JOURNAL OF FARM MANAGEMENT VOL.13. NO..6. PAGES 419 - 434

REFEREED ARTICLE

A SURVEY ANALYSIS OF OPPORTUNITIES AND LIMITATIONS OF IRISH DAIRY FARMERS

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The objective of this study was to examine the opportunities and limitations facing Irish dairy producers based on a survey of 800 suppliers from the largest dairy processor in Ireland. The survey sample was randomly selected based on a proportionate representation of suppliers broken down by quota size, supplier region and system of production. The sample was subsequently broken into five quota categories to investigate the effect of scale on survey variables. Findings reveal an average milk yield of 4,808 l per cow and 8,346 l per hectare at an average stocking rate of 1.78 (LU/ha). Stocking rate, milk yield per cow and per hectare increased as quota size increased. Furthermore the proportion of farmers paying for labour increased as quota size increases with results showing that 55% of all respondents had paid labour on their farms. A successor has been identified on 45% of farms and in greater frequency on larger farms. Despite the relatively small scale of enterprises, only 15 percent of dairy farms had off-farm employment. Of those surveyed, 20% have winter housing facilities capable of holding more animals than they currently have, with 5% having capacity for more than 15 additional cows. The results show considerable underutilisation of land with potential for increases in productivity through increased per animal production, increased stocking density and increased specialisation in dairying

Key Words: survey, Irish dairy farms, opportunities, challenges

1. Introduction

The Irish dairy industry accounts for 27% of agricultural output with production of 5.35 million tonnes of milk per annum (DAFRD, 2006a); while Irish milk production stands at 3.7% of the total EU milk production (Irish Dairy Board, 2006a). The Irish dairy industry is also a significant contributor toward rural sustainability; directly employing 22,386 dairy producers (National Farm Survey, 2005); whilst indirectly providing further spin-off employment opportunities in the retail, marketing and financial sectors.

The Common Agricultural Policy (CAP) has been responsible for the delivery of price supports in the form of import tariffs and export subsidies which have served to deliver higher and more stable prices relative to producers outside the EU. As a direct result of milk quotas, milk producers within the EU have received a relatively high milk price in comparison to world market prices in recent years (Shalloo, 2005). Historically milk quota transfer in Ireland took place through an administered system with a fixed price and reallocation based on a priority system which tended to favour smaller farmers. This often meant that the true market value of milk quota was unknown in Ireland. This system also meant that it was very difficult for milk producers willing to expand milk production to be able to acquire adequate milk quota. In recent years a more market orientated system of quota exchange was established whereby milk quota was traded between buyers and sellers and therefore an equilibrium price for the milk quota was agreed. The price that individual dairy farmers can afford to pay for milk quota varies greatly depending on the farm cost base, milk price and the level of increased cost

incurred on the farm to facilitate the increased production (Shalloo and Dillon, 2006). Milk quota price has varied from 11 c/l to 45c/l (1c = EUR0.01) across the four milk quota exchanges that have taken place in Ireland (DAFRD, 2007). Milk quotas have been widely regarded as a constraint on the EU and Irish dairy industry deterring it from exploiting the potential which exists (Hennessy, 2007; Lips and Reider, 2005). The Mid Term Review (MTR) allowed for a reappraisal of the CAP in 2008 (Health Check), where the future EU milk quota policy would be negotiated, which will lead the way to the eventual abolishment of quotas in the EU. This has generated a level of uncertainty as well as a sense of opportunity for Irish dairy producers who are currently seeking to expand production.

Labour challenges will influence future decisions for expansion at farm level on many dairy farms. In recent years the supply of agricultural labour in the Irish dairy industry has come under strong competition from the industrial and construction sectors of the economy as a result of a period of unprecedented economic growth. The average industrial wage has grown by approximately 6.6% per year in the past decade to €31,263 (CSO, 2007b) in contrast to Farm Family Income (FFI) which has only increased by 1.7% per year (NFS, 2007). Family labour input continues to fall short of requirements across most systems and competition with non-agricultural industries continues to exert pressure on agricultural wage rates in Ireland (O'Donovan, 2008).

A key constraint to the expansion at farm level on Irish farms in particular due to grass based system is the availability of land around the milking parlour at prices that will substantiate a return from dairying (Dillon *et al*., 2006). The Irish grass based system requires land that the cows can be walked to the milking parlour in order to provide sufficient grass for the dairy herd. Land fragmentation is a feature of Irish agriculture resulting in a reduction in the potential for expansion and subsequently affecting overall farm profitability. Coupled with this agricultural land purchase has become extremely difficult as land prices in Ireland have risen in the region of 17% per annum over the last 10 years since 1995 (CSO, 2007a) making it increasingly difficult to achieve a return on the investment.

The objective of this study was to identify the opportunities, challenges and limitations of a large sample of Irish dairy farmers, through the administration of a telephone survey. A key aim of the survey was to quantify the overall potential for expansion on farms taking into consideration land, housing, successor and labour. The study also seeks to explore and identify at farm level the pertinent issues facing Irish dairy farmers in the midst of economic and policy change.

2. Materials and Methods

2.1 Survey Method and Sample Selection

The sample population for the survey was chosen from a proportionate representation of all milk suppliers taken from the largest dairy processor in Ireland. The sample was randomly selected based on location within the processor region, system of production and quota size. The sample was further

subdivided into five quota categories based on quota size so as to investigate effect of scale on key variables. The sample size of 776 suppliers is representative of 16.2% of the entire processor population (n=4,806). A telephone survey was identified as the most suitable method of data collection due primarily to the large number of suppliers required to get a representative proportion of the processor population. It was anticipated that this mechanism would generate a greater response rate than that achievable through a postal or email survey and due to financial and timing constraints it would be more appropriate than a face to face interview with such a large region.

2.2 Survey Design

The survey was centred on three primary sections.

1) Description of the dairy enterprise, where respondents provided data on land area and the levels of stock on the farm.
2) Details of off farm employment, hired labour and the availability of a successor were discussed.
3) Description of milking and housing facilities.

The survey contained 30 questions which were designed to create a profile of each individual farm by extracting information on livestock numbers, system of production, farm size, land accessible to the milking parlour, availability of a successor, off farm employment, labour demand and availability, education, milking facilities and winter housing facilities. The questions were predominantly close-ended and designed for the specific aim of getting the required response in the most efficient and easily understood manner.

2.3 Data Collection

Cover letters along with a copy of the questionnaire were sent by post on the 12th January 2007 to a total of 776 milk suppliers informing them that a Teagasc[1] official would be contacting them by telephone to carry out a survey. Contact by telephone call was made to the sample between Wednesday 17th January 2007 and Monday 26th February 2007. The cover letter outlined the purpose of the research, details of all collaborating organisations, the time frame in which they would be contacted and also an overview of the significance of the study. The cover letter also provided a guarantee to the supplier that all information revealed would be held in total confidence. The farmer received a copy of the questionnaire so that he could have studied the questions and be prepared prior to contact being made. The questionnaire was validated to check its feasibility and comprehensiveness by piloting the survey on a sample of 10 farmers from the same processing region. Extreme care was taken to prevent bias in the design of the questions. Attention was given to ensure questions were structured / phrased correctly and to avoid leading the respondent to a given choice.

Each survey took on average 10 to 15 minutes to complete. Once contact was made the outcome of the call was logged. In many cases an arrangement

1. Teagasc is the Irish national body providing integrated research, advisory and training services to the agriculture and food industry and rural communities.

to conduct the survey at a specified time as agreed between both parties. The data was inputted to an online survey software package [www.surveymonkey.com] (Bauer and French, 2006; Hestor *et al*., 2004). In this study the interviewer loaded the questionnaire data to the online survey software as the farmer responded to the survey questions. Once an individual survey was completed it could automatically be stored on the software's database.

Of the 776 suppliers in the sample, the respondent population totalled 659 which was an overall response rate of 86%. All data was transferred to Microsoft Access 2003 to derive additional variables and check data for errors.

2.4 Data Handling

A total of 30 key variables describing the existing dairy farms were created from the survey data. The survey variables included:

11 farm size descriptors: Quota category, quota 2006, quota change (1998-2006), land area owned (around the parlour), land area rented (around the parlour), total land area fragmented, total land area rented, cows per milking unit in the milking parlour, location (branch), system of production (creamery, liquid, winter), number of parcels fragmented.

4 stock variables: cow numbers, replacements, percentage specialist (cows only), % specialist (all dairy stock).

6 infrastructural variables: age of milking facilities, age of tank, animal housing adequacy, additional cows housed with small investment, stocking rate (SR) for dairy cows on the milking platform as well as for all stock on the entire farm.

3 labour variables: paid labour (yes/no), successor (yes / no / don't know), off farm employment (yes / no).

2 productivity variables: milk production per cow and per hectare.

Data analysis was carried out using (PROC GLM) general linear model procedures of SAS. Individual quota category pairs were compared using a whole survey standard error for each variable calculated across all quota categories. Each continuous variable generated in this analysis was pre-screened for normality using PROC UNIVARIATE of SAS. For binary data (tables 4 and 5) chi square analysis was performed using PROC FREQ of SAS.

3. Results

3.1 Primary characteristics of surveyed farms

Table 1 shows the primary farm indicators for the sample of suppliers surveyed. The total number of suppliers within the surveyed population was broken into five quota categories (Q1-Q5). The average milk quota per supplier in the sample was 305,503 l (67,201 gal) supplied by 65 dairy cows. As quota category increased, the amount of quota acquired since 1998 by each individual supplier, milk production per cow and per hectare increased. The mean quota increase across the entire sample since 1998 was 71,507 l. In general as quota size increased the level of specialisation around the milking

Table 1. Effect of quota size on key characteristics for the farms.

Farm Indicator	Q1	Q2	Q3	Q4	Q5	Avg.	Std. Err.	Sig.
No. of Suppliers	1,218	1,638	853	568	529	-	-	-
Quota range (000' l)	0-173	173-268	268-360	360-454	454-2,100	305.5		
Cow (No.)	40.5	54.9	68.5	82.8	123.9	64.6	3.86	***
Quota change (l)	10,671	71,106	82,608	99,474	164,889	71,507	13114.0	***
Milk production (l/cow)	3,834	4,857	5,122	5,307	5,858	4,808	129.18	***
Milk production (l/ha)	5,818	7,898	8,758	10,109	13,000	8,346	4,409	***
[1]Specialist dairy (%)	74	80	79	81	83	79	0.16	**
[2]Specialist cows (%)	60	64	63	65	66	63	0.015	ns
[3] Dairy cow SR (LU/ha)	1.60	1.67	1.78	1.96	2.33	1.78	0.093	***
[4] All stock SR (LU/ha)	1.82	1.95	2.10	2.36	2.84	2.09	0.135	***
[5] Total farm SR (LU/ha)	1.29	1.49	1.67	1.71	1.86	1.54	0.056	***

[1] Dairy cows and replacement heifers as a % of the total farm livestock
[2] Dairy cows only as a % of the total farm livestock
[3] Stocking rate adjacent to milking parlour for cows only
[4] Stocking rate adjacent to milking parlour for all dairy stock
[5] Stocking rate for total farm stock on total land area farmed

platform in terms of all dairy stock (specialist dairy %) and cows (specialist cows %) increased. This suggests that a greater proportion of smaller farms have substantial levels of stock from the beef enterprise on their existing milking platforms and also suggests greater potential for expansion. The average SR for milking cows (Dairy cow SR) around the milking platform was 1.78 LU/ha which increases as quota size increases. This stocking rate emphasises the number of cows around the milking platform and is the real indicator of the potential to increase cow numbers. When dairy replacement stock (All stock SR) is included, the SR around the milking parlour increases to 2.09 LU/ha and again this increased as quota category increased. The total farm SR for all farm stock on the total land area (milking platform and fragmented) was 1.54 LU/ha which would suggest that the stocking intensity on the external platforms was substantially lower than on the milking platform.

The total land area around the milking platform was 38.8 ha. The average land area owned around the milking platform for the sample was 35.9 ha while the amount rented around the milking platform was 3.0 ha (Table 2). This suggests a very high level of land ownership of the dairy farmers surveyed. The average area of the land that was outside of the milking platform was 25.7 ha divided across 1.56 land parcels.

Table 2. A description of the scale and distribution of lands farmed across five quota categories.

Quota Category	Q1	Q2	Q3	Q4	Q5	Avg.	Std. err.	Sig.
Total area farmed (ha)	51.0	57.1	66.5	76.9	98.3	64.1	8.768	***
[1]Milking platform (ha)	27.1	35.6	43.8	46.2	55.9	38.8	5.15	***
[2]Fragmented area (ha)	23.9	21.5	22.7	30.7	42.4	25.7	8.734	***
[3]Milk. platform owned (ha)	25.5	33.2	38.9	43.7	55.0	35.9	5.67	***
[4]Milk. platform rented (ha)	1.6	2.4	4.9	2.5	5.9	3.0	2.30	***
Land Parcels (No.)	1.6	1.3	1.6	1.7	2.2	1.56	0.144	***

[1] Milking platform is all land adjacent to the milking parlour
[2] Fragmented area is land that is not accessible to dairy cows
[3] Land area around the milking platform that is owned
[4] Land area around the milking platform that is rented

3.4 Farm Successor

On 45% of farms surveyed a successor has been identified while 25% have no successor and a further 30% were unsure at the time. As quota size increases so too does the proportion of farmers within each quota category that have a successor identified. Of the farms that have a successor identified 40.9%, 50% and 56.5% are in Q1, Q3 and Q5 respectively. Conversely larger farms were less likely to not have a successor identified; with 34.1%, 21.2% and 14.5% of those farms having no successor in Q1, Q3 and Q5 respectively. Neither quota size, land area farmed, milk production or stocking rate differed significantly with successor status. Level of dairy specialisation was significantly lower (P=0.08) on farms with an identified successor (61% specialisation) compared to those with definitely no successor or where no successor had been identified as of yet (64 and 63%, respectively).

3.5 Milking and winter facilities

Information was gathered regarding milking facility type, age, and number of units (Table 5). Parlour type did not differ with quota size with 86% of parlours of herringbone swing over design. The average number of units on farms was 7.8 with on average 8.3 cows per unit. The average age of milking facilities was 16.1 years. As expected a positive relationship exists between the number of units in the parlour and quota size with 6.2, 7.5, 8.2, 8.8 and 10.3 units in the parlour for Q1, Q2, Q3, Q4 and Q5 respectively. The number of cows per unit was also influenced by quota size with 5.8, 7.2, 7.8, 8.6 and 10.1 cows per unit for Q1, Q2, Q3, Q4 and Q5, respectively. This would suggest a greater use of capital resources on the larger farms.

Farmers were requested to express their opinions on their winter housing facilities in terms of current capacity to cater for the levels of the stock on the farm. Table 5 classifies winter housing facilities in terms of current capacity to

Table 3. Characteristics of farms with and without paid labour across five quota categories.

Labour Status	**Paid Labour**					**No Paid Labour**							
Quota Category	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Std. Err.**	**H.L[1]**	**H. L*Qcat**
Quota 2006 (l)	148,962	255,298	338,605	420,816	720,120	140,787	245,796	326,117	415,564	558,525	16342	***	***
Cow (No.)	42	56	30	85	134	35	51	64	79	100	4.489	***	**
Land area (ha)	27	37	45	49	67	25	34	42	45	47	7.654	***	*
Milk yield (l/cow)	3,731	4,706	5,010	5,178	5,707	3,948	5,007	5,231	5,432	6,056	172.29	***	ns
Milk yield (l/ha)	6,113	7,564	8,586	9,883	12,479	5,772	8,263	8,960	10,367	14,204	601.78	***	ns
SR (LU/ha)	1.64	1.84	1.97	2.01	2.03	1.55	1.60	1.71	1.91	2.33	0.124	***	ns
[3]Specialist cows (%)	62	66	65	64	64	62	65	63	66	64	0.024	*	ns

[1] Hired labour
[2] Production per hectare
[3] Proportion of dairy cows only (LU) as a % of the total farm livestock (LU).

Table 4. The influence of quota category on annual labour costs

Annual Labour cost (€)	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Avg.**
0 - €5,000 (%)	75	67	62	49	12	56
5,001 - €15,000 (%)	17	22	30	24	21	23
15,001 - €25,000 (%)	6	6	8	20	25	12
25,001 - €35,000 (%)	0	5	0	5	21	6
>€35,001 (%)	2	0	0	2	21	4

cater for stock across quota categories. Quota category had a significant influence on housing capacity with greater number of respondents indicating there housing as adequate within larger quota categories. Fifty four per cent of the total sample of respondents claimed that their existing facilities were 'adequate' to house current cow numbers with a further 26% describing their current facilities as 'less than adequate'. Fifteen per cent of respondents revealed that they had capacity to house between 15 to 30 more cows while the remaining 5% had capacity for 30 or more cows on the farm.

4. Discussion

4.1 Survey Methodology

Telephone surveys have been shown to allow a large sample to be interviewed and positive response rates to be achieved, providing reliable and accurate results (NBRI, 2007). The average quota size (305,503l), SR (1.78LU/ha), milk production per cow (4,805 l) and herd size (65 cows) for this survey sample are very similar to figures published for the national population of specialist dairy farmers (National Farm Survey, 2007) indicating a close fit between survey sample and the national population. Results from the survey show that stocking rates and productivity per hectare while representative of current national data (Boyle *et al*., 2002; O'Donovan, 2008) are also comparatively low relative to internationally observed levels (Dillon *et al*., 2005).

4.2 Productivity indicators

As observed in this survey, dairy production in Ireland is characterised by relatively small farms and herd sizes, small quota sizes and modest levels of milk production per cow when compared with other countries (Eurostat, 2007; IFCN, 2006). Irish dairy production is similar to that of the New Zealand model whereby a large proportion of the cows diet is made up of grazed grass which is the most cost efficient feed available, therefore providing Ireland with a natural competitive advantage when compared with other EU producers who operate a more high cost concentrate system. This system results in low cash costs when compared to EU competitors, however due to low output per hectare and per farm when compared on total economic costs the competitive advantage of Irish dairy farmers is substantially lower (Thorne 2006, Boyle 2002)

The results of this survey indicate the large potential for increased milk production at farm level in Ireland in a post quota environment. Similar studies have also highlighted the potential that exists in Irish dairy production in a post quota environment. Lips and Reider (2005) found that the potential for increased in milk production post milk quotas was comparatively greater in Ireland (38.6%) relative to the average of all EU member states (2.9%). FAPRI[2] (2006) projected that the level of milk output from Irish dairy farms would double following the removal of EU milk quotas. According to Boyle *et al*., (2002) the high potential for expansion on Irish dairy farms relates to the extensive nature of current production systems and comparative financial efficiency of milk production relative to other EU countries.

In comparison to the average milk production per ha observed in the survey (8,346 l), milk production experiments in Ireland have realised 15,000 litres/ha within Irish pasture-based systems (Shalloo *et al*., 2004b; Horan *et al*., 2005). The difference can be made up primarily by increasing the stocking rate at farm level while maintaining a similar amount of grass in the diet of the cow. Ireland's favourable climate for grass growth ensures that 2.6 to 3.0 cows per hectare can be sustained (Shalloo *et al*., 2007), while maintaining similar amounts of grazed grass in the diet. The average specialist dairy farmer utilises 7 tonnes DM of grazed grass while research from Irish commercial dairy farms have recorded grass utilisation of 11 – 14 tonnes DM varying by region (Brereton, 1995). The vast majority of the additional feed required in expanding dairy herds will come from increased grass production and utilisation. Therefore the additional feed costs with increased stocking rate and production per hectare would be marginal when compared to the increased output. This would result in only minor increases in cash costs while at the same time substantially reducing the total economic costs.

4.3 Land Fragmentation

This study has shown that considerable levels of land fragmentation are prevalent with Irish specialist dairy farms. When EU milk quotas are abolished it is generally accepted that the next most limiting factor to increased milk production on dairy farms in Irish grass based systems is grazing land availability (Dillon *et al*, 2006). Studies on the impact of land fragmentation have shown that it can have a negative effect on technical efficiency leading to inefficient use of resources in agriculture and increased costs (Jha *et al*, 2005). Solutions to the issue should be considered such land swaps as based on the Dutch system (Carsjens and van der Knaap, 2001) or the relaxation of legislation to allow leasing or renting of land where farmers can commit to an agreement on land acquisition (Van Hung, 2007). Farmers will have to increase the amount of dairy stock around the milking platform while simultaneously consider maximising the utilisation of fragmented lands for such tasks as rearing replacements, crops and rearing of stock from the other enterprises. This survey has shown a substantial degree of fragmentation on dairy farms with an average 1.61 parcels per farm. Figures from the CSO (2000) reveal that 28% of Irish farms are contained within a single parcel,

2. Food and Agricultural Policy Research Institute.

while 29% have four or more parcels. The average land area fragmented across the sample was 25.7 (ha) and this represents on average 40% of the total land area.

4.4 Expansion

Dairying is the most profitable enterprise within the Irish agricultural sector. Comparative data from the NFS (2007) shows that the average incomes from dairying, cattle rearing, tillage, and sheep enterprises were €36,221, €8,291, €28,536 and €11,902 respectively. As the Single Farm Payment is fully decoupled from production in Ireland it is possible for dairy farmers to drop unprofitable enterprises and to concentrate on increased milk output. Therefore it is anticipated that there will be an increase in milk output on existing dairy farms if the restrictions of milk quotas were removed given the current levels of output on these farms. The requirement for expansion was highlighted by Shalloo (2004a) when examining 8 farm options for specialist dairy farms in Ireland over the period 2004 to 2013. The study found that dairy farmers who remain static can expect a reduction of 30% in real income while those expanding could maintain or increase real income.

Dairy herd expansion can also be achieved through increased dairy specialisation with this study highlighting that the beef enterprise currently comprises of on average 21% of all livestock units on farms from this study. Benson (2002) suggested that where land area is restricted, expansion at farm level can also be facilitated by contracting the rearing of heifers to an outside farm.

4.5 Labour efficiency

Improved labour efficiency will be essential on farms if the aforementioned increases in scale are to be achieved. Dillon *et al*. (2005) showed large variability in labour efficiency between countries and systems of production. The result of that study visibly identified specialised pasture based systems of production are the most labour efficient when compared to intensive confinement systems such as those commonly practiced in the United States and mainland Europe. Increases in labour productivity on Irish dairy farms of this magnitude will be required in a post-quota environment if the expected expansion at farm level is to be achieved.

This study shows substantial differences in hired labour cost per litre of milk across the five quota categories. Similar to O'Donovan (2008) these results highlight scale as a major factor limiting labour efficiency on farms. Guitierrez (2002) examined the variability in agricultural labour productivity across countries and cited government driven policy to liberalise trade and increased levels of investment in human (education and training) and physical capital (technological) as the principal reasons for increased productivity. A study by Boyle (2002) comparing levels of paid labour across EU countries revealed that the UK and Denmark had the highest proportions of hired labour (29 and 28%, respectively). In contrast Ireland (9%), Netherlands (4%) and Germany (5%) had lower levels of hired labour indicating that they have increased levels of family labour involved in the system. Similar to the

findings of this study Hadley *et al*. (2002) observed that as herd size increased, labour efficiency improved because of labour saving, technology adoption, specialization and economies of scale.

4.6 Successor

Results from the survey reveal that on 45% of farms a successor has been identified which is similar to previous findings. Giraud and Baker (2005) studying succession across countries found that a successor was identified in 53, 27, 40, 43, 29 and 51% of cases in England, France, Ontario, Quebec, Iowa and California, respectively with successors identified more frequently on large herds. Research by Glauben *et al*. (2002) found that as farm size increases, the probability of farm succession increases as larger farms hold the best prospects for providing a potential successor with a reasonable and secure income. Unlike the current survey however, where no differences in quota change during the period from 1998 to 2006 were observed. Glauben *et al*. (2002) also noted that farm operators with successors display greater initiative and motivation to expand their enterprises, however this disparity may relate to the restrictive nature of the milk quota system in Ireland.

4.7 Off farm employment

The availability of employment outside of agriculture has meant that a broad range of options are available to farm families in order to supplement farm income, with the result that farmers must now closely examine their farming systems in terms of labour input and working hours (DAFRD, 2006b). Blank *et al*. (2004) in a study on agricultural profit and household wealth came to the conclusion that non-farm employment can help substitute for farm capital. This highlights the fact that farm households are diversifying their portfolios in search of alternative forms of revenue to supplement household income. Results from this survey reveal off farm employment levels for farm operators are relatively low at 15%. This is perhaps surprising for the smaller quota categories that have an average herd size of 40.5, 54.9 and 68.5 cows in quota categories Q1, Q2 and Q3, respectively. Labour efficiency studies both in Ireland (O'Donovan, 2008) and New Zealand (IFCN, 2002) showed that one labour unit could manage 90 to 170 cows thereby denoting widespread labour inefficiency among the smaller quota categories of this survey. Gasson and Errington (1993) suggest that for British farmers, the non-pecuniary benefits of farm work, such as job satisfaction, are so great that off-farm work is very much the last resort, taken up to fulfil the immediate cash requirements of the family.

4.8 Farm facilities

Twenty percent of surveyed farms have winter housing facilities capable of holding greater numbers of animals with 5% having capacity for more than 15 additional cows. As quota size increases the ability of farms to accommodate more cows also increases. Shalloo *et al* (2004a) compared net profit and cash flow under eight different production systems including expansion using conventional (€1,591/ cow) and low cost winter housing strategies (€262/cow)

(cows wintered on a standoff pad and slurry stored in an earthen bank tank). Expansion using low cost housing or existing building conversions (e.g. beef cattle housing) greatly facilitates an increase in income in comparison with conventional expansion.

5. Conclusions

The objective of this paper was to examine the limitations, opportunities and challenges facing Irish dairy producers based on a survey of 800 suppliers. The study emphasises the merits of a telephone survey as a mechanism of extracting precise numeric and attitudinal information from a large sample population. A key message emerging from the study is that there is considerable scope for increasing the efficiency of production of individual farms through expansion. There will be a requirement for a radical rethink on how milk is processed in Ireland based on the number, type, age and location of some of the facilities currently in use and the requirement for further facilities. This study has highlighted the need for a further study to determine the expansion direction of the entire Irish Dairy Industry. The results show considerable underutilisation of existing animals, land and labour with considerable scope for increased productivity. Scale of enterprise has been identified as one of the major factors influencing labour efficiency, the availability of a successor and productivity per cow and per hectare.

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