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## Preliminary Investigation of the Incidence and Impact of Disability on Irish Farms

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### Abstract

*Farming is identified as being a hazardous occupation, resulting in disability and numerous fatalities each year. While occupational health and safety issues among farm households have been studied recently in Ireland, there has been no research directed at identifying the incidence and impact of disability within farm households.*

*The aim of the research outlined in this paper was to identify the cause, extent, and nature of disability among farm household members. The impact of disability on the farm business was examined also. Questions relating to disability were attached to the Teagasc National Farm Survey, and circulated to a representative sample of 119.5k households in 2001. The results revealed that 19.5% of farm households reported one or more persons with disability, with the farm operator (39.5%) reporting the highest incidence among household members. Physical disabilities accounted for 80.1% of all reported disability, with its principle source being health-related. Disability in affected households had a “major” or “some” impact on the farm business in 22.4% and 52.9% of cases respectively. Family farm income was €24/ha less on farms where the farm operator reported disability compared to non-disability farms. When the farm operator reported disability, participation in off-farm employment was reduced for the farm operator and spouse when compared to non-disability farms. The results generated raise awareness of issues among farm households reporting disability. Further research should be directed toward agricultural disability to facilitate agricultural and extension educators in designing prevention programmes that minimise the occurrence and impact of disability among farm households.*

**Keywords:** Disability, Impact, Farm Business, Farm Household

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### Introduction

Internationally, farming has been identified as being a hazardous occupation, accounting for numerous accidents each year (McCurdy & Carroll, 2000; Karwat, 1998; Browning, Truszczynska, Reed, & McKnight, 1998). Outcomes from these accidents range from production delays, property damage and minor injury to more serious results such as disabling injuries or fatalities (Jovanović, Arandelović, & Jovanović, 2004).

Researchers, internationally, have approached the issue of farm and farmer safety from a variety of perspectives. Jovanović et al. (2004) reviewed various accident causation theories from the literature and identified the Domino Theory as the oldest of these theories. The Domino Theory postulates that “88% of all accidents were caused by unsafe acts of people, 10% by unsafe actions, and 2% by ‘acts of God’” (Jovanović et al., 2004, p. 329).

The Multiple Causation Theory (MCT), while building on the conceptual and theoretical dimensions introduced in the Domino Theory, attempt's to provide greater understanding to the true causation of accidents from a different perspective. The MCT suggests that “the accident is the result of a complex and random interaction between the victim, the agent and the environment” (Taylor, Easter & Hegney, 2004, p. 12), and “rarely, if ever, is an accident the result of a single cause or act” (Jovanović et al., 2004, p. 329). In many respects the conceptual dimensions of the MCT mirror the Biopsychosocial Model of disability, as used by the International Classification of Functioning, Disability, and Health (WHO, 2002). This model encapsulates elements from the Medical and Social Models of disability and views disability as being an outcome of a complex interaction between personal factors, environmental factors and a health condition (WHO, 2002). Disability is an emerging issue, but as yet, receives relatively little

attention in the agricultural education and extension literature.

The principal mechanisms of injury (machinery, livestock, trips and falls) are continually being reported as sources of farm accidents at an international level (McCurdy & Carroll, 2000; Browning et al., 1998; Suutarinen, 2004). These farm accidents, and their mechanisms, are also contributing sources of impairment, which may lead to disability. Other causations of disability include the farm-working environment (Harmon, Zhang, & Xin, 1994), sports injuries, motor vehicle accidents and health impairments (O’ Shea, 1997).

Many farm related sources of disability, for example, farm accidents or health conditions related to the farm-working environment, are potentially avoidable. It is the remit of organisations in extension and education to raise awareness of the situation on the farm and to educate the farming population in ways to avoid causes of disability. “Education, as the carrier of science and technology, should play an important role in this transformation process” (Shen & Jones, 2005, p. 28). One such mechanism through which this may be achieved is by designing a multifaceted development programme. However, “as the extension process advocates, and in line with what has been suggested in international extension (World Bank, 1990; Zijp, 1991), the first step must be to understand what the situation is and have a clear understanding of the nature and scope of the problem” (Seepersad, 1994, p. 23).

Farming in Ireland remains an important indigenous industry, with population statistics showing that there were 270,000 persons employed in agriculture on 143,000 Irish farm holdings (CSO, 2001a). Occupational health and safety issues among farm households have been studied recently (McNamara & Reidy, 1997; Finnegan & Phelan, 2003), but there has been no corresponding research on the incidence and impact of farm household disability in Irish

agriculture. Disability may create a substantial negative impact upon an individual's life, yet in the occupational area of agriculture and related fields, there has been relatively little research on farm-based disability. Accordingly, a preliminary collaborative study between Teagasc (Irish Agriculture and Food Development Authority) and University College Dublin, was conceived to obtain a metric of the extent of disability on Irish farms, determined by respondents' self-reporting of disability in respect of themselves and members of the farm household.

### **Purpose**

The research objectives of the study were: (1) to identify the cause, extent, and nature of disability among farm household members, and (2) to assess the impact of disability on the farm business. The definition of disability used in this research was derived from the Report of the Commission on the Status of People with Disabilities (1996, p. 11), and includes: "People with disabilities were to include children and adults who experience any restriction in their capacity to participate in economic, social or cultural life on account of physical, sensory, learning, mental health, or emotional impairment."

### **Methodology and Data Sources**

The research instrument was a survey carried out on the National Farm Survey (NFS) sample of farms, which is conducted annually by Teagasc (Irish Agriculture and Food Development Authority). The NFS sample is a random sample of farms selected statistically to represent the main farming systems and farm size groups nationally (Connolly, Finnerty, Kinsella, & Quinlan, 2001). The main objective of the NFS survey is to monitor trends in output, costs, incomes and socio-economic changes in Irish agriculture. In 2001 the relevant NFS population represented was 119,500 farms of at least 2 Economic Size Units–(ESU) (1 ESU =

€1200 of Standard Gross Margin). NFS farms are categorised into the main farming systems on the basis of EU Farm Typology, which applies Standard Gross Margins to each farm enterprise.

Questions on disability were appended to the NFS survey in autumn 2001. Disability was classified using seven codes based upon an adaptation of ICIDH-2 (WHO, 1997). The codes were for type of disability and were identified to respondents. All the data on disability were collected on a voluntary basis by trained farm recorders. The survey data were analysed using SAS®.

### **Results**

#### *Occurrence of Disability among Irish Farm Households*

Disability was reported for 19.5% of farm households nationally corresponding to an estimated 23,332 farms in 2001. The majority of farms reporting the incidence of disability had one case, while two or more persons with reported disability were found on 2.1% of all farms nationally. The highest reported incidence among farm households reporting disability was the farm operator (39.5%). Spouses with a disability represented 10.2% of farm household members while children, parents and other household members reporting disability were 20.8%, 23.1% and 6.4% respectively. Younger farm operators (i.e. under 45 years) reported lower disability levels than older farmers (over 65 years). A similar finding was also reported by Karwat (1998) and Woolf and Pflieger (2003).

#### *Main Causes of Disability*

Physical disabilities accounted for 80.1% of all reported disabilities while 19.9% were non-physical. Within the physical categories, the combined incidences of health-related and physical injury among farm operators and spouses were 75.3% and 74.7% respectively. These persons represent the usual income providers in farm households.

Where disability arose from injury, further analysis of the data showed that 70% of the incidence occurred from farm work, with the remaining 30% from non-farm causes (most notably vehicular and industrial accidents). The highest incidence

in the non-physical categories was recorded in children with learning and intellectual disabilities (42.6%). Table 1 illustrates the distribution of reported categories of disability by type of farm household member.

Table 1

*Distribution of Categories of Disability by Type of Farm Household Member (%)*

	Farm Operator	Spouse	Children	Parent(s)	Other members	All Household Members
<b>Physical:</b>						
From Injury	25.9	13.2	4.7	6.6	3.8	14.3
From Birth	5.6	6.8	16.8	1.7	---	6.8
Health Related	49.4	61.5	18.7	49.3	42.9	43.8
Sensory Impairment	5.3	2.3	5.6	14	---	6.7
Other Physical	4.9	---	---	25.9	9.1	8.5
Sub-Total	91.1	83.8	45.8	97.5	55.8	80.1
<b>Non-Physical:</b>						
Learning/Intellectual	4	7.8	42.6	1.8	19	12.9
Mental Health	4.9	8.4	11.6	0.7	25.2	7
Sub-Total	8.9	16.2	54.2	2.5	44.2	19.9
Total	100	100	100	100	100	100

The reported source of health-related disability identified from the farm operators is outlined in Table 2 below. The farm operator, having the highest reported incidence of disability among the farm

household, attributed the sources of their disability to arthritis or cardiovascular problems in approximately equal proportions with a smaller number reporting cancer and diabetes.

Table 2

*Source of Reported Health-Related Disability of Farm Operators Only*

Source of Disability	% of farm operators with disability
Total health-related disabilities	49.4
Of which:	
Arthritis	18.6
Cardiovascular	17.7
Cancer	3.2
Diabetes	1.7
Other health related disabilities	8.2
Total non-health related disabilities	50.6
Total	100

*Occurrence of Disability across Farming Systems and its Impact on the Farm Business*

The NFS identifies six systems of farming: namely dairying, dairying & other, cattle rearing (mainly suckler cows, cow-calf systems), other cattle systems, mainly sheep and mainly tillage for categorization purposes. The system title refers to the dominant enterprise in each group. Disability was reported across all the main systems of farming as illustrated in Figure 1.

The presence of disability in the farm households by system of farming shows that a similar distribution pattern of farming systems was observed as for all farms nationally. This occurrence was not

observed where focus was averted solely to the farm operator reporting a disability. The results showed 59.8% of farm operators with reported disability have cattle rearing/other cattle systems as their principal enterprise. This is higher than the equivalent proportion (52.1%) for all farms nationally. There are proportionately fewer specialist dairy (10.3%) and sheep (8.2%) farm operators with disability than for all farms nationally and proportionately more in tillage farming (10.4%).

Further study of the data showed that farm operators with disability worked predominantly on farms of 50 hectares or less (83.2%).

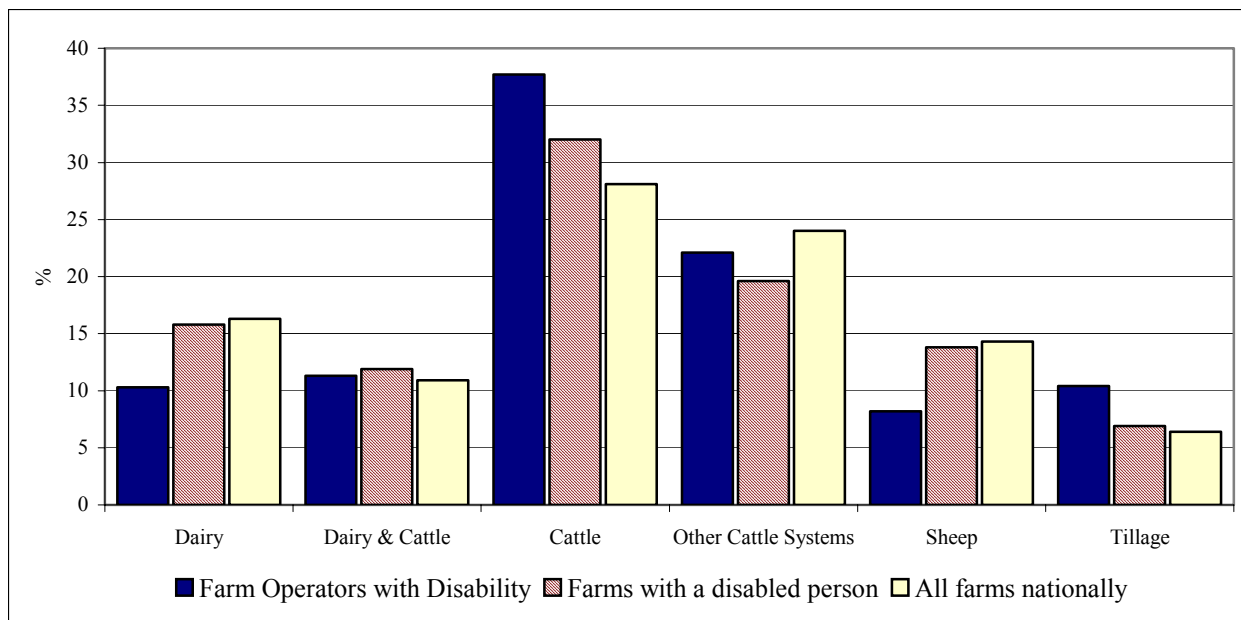


Figure 1. Distribution of farms reporting disability, all farms nationally and farms with disability by system of farming (%).

<sup>1</sup>Estimated number of Farm Operators with Disability = 10,400.

<sup>2</sup>Estimated number of Farms with a Disabled Person = 23,332.

<sup>3</sup>Estimated number of All Farms Nationally = 119,500.

Farm families are now becoming more dependent on external sources of income in order to maintain a viable income. Data from the CSO highlight that 48% and 44% of household income comes from off-farm work and farming respectively (CSO, 2001b). The impact of the presence of

reported disability on off-farm employment by the farm operator and spouse was examined in this study. Table 3 describes the incidence of off-farm employment among farms where there is reported disability, and among farms where disability was not reported.

On farms reporting disability, the proportion of farm operators with disability and other disabled farm household members with an off-farm job was 13.7% and 28.9% respectively, while the corresponding proportion of farm operators on non-disability farms was 34.6%. The proportion of spouses with an off-job where the farm operator reports disability (23.5%) was lower than on non-disability farms (35.9%) while the corresponding proportion in respect of farms where a person other than

the farm operator reports a disability was higher (48.9%). The low incidence of off-farm employment due to disability of the farm operator or spouse may give rise to a reduced household income compared to farms having another member of the household with disability. CSO (2002) data suggest that just 40% of people with a disability were employed in the Irish economy compared to 65% in the total population between 15 and 64 years of age.

Table 3

*Farm Operators and Spouses with Off-Farm Jobs on Disability and Non-Disability Farms (%)<sup>1</sup>*

Person with Off-farm job	Farms with a person reporting disability <sup>2</sup>		Non-Disability Farms <sup>3</sup>
	Farm Operator with disability	All other members with disability <sup>4</sup>	
Farm Operator	13.7	28.9	34.6
Spouse <sup>5</sup>	23.5	48.9	35.9

*Note.* <sup>1</sup>Based on a reduced sample of 980 farms weighted to represent 119,500 farms in NFS 2001. <sup>2</sup>Estimated number of farms with reported disability - 23,332. <sup>3</sup>Estimated number of farms with no reported disability - 96,213. <sup>4</sup>Includes all household members other than the farm operator. <sup>5</sup>Farms with a spouse in the household.

Reduced family farm income (FFI), in addition to the lower amounts of off-farm employment being obtained, can add additional pressure on the farm family. In 2001, FFI and FFI/ha were lower, by €2429 and €24.1 respectively, on farms where the farm operator reported a disability compared to farms where disability was not reported. Table 4 attributes these differences to various factors. Some of this difference in FFI may be attributable to differences in farm size. Direct payments (DP), which are income supports made to farmers from the European Union (EU) for participation in certain farming systems, were higher to farmers reporting a disability by €1050

compared to non-disability farmers. The DP's expressed as a percentage of FFI were 19% higher on farms where the farm operator reported a disability. The data show that farm operators with a disability had therefore, a higher income dependency on DP's. Table 4 illustrates that FFI and system gross margins were comparable across enterprises on farms where no disability was reported compared to farms with a household member with a disability other than the farm operator was reported. However, care must be taken in interpreting the NFS farm income data on an individual year basis as FFI outcomes from year-to-year may vary (NFS (1998-2001)).

Table 4

*Business Parameters on Farms Reporting Not Reporting Disability in 2001<sup>1</sup>*

	Farm operator with disability	Other member with disability	Farms where disability was not reported
Family farm income (FFI) (€) <sup>2</sup>	13,733	16,571	16,162
Size of farm (ha) <sup>3</sup>	31.7	33.6	35.3
FFI per ha (€)	433.7	493.9	457.8
Direct Payments (DP) (€)	10,978	9,492	9,928
DP as % of FFI	80	57	61
Total farm GM <sup>4</sup> (€)	26,148	31,499	31,383
GM from Dairying (€)	5,554	12,135	11,300
GM from “Cattle” <sup>5</sup> (€)	9,810	9,529	9,552
GM from “Sheep” (€)	2,735	2,458	2,700
GM from mainly tillage (€)	8,049	7,378	7,831

*Note.* <sup>1</sup>Based on a sample of 980 farms weighted to represent 119,500 farms in NFS 2001. <sup>2</sup>€1 = \$1.11691 (2001 average) – (OANDA Corporation, 2006). <sup>3</sup>Area in hectares (ha) adjusted for land quality. <sup>4</sup>Farm gross margin is Gross output from all farming activities minus direct costs. <sup>5</sup>“Cattle” includes cattle from cattle rearing and other cattle systems (Figure 3).

When respondents were asked to estimate what the total impact of the household’s disability had on the farm business the results showed that farm household disability was described as having a “major” or “some” impact on the farm business in 22.4% and 52.9% of cases respectively with 24.7% reporting “little or no impact”. On farms where a farm operator reported a disability, the corresponding figures were 27.8%, 66.1% and 6.1% respectively for the three stated impacts. On the farms where the spouse reports a disability, the proportion of respondents who stated there was a major, some, or no impact on the farm business, the results showed the corresponding figures were 30.8%, 42.0% and 27.2 per cent respectively. The incidence of “major impact” on the farm business was 16.2% where the person

reporting a disability was someone other than the farm operator or spouse.

The FFI was lower on farms where the impact was “major” by €5,098 compared to farms with no disability or €3,678 compared to farms where disability had “some impact” on the farm business (Table 5). These differences are due to a combination of variation in farm size, levels of activity as reflected by total farm gross margin, dairying, the other enterprise systems and the DP income levels. Total gross margin was lower on the farms where disability had “some” impact compared to farms reporting no disability. On farms where disability had “little or no” impact, the farms in this group were larger and more intensive compared to farms with no disability.

Table 5

*Business Parameters for Farms by Reported Impact of Household Disability and for Farms not Reporting Disability in 2001*

	Major	Some	Little or no	No Disability
Family Farm Income (FFI) (€)	11,064	14,742	20,456	16,162
Ha Adjusted	29.2	31.6	38.6	35.3
FFI/ha	378.6	467	530	457.8
Direct Payments (DP) (€)	7,505	10,698	11,418	9,928
DP as % of FFI	68	73	56	61
Total farm Gross Margin (GM) (€)	20,284	28,532	38,652	31,383
GM Dairying (€)	5,404	8,602	14,019	11,300
GM Cattle (€)	7,331	10,444	10,206	9,552
GM Sheep (€)	1,929	2,217	4,026	2,700
GM mainly Tillage	5,621	7,270	10,401	7,831

On 40.9% of farms with reported disability, a household member working on the farm attended to the needs of a farm household member with a disability. Table 6 shows respondents' estimates of the amount of farm-working time, expressed as a percentage of estimated total farm-working time, spent by a household member attending to the needs of a person with a disability in the household. As these were

verbal estimates provided by respondents, and not the result of a referral to farm records, these estimates must be treated cautiously. Best estimates provided on this basis by respondents were that 29.3% of farm household members spend a maximum of 25% of their working time attending to the person with a disability, and a further 11.6% spent 25 to 50% of their working time (Table 6).

Table 6

*Estimated Proportion of On-Farm Working Time for People in Farm Households Attending to Disabled Members of the Farm Household, %*

Attending to Person with disability	Household member with a disability			All farms with person reporting disability
	Farm operator	Spouse	All other Members	
No information provided	4.8	---	---	2.6
Zero	78.2	66.9	34.8	56.5
1% < 25%	12.7	25.0	45.9	29.3
25% < 50%	4.3	8.1	19.3	11.6
Total	100	100	100	100

It is evident that if a considerable amount of farm working time is spent by a household member who is also attending to the significant needs of a household member with a disability, then an impact on the farm business is likely. Spending substantial amounts of time caring for a family member

was also reported by Karwat (1998) in Poland.

### Discussion and Conclusions

A discussion of the incidence of disability in agriculture or indeed in any other occupational group centres on the



definition used to describe disability. In a preliminary study, such as this, using a self-reporting mechanism, the broad definition of disability used was the most appropriate for the sector as represented by a NFS sample. This study provides agricultural education and extension professionals with new knowledge on occupational disability among the farming community. This research area previously has not received adequate attention.

The study findings indicated that self-reported disability was recorded in 19.5% of farm households. Within the farm household, physical health related (43.9%) followed by injury (14.3%) and intellectual disability (12.9%) were the highest incidence levels found. The farm operator was the most frequently affected, with physical health related disability, arthritis and cardiovascular conditions being their most frequent causes identified. This finding mirrors somewhat those found in a major Polish study, where the most frequent reasons for disability found among disabled rural inhabitants were cardiovascular diseases, diseases of the musculo-skeletal system and connective tissue (Karwat, 1998).

Farming is often considered a “healthy occupation” in the public domain, yet this perception is questionable. Recent research has found that farmers have a particularly negative health profile in the Irish Republic (Hope, Kelleher, Holmes, & Hennessy, 1999). Also over 3000 accidents take place on Irish farms annually and these predominantly occur to the farm operator. This group (i.e. farm operators) has been found to have low levels of training in occupational health and safety in Ireland (Finnegan & Phelan, 2003). Farm operators also had the highest level of accident-related disability in this study of disability while spouses and children had the highest proportion of health and learning/intellectual disability-related conditions respectively. Clearly attending to matters of health and safety, together with disability are important

issues to address for farm operators, farm households, extension faculty and other professionals.

On farms where the farm operator reported a disability, farm income measures showed that incomes were reduced. This was attributable to respondents reporting a disability being less involved in dairying and more involved in the cattle rearing enterprises (Figure 1). It may be that a larger proportion of farm operators with significant impairment arising from the preponderance of cardiovascular and arthritic conditions may have been involved in the less labour-demanding enterprises of cattle systems compared to dairying. Respondents indicated that disability in the household impacted to some extent upon the farm business in 75% of cases. The data in Table 5 shows that financial performance of farms where the respondents indicated a major impact was below that of the other groups. A measure of the full extent of the impact on the farm business requires further study.

Where significant time was required to attend to needs of a person with a disability in the farm household, maintaining a high labour input into an intensive enterprise such as dairying would be difficult in practice. The results in Table 6 tend to support this assertion but again further research is required to examine this issue more fully. Households reporting disability had less participation in off-farm employment than households not reporting disability. There was no indication sought as to the kind of off-farm work in which the farm operator or the spouse was engaged, and consequently it was not possible to assess this impact on farm household income. However, if the work sought by these respondents reporting disabilities was physical in nature, the preponderance of health-related conditions and injuries among these respondents may make off-farm employment more difficult to secure in certain cases.

This study indicates that disability is a major issue among farm households.

When disability occurs it can adversely affect the farm business. Going forward, the labour resource available to farming is projected to decline further (Agri Food 2010 Report, 2000).

Generally, farms will have to increase in scale and efficiency or farm family members will have to find off-farm employment to maintain household viability. This research shows that farm households with disabilities may already be suffering disadvantage in the farm business and in off-farm employment. Against this background the occurrence of disability has the potential to have an increasingly detrimental impact on the viability of affected households. Agricultural Educators in Colleges, Extension and Universities need to become proactive in learning about the issues affecting people with disabilities. Prevention programmes that reduce the incidence of disability, farm accidents, and ill health are critical matters requiring attention.

Extension officers traditionally, have been seen as service providers (Kroma, 2003), providing solutions to problems encountered by farmers. This “top-down” approach has now been viewed as an inappropriate means for human resource development (Tucker, 2000), and prevents the adoption of innovation provided by extension workers. Perry and Bloom (1998, as cited in Seiz & Downey, 2001) suggest that, “prevention programmes, to be effective, must be responsive to the concerns and values expressed by the population to whom they are directed”. Indeed Extension Workers may be viewed “as a catalyst and facilitator of learning processes” (Kroma, 2003, p. 43), especially when the potential user (i.e., farmer) is involved in the programme from the onset (Sadighi & Mohammadzadeh, 2002; Bogue & Phelan, 2004; Kroma 2003; Rogers, 1995). Involving the target audience from the beginning empowers them to “act on the concerns that they jointly define” (Morton, 2001, as cited in Morton, 2002). This is particularly relevant to the issue of

disability, which may affect any member of the farming community.

Brashear, Hollis, & Wheeler (2000), in their study highlighted a range of channels, namely “popular publications, corporate representatives, Extension newsletters, current users of innovation” through which research findings may be transferred to both Extension and public knowledge. Extension educators should target these channels so that the probability of adoption of the desired message is increased.

One successful accident prevention programme, which incorporated the components outlined above, was the West Jutland study (Denmark) initiated in 1992 (Rasmussen, Carstensen, Lauritsen, Glasscock, Hansen, & Jensen, 2003). The benefits experienced from a well-constructed prevention programme will surpass participation in the programme, as the farm incorporates the home in addition to the place of employment. Children of farm families generally learn from actions of other family members. These actions “influence how they approach their work and their safety on the farm” (Seiz & Downey, 2001). If this fact can be harnessed, and the accident prevention messages adopted by participating adults, the programme will enjoy a synergistic effect as accident prevention messages are passed on to their offspring.

Health and Safety issues on farms have received increasing attention in recent years. However, insufficient attention has been paid to the consequential disability issues arising from ill health and farm accidents, in agricultural curricular and extension programmes. Extension educators need to design courses to address the issue of disability management and prevention. These courses must not solely be directed at farmers and their families. Health and Safety modules must also be highlighted in our agricultural educational system so that students become aware of the hazards associated with farming and appreciate the

potential impact of unsafe actions on the farm. The consequential impacts on individuals on the occurrence of disability, ill health, and farm accidents must be highlighted to the students. Education on farm safety management, the use of personal protective equipment and the maintaining of general farm health and safety will facilitate these farm hazards being eliminated. The process of commencing this development will be through research, knowledge development and through educating and training of agricultural and other professionals, together with the farming community.

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