referred to as ***Larger Farms*** since their standard output exceeds €8,000.

Profiling Small Farms: CSO 2013 Farm Structures Survey

- Small Farms are defined as those producing a standard output of €8,000 per year or less, that is the equivalent of 6 dairy cows, 6 hectares of wheat or 14 suckler cows.
- In 2013 Small Farms accounted for 37% of farms nationally, 44% in the Border Midland and West (BMW) region and 30% in the rest of the country.
- In total 16% of the total farmland area of the country is operated by Small Farms. In 2013 43% of Small Farms had a land area of 10 hectares or less.
- Cattle farming is the predominant enterprise on Small Farms, with 61% of Small Farms categorised as Cattle Farms.
- The age distribution of Small Farms is not substantially different from larger farms with 33% of Small Farms being over 65 years of age compared to 23% of larger farms.
- Just 38% of Small Farms describe farming as their main occupation.
- In 2010 Small Farms collectively received €227 million of Pillar I payments, 13% of the national envelope, this averaging at €4,300 per farm.

The Economic Sustainability of Small Farms: Tegasc NFS Small Farms Survey

- Based on the survey of small farms conducted by the Teagasc NFS in 2015 the average Small Farm is 14 hectares in size. Average Family Farm Income on Small Farms was just €2,917 in 2015 and three quarters of Small Farms earned a Family Farm Income of less than €5,000.
- The average Small Farm employs less than half a labour unit. The average income per full-time labour unit equivalent was €6,238 in 2015.
- Small Farms are less productive than Larger Farms. On a per hectare basis gross output on Small Farms was just €800, 30% less than Larger Farms.

- Small Farms are also less efficient, total costs consume 74% of output compared to 68% on Larger Farms. This is mostly driven by overhead costs which are high on Small Farms relative to their output level.
- Depending on the Farm System the average level of direct payments ranged from 173% to 219% of income on Small Farms.
- According to the Teagasc NFS supplementary survey of 2015, 32% of all Small Farms were operated by famers aged 65 years or older in 2015 compared to 25% of Larger Farms. Overall, 28% of all Small Farms were single person households compared to 18% of Larger Farms.
- In 2015 88% of Small Farm households were in receipt of an off-farm income source - an off-farm job, pension or social welfare payment.
- The proportion of Small Farms classified as economically vulnerable is extremely high at 50%.

The Social Sustainability of Small Farms

- Despite one in four operators of Small Farms living alone, the majority of farmers meeting persons outside of their household on a daily basis, so for most Small Farmers there does not seem to a risk of isolation. Nevertheless, even small numbers of people at risk of isolation could be considered a serious issue.
- Risk of isolation increases with age, just 39% of farmers over the age of 60 meet people outside of their household on a daily basis compared to 84% of younger farmers.
- Almost two-thirds of farmers reported a deterioration in their sense of security in their home in the last 5 years. This figure increases to three-quarters for farmers over 60 years of age.
- The majority of farmers report relatively easy access to post offices, Garda stations, social amenities and medical services, but over half report limited access to public transport. However access to services does decline with age as older farmers report greater difficulties with access than younger farmers.
- The majority of farmers report no change in their access to services over the last five years. However, 40% of respondents to the Teagasc NFS Small Farms Survey report a deterioration in access to Garda stations and banks over the last 5 years.
- Despite the low levels of profitability and high incidence of economic vulnerability, 85% of operators of Small Farms plan to continue farming. Only 7% of operators are seeking employment off the farm. Given the age profile and high prevalence of pensions this is perhaps not surprising.

The Environmental Sustainability of Small Farms

- Nitrogen and Phosphorous balances (when expressed on a per hectare basis) are lower on Small Farms than Larger Farms.
- When the nutrient balances are expressed on a kilogram of liveweight basis, Small Farms show more animal growth per nutrient excess, mostly due to the low-input nature of the systems and high proportion of grass use in animal diets.
- On a per hectare basis Small Farms emit fewer greenhouse gas emissions. However when the level of output is accounted for, Small Farms are less emissions efficient. In other words Small Farms emit more greenhouse gases per kilogram of meat produced than Larger Farms.

2. INTRODUCTION

In recent years Small Farms have received increased attention in policy circles, especially in the context of the role they play in rural areas, in protecting the landscape and environment and in terms of the need to improve the economic and social conditions on small scale farms. While there is no commonly accepted definition of a small farm, for the purposes of this analysis we define small farms by their level of standard output. In this analysis it is not the size of land area farmed, the labour employed or profitability that defines whether a farm is small, but its level of output. Using data from a special Teagasc NFS survey of Small Farms, the economic sustainability of Small Farms in Ireland is discussed. Following this the social situation on Small Farms is explored followed by the environmental sustainability of such farms. The final chapter considers the future of Small Farms and the policy supports that may be required to ensure the long-term survival of such farms.

This chapter begins by providing a definition of Small Farms and Larger Farms and outlines the data used in this analysis. The current state of Small Farms in Ireland is profiled, in terms of the population of Small Farms, the typical system of farming, the demographic structure; the quantity of direct payments received is then profiled. Following this is a discussion of the evolution of Small Farm structures and the policy environment contributing to the changing population of Small Farms. The chapter concludes with a discussion of the importance of Small Farms and why modern society should be concerned with the long-term sustainability of such farms.

2.1. Data

The CSO classifies farms into size groups on the basis of their standard output by applying a standard output coefficient to each animal and crop output on the farm. Table 1 presents the total number of farms in the State and the number of farms by each Standard Output (SO) size category (CSO 2015). For the purposes of this study we define farms with a SO of €8,000 or less as Small farms. This is the equivalent of 6 dairy cows, 6 hectares of wheat or 14 suckler cows. The CSO estimate that in 2013 there are 52,300 Small Farms in the country. Table 1 indicates that over 32,000 (62%) of these were located in the Border, Midland and West (BMW) region.

In 2012 the economic size threshold for the inclusion of farms in the Teagasc NFS was increased to a SO of €8,000 or more. Prior to this, the threshold for the inclusion of farms had been an SO of €4,000. In 2015 an additional survey was carried out on these Small Farms. The Teagasc NFS collected data on 180 farms falling below the €8,000 SO threshold.

Table 2.1: Number of farms classified by Standard Output in each region 2013

Region	Standard Output (SO)							Total ('000)	Average SO (€)
	Less than €4,000	€4,000 - €8,000	€8,000 – €15,000	€15,000 – €25,000	€25,000 – €50,000	€50,000 – €100,000	> €100,000		
State	**29.3**	**23.0**	**26.0**	**19.4**	**17.8**	**11.4**	**12.6**	**139.6**	**€35,912**
BMW	**17.6**	**14.9**	**15.9**	**10.8**	**8.2**	**3.6**	**2.6**	**73.6**	**€23,013**
Border	7.3	6.3	6.2	3.7	2.6	1.4	1.2	28.7	€25,443
Midland	2.2	1.7	2.3	2.1	2.3	1.3	1.0	12.9	€36,673
West	8.1	6.8	7.5	4.9	3.3	1.0	0.4	32.0	€15,321
South & East	**11.7**	**8.2**	**10.1**	**8.7**	**9.6**	**7.8**	**10.1**	**66.0**	**€50,303**
Mid-East & Dublin	1.9	1.3	1.5	1.4	1.8	1.2	1.4	10.5	€52,527
Mid-West	3.0	2.4	3.1	2.4	2.1	1.5	1.8	16.2	€37,154
South-East	2.5	1.4	2.0	2.2	3.0	2.4	3.2	16.7	€62,791
South-West	4.3	3.1	3.5	2.6	2.7	2.6	3.7	22.6	€49,484

Source: CSO Farm Structures Survey 2013

Reflecting the geographic spread of Small Farms, as reported in Table 2.1, the Teagasc NFS Small Farms Survey was conducted primarily across the BMW region, with the greatest concentration of farms selected from counties where there was a prevalence of these farms, namely Donegal, Mayo, Galway, Longford and Kerry. Overall, 180 Small Farms were surveyed. The farms were selected from the two cattle systems and the sheep system, as these are the predominant farm types in this size category.

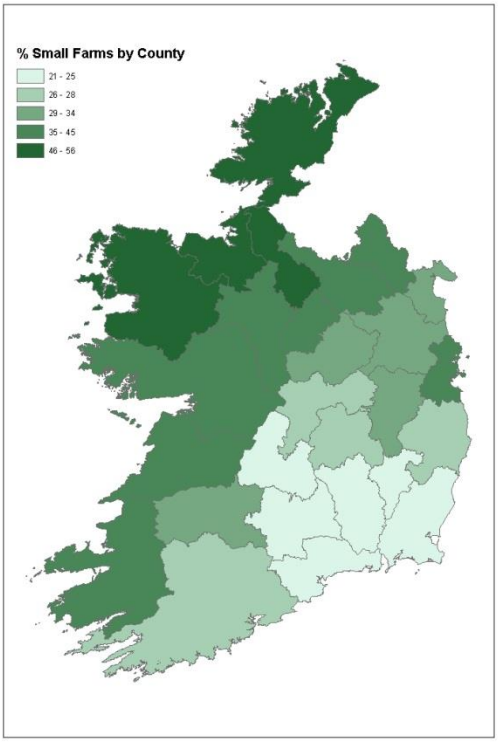
Data were collected on 73 Cattle Rearing farms, 67 Cattle Other (Finishing) farms and 40 Sheep farms in total. Farm classification is based on the EU typology and relates to the type of farming undertaken and the economic size of the farm. As Irish farms are typically mixed in nature the farm is classified based on the dominant enterprise on the farm. The Cattle systems are defined as being either Cattle Rearing or Cattle Other (Finishing). Cattle Rearing farms are those where the majority of standard output is from suckler cows whereas Cattle Other farms are those where the share of output from suckler cows is less than 50%.

Figure 2.1 illustrates (a) the proportion of small farms (less than €8,000 SO) nationally according to the CSO and (b) the counties where data was collected as part of the Teagasc NFS small farms survey.

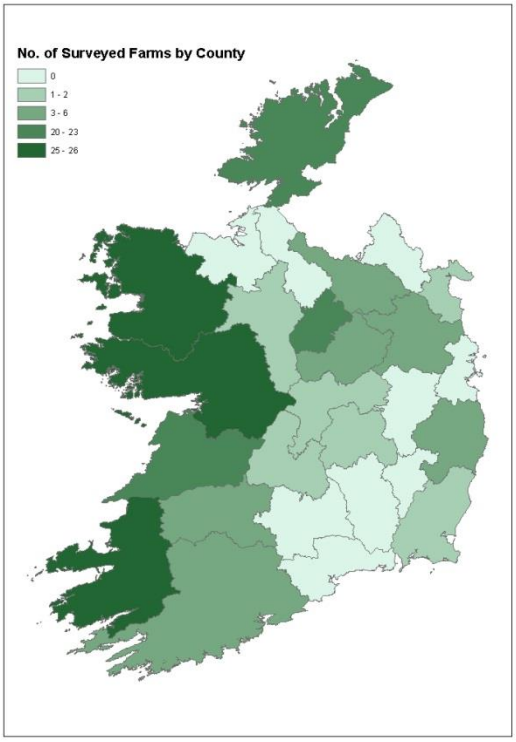
In conjunction with the CSO, national weights were then applied to these farms meaning that the sample is representative of 35,000 cattle and sheep farms nationally. A comparative

analysis of this **Small Farm** subset and the wider Teagasc NFS sample of Cattle and Sheep farms (N = 460), was then undertaken, the results of which follow.

Figure 2.1: (a) Proportion of Irish farms (less than €8,000 SO) by County;
(b) No. of Farms Surveyed by County– Small Farms Survey



Source: CSO



Source: Teagasc NFS

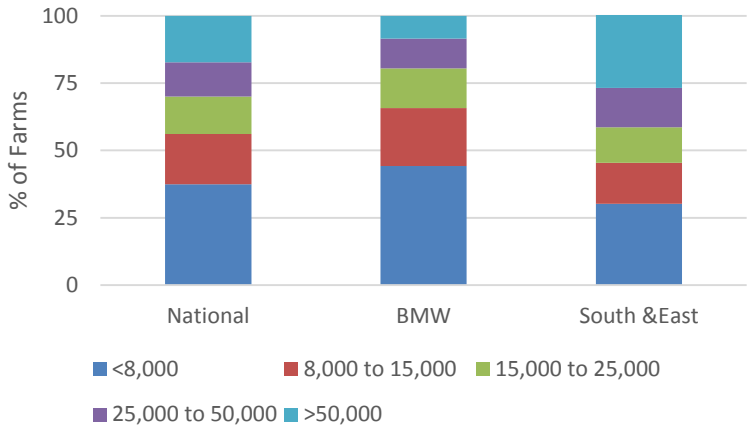
2.2. Profiling Small Farms

According to the 2013 CSO Farm Structures Survey, there were 139,600 farms in Ireland. Almost 30,000 of those are in the less than €4,000 SO category, while a further 23,000 are in the €4,000 to €8,000 SO category. In terms of products produced, €8,000 of SO is equivalent to 6 dairy cows, 6 hectares of wheat or 14 suckler cows. These farms will be referred to hence forth as Small Farms. They represent over one-third of farms in Ireland.

Figure 2.2 shows the percentage of farms in each SO category nationally and in the two main regions of Ireland. Some 44% percent of farms in the BMW region are Small Farms compared to just 30% in the South and East region. The Farm Structures Survey also shows that 61% of Small Farms are Cattle farms, a further 14% are Sheep farms, just 1% are Tillage farms and the remainder are in mixed livestock and crop systems. There are no Dairy farms in the Small Farms category. The estimated total land area operated by Small Farms is 706,000 hectares or 16% of total land area in the country, but the proportion of total

standard output that they account for is just 5%. The average farm size for Small Farms is 14 hectares.

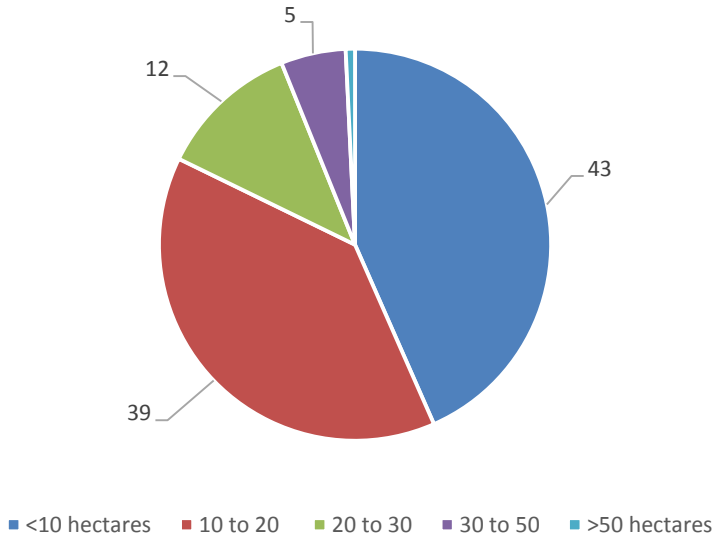
Figure 2.2: Percentage of Farms by Standard Output Nationally and by Region



Source: CSO Farm Structures Survey 2013

Figure 2.3 shows the percentage of Small Farms in the different farm size categories. Of these farms 43% operate a land area of 10 hectares or less, while a further 39% farmed an area of between 10 and 20 hectares. Approximately 3,000 farms are holdings of 30 hectares or more, but are operated on a sufficiently extensive basis to be defined as Small Farms.

Figure 2.3: Percentage of Small Farms by Farm Size in hectares



Source: CSO Farm Structures Survey 2013

As can be seen in Figure 2.4 the age distribution of farmers in the two size groups, Small Farms compared to Larger Farms, is not substantially different. Only 19% of the operators of small farms are less than 45 years of age, compared to 25% in the case of larger farms. One in three operators of the small farms were over 65 years of age compared to 23% of operators of larger farms. This is somewhat surprising as anecdotal evidence often suggests that the majority of Small Farms are operated by older, even pension age, farmers. This is not the case with the Farm Structures Survey indicating that two out of three Small Farms were operated by farmers less than the age of 65.

Figure 2.4: Age Distribution of Farmers with more or less than €8,000 Standard Output

Source: CSO Farm Structures Survey 2013

Just 13 percent of small farms are operated on a full-time basis, i.e. a full annual work unit is employed on the farms. Small farms are typically part-time farms, as 43% of them are operated by half an annual work unit or less as shown in Figure 2.5. Just 38% of operators of small farms state that farming is their sole occupation, while over one-third classify farming as only a subsidiary occupation.

Figure 2.5: Annual Work Units (AWU) on Small Farms

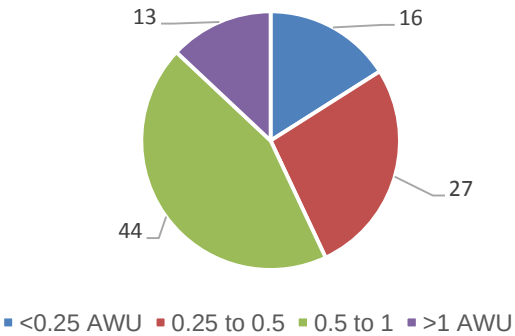
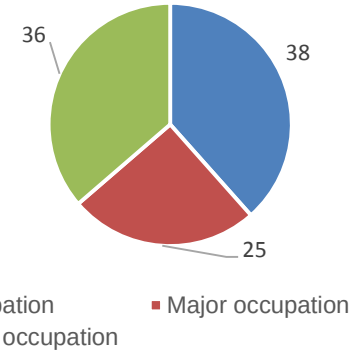


Figure 2.6: Occupation of Operators on Small Farms



Source: CSO Farm Structures Survey 2013

It is difficult to determine the exact quantity of direct payments made to Small Farms as the direct payments are excluded from the standard output definition. However research undertaken by Hanrahan (2014) provides some insight into the situation in 2010. Hanrahan estimated that in 2010 Small Farms were in receipt of 13% of the national envelope of Pillar I payments. This equates to approximately €227 million or €4,300 per farms. Hanrahan estimated that given the convergence model that was agreed in the last Common Agricultural Policy (CAP) reform, i.e. moving payments from farmers with large payments to those with smaller payments would increase the share of Pillar I payments received by small farms to 16.5%.

The following points summarise the profile of Small Farms in Ireland:

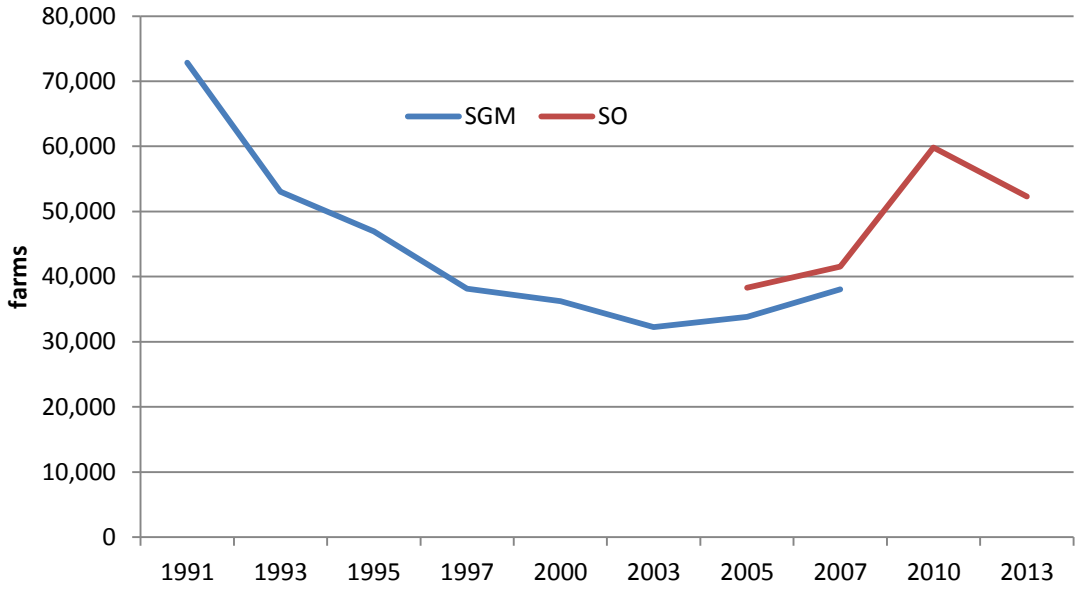
- In 2013 Small Farms accounted for 37 percent of farms nationally, 44% in the BMW region and 30% in the rest of the country;
- Up to 16 percent of the total farm-land area of the country is operated by Small Farms;
- The average land area of Small Farms was 14 hectares in 2013 and 43% of Small Farms had a land area of 10 hectares or less;
- Cattle farming is the predominant enterprise on Small Farms, 61% of them are Cattle Farms;
- The age distribution of Small Farms is not substantially different from larger farms with 33 percent of Small Farms being over 65 years of age compared to 23% of larger farms;
- Just 38 percent of Small Farms describe farming as their main occupation;
- In 2010 Small Farms collectively received €227 million of Pillar I direct payments, 13% of the national envelope, this averaged at €4,300 per farm.

2.3. The Evolution of Small Farms

The definition of what constitutes a Small Farm in this analysis is based on the Standard Output concept, with a small farm defined as farm with less than €8,000 of standard output. The standard output economic size concept has been used by the CSO in the 2010 Census of Agriculture (CSO, 2012) and in the 2013 CSO Farm Structure Surveys (CSO, 2015). In earlier Census of Agriculture and Farm Structure Surveys the Standard Gross Margin economic size concept was used (CSO 2002, 2007, 2008, 1998). Eurostat data on farm structures includes data on Irish farm structures from the Farm Structures Survey and Census of Agriculture from 2005 onwards using the Standard Output and for years up to and including 2007 using Standard Gross Margin. Because there are no available data that

categorise 1991 Census of Agriculture data from using the Standard Output concept it is necessary to make an assumption about an approximate equivalence between small farms defined using Standard Output and Standard Gross Margin. In what follows we define small farms in the 1991 Census of Agriculture as farms with less than 4,000 ESU of SGM, Figure 2.7 illustrates how numbers of farms earning less than 4,000 ESU evolved between 1991 and 2007 and how this number of farms compares with the numbers of farms defined as having a standard output of less than €8,000 of standard output.

Figure 2.7: Number of "Small Farms": 4 ESU (SGM) & €8,000 Standard Output



Source: Eurostat dataset ef_m_farmleg and ef_ov_kvaaesu.

While the number of farms under the two definitions of "Small Farms" are different in 2005 and 2007 the correspondence is quite close and quite consistent. In the discussion that follows comparisons in the evolution of Small Farm numbers are based on this categorisation.

The number of Small Farms declined from 72,830 in 1991 to 52,300 in 2013 according to the CSO Census of Agriculture. This represents an annualised rate of decline of 1.5%. Over the same period 1991-2013 total farm numbers in Ireland declined at an annualised rate of 0.9%, so while there is some difference in the rate of decline it is not very large. While the average land area of Small Farms increased by 27% between 1991 and 2010 from 11 hectares to 14 hectares, this growth lagged the growth in the average Irish farm size over the same period. The average Irish farm in 1991 was 26 hectares and by 2013 this had grown by 36% to 35.5 hectares.

The systems of farming prevalent among small farms have also changed over time. In 1993 there were over 1,300 specialist dairy farms classified as Small farms, representing less than 2.5% of all Small Farms. However by 2010 there were no dairy farms in the Small Farms category. The dominance of Cattle and especially Sheep in the Small Farms category has increased over time.

The age distribution of Small Farmers has also changed substantially over the 20 year period. In 1993 33.2% of Small Famers were aged 45 years or less and by 2013 this percentage had shrunk to 19.3%. Furthermore, 25.5% of farmers were aged 65 years or more in 1991 and this had increased to 33% by 2013.

The most striking change to Small Farms over the twenty year period is the labour requirement on Small Farms. In 1993 48% of Small Farms supported a full-time Annual Work Unit (AWU) by 2013 this number had decreased to less than 13%. This trend is also reflected in the reliance of Small Farmers on farming as an occupation. In 1993 56% of the operators of Small Farms stated that farming was their sole occupation, compared to just 38% in 2013.

In conclusion while the number of farms nationally has declined over the last 20 plus years the rate of decline in small farm numbers has been higher. Like farms in general the size of small farms has increased over time though the rate of growth in size has lagged that of farms in general. Cattle and Sheep farms have dominated the small farm population throughout the period considered; there are no longer any dairy farms that can be classified as small. The age distribution of small farms has changed over the last 20 years with the share of farms with operators of less than 45 years declining and the share of farms with operators with aged 65 years and older increasing. The most dramatic developments are the decline in the proportion of small farms that supported a full-time AWU and in the proportion of farms where farming is considered the sole occupation.

2.4. Policy Context

Ireland joined the EEC in 1973 and since then the main policy governing the development of the farming sector in Ireland has been the CAP. Throughout the 1970s and 1980s the CAP was centred on a productivist policy, whereby farmers were incentivised to increase output through artificially high prices. Farm output and incomes increased throughout the 1970s. Between 1970 and 1978 the average nominal price paid for livestock products increased by 288% (Brady, 1999). The productivist policy setting was most keenly embraced by the dairy sector. In the first eight years of EEC membership, total milk production increased by almost

50 percent, driven by both an increase in cow numbers and productivity per cow (Hennessy and Kinsella, 2013). However much of the analysis of agricultural policy in the 1970s and 1980s points to a sector of two halves, whereby larger farm exploited the new found economic circumstances and expanded production more quickly than smaller farms. Matthews (1982) concluded that the extent to which EEC membership addressed the growing divide in Irish farming was questionable. He surmised that much of the additional support Irish farming received in the 1970s resulted in greater numbers remaining in agriculture, rather than higher per capita farm incomes, and the benefits that did accrue in the form of higher farm incomes, went in the main to larger farms.

In 1980 there were approximately 223,000 farm holdings in Ireland and agriculture was the main sector of employment for over 16 percent of the labour force. By the end of that decade farm numbers had declined to less than 170,000 holdings. Despite the contraction in the sector, the value of gross output from the sector increased and its contribution to exports remained more or less static.

The persistent dichotomy in the farm sector of - low income, vulnerable farms and progressive, high income farms - continued to stimulate debate and academic interest throughout the 1980s. Using Teagasc NFS data, Higgins (1986) examined the distribution of farm income to determine the impact of EEC membership on the income gap between farmers/producers at either end of the scale. The study showed that there was a widening of the absolute and relative income gaps post-EEC membership, with large profitable farms growing faster than their smaller low-income counterparts. He stated that this was not unexpected given that policy supports over this period favoured larger farms. Using Gini coefficients, an accepted measure of income equality in the literature, Higgins presented evidence that farm income distribution became more unequal between 1973 and 1983. The top 20 percent of farm households earned 61 percent of farm income in 1983 compared to 57 percent of income ten years earlier. It should be noted however that the author did warn of the misleading nature of examining farm income in isolation and he supplemented the farm survey with other data sources to arrive at total household income estimates. The study concluded that the failure to close the income gap in farming could be viewed as one of the major deficiencies of the CAP.

The MacSharry reforms, introduced in the early 1990s, were a watershed in European farm policy marking the a reduction of price support in favour of direct income support, or what has widely become known as the “cheque in the post”. Research by Keeney (2000) used Teagasc NFS data to conduct a detailed examination of the impact of direct payments on farm income distribution in Ireland in the 1990s. Keeney found evidence of favourable

movements in the Gini coefficient following the introduction of direct payments, which targeted less well-off farmers. In particular headage was the most egalitarian support scheme, as it accrued mainly to livestock farmers in areas facing natural handicaps to production, those at highest risk of low farm income.

The decoupling reform in the early 2000s broke the link between production and support payments. At the time of decoupling it was expected that many unprofitable and small farms would disengage from production and use their land only to claim the decoupled payment. However this did not transpire and many unprofitable farms continued in production. Following the introduction of decoupling, each farmer's decoupled payment was determined by the level of direct payments received in the 2000, 2001, 2002 period.

The initial proposals in the 2012/2013 reform of the CAP involved shifting decoupled payments to a uniform flat-rate per hectare payment model. The Commission's communication from October 2011 proposed a shift to such a national flat rate payment per hectare in each Member State. This generated considerable controversy in Ireland and in other Member States. Given that Ireland had opted for the historical payment model at the time decoupling was introduced, payments per hectare continued to vary across farms according to the production decisions taken in the reference period. A move to a flat-rate payment model would have led to a significant redistribution of payments between farmers, mostly from more productive to less productive farms, as farmers that were relatively intensively stocked in the 2000-2002 reference period continue to have relatively higher Single Farm Payments per hectare. This proposal probably presented the an opportunity to re-orientate direct support to Small Farms. However, by the end of the political negotiation process, a relatively conservative version of this policy was implemented. In 2010 Small Farms received 13% of the national envelope and it is estimated that by 2019, at the end of the convergence process, using the convergence model chosen by the Irish Government that this share will have increased to over 16% (Hanrahan, 2014).

2.5. Why the concern with Small Farms?

One may ask why we should be concerned with the current circumstances and long-term sustainability of Small Farms. Davidova et al. (2013) state that small and semi-subsistence farms in the EU play a number of socio-economic roles. They maintain rural welfare, keep rural areas populated, contribute to the rural non-farm economy, and provide environmental public goods such as attractive landscapes. Furthermore they assert that the disappearance of small farms often means increased poverty, losses to the rural non-farm economy, and depopulation, especially in remote areas, and might result in environmental loss. They argue

that small farms produce a range of public goods for which, compensation is justified, and the case for support on welfare grounds is strong.

Although Small Farms contribute less than 5 percent of the total output of the agricultural sector in Ireland, they occupy 16 percent of the farmland. The manner in which this land is farmed is of concern to wider society especially where Small Farms are located in sensitive areas. The impact of small scale farming on soil, water and air quality as well as biodiversity is important and these are issues which will be explored further in this report.

Small farms in Ireland received approximately €230 million of Pillar I support from the EU in 2010 (Hanrahan, 2014). It is important to gain an understanding of the characteristics of the farms receiving this support and what they are delivering in return. It is also important to acknowledge that these direct payments are a financial injection into rural economies, which in many cases may otherwise be depressed. A study by Renwick (2013) concluded that each €1 of support in the form of direct payments underpins €4.28 of aggregate output in the economy and €2.37 of GDP. Clearly it is in the best interests of the wider rural economy to protect the value of these payments. These issues will also be explored and discussed in this report.

3. ECONOMIC SUSTAINABILITY

This chapter outlines the economic sustainability of Small Farms. Using data collected through the special Teagasc NFS survey of Small Farms, the details of income on Small Farms is reported relative to larger farms. The analysis also includes data on the reliance on direct payments, other sources of income earned off the farm and the demographic make-up of Small Farms in comparison to their larger counterparts. The economic situation of Small Farms is compared to farms in the regular Teagasc NFS sample (those with a SO of €8,000 or greater) which we refer to here as Larger Farms, although it should be noted that many of the farms in the category termed Larger Farms for the purposes of this report would not be considered as large farms ordinarily, as there is already a wide spread of standard output within the farms surveyed within the Teagasc NFS. Given that all of the Small Farms surveyed were specialist Cattle or Sheep farms, the comparison with Larger farms includes Cattle and Sheep farms only.

3.1. Family Farm Income

Family Farm Income (FFI) is the principal economic measure produced by the Teagasc National Farm Survey. FFI represents the return from farming for the farm family to their labour, land and capital. This measure does not include the non-farm component of farm household income.

Table 3.1 indicates that average family farm income on Small Farms in 2015 was €2,917 or about 20% of the average income on Larger Farms, which was closer to €15,000. Taking account of farm size, it is unsurprising that the average direct payment received on Small Farms was almost one-third of that received on Larger Farms (€5,474 compared to €15,217). However the data indicate that in terms of relative contribution to farm income, such payments are of more significance on small farms.

Table 3.1: Average Family Farm Income
Cattle and Sheep Farms 2015

	Larger Farms	Small Farms
Gross Output	46,235	11,351
(of which direct payments)	15,217	5,474
Total Costs	31,265	8,434
(of which direct costs)	15,112	3,304
(of which overheads)	16,153	5,131
Family Farm Income	**14,970**	**2,917**

Source: Teagasc National Farm Survey

The average utilised land area of Small Farms was 14 hectares in 2015, compared to 40 hectares on the Larger Farms. Given differences in scale, it is useful to illustrate these metrics on a per hectare basis as in Table 3.2. Larger farms do not only have a larger land area, but they are also more productive, producing 42% more output per hectare than the Small Farms. The level of direct payments per hectare is very similar, but Larger Farms are more efficient with costs consuming 68% of output on Larger Farms compared to 74% of output on Small Farms. This seems to be driven by the relatively high overhead costs on the Small Farms. There is a very significant income differential of €163 per hectare between the two groups, with Larger Farms producing an income per hectare 80% higher than Small Farms.

Table 3.2: Average Family Farm Income per hectare Cattle and Sheep Farms 2015

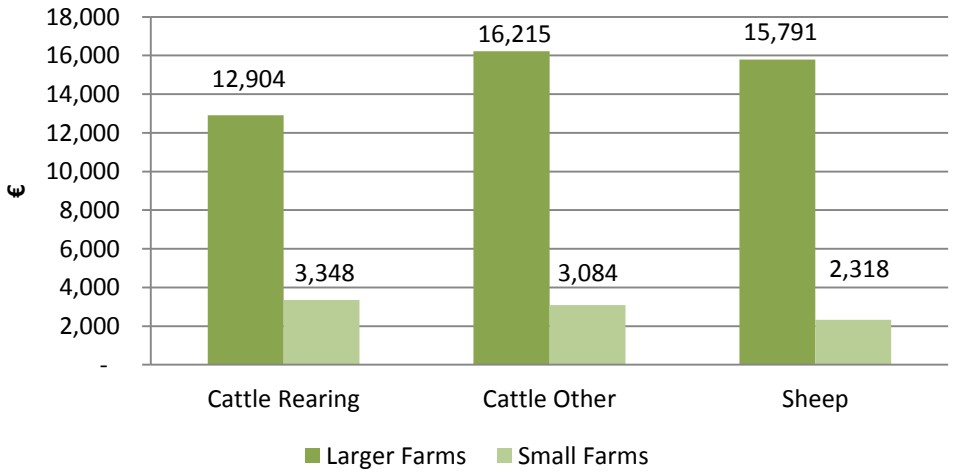
	Larger Farms	Small Farms
Gross Output	1,137	801
(of which direct payments)	373	387
Total Costs	769	596
(of which direct costs)	371	233
(of which overheads)	398	363
Family Farm Income	**368**	**205**

Source: Teagasc National Farm Survey

3.2. Income by Farm System

The variation in farm income across farm systems is well recognised, with higher income levels generally reported across dairy and tillage farms compared to cattle and sheep. That said, the focus of this analysis is solely on cattle and sheep farms and the income differential between the small farm cohort and the larger (cattle and sheep) farms is quite sizeable. This is reflected in Figure 2.1, where the average farm income across the three farm systems can be seen to be substantially lower on the Small Farms. Farm income on the smaller Cattle Rearing farms was about 25% of that on their larger counterparts at €3,348 and €12,904 respectively. The difference was even more marked on Cattle Other farms, where the average income on the Larger Farms at €16,215 was more than five times that of the Small Farms (€3,084). Smaller Sheep farms performed worst with the income differential almost seven-fold on average, at €2,318 compared to €15,791 on larger farms.

Figure 3.1: Average Family Farm Income by Farm System 2015



Source: Teagasc National Farm Survey

It is clear that farm size is the key difference here, as larger cattle farms (on a standard output basis) are also more than twice as large in terms of farm size (utilisable agricultural area UAA). Similarly, larger sheep farms have a UAA almost four times that of the smaller grouping. However, in addition to having a smaller utilisable area, small farms are also less profitable on a per hectare basis (Table 3.3). The difference in profitability per hectare is greatest on Cattle Other farms, with the profit per hectare only slightly more than half the rate earned on the larger farms.

Table 3.3: Average Farm Size and Income per hectare – Cattle and Sheep Farms 2015

	Larger Farms			Small Farms		
	Cattle Rearing	Cattle Other	Sheep	Cattle Rearing	Cattle Other	Sheep
Farm Size (ha)	36	38	50	16	14	13
Gross Output	1,121	1,306	985	805	897	700
Direct Payments	369	407	342	374	405	383
Total Costs	760	880	668	589	672	525
Direct Costs	346	440	326	236	281	182
Overhead Costs	414	439	341	354	391	343
Family Farm Income	**361**	**427**	**317**	**216**	**225**	**175**

Source: Teagasc National Farm Survey

Average income per hectare on the larger Cattle Rearing farms is 1.7 times that of the Small Farms and the differential across Sheep farms is 1.8. The difference in farm income across systems on a per hectare basis is insightful and it is interesting to note that small sheep farms are earning almost half of that of larger farms despite being significantly smaller. The higher level of direct payments on these farms (€383 and €342) serves as an explanation for this. The level of direct payments on Cattle farms across two groups is broadly similar.

The source of the differences in profitability can be explained by examining productivity and efficiency of both groups (Table 3.4). To this end, gross output per hectare and per labour unit is reflective of the relative productivity of farms. Gross output per hectare on Cattle Rearing farms was on average €1,121 or 1.4 times higher on the Larger farms compared to the Small farms (€805). The differential on Cattle Other farms was of a similar magnitude at €1,306 and €897 respectively. Similarly on Sheep farms there was a noticeable difference with figures of €985 and €700. Despite the lower labour contribution on Small Farms (approximately half a labour unit) gross output per labour unit is substantially lower on those farms. This is particularly the case on Sheep farms where the figure is less than half that of the wider Teagasc NFS group (€19,843 and €42,282 respectively).

Table 3.4: Productivity and Efficiency metrics – Cattle and Sheep Farms 2015

	Larger Farms			Small Farms		
	Cattle Rearing	Cattle Other	Sheep	Cattle Rearing	Cattle Other	Sheep
Gross Output per hectare €	1,121	1,306	985	805	897	700
Gross Output per labour unit €	40,019	47,274	42,282	23,750	26,375	19,843
Direct costs as a % of output	0.31	0.34	0.33	0.29	0.31	0.26
Overhead costs as a % of output	0.37	0.34	0.35	0.44	0.44	0.49
Market Income per hectare €	-7	19	-25	-158	-180	-208

Source: Teagasc National Farm Survey

It is interesting to note that despite the differential in gross output across the sectors between both groups of farms, costs are relatively high on the smaller farms. The relative efficiency of both groups is reflected in their costs as a percentage of output. Although direct costs as a percentage of output on the smaller farms is on average lower on the small farms (29%) versus 33% on the wider Teagasc NFS farms, overhead costs as a percentage of output are much higher on the smaller farms at 46% as opposed to 35% on the larger farms. The data on market income per hectare are interesting. Larger Farms manage to break even

or just about turn a market profit, i.e. when all direct payments are discounted. However, on a per hectare basis Small Farms make relatively substantial losses in their market income.

Labour input on both farm groups across the three systems is contained in Table 3.5. Total labour is inclusive of hired paid labour and there is some evidence of this on the larger farms. Typically the Small Farms employ half of a labour unit.

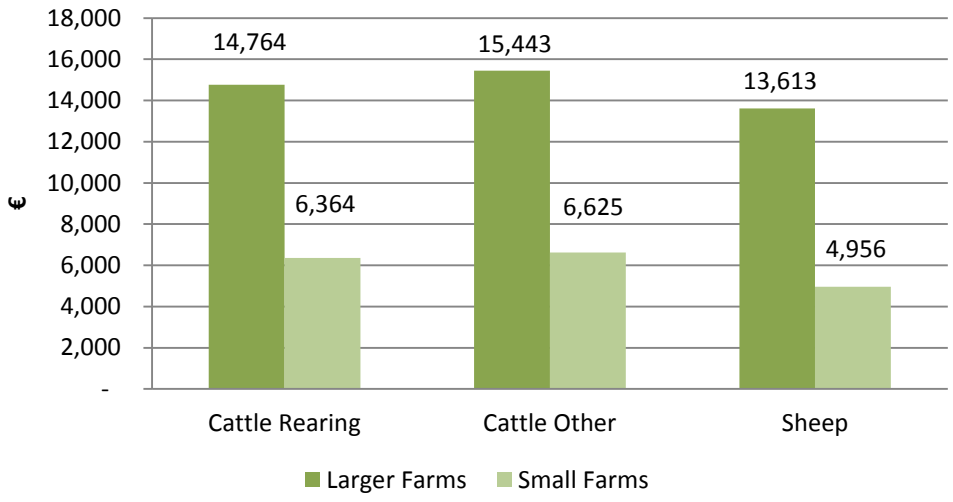
Table 3.5: No. of Units of Labour Input on Cattle & Sheep Farms 2015

	Larger Farms			Small Farms		
	Cattle Rearing	Cattle Other	Sheep	Cattle Rearing	Cattle Other	Sheep
Family	0.98	1.02	1.12	0.53	0.46	0.46
Total	1.00	1.05	1.16	0.53	0.47	0.47

Source: Teagasc National Farm Survey

The lower labour input required on Smaller Farms is reflected when income distribution per labour unit is considered. Figure 3.2 illustrates the smaller differential in income between Small and Larger farms when it is displayed on that basis. However at less than €6,000 per labour unit, the income on Small Farms is still extremely low.

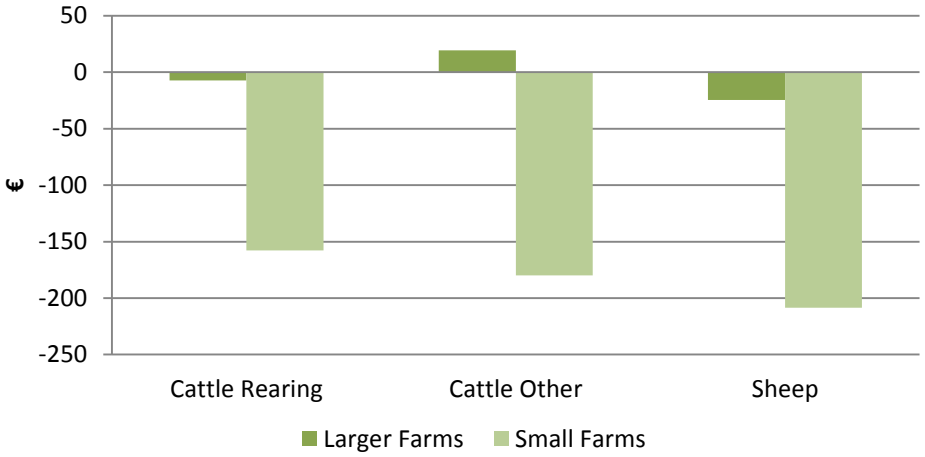
Figure 3.2: Income per labour unit by Farm System



Source: Teagasc National Farm Survey

Finally, Figure 3.3 shows the average market income by system in 2015. Small Farms on average report a negative market income. When the larger farms are considered the losses are less marked but remain negative for Cattle Rearing farms and more so for Sheep farms with cattle other farms returning a positive market income, albeit of only €19 per hectare on average in 2015.

Figure 3.3: Market Income per hectare – Cattle and Sheep Farms 2015

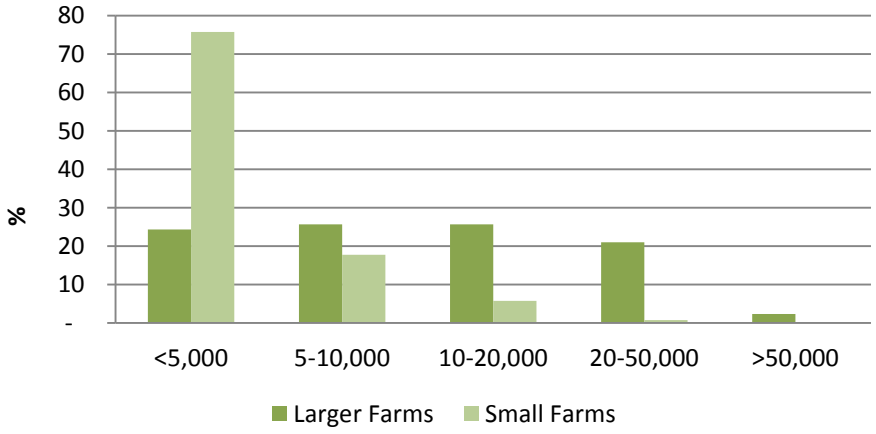


Source: Teagasc National Farm Survey

3.3. Income Distribution

The family farm income distribution on Small and Large Farms is displayed in Figure 3.4.

Figure 3.4: Farm Income Distribution – Cattle and Sheep Farms 2015



Source: Teagasc National Farm Survey

As can be seen, 76% of the small farms earned an average farm income of €5,000 or less in 2015. The equivalent figure on the Larger farms was 24% in 2015. A further 18% of small farms earned between €5,000 and €10,000, with only 6% earning more than this. Conversely, almost half of the larger farms earned more than €10,000, with 23% earning more than €20,000 on average.

3.4. Reliance on Direct Payments

Total direct payments received per farm were as expected lower on the Small Farms, however, in terms of their overall contribution to income they are significantly higher. This is set out in Table 3.6. For the Larger Farms direct payments were equivalent to approximately 100% of farm income on average in 2015. The contribution of direct payments on Small Farms was approximately twice that, with Sheep farms reporting the highest figure on a per farm basis as shown in Table 3.6. Across the two groupings the highest level of direct payments per hectare was received on Cattle Other farms.

Table 3.6: Value of direct payments and contribution to income 2015

	2015 Larger Farms			2015 Small Farms		
	Direct Payments	Per ha	Contribution to Income	Direct Payments	Per ha	Contribution to Income
	€		%	€		%
Cattle Rearing	13,158	369	102	5,796	374	173
Cattle Other	15,478	407	95	5,543	405	180
Sheep	17,016	342	108	5,082	383	219

Source: Teagasc National Farm Survey

The composition of direct payments across Small and Larger Cattle and Sheep farms also differs (Figure 3.5; Figure 3.6) with the basic payment scheme (single farm payment) accounting for 72% of overall income across Larger Farms compared to 50% on the Small Farms.

Figure 3.5: Composition of Direct Payments - Larger Farms

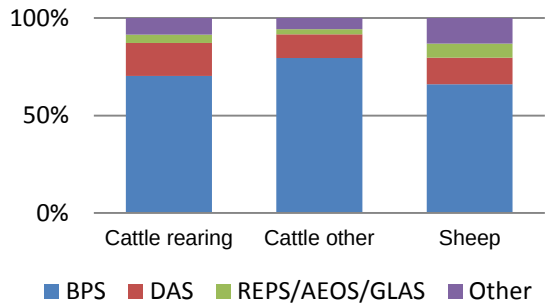
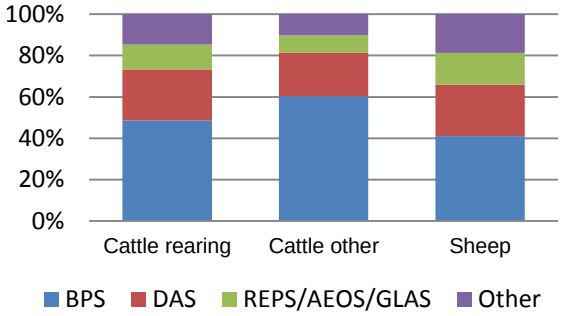


Figure 3.6: Composition of Direct Payments - Small Farms



When the individual farm systems are taken into consideration the figure was highest on cattle fattening farms (79%) and lowest on sheep farms (66%). A similar ordering was found across the small farms on average. The presence of agri-environmental scheme payments and monies paid under the disadvantaged area scheme serve as an explanation for this. Disadvantaged area scheme payments in particular comprise a much larger proportion of total direct payments on Small Farms.

3.5. Demographics

The poorer demographic situation on Small Farms is reflected in Table 3.7 which indicates that on average such farmers are older (average aged 59) than their larger counterparts (average aged 55). In terms of marital status, a much larger proportion of farmers on Larger Farms were married (70%) compared to 60% on Small Farms. Household size was marginally bigger on the Larger Farms. The proportion of households with members in younger age categories was significantly higher on larger farms. For small farm 32 percent of operators were aged 65 years or older, compared to 25% in the case of Larger Farms. Twenty eight percent of all Small Farms were single person households compared to 18% of Larger Farms.

Fig. 3.7: Demographic Data – Cattle and Sheep Farms 2015

	Larger Farms	Small Farms
Farmer Age	55	59
Married (%)	70	60
Single (%)	23	28
Widowed (%)	3	8
Separated (%)	3	3
Household Size	2.7	2.4
Household with members aged <24 years (%)	35	12
Household with members aged <24-44 years (%)	28	10
Single Person Household (%)	18	28
Farmer aged 65 or over (%)	25	32

Source: Teagasc National Farm Survey

Given the extremely low levels of farm income, it is not surprising that a large proportion of Small Farms have some alternative income source. The data indicates that in 2015 88% of small farms and 77% of larger farms were in receipt of an off-farm income source (Table 3.8). This relates to either an off-farm job/pension or social welfare payment for the farmer and/or spouse. In terms of the sources of that income, a higher proportion of small farm households are in receipt of pensions given the slightly older age profile of those farms.

Similarly, social welfare payments were more prevalent on those farms in 2015. Nevertheless 12% of Small Farms do not have a non-farm income source and given the very low farm income levels, one has to question the sustainability of this group.

Table 3.8: Proportion of Farms with off-farm income 2015

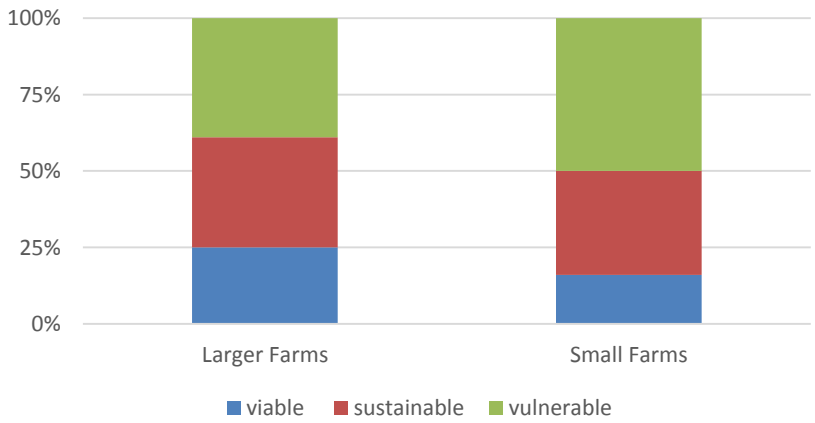
Farmer/Spouse	Off-Farm Job	Pension	Unemployment/ Farm Assist	Job/Pension/Social Assistance
Small Farms	45%	39%	20%	88%
Larger Farms	50%	26%	8%	77%

Source: Teagasc National Farm Survey

3.6. Viability Analysis

Finally, an overview of the economic viability of farms is contained in Figure 3.7. Based on the work of Frawley and Commins (1996), a farm is defined as being economically viable if it can (a) remunerate family labour at the average agricultural wage, and (b) provide a 5 per cent return on non-land assets. Two further categories exist, i.e. farms deemed 'sustainable' (not economically viable based on farm income alone, but due to the presence of another income earned from an off-farm job). The final group is deemed vulnerable if the farm is not viable and there is no off-farm income present in the household.

Figure 3.7: Viability Analysis of Small and Larger Farms



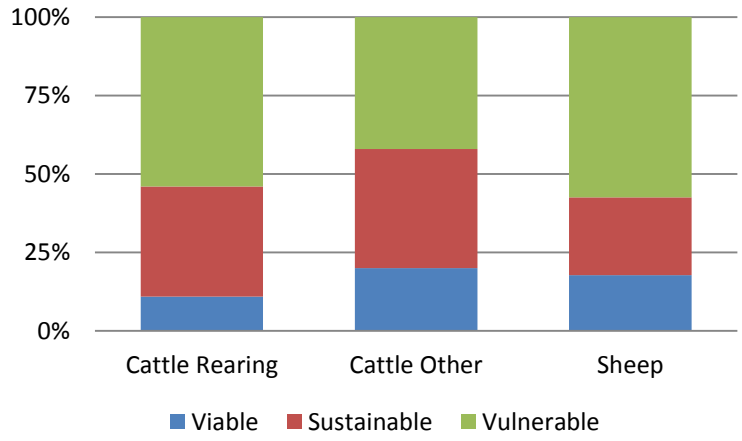
Source: Teagasc National Farm Survey

Clearly, the economic situation on Small Farms is more worrying than on their larger counterparts, with only 16% classed as viable in 2015 compared to 25% for the wider Teagasc NFS group. Of course, it should be added that this figure in itself is low. A similar proportion of farms across the two groups (approximately one-third) can be defined as

sustainable. However, the proportion of Small Farms classified as vulnerable is extremely high at 50%. In other words half of all Small Farms are not economically viable businesses and neither the farmer nor the spouse works off the farm.

Figure 3.8 presents the viability analysis of Small Farms on a farm system basis. Interestingly, across systems sheep farms are the largest vulnerable group amongst small farms (58%). A further 25% were termed sustainable (viable only with the presence of an off-farm household income). Just 18% of small sheep farms were classed as viable. From a farm business perspective, Small Cattle Rearing Farms performed the poorest, with just 11% of them being operated as economically viable businesses.

Figure 3.8: Viability of Small Farms by Farm System



Source: Teagasc National Farm Survey

3.7. Summary and Conclusions

The following points summarise the main results on the economic sustainability of Small Farms in Ireland;

- The average Small Farm is 14 hectares in size. Average Family Farm Income on Small Farms was just €2,917 in 2015. Three quarters of Small Farms earned a Family Farm Income of less than €5,000 in 2015.
- The average Small Farm employs less than half a labour unit. The average income per full-time labour unit equivalent was €6,238 in 2015.
- Small Farms are less productive than Larger Farms. On a per hectare basis gross output on Small Farms was on average €800, 30% less than the average for Larger Farms. On a per labour unit basis, average gross output on Small Sheep Farms is less than half of that on Larger Sheep Farms.

- Small Farms are also less efficient, with total costs consuming 74% of output compared to 68% on Larger Farms. This is mostly driven by overhead costs, which are high on Small Farms relative to the output level.
- Depending on the Farm System, the share of direct payments range between 173% and 219% of income on Small Farms.
- On small farms, 32 percent of operators were aged 65 years or older compared to 25% on Larger Farms. For Small Farms, 28% were single person households, compared to 23% on Larger Farms.
- In 2015 88% of small farms were in receipt of an off-farm income source, either an off-farm job/pension or social welfare payment.
- The proportion of Small Farms classified as vulnerable is extremely high at 50%, i.e. half of all Small Farms are not economically viable businesses and neither the farmer nor the spouse works off the farm.

4. SOCIAL SUSTAINABILITY

Social sustainability is commonly accepted as one of the major pillars of the concept of sustainability, along with economic and environmental sustainability. Social sustainability has been defined by Black (2004) as "the extent to which social values, social identities, social relationships and social institutions can continue into the future". As such studies of the social sustainability of farming have included issues such as measures of the quality of life on farms, including health and safety indicators, measures of the likelihood of farm succession, sectoral resilience and demographic change (ageing, migration, mobility), measures of educational participation and employment creation and risk or isolation and access to services. In addition to collecting economic data on Small Farms, the Teagasc NFS also collected data on social issues around quality of life, access to services and so forth. These data are discussed in this chapter.

4.1. Risk of Isolation

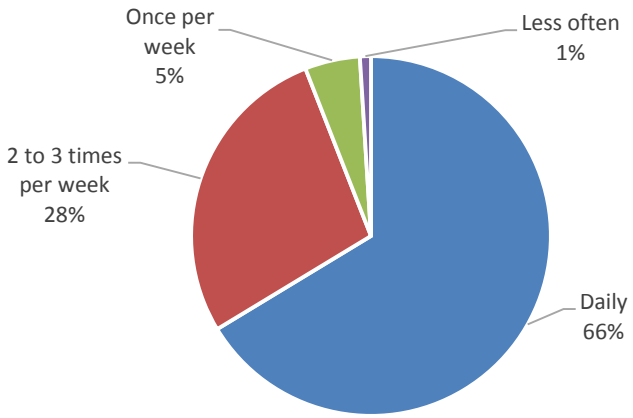
As discussed earlier just over one in four Small Farms are single person households. Single person households located in rural areas are at considerable risk of isolation. Furthermore, single person households are also at greater risk of poverty, with 45% of such households falling below the 60% poverty threshold established by the EU Survey on Income and Living Conditions (EU-SILC). In order to gain a better understanding of the risk of isolation for Small Farms, we asked participants in the survey about how often they have contact with others outside of their household.

As can be seen from Figure 4.1, the risk of isolation is not as great as may have been expected. Two-thirds of operators of Small Farms state that they have daily contact with persons outside of their household. Only 1% of farmers go more than a week without contact with someone outside of their household. The internet and social media in particular is regularly referenced as a means of connecting people, reducing isolation and reducing the impact of rurality. For this reason, we asked participants in the survey about their access to the internet and their main reason for using the internet. Results showed that 59% of farmers had internet access and somewhat surprisingly, 61% of those that had the internet used it for social purposes such as Facebook, Skype etc. However access to and use of the internet was very age dependent. Just 28% of farmers over the age of 60 had access to the internet and only 7% of those with access used it for social purposes.

Farmers' were also surveyed about their sense of security in their homes. Given the widespread media coverage of rural crime and people feeling fearful in their home, it is

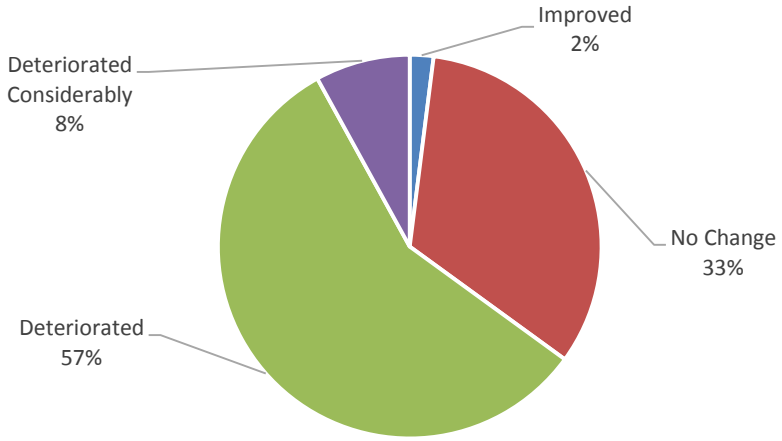
interesting to see how farmers' perceive their own situations. In response to the question *"how do you feel your sense of security in your home has changed in the last 5 years?"* 57% of farmers responded that it had deteriorated, with 8% saying it had deteriorated considerably. While 33% felt that there had been no change in their sense of security.

Figure 4.1: Frequency of Contact with Persons Outside of the Household



Source: Teagasc National Farm Survey

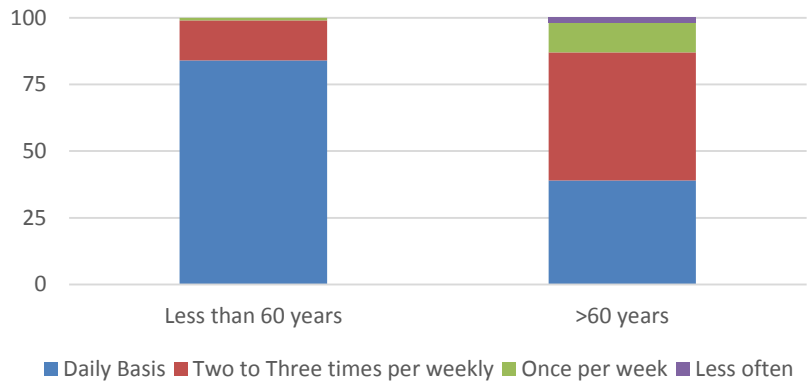
Figure 4.2: Sense of Security at Home: Change over last 5 years



Source: Teagasc National Farm Survey

It is interesting to consider the risk of isolation in conjunction with age. As can be seen, the risk of isolation increases with age as far fewer farmers aged 60 years or over have daily contact with persons outside of their household. Among older farmers 13% of those aged 60 or over have contact with people outside of their household once per week or less compared to just 1 percent of younger farmers.

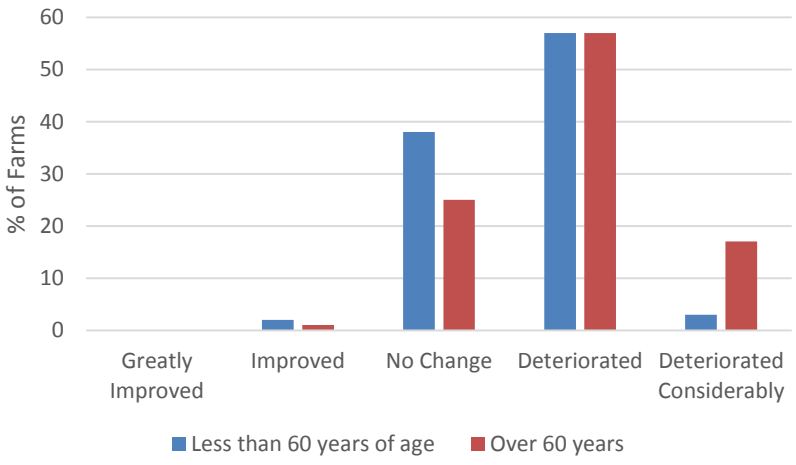
Figure 4.3: Frequency of Contact with Persons Outside of Household by age Group



Source: Teagasc National Farm Survey

Similarly, farmers' perceived sense of security in their home is also negatively correlated with age. A greater proportion of older farmers report a deterioration in their sense of security in their homes. For example, see Figure 4.4, 3% of younger farmers reported that their sense of security had deteriorated considerably in the last 5 years, compared to 17% of older farmers.

Figure 4.4: Sense of Security at Home: Change over last 5 years by Age Group



4.2. Access to Services

Another dimension of social sustainability is the quality of life in rural areas. There has been significant media coverage in recent years about access to amenities in rural areas, in particular with the closure of post offices, Garda stations. In order to gain a better understanding of the extent to which farmers feel exposed to such changes, and how that impacts on their risk of isolation, we asked participants in the survey about their access to services and amenities. Farmers were asked to describe their access to an array of services in their local area. The results of this question are presented in Table 4.1.

Table 4.1: Access to Services - Small Farms 2015

Which of the following best describes your household's ability to access (get to)?	Great difficulty	Some difficulty	Easily	Very Easily
	%	*%*	*%*	*%*
Post Office	0	17	61	22
Garda Station	6	40	41	13
Bank	5	33	51	11
Social Amenity (e.g. clubhouse, pub)	0	9	73	17
Public Transport	13	42	36	9
Medical Services	1	37	52	10

Source: Teagasc National Farm Survey

In terms of difficulties encountered with access to services, public transport is deemed to be worst with over half of Small Farm operators finding some or great difficulty in access. Only 9% reported very easy access to public transport. Access to services such as Garda stations, banks and post offices was not as poor as anticipated, although there may be a regional effect here and the data cannot be interpreted as being nationally representative of the level of public service provision in rural areas. Overall, 83% of respondents stated that they had easy or very easy access to a post office. The equivalent figure for banking services was 62%. Although 46% reported difficulties in accessing a Garda station, more than half of respondents do not report this as being an issue. This is somewhat surprising given that two-thirds of farmers stated that their sense of security had deteriorated in the last five years. Access to medical services was also reported as being relatively satisfactory (62%). The vast majority of small farm households indicated that they were within easy access of a social amenity (e.g. clubhouse, pub).

In addition, respondents were asked to describe how access to such services had changed over the past five years. The vast majority of respondents reported no change over the

period for social amenities. Approximately 40% declared deterioration in relation to Garda stations, medical services and banks. Interestingly, 96% report no change in their level of access to social amenities, which is surprising given widespread reporting of the demise of the rural pub and problems of access due to drink driving laws. Of those surveyed, 80% report no change with regard to public transport, but that is not to say that access is satisfactory.

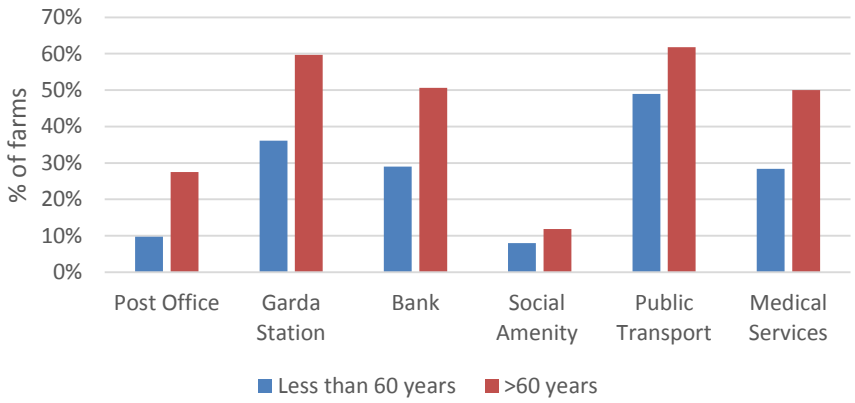
Table 4.2: Change in access to services over past 5 years?

Has your access to these amenities in the last 5 years?	Greatly Improved	Improved	No Change	Deteriorated	Deteriorated considerably
Post Office	0	0	84	13	0
Garda Station	0	1	56	37	3
Bank	0	0	66	34	2
Social Amenity (e.g. clubhouse, pub)	1	1	96	3	0
Public Transport	0	7	80	13	0
Medical Services	0	2	62	36	1

Source: Teagasc National Farm Survey

Again it is interesting to consider how a farmer's age may impact on access to services. Figure 4.5 presents the percentage of farmers that cited having some difficulty or great difficulty in accessing services disaggregated by age group. Across all of the services examined, farmers over the age of 60 years were more likely to have difficulty with access. Access to a Garda station and medical services display the greatest differences by age group.

Figure 4.5: Percentage of Farmers with Difficulty Accessing Services by Age Group



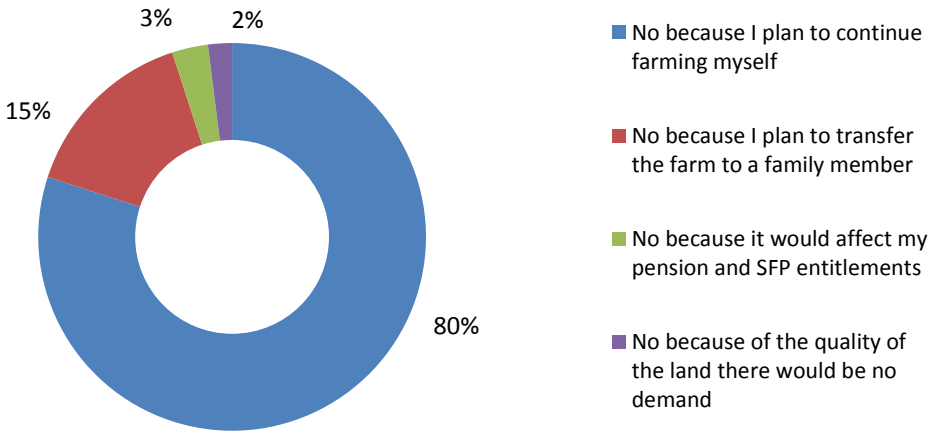
Source: Teagasc National Farm Survey

4.3. Future Farming Plans

The very difficult economic situation on Small Farms was discussed in Chapter 3. Given that half of all Small Farms are in an economically vulnerable position, - the farm business is not viable and neither the farmers nor the spouse work off farm, - it is interesting to consider what their longer terms plans are for their farms and their households. It was in this context that we put a number of questions to farmers about their future. For example we asked farmers that were not currently employed off the farm whether they were seeking off-farm employment. In 55% of Small Farm households neither the farmer nor the spouse is working off the farm. Despite this, just 7% of farmers report that they are seeking employment (high age profile and the proportion in receipt of pensions is a factor here). They cite the main barrier to finding work to be the lack of job opportunities in the local area.

Farmers were also questioned about their future plans for their farm as illustrated in Figure 4.6. Given the low level of profitability and the relatively high incidence of economic vulnerability, it was felt that operators of Small Farms may be considering some alternative future strategies. Farmers were asked if they considered leasing their land. Surprisingly, only 15% of farmers would consider leasing out their land, while only 4% would consider planting forestry within the next 3 years. Farmers were asked why they would not consider leasing out their land and an overwhelming majority reported that they would continue farming the land themselves.

Figure 4.6: Reasons for Not Leasing Land



Source: Teagasc National Farm Survey

4.4. Summary and Conclusions

The following points summarise the main results on the social sustainability of Small Farms in Ireland;

- Despite one in four operators of Small Farmers living alone, there does not seem to be a serious risk of isolation with the majority of farmers meeting persons outside of their household on a daily basis.
- Risk of isolation increases with age, just 39% of farmers over the age of 60 meet people outside of their household on a daily basis, compared to 84% of younger farmers.
- Almost two-thirds of farmers report a deterioration in their sense of security in their home in the last 5 years. This figure increases to three-quarters for farmers over 60 years of age.
- The majority of farmers report relatively easy access to post offices, Garda stations, social amenities and medical services, but over half report limited access to public transport. However, access to services does decline with age, as older farmers report greater difficulties with access than younger farmers.
- The majority of farmers report no change in their access to services over the last five years, with the exception of Garda stations and banks, with 40% reporting a deterioration in both facilities.
- Despite the low levels of profitability and high incidence of economic vulnerability, 85% of operators of Small Farms plan to continue farming and only 7% of them are seeking employment off the farm although many have pensions and other social welfare payments.

5. ENVIRONMENTAL SUSTAINABILITY

The other major pillar of sustainability is environmental sustainability. It is increasingly important to be able to demonstrate the environmental impacts of farming, as a result of consumer demand for environmental sustainability, and the prominence of agriculture in national environmental policy. As part of this survey we focus on two key environmental topics on Small Farms: agricultural greenhouse gas emissions and farm nutrient balances.

5.1. Nutrient Balances

Farm-gate nutrient balances are calculated by subtracting the nitrogen (N) and phosphorus (P) contained in all agricultural outputs (e.g. livestock and livestock products sold) from all farm inputs (e.g. fertilisers, animal imports and purchased feed). This provides us with an estimate of the nutrient surpluses applied to each farm. High nutrient balances can indicate a risk of losses to water bodies, while very low nutrient values (near 0) can indicate a risk of degrading soil quality.

As shown in Figure 5.1, Small Farms generally had lower nitrogen balances on a per hectare basis, especially on sheep farms, indicating a lower risk of nitrogen pollution to local water bodies. This is a result of more extensive management on smaller farms, especially smaller sheep farms, with lower nitrogen fertiliser application rates per hectare and lower stocking rates. Figure 5.2 demonstrates that farm phosphorus balances were similar between the smaller farms and the regular Teagasc NFS survey.

Figure 5.1: Nitrogen balance

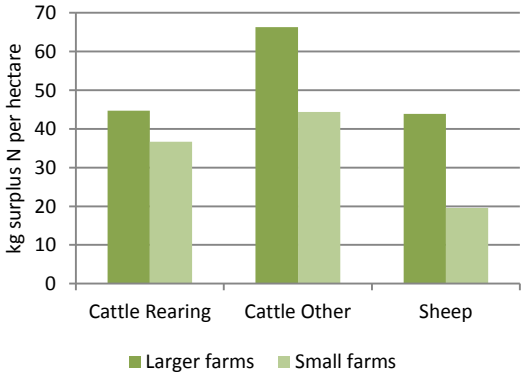
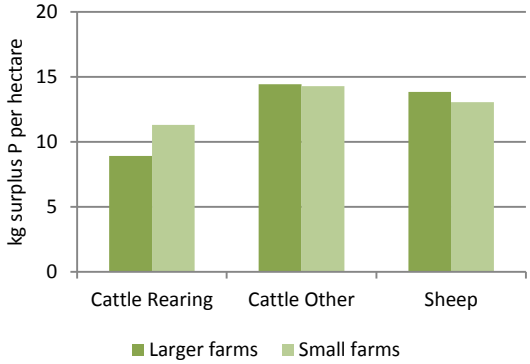


Figure 5.2: Phosphorus balance



Source: Teagasc National Farm Survey

Expressing the nutrient balances on a per unit liveweight basis shows how much animal weight gain is achieved for each kilogram of surplus nitrogen or phosphorus, and hence gives an indication of the efficiency of nutrient imports. As shown in Figure 5.3 for nitrogen and Figure 5.4 for phosphorus, the results show that smaller farms achieve greater animal

weight gains for the quantity of excess nutrients applied, despite having lower outputs per hectare, as discussed in chapter 3.

Figure 5.3: Nitrogen balance

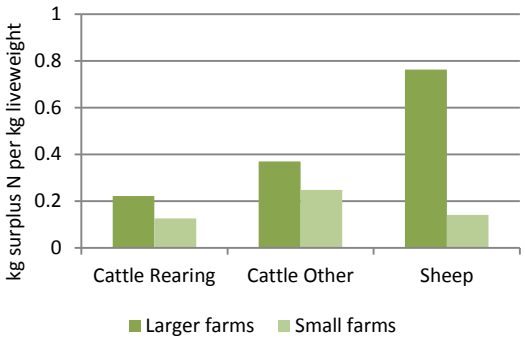
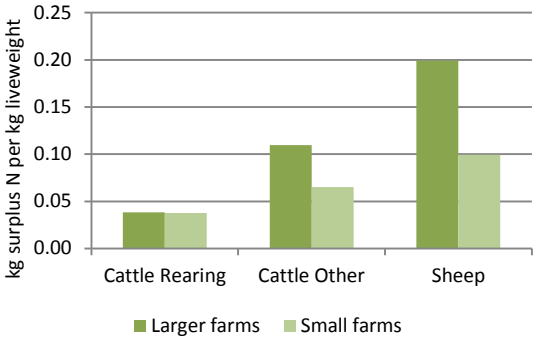


Figure 5.4: Phosphorus balance



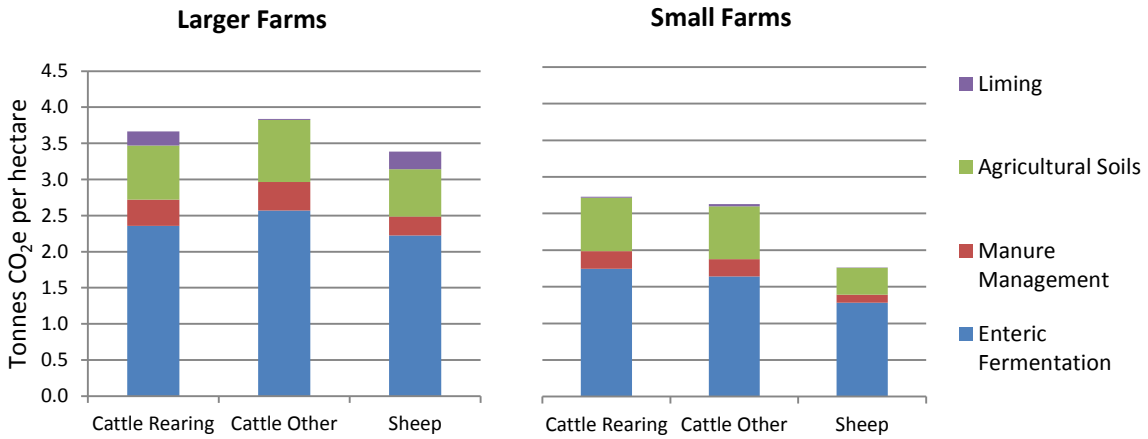
Source: Teagasc National Farm Survey

This is because the small farms are generally low input, grass fed systems, with lower N and P imported in animal feeds and lower fertiliser applications than larger farms.

5.2. Greenhouse gas emissions

Farm-level agricultural greenhouse gas (GHG) emissions were calculated using IPCC (Intergovernmental Panel on Climate Change) methodologies, as employed in the Irish National Inventory Report. Key farm structural and management details, such as livestock number and age and fertiliser applications, are multiplied by relevant coefficients to estimate agricultural greenhouse gas emissions. These GHG accounting methods reflect the current policy issues in relation to Irish agriculture and national emissions reductions targets. As shown in Figure 5.5, Small Farms tended to have lower greenhouse gas emissions per unit area, for all systems.

Figure 5.5: Agricultural Greenhouse Gas Emissions per hectare

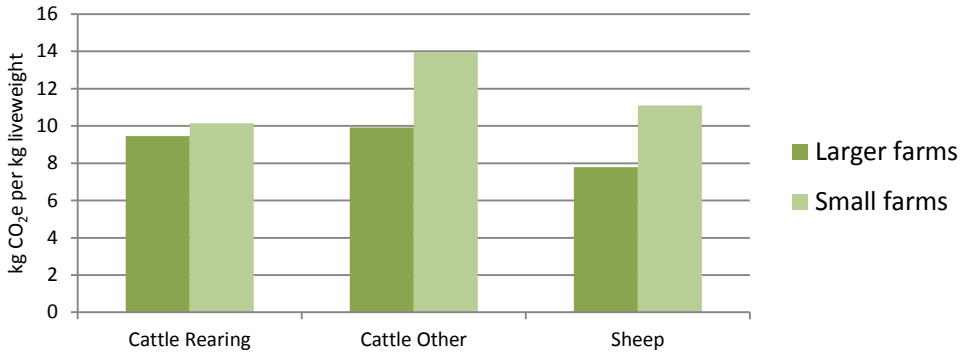


Source: Teagasc National Farm Survey

This is a result of small farms generally having low stocking rates, leading to low per hectare emissions from enteric fermentation and animal manures. These farms are managed more extensively, with lower fertiliser and lime applications.

However, when expressed per unit of animal liveweight produced, as shown in Figure 5.6, small farms are relatively less emissions efficient, with greater emissions per unit of output. This is largely as a result of slower animal weight gain and longer animal lifespans on smaller farms. It should be noted, however, that the GHG accounting methods employed here do not include emissions from off-farm imports ('embedded emissions' in purchased fertilisers and animal feeds), which are generally higher on more intensive farms.

Fig. 5.6. Agricultural GHG emissions per kg liveweight



Source: Teagasc National Farm Survey

5.3. Biodiversity

Biodiversity, the variety of animal and plant life in a habitat, is generally considered an important aspect of sustainability. The impact of farming production systems on the presence of biodiversity is generally considered important. The measurement of biodiversity is a key component of any assessment of environmental sustainability. Ideally measurements of habitat area and diversity would have been included in this study to represent a measure of farmland biodiversity on Small Farms. However, collecting such data remains notoriously difficult and labour intensive. Furthermore, there is no standardised methodology for aggregation and weighting of farmland biodiversity data.

Given the small scale and relatively extensive nature of Small Farms, one would expect that they may play an important role in protecting and promoting biodiversity. Given that no new data was collected on these Small Farms in relation to biodiversity, it is not possible to answer this question definitively. However, previous studies may provide some insight. Following a review of the literature, Cooper et al. (2009) conclude that is it not the farm size that impacts on the provision of public goods in general but more the farm production

practices and the farmers' attitudes. They found that low intensity grazing systems tended to be "best" providers of public goods.

Davidova et al. (2009) tried to quantify the relationship between biodiversity on the one hand, and farm size and market integration on the other, using a detailed survey of 557 agricultural households conducted in Bulgaria, Poland and Romania. They report a negative relationship between biodiversity and market integration, i.e. as the proportion of output on the farm is sold on the market increases the biodiversity falls. However they found no significant relationship between farm size and biodiversity, therefore they could not conclude that small farms offer more or better environmental public goods than larger holdings.

5.4. Summary and Conclusions

The following points summarise the main results on the environmental sustainability of Small Farms in Ireland;

- Nitrogen and Phosphorous balances (when expressed on a per hectare basis) are lower on Small Farms than Larger Farms.
- When the nutrient balances are expressed on a kilogram of liveweight basis, the results show Small Farms achieve more animal growth per nutrient excess, mostly due to the low-input nature of the systems and high use of grass in the diet.
- On a per hectare basis Small Farms emit less greenhouse gas emissions. However when the level of output is accounted for, Small Farms are less emissions efficient. In other words Small Farms emit more greenhouse gases per kilogram of meat produced than Larger Farms.
- It was not possible to collect data to measure the impact of Small Farms on biodiversity.

6. THE FUTURE OF SMALL FARMS

The following chapter considers the future of Small Farms. First the case of Small Farms in Europe is considered. Then the case for state intervention and government support for Small Farms is debated and finally some policy measures are considered.

6.1. Small Farms in Europe

The productivist policies of the CAP encouraged the modernisation and rationalisation of farming over many decades. Various policy mechanisms including price support, direct income support and so forth favoured larger farms and along with modernisation plans such as the Mansholt plan contributed to the trend towards fewer and larger farms. In recent years, and in particular following the accession of Bulgaria and Romania to the European Union, small farms have received increased attention in the political debate. The greater market orientation of agriculture, coupled with productivity gains largely supported by technological progress (e.g. mechanisation, development in crop and animal genetics), are driving a process of structural change towards fewer and larger farms. However, significant numbers of small farms exist in many Member States. Small farms play an important role in supporting rural employment and maintaining the social fabric of rural areas and thus contribute to the objective of balanced territorial development. In addition, structural diversity in the farming systems contributes to the attractiveness and identity of rural regions, (European Commission 2011).

The question of "what is a small farm?" has many answers, depending on the context in which it is posed. In 2010, the total number of farms in the EU stood at 12 million on 174 million hectares of arable land, with 25 million people involved in agricultural production. Using utilised agricultural area as a measure of “Small”, 69% of EU farms are of 5 hectares or less in size.

In the 2013 reform of the CAP, Commissioner for Agriculture, Dacian Cioloş, was motivated to introduce a “level playing field” for all farmers in Europe. He placed special emphasis on supporting Small Farms. The “Small Farmers Scheme” allowed a farmer to replace all other CAP direct payments and coupled support by a fixed lump-sum annual payment of between €500 and €1,000. Farmers participating in the scheme are then exempt from greening and cross-compliance, although they still receive the greening payment, and benefit from more simplified procedures. The objective of the scheme was to reduce the “red tape” faced by Small Farms. According to the Commission’s own impact analysis of the Scheme, it “means much less burdensome access to support” for farmers, with one of the major advantages

being the considerable “simplification of the overall management of the direct payments scheme for Member States”.

The Cioloş reforms also included the convergence model which involved the reallocation of payments from farmers with relatively large per hectare payments to those with relatively low payments. While these proposals had the potential to redirect significant support to small farms, the final model implemented led to only minimal reform.

6.2. Arguments for Supporting Small Farms

Small Farms in Ireland receive over €200 million in Pillar I income support each year and these farms also receive payments under Pillar II. One may question why such support is justified or indeed one may ask why they do not receive a greater share of the national envelope.

Agriculture is widely recognised to be multifunctional in the sense that it jointly produces multiple outputs - a range of marketable food and fibre outputs alongside environmental outputs, both positive, such as landscape amenities and biodiversity, and negatives, such as nitrogen surplus and other pollutants. These environmental outputs are rarely produced as a deliberate decision of the farmer and are externalities of the farming process, (Davidova et al, 2013). It is because of the multifunctional nature of Small Farms, and the important role that they play in the provision of public goods, that it can be argued that such farms warrant public support. Some of the public goods provided by Small Farms are discussed below.

Supporting employment

Small farms are often cited as being a source of rural employment, both in terms of the numbers of people working on the farm as well as the additional employment created. Small Farms are often located in disadvantaged areas and provide economic activity in areas that may otherwise be bereft of such activity. Flaten (2002) has studied the implication of structural change in dairy farming on rural employment in Norway. He confirms that large farms decrease farm employment substantially, and that rural areas lose most employment since they represent a large share of the total milk production and many of the smallest farms are located there.

While the continued employment of a large number of people on Small Farms may be quoted as being beneficial for the rural area, one must also question the productivity of that labour and the implications for the economy in general. Would that labour be better

employed elsewhere? Analysis by Loughrey and Hennessy (2014) suggests a serious problem of underemployment in Irish farming. They examined the scale of what they termed as hidden underemployment in farming in Ireland by measuring the difference between a farmer's self-reported amount of labour and the standard labour requirement estimated in the Irish FADN dataset. Their analysis showed that the number of farms with hidden forms of underemployment increased from 1996 to 2011, despite increases in off-farm employment. Loughrey and Hennessy note that from a productivity perspective, it is worrying to find that over 10% of working age farm holders have more than 120 days of hidden underemployment per annum.

Small Farms as providers of ecosystem services

Many of the public goods provided by farmers such as protection of the landscape, maintenance of biodiversity, protection of waterways and soil, animal welfare and so forth are collectively known as ecosystem services. Some argue that smaller farmers are more "environmentally friendly" and are better providers of ecosystem services.

A 2004 OECD study addressed the questions *"are particular types of farm characteristics associated with the generation of positive or negative externalities?"* And, *"can farms with specific characteristics provide positive externalities with public good features at lower cost?"* The study considers whether farm size, intensity of production, organic production, non-farm activities and commercial orientation impact on the positive and negative externalities produced by the farm. The review concludes that there is no significant relationship between these farm characteristics and the production of either negative or positive externalities. The study concludes that personal characteristics of the farmer are more significant in determining the outcome than the characteristics of the farm.

A number of studies are cited and a short number referenced here. For example, Potter and Lobley (1993) conducted a review of the literature regarding farm size and the environment, focusing on the United Kingdom. They concluded that there is little evidence supporting a "functional" relationship between the economic or physical size of a farm and its environmental impact. However, they find it likely that certain small farms contain conservation assets that deserve to be protected. They also conclude that there is little evidence that people managing physically or economically small farms are more conservation-minded. Callois *et al.* (2002) found a mixed relationship between farm size and environmental impact on French farms. Large farms (in terms of area) did more landscape maintenance and contributed to landscape openness and had lower pollution risk. However, they also reduced landscape diversity and biodiversity, and contributed to a lower rural

population. In the US, Gould, Saupe and Klemme (1989) found that large farms were more likely to adopt conservation tillage technologies. McInerney et al. (2000) also concluded that large farms were noticeably more involved in agri-environment schemes and projects to maintain the countryside than the average farm.

Supporting the non-farm rural economy

By maintaining landscape and farms practices in rural areas, Small Farms contribute to the aesthetics of the countryside and thereby to rural tourism. A large review of the role of crofters in Scotland points to the important role crofters play in the non-farm rural economy and in contributing to a vibrant rural population.

The Case not to support Small Farms

Analysis presented here shows that the vast majority of Small Farms are run on a part-time basis where the farm operator is employed elsewhere or where they are in receipt of social welfare or pension entitlements. One may argue that such farmers should not be in receipt of direct income support. However, the level of payments received by individual farmers is quite low. The analysis also shows that Small Farms are less efficient from an economic perspective and also from a greenhouse gas perspective. One may argue that by supporting such farms with direct payments that the natural process of structural change is inhibited and inefficient farms that would otherwise go out of business can be maintained. However, given the very small scale of the farms examined here and their geographic location, it is most unlikely that even in the absence of direct payments that this land would be converted to more productive and efficient uses.

6.3. Future Policy Support

Davidova et al. (2013) conducted an extensive study of the situation of small and semi-subsistence farms in Europe. They concluded that there are three possible paths of development for small farms: disappearance due to absorption into larger commercialised farm holdings, or to land abandonment (e.g. in remoter areas); transformation into small commercial farms; continuation through (a) diversification; (b) non-agricultural wage employment and part-time farming; or (c) “forced” re-entry of successive family generations due to the lack of other income sources. Davidova et al conclude that no single support measure, even a well-targeted one, is likely to be wholly appropriate for all types of farms and all development paths: this is not a one-size-fits-all situation.

Future support for Small Farms from the CAP can be delivered through Pillar I or Pillar II. To date Pillar I payments are land based and hence farmers with more hectares get more

payments. Furthermore, the decoupling model in operation in Ireland is the historical model, meaning that farms that were more productive in the 2000 to 2002 period continue to receive higher payments per hectare. In the last reform of the CAP the French proposed a degressivity model, which involved farmers receiving a higher rate of payment on their initial hectares with the per hectare rate reducing as farm size increased. Such a model would obviously favour Small Farms. However, it was vehemently opposed by the farm lobby groups in Ireland and elsewhere. It is unlikely that such a proposal would garner any additional support in the forthcoming CAP reform. Indeed Davidova et al. (2013) questions whether Small Farms have a political voice. They comment that some interests are better represented than others because some groups are better organised, more active and more capable of showing the intensity of their preferences. Large producers have an advantage in this respect because they are not too numerous and spatially scattered, and are likely to have more educated managers with greater competence and better information about current and potential agricultural, rural and regional policy measures.

The other main channel of support for Small Farms is through Pillar II. It is likely that the forthcoming CAP reform will place greater emphasis on agri-environmental measures and the provision of public goods and that this will be funded through the Pillar II. For example the recent Rise Foundation report (2017) calls for a redesigned, more integrated tiered structure of supports with clearer targets on the environmental outcomes sought. Such a move may present an opportunity for Small Farms to increase their direct income support. However as long as payments are linked to the land area farmed it will be difficult for farmers to substantially increase their payments. Given the flexibility within the Pillar II, there is of scoped to design policies which can specifically support Small Farms.

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