Environment and Rural Affairs Monitoring & Modelling Programme (ERAMMP) Sustainable Farming Scheme Evidence Review Technical Annex

Annex 5: Building resilience in farm systems

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0.2	WG	18/6/2019	Responses from WG
0.3-1.0	LLR	30/6/2019	Edit to WG comments
1.1	PMO	5/7/2019	For publication

Contents

1 Introduction

All farms are essentially businesses, but direct subsidy has not encouraged a business approach. As a consequence, the majority of Welsh farm businesses have a restricted perspective of productivity and are largely disconnected from market need. This has led to the current situation where a significant proportion of Welsh farm businesses struggle to compete in an increasingly competitive global market.

A desirable end state for direct support could therefore be that Welsh agricultural businesses are able to compete in an increasingly competitive and global environment. Research from the Agriculture & Horticulture Development Board (2018) as well as the Organisation for Economic Cooperation and Development (2011), describe the fundamental importance of business planning, goal setting, performance management & benchmarking and having the human capital to achieve longer term goals as fundamental to the long term viability of successful agricultural businesses.

Given the current picture in the agricultural industry, a significant change programme is needed to encourage the effective behavioural characteristics of the top performers to be adopted by the wider farming community. This change programme will fundamentally underpin much of the support given to improve the economic and environmental resilience of farms.

The purpose of this review is to focus on examining the work needed to effect this behavioural change with a particular focus on any previous examples of how such a change programme could be explored, as well as the effectiveness of any current and future potential interventions to improve business capacity.

2 Outcomes

Given the review definition above, we have focused on those outcomes within the proposed SFS that relate to governance. These are outcomes which are primarily associated with the resilience of the farm business from a human capital perspective (e.g. resist external impacts, remaining viable in terms of business profitability and the retention of capital asset value) and as such are driven by internal capacity rather than external market conditions (e.g. expansion of market share, enhanced regulatory framework).

The SFS Outcomes which relate to governance include:

i. Managed financial risk
ii. Managed biological and environmental risk[1]
iii. Managed social risk[2]
iv. Holistic long-term business planning, that allows social, economic, environmental future proofing
v. Mobility and succession planning
vi. Innovation

Those highlighted in blue are being addressed in other reviews, however where appropriate, we have made links with relevant interventions; those highlighted in green are considered beyond the scope of this review.

As outlined in the SFS framework, the 'Governance' outcomes describe specific changes to business practice and whether the existing and future human capital of said businesses are capable of taking up and benefiting from these interventions. Such changes are often best facilitated through advice and skills development rather than capital investment.

However capital investments to support innovation, access to new markets, and the mitigation of biological and environmental risk through infrastructural improvements are also mechanisms which would mitigate risk and enhance farm business resilience. Where appropriate, linkages have been made with interventions associated with tasks which support the capability of the infrastructure on farm (built or ecological) to adapt to change.

[1] This is being addressed in other reviews, however where appropriate, we have made links with relevant interventions.
[2] This is beyond the scope of this review.

3 Policy Relevance and Policy Outcomes

The Well-being of Future Generations (Wales) Act 2015 establishes a duty to take reasonable steps to achieve 7 well-being goals: a prosperous Wales, a resilient Wales, a healthier Wales, a more equal Wales, a Wales of cohesive communities, a Wales of vibrant culture and Welsh language, and a globally responsible Wales. The Environment (Wales) Act 2016 puts in place a biodiversity and resilience of ecosystems duty, as well as setting emissions targets, budgets, requirements and duties to address Climate Change.

Policy Issue	Specific Question	Duty Addressed
Economic	To what extent would resilient farm businesses impact upon their economic viability?	A prosperous Wales A resilient Wales
Social and Well-Being	To what extent would resilient farm businesses address the social and well-being needs of rural communities and the Welsh people more broadly?	A healthier Wales A more equal Wales A Wales of cohesive communities A Wales of vibrant culture and Welsh language
Climate Change	To what extent would resilient farm businesses mitigate or adapt to climate change?	Climate change duty Biodiversity/resilience of ecosystem duty A resilient Wales

Providing the relevant advisory support is implemented and skills/capital are addressed, more resilient farm businesses will deliver against the following Natural Resources Policy (NRP) objectives:

- Increased canopy cover and well-located woodland, for example close to towns and cities where it will have the greatest recreational and ecosystem service value
- Maintaining, enhancing and restoring floodplains and hydrological systems to reduce flood risk and improve water quality and supply; (including catchment management approaches, natural flood management, soil management etc)
- Restoration of our uplands and managing them for biodiversity, carbon, water, flood risk and recreational benefits
- Resilient ecological networks
- Coastal zone management and adaptation

4 Interventions

As stated in the SFS, payments for certain environmental and social outcomes would provide farm businesses with a new income stream. This diversified income portfolio would reduce risk to the farm business whilst also increasing resilience to market volatility. The SFS also identified that those businesses which have long-term viability are those that have the potential to be environmentally and socially sustainable. To ensure uptake from industry, it is crucial that the SFS is not wholly associated with being at odds with production. Rather, it should be a mechanism to facilitate more sustainable production alongside delivery of environmental and social outcomes.

It is also important to recognise that the features of a financially ‘‘top performing’ farm business (e.g. cost efficiency and market alignment) can in some cases result in detrimental outcomes for the environment (e.g. removal of hedgerows, in-field trees, intensification of production). Firbank et al (2013) identified that on ‘progressive farms’ which were identified as participating in ‘sustainable intensification’ (defined as where food production per unit area had increased during the study period, and where none of the environmental variables had deteriorated), these businesses were driven by profit maximisation. Although overall profitability is a logical driver for a business, with regards to farm businesses in particular, Hyland et al (2015) identified other significant drivers also underpin farmer behaviour. These included a degree of adherence to farming traditions and a preference for actions which would result in an overall reduction in workload. Firbank et al (2013) also found strong evidence to support the perspective within the farming sector that active management of land for biodiversity was a good thing to do but the general consensus is that any associated costs should be borne by external financial support.

As such a key role for the scheme in terms of business resilience could be to reframe the definition of ‘top performers’ to include delivery associated with social and environmental outcomes. This would expand the focus beyond the conventional definition of a profit maximising top performer’ whilst helping to facilitate a holistic understanding within the farming, public and wider private sectors of the range of ‘values’ derived from a sustainably managed landscape.

Regardless of where individual farmers sit within the spectrum of current assessments of farm performance, the delivery of the SFS objectives will be entirely dependent upon whether they are prepared and able (i.e. possess skills, capacity) to take advantage of the new opportunities. ERAMMP SFS Evidence Review 2 *Sward Management* (Newell Price et al., 2019) has highlighted that the most significant barriers to uptake of sward management interventions are most likely to be social, practical and psychological, and can only be overcome through a better understanding of each specific farming system (enterprises, machinery availability, labour availability, market) and of farmer behaviour. It is vital to understand the practical limitations of adopting a certain practice in different landscapes, microclimatic conditions and soil type situations; and the individual farmer’s outlook and vision for the future will be key to determining their innovative capacity (Brooks & Loevinsohn, 2011). It is also important to highlight the risk that farmers in areas previously managed under AES will choose to intensify production, leading to undesirable consequences. It will therefore be critical to perform a full impact assessment and piloting of any policy/regulation changes before they are implemented.

Work undertaken by Wynne-Jones (2013) highlighted that most farmers see their primary role as being producers of food, and few understand the concept of being producers of ecosystem services or other environmental outcomes. Those who take up higher tier agri-environment schemes generally do so as a way to support an approach to farming that makes less demand of their time and resources, or as a risk management solution to smooth incomes during uncertain economic times (Ingram et al., 2013). As a consequence, the efficacy of schemes such as Glastir and Catchment Sensitive Farming, in delivering against their environmental objectives is often undermined by the fact that farmers often select, options that can be easily implemented (Arnott and Harris, 2018) rather than those that would generate the best ecological return on investment; often referred to as adverse selection (Quillerou and Fraser, 2010). This 'business as usual' option selection often reflects a farmers understanding of what works best for their business but also demonstrates shortcomings in the landowners understanding of Scheme objectives (Turner et al., 2013).

Given that approximately 40% of Welsh farms are predicted to have a negative income after the removal of subsidies (ADAS CAP Analysis, 2017) landowners will need to adapt to that eventuality or be displaced (over time) by those that do. Such displacement may present opportunities for new entrants to farming but in the short term, it is likely that existing farm businesses with sufficient working capital will instead absorb those smaller farm businesses that come up for sale or land rental. Depending upon the ethos of the larger business, this could come at a social cost, as larger farms sustaining fewer people would contradict the objectives of "A Wales of vibrant communities" and "A Wales of vibrant culture and thriving Welsh language" in the Well-being of Future Generations Act. The 'Opportunities for the Uplands report' (ADAS, 2017) highlighted that the role of government is to champion the social and cultural capital required to facilitate and encourage the transition to new opportunities and markets rather than enable mechanisms which resist change. To promote long-term behavioural change and foster a willingness to participate (de Krom, 2017; Burton and Paragahawewa, 2011), policymakers must think beyond the economic aspects of scheme participation (Riley et al., 2018) but also invest in structures which embrace the importance of social and cultural capital, promote peer to peer exchanges and social learning, which in turn will raise the professionalism of farmer groups (Westerink et al., 2017). This argument is largely borne out by the literature associated with behaviour change.

Behaviour frameworks outlining barriers

It is important to understand the process of how a behaviour is formed. The theory of planned behaviour postulates that an attitude moving towards behaviour encompasses subjective norms, perceived behavioural control and beliefs, which together move towards an intention and ultimately behaviour. Shove's Social Practice Theory hypothesises that practices are made up of skills (knowledge and information available), objects and tools (infrastructure to be able to take up the innovation/practice) and meaning assigned to the practice (shared ideas on the norm).

Improved communication has been cited by many as key to improving the uptake of measures in the agricultural sector. However, the assumption that the transference of knowledge alone, from those who create knowledge to those who act upon the

knowledge, leads to practice change has been criticised (Shove, 2010). The role of networks is important for the assimilation of knowledge (Oliver, 2001; Tsai, 2001; Lane, P.J., 2006) with absorption of information through networks being related to the frequency of contact (Tepic et al., 2012). There are several levels of influence which affect the motivations of farmers to change practices. This is outlined in the conceptual framework in Figure 4.1. Influence can happen at all levels from the farm level, community level and societal level.

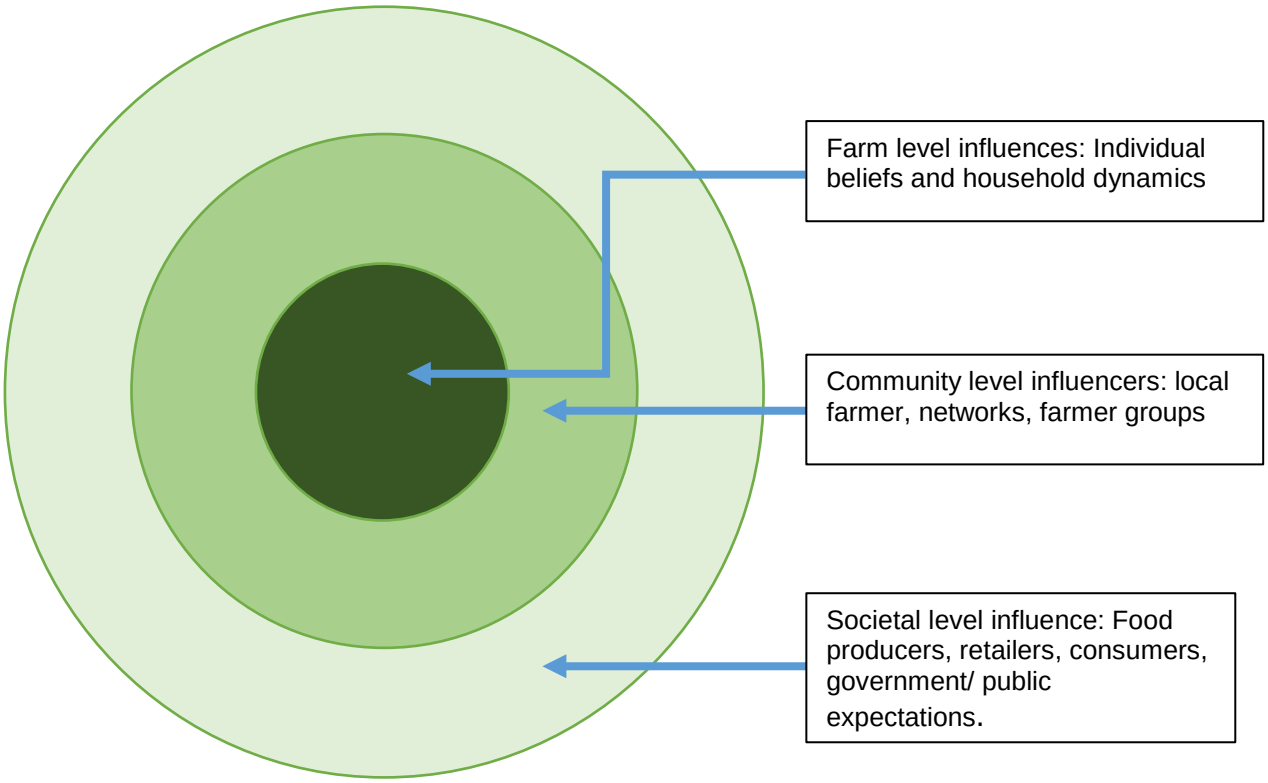

Figure 4.1: Conceptual framework to understand the levels of influencers. Adapted from (Mills, Gaskell et al. 2016)

Community level farming channels such as farming press, vets, farmer groups and advisers have been highlighted as particularly useful for improving knowledge exchange (Garforth, Bailey and Tranter, 2013). It has been reported that farmers and scientists would like more interaction to address a range of issues, however, there has been limited success in open knowledge sharing between groups (Benard, Schuitmaker and Buning, 2014).

Alongside networks the role of trust between the information giver and the farmer is vital in understanding the uptake of and response to information provided (Fisher, 2013).

'Trust is a big part of my business. If I can't trust someone, I don't deal with them, and if that trust is betrayed, I kick them into touch very quickly...Farming still runs very much on a gentleman's hand shake'

Quotation 1 - A gentleman's handshake (Fisher, 2013).

Three groups of external influencers in farms have been identified; vets, supply chain (contractors and abattoirs) and the government (Alarcon et al., 2014). Farmers cited vets as the source of most trusted information (Alarcon et al., 2014). A conceptual

framework (Figure 2) which considers factors which enable the development of trust links the four trust components (competence, commitment to a goal, predictability and caring (Kasperson, R.E., Golding, 1992) with social relationships. Fisher highlights the importance of longevity, consistency and regular contact for social relationships to build trust (Fisher, 2013). This is consistent with findings that suggested longevity and capability were more important than the commercial status of advisory services (Sutherland et al., 2013).

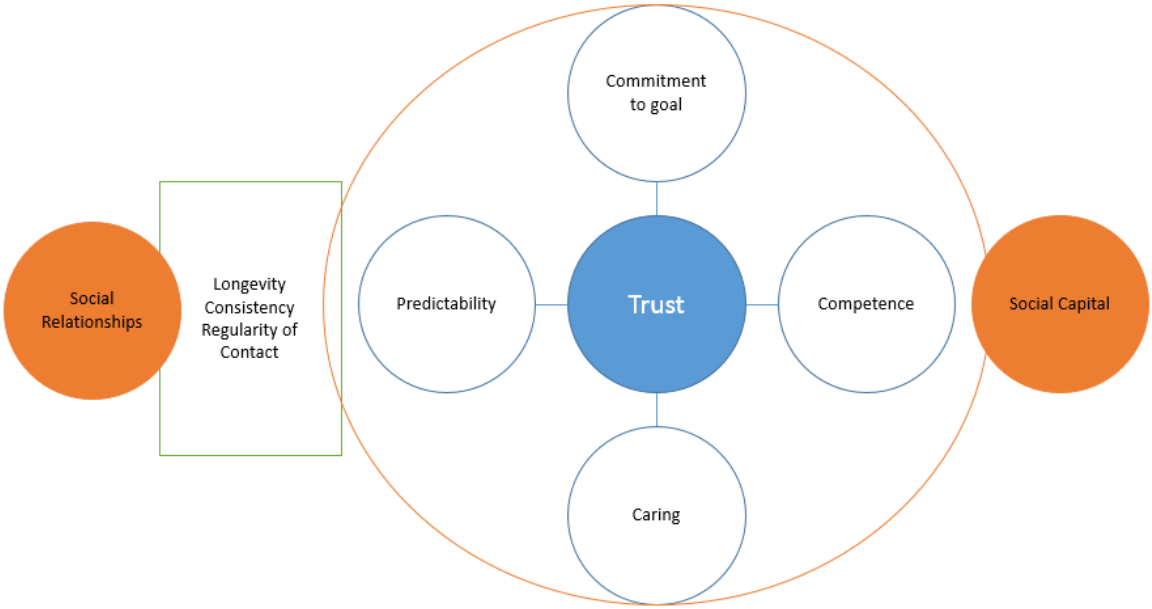

Figure 4.2 Trust conceptual framework adapted from (Fisher, 2013)

Fisher argues that farmers in the UK have little trust of government representatives, by sharing examples where farmers have felt that one or more of the trust components have been broken with government organisations, meaning they are unlikely to integrate information from them. In comparison farmers shared experiences of having strong relationships with their private vets allowing for information transfer to take place (Brennan and Christley, 2013; Fisher, 2013). Information with a local context and understanding of practices is more likely to have an impact (Enticott et al., 2011) and vets have been identified by farmers as figures who can help interpret and give a local context to national more generic information (Garforth, Bailey and Tranter, 2013).

Aside from vets, well known agencies and organisations were more able to influence farmer behaviour, particularly if they were seen to have an 'impartial' or having a 'pro farmer' orientation (Sutherland et al., 2013). Previous experience and the credibility of the information and advice were identified as important factors for pig farmer decision towards the control of disease (Garforth, Bailey and Tranter, 2013). Ultimately a variety of methods are needed to engage with a variety of farmers (Jansen et al., 2010) and it is important for policy makers to not only think about the how material is disseminated, but also who distributes the content.

As identified above and the work carried out into various segmentation models of the farming community (Lee-Wolfe et al., 2014; Hyland et al., 2015) reveals the heterogeneity of the Welsh Agricultural Sector at all levels within the spectrum of

performance and resilience (e.g. economic, social and environmental perspective). To affect positive change a variety of methods targeted at the different farmers types must include:

- A recognition of the social and economic factors that influence decision making and knowledge transfer (e.g.age, education, gender, attitude to risk, personality, availability of social and economic capital) within the current generation of farmers
- Provision of opportunities for learning and innovation for current land managers whilst also enabling growth and skills development of subsequent generations
- Exploration of novel types of market-orientated agricultural policy tools that could be developed as mechanisms to help farmers manage market uncertainty and supply chain limitations

The interventions outlined below are a combination of approaches which reflect the potential to learn the lessons associated with improving upon what is already working whilst also providing proposals for novel mechanisms which require further exploration.

4.1 Intervention (Knowledge Transfer and Exchange)

The current Farming Connect offer is a strong reflection of the lessons learned from evaluations of previous RDPs and emerging literature. This includes the necessity of a plethora of techniques and methods for engaging with and upskilling a heterogeneous group of people. As such, it is not necessary to restate all of the work that Farming Connect is delivering in this area but we have instead highlighted key aspects of the Farming Connect programme that tally with current literature on supporting behaviour change and for which there is available external evaluation documents and expert opinion.

Trusted intermediaries

The role of these intermediaries is crucial across the whole of the sector. However, it is particularly important for those farmers who may not already be in the upper quartile of farm businesses, as it has the potential to enable them to learn from their more innovative and entrepreneurial peers. Evaluations of a range of Farming Connect services conducted by SQW with respect to the 2007 – 2014 RDP showed that Farming Connect was seen as an independent “trusted provider” of support and advice. The importance of skills, professionalism and quality of co-ordinators and consultants was key across all elements of Farming Connect and the importance of co-ordinators investing time “on the ground” to build a good rapport with farmers and get the “harder to reach” was deemed crucial to expanding the reach into the wider farming sector.

The Agrisgôp element of the Farming Connect is defined as an ‘action learning’ development programme designed to improve the sustainability of rural communities in Wales. It utilises group facilitators (called ‘leaders’) who are recruited from local communities and then engage local farmers as participants in the programme. The individual groups then focus on a particular subject or suite of subjects to facilitate

the development of skills, opportunities for innovation and entrepreneurism. This element of the Farming Connect programme builds on the evidence base which highlights the role of trust in facilitating learning and behaviour change. The linkages with innovation and entrepreneurism are also supported through the mechanisms of regular group meetings which can involve external experts from other elements of the supply chain.

Farm Advisory Services (FAS) element of the Farming Connect Subsidised Services programme was designed to help farm and forestry businesses improve the sustainable management of their holdings and meet statutory requirements through one-to-one advice. ERAMMP SFS Evidence Review 4: *Building ecosystem resilience and focal species resilience* (Keenleyside, 2019) have highlighted that farmers often lack the knowledge, skills and time to manage some of their existing farmland habitat. Although third sector NGOs such as Coed Cymru and the Wildlife Trusts often work to fill the advice gap, the role of local project officers and a trusted advisory service will be key to the implementation and efficacy of the SFS sustainable land management interventions. A reliable and readily accessible advice service will also be key for the implementation of new tools such as the GHG calculator outlined in ERAMMP SFS Evidence Review 7: *Systems approach to GHG emissions reduction* (Martineau, 2019).

4.1.1 *Causality*

An evaluation of Agrisgộp from the previous 2007 – 2014 RDP completed by SQW (2011) identified that it had:

i. performed well against the programme's aims and objectives.
ii. helped participants to gain confidence, and behave in a more innovative and entrepreneurial way
iii. enable beneficiaries to feel more confident in developing new business ideas, more assertive in making business decisions, and have greater optimism for the future of farming
iv. changed the 'culture' of those taking part, particularly in terms of their self-reflection, ability to appraise alternatives, approach to problem solving, commercial awareness and willingness to consider change – and has resulted in sustainable changes to the way in which farmers do business
v. influenced the enterprise and innovation skills of participants and analytical skills to better assess business opportunities.

As a result of the outcomes above, the evidence suggests that beneficiaries have gone on to make improvements to their businesses which in turn have improved overall business viability, performance and sustainability. In addition, beneficiaries have accessed new markets as a result of Agrisgộp (for example, the renewable energy market and securing contracts with major national supermarkets) and have improved efficiency/reduced costs. The extent to which Agrisgộp has created new jobs is limited, but the available evidence suggests that Agrisgộp has helped to increase the productivity of existing employment on the farm.

An evaluation of the FCSS conducted by SQW (2013) found that the efforts made by the skilled and professional regional co-ordinators to build relations with farmers and attend events/markets to encourage the "harder to reach" to get involved proved effective at spreading the message. Message dissemination will be key to the efficacy of SFS interventions such as those identified in ERAMMP SFS Evidence Review 3 *Soil Carbon Management* (Alison, 2019)

(e.g. the significant trade-offs between the utility of enhanced carbon storage via organic manure application where application is excessive or poorly timed (Goulding et al., 2000)).

A key feature that needs improvement in the multifaceted mechanism that is Farming Connect is the sharing of learning and best-practice across all facets of the programme. This lack of 'cross pollination' between the multifaceted Farming Connect elements was shown in previous evaluations to limit the opportunity for both farmers and the advisors/proponents of the programme to signpost additional features or learn from others.

4.1.2 *Co-benefits and trade-offs*

The evaluation by SQW (2011) also highlighted that around one-third to two-fifths of beneficiaries observed an increase in turnover that was partly/fully attributable to FCSS (most said it was partly attributable to FCSS). The services were also identified as having delivered other benefits, for example, in helping farmers to lever further investment, in helping to professionalise the sector, and through wider environmental, social and economic benefits brought to rural communities across Wales.

4.1.3 *Displacement*

The evaluation conducted by SQW (2011) of the Agrisgôp programme identified that some of the Agrisgôp groups were entering existing/well established markets, which may result in a reduction in market share for existing producers. It was determined that in some cases this resulted in a raising of the standards of mainstream farming activity and that this shouldn't deter the programme from continuing to make innovation and access to new markets a priority.

4.1.4 *Longevity*

Bradley and Hill (2015) highlighted that some £8 million of public expenditure on Farming Connect appears to have generated £8.2 million of extra profit. This would imply that the programme was about as effective as giving the funds direct to farmers as a way of increasing their income. However, no account is taken in this calculation of the persistence of benefits to the incomes of the participating farms beyond the period covered by the follow-up data; neither is account taken of non-private benefits (animal health and welfare, environmental, etc.), nor of second-order benefits such as savings from reduced work place injuries, pollution clean-up costs, etc.

The degree of 'persistence' of these activities in terms of affecting long term behaviour change is difficult to quantify, often because of the lack of a counter factual.

4.1.5 *Social and economic barriers*

Join-up between the advice provision and grant aided working capital interventions (4.5) could be a key intervention to facilitate small businesses with significant social capital (e.g. Nutrient Management Plans) but limited working capital.

4.1.6 *Metrics and verification*

Previous evaluations of the Farming Connect programme have highlighted that the adequate and replicable monitoring was not sufficient across all elements of the

programme. A lack of a counterfactual was also highlighted as limitation in terms of assessing the impact.

It has been suggested that one method for verification of efficacy could be the establishment of a long-term focus group of participants. This group would be surveyed over an extended period to assess their response to the programme, the impact of interventions and whilst providing on-going evidence for intervention efficacy and alteration.

The Welsh Rural Observatory (2014) has also highlighted that it is important to ensure that flexibility and on-going evaluations are built-in to any future public spending method. It was felt that current evaluation methods were often conducted in a way that did not foster ownership or inclusion of the participating groups. If some element of self-evaluation was present and on-going within the programme, a culture of innovation would be nurtured in Wales which accepted risk and the freedom to fail.

4.2 Intervention (Skills development)

The WG have already highlighted in the Business Improvement excerpt that statistically, those with a higher formal education level are more likely to be better performers, more likely to adopt innovation and technology and more likely to have the business skills necessary for increased business resilience. This is also reflected in the commitment of the UK farming sector to professional development.

In 2012, only 32% of UK farmers had any formal agricultural training as compared to 72% in the Netherlands and 68% in Germany. This has been correlated with multiple methods of productivity measurement (including Total Factor Productivity and Agricultural Labour productivity), for which both the Netherlands and Germany demonstrate a significantly higher performance than the UK (AHDB, 2018).

The Republic of Ireland has established a mandatory training system through Teagasc; the Irish Agriculture and Food Development Authority, for all those who wish to be able to access stamp duty relief and various grant schemes. All farmers who have not previously completed an Agricultural Award program are required to train for a ‘Green Certificate’. The Green Certificate refers to a list of agriculture courses or agricultural science courses which qualifies a person as a ‘trained farmer’ and is designed to enable the next generation of farmers to develop skill sets that will enable them to be independent of grant aided farming in the future. There are many ways to obtain one of these qualifications from Teagasc including fulltime education in a Teagasc college or part time in one of the 12 Teagasc Regional Education Centres. It takes a minimum of 2 years to complete this training and the content gives graduates the skills to run a farm business.

As part of the Northern Ireland Future Agricultural Policy Framework Consultation document, the Northern Irish government have also highlighted the need for mandatory minimum education levels within their farming sector. They have proposed that by 2025, anyone taking over as head, or effective head, of a commercial farm or horticulture business should have at least a relevant Level 3 qualification. Knowledge exchange has also been identified as fundamental to CPD within the Northern Irish Agricultural sector.

The Welsh Rural Observatory (2014) highlighted the need for there to be a greater prioritisation of professional development within the land economy, in order to raise the status and standards of the sector and provide more attractive employment

prospects. This could be achieved through the better use of existing graduates but there is also a need to promote training, continuing Professional Development and professional support networks amongst both the existing and future land economy professions (including farmers) and advisors.

The implementation of a mandatory education level for those seeking to participate in the SFS is one way to facilitate not only an improvement in the skill set of the farming sector but also a greater appreciation for education and as a consequence, CPD. To facilitate this requirement, the Welsh Government could establish a Panel of Experts to work closely with the Sector Skills Councils to ensure that the courses being delivered by the Higher and Further Education Institutions were themselves meeting the requirements for an environmentally and socially sustainable agricultural sector.

4.3 Intervention (Succession)

The capability of the Welsh farming sector is not simply a reflection of the current generation of farmers but is strongly influenced by younger farmers and new entrants looking to take over the business. The presence of a successor has long been identified as a key driver of innovation and expansion of farm businesses (Barnes et al., 2014; Chiswell, 2014; Potter and Lobley, 1992). Farms with an identified successor and an established plan for the handover of responsibility tend to be motivated, as well as increasingly disposed to adaptation, investment and expansion (Chiswell, H., 2014). This was also highlighted by (Lee-Wolfe, 2014) who identified that productivity, efficiency and passing the farm on to the next generation tended to be raised more frequently by those farmers identified as 'commercially minded' in the farmer focus groups.

4.3.1 *Causality*

The WG have sought to address the issue of 'succession' through the implementation of the Young Entrants Support Scheme in the previous RDP and the Young Entrants Programme in the current round. Both programmes were designed to improve mobility and accelerate succession within the agricultural industry by providing direct working capital to young farmers (sub 40 years of age). This was designed to facilitate entrepreneurial and innovative activity within the farming sector. However, expert opinion states that although it has brought some younger individuals into business ownership than would have been the case otherwise, it is not always achieving its intended outcome because there is often no real or robust linkage between training/CPD/infrastructure investment and the Business Plan. The transition of these young entrants to head of holding status with limited training and mentoring also limits the viability of the process. A phased transition of succession, with defined benchmarks (e.g. evidence of planning, evidence of longevity within farm business) whilst making access to support suitable to the younger generation (e.g. digital tools, social media-based platforms) would result in more robust and persistent outcomes.

4.4 Intervention (Producer Co-operation)

This involves support for collective action via Producer Organisations (POs) and/or informal groups and can incorporate horizontal co-ordination (i.e. collaboration among farmers at the same level of the supply chain) and vertical co-ordination (i.e.

collaboration between farmers and other supply chain actors up or downstream of the farm).

This intervention would only be successful if specific policy mechanisms were implemented to support collaboration and would rely on a degree of continued government support, but with a new emphasis on business and marketing skills and technology uptake. Government involvement may also be required to implement niche food production (e.g. Sustainable Brand Value) as although marketing is not reliant on regulation change clear labelling rules and enforcement by trading standards is an essential element of maintaining consumer trust.

Welsh Government could build on early momentum gained for the Sustainable Brand Values initiative. This aims to develop and promote a new 'brand' for Welsh food products, certified on its sustainability credentials. This is similar in many ways to the Origin Green initiative in Ireland, which promotes Irish produce around the world as produce that has in-built sustainability. The scheme has considerable buy-in from all aspects of the agri-food chain and gives participants advice on how to improve business (economic) and environmental performance year-on-year. Wales could emulate this plan, and this could play an important role in securing access to new markets for Welsh produce in the post-Brexit era, or of course gain a firmer stronghold in existing markets.

4.4.1 *Causality*

POs and cooperatives are a means of improving the market power of what are often small-scale and fragmented producers, in the face of powerful corporate retailers. Aggregating the outputs of large numbers of small-scale producers has been seen as critical in allowing access to large supermarket chains and subsequently to overseas markets. Farmers often frame issues linked to price and respond at a farm-level (which may be more comfortable or beneficial to them in the short-term but does not support the wider sector).

Schermer et al. (2011) found that "collective [farmers marketing] initiatives have contributed to the development and dissemination of sustainable production methods". This is supported by a study which scored farms in a dry land agricultural system in Spain using a sustainability indicator (Reig-Martinez et al. 2011). Farms that were part of an agricultural cooperative had a greater sustainability indicator score than those that weren't because participation enabled the farmer to optimise the use of resources and apply cooperative sourced technical expertise. Similarly, Galdeano-Gomez (2008) found that an increase in productivity in horticultural cooperatives in Andalucia, Spain, was due to an increase in the environmental productivity, measured as the reduction in wasted produce. This increase in environmental productivity was due to increased regulation, consumer quality schemes and better qualified cooperative staff.

A successful example from Italy is "O-pera", an organization that involves exclusively Italian fruit growers specialized in the cultivation of pears. It represents more than 1,000 pear fruit growers, with the support of agronomists and technicians. Each O-pera pear follows a precise path, from cultivation to packaging. There is a focus on developing new varieties which are more attractive to the consumer. However, this takes time and needs to be carefully evaluated. The idea is to open up new markets and market opportunities.

In Belgium, an initiative entitled Vegaplan has been developed, which has involved collaboration along the supply chain helping to ensure access for those products that achieve a set standard. It incorporates cross compliance measures, as well as being exchangeable with the German equivalent, thereby allowing access to the German market.

Dobson (2011) shares how Delamere Dairies in Knutsford, England became market leaders in producing and selling goat's milk, using strategies such as co-operative marketing whereby they joined forces with other producers to have higher volumes that they could supply into larger customers. Further, they developed value-added products, such as seasoning and catering and used auction markets for additional sales.

Some farmer cooperatives exist in the UK, with different degrees of success. CAMGRAIN in the Eastern Counties buys, processes, stores and ultimately sells grain of guaranteed quality.

Omsco is an organic dairy company, managing 65% of the UK's organic milk supply that is entirely owned and run by farmers (100% organic). It comprises over 250 members (https://www.omsco.co.uk/why-us/who-we-are/)

In contrast, Dairy Farmers of Britain **was** a UK co-operative milk processor that bought milk directly from farmers and had several factories. It had 2,000 member farms, but it closed in 2007.

Collaborative approaches are much needed, especially co-operatives but not all sectors or commodities trust these arrangements and as highlighted above, a number of these initiatives have been set up only to disappear after a few years in operation.

4.4.2 *Co-benefits and trade-offs*

It should be noted that informal social ties also play an important role and should be considered as part of farmers' strategies to manage market uncertainty.

4.5 Intervention (Working Capital)

Changing infrastructure can be difficult due to the cost and time to, design the change to the building, get relevant permissions and construct the appropriate structure. It has been shown that grant opportunities play a primary role in farmer decision making (Sutherland, 2010). This included decisions on the construction of agricultural buildings and on the farm development. More recently adding value to the end product, with the consumer paying for higher specifications, has been seen as attractive by farmers and the government in the UK. Providing financial reward for delivery of public good is possible, however, it is dependent on robust measures to provide trust in the supply chain for the consumer (Nocella, Hubbard and Scarpa, 2010).

For small farm businesses with significant social capital but limited working capital, there is a case for intervention due to credit market failure (i.e. small businesses face higher transaction costs and higher interest rates). The significant costs associated with implementing certain intervention, such as those outlined in ERAMMP SFS Evidence Review 1 *Soil Nutrient Management* (Williams, 2019) (e.g. slurry storage capacity, precision application equipment) may limit uptake. There ultimately also needs to be positive environmental outcomes for these interventions to link with the

overarching objectives of the SFS. Monies saved from an overall reduction in payments could be used via appropriate capital grants to facilitate farmer investment in technology that improves efficiencies in use of resources and time, and help the industry embrace technological developments. Grant-aid schemes to achieve similar outcomes have already been available to Welsh farmers for many years (e.g. the Glastir Efficiency Scheme, Farm Business Grant, Sustainable Production Grant).

Officials reviewed the opportunity of delivering the funding as a Working Capital Loan to ensure the return on the investment would be recycled for further investment. However, to achieve this, the Development Bank for Wales would need to hold the fund and administer on behalf of the Welsh Government. Given the short window of opportunity to deliver on this funding allocation within the respective financial years, the steps required to establish and deliver the fund was deemed to be too challenging within the necessary timeframe. With these limitations lifted, the institution of this loan via the Development Bank for Wales could form a useful part of the suite of measures available to developing innovation within the farming sector.

4.5.1 *Social and economic barriers*

The assumption that farm businesses have the financial capacity to invest in modernisation may be erroneous, even where grant aid pays a significant proportion of costs (as witnessed in the relatively low uptake of the recent Farm Business Grant). Moreover, whilst grant aid could help improve productivity, it may account for a considerable proportion of spend, often with debatable long-term benefit to businesses. Allocation of funding towards such a scheme should therefore be done with caution. This is especially so concerning machinery, which typically have large up-front cost coupled with high rates of depreciation and do not bring about permanent change to farm viability

4.6 Intervention (Financial measures)

For those land managers who would be identified as ‘top quartile operators’ with all the necessary skills and capabilities, there are a range of interventions which Government could explore to help facilitate resilience. These include measures such as insurance schemes, futures markets and contractualisation. The uptake of such tools by farmers has been modest to date (Maye et al., 2018) and there is a limit to the degree of influence that the WG could wield in this area (e.g. Grocery adjudicator). However, given that they are a potentially important risk management tool as a means for hedging and price discovery, Veerman et al. (2016) have recommended their mandatory inclusion in future RDPs across Europe. Given the complexity of these Scheme it is essential that the implantation of any such interventions are accompanied by more awareness-raising and training measures.

5 Evidence Gaps

An assessment of the current Welsh Government mechanism to facilitate succession has not been undertaken. Given the strong evidence of the linkages between identified successors and innovation within the industry, an understanding of the efficacy of current mechanisms is key to ensuring that lessons are learned and best practise developed.

In the face of powerful corporate retailers, producer organisations and cooperatives are a means of improving the market power of what are often small-scale and fragmented producers. Despite the success of these mechanisms elsewhere in the world, a number of these initiatives have been set up in the UK only to disappear after a few years in operation. The establishment of these initiatives is often more successful if lead from the bottom-up, however mechanisms by which the Welsh Government could facilitate their establishment and continuity is a key area of exploration.

Exposure to market volatility and uncertainty is a current feature of commercial agriculture. To facilitate the development of new markets for environmental goods, it is essential to explore the efficacy, utility and viability of:

i. Risk management tools (e.g. insurance schemes[3], futures markets (as a means for hedging, price discovery).
ii. Wales/UK level framework legislation to impact upon unfair trading practises
iii. Contractualisation (to rebalance bargaining power; absence of written contracts can be a disadvantage).
iv. Access to finance (agriculture is risky in the world of financing, with entry barriers for non-specialised banks/institutional lenders; young farmers, small farmers and producer groups are the most affected; need more measures to facilitate access to finance, including targeted financial instruments).

[3] Agra CEAS have recently completed a project for WG on insurance schemes which is as yet unpublished

6 Summary

Confidence	Intervention name	Key Outcomes	Key Benefits	Critical concerns
Blue	Knowledge transfer and exchange: Improve skills and disseminate information to underpin socio-economic resilience in rural communities/ farm business	1. Ability to understand and adapt to new drivers of policy interventions (e.g. GHG emissions, Climate Change) 2. Ability to obtain alternative source of income (e.g. supply environmental management services)	Socio-economic resilience of farmer livelihoods, ability to adapt to new on-farm and rural economy opportunities.	Current Farming Connect system has a high level of engagement but currently no mechanism in place to track whether the same cohort of farmers is participating in a range of activities or if attendance truly reflects engagement across the sector
Blue	Skills development: Implementation of mandatory education level for those wishing to participate in the SFS	1. Increased skills and knowledge base within the farming sector 2. Enhanced levels of professionalism within the sector	Recognition of the value of CPD within the farming sector and greater resilience to changing market (public or private) demands	How to implement within current system given range of capabilities currently operating in the sector. Level of education required needs to be carefully explored
Blue	Succession support for young and new entrants into farming	1. Stratification of age range within agricultural sector 2. Diversification of skills sets and perspectives within the farming sector	Increased levels of innovation and stability within the agricultural sector	Links closely with above intervention. Implementation of intervention will be key to efficacy (e.g. assessment metrics)
Amber	Producer Cooperation: Horizontal and vertical Supply-chain (produce custody) collaboration measures	Ability to manage and supply certified environmental products of different farm locations, or production standards)	Potential improved return on defined production locations/ standards.	Part of industry support measures – see link to industry/ sector policy positions.
Amber	Working Capital	Provides targeted capital investment to small business to counteract market failure and facilitate innovation	Support diversification of sector and uptake of economic and environmental efficiency mechanisms	Assessment for allocation of support will have to be robust to ensure best value for money and appropriate business planning
Pink	Financial measures	Mitigates the uncertainties of emerging and existing market systems	Facilitates innovation within the sector and increases market awareness	Interventions largely untested and limitations as to how effective Welsh Government can be in facilitating this within a global marketplace

Table 6.1 Confidence in Interventions - Summary table

Colour Key:

- Blue = well tested at multiple sites with outcomes consistent with accepted logic chain. No reasonable dis-benefits or practical limitations relating to successful implementation.
- Amber = agreement in the expert community there is an intervention logic chain which can be supported but either evidence is currently limited and/or there are some trade-offs or dis-benefits which WG need to consider.
- Pink = either expert judgement does not support logic chain and/or whilst logic chain would suggest it should work there is evidence of one or more of the following:
  - its practical potential is limited due to a range of issues (e.g. beyond reasonable expectation of advisory support which can be supplied and/or highly variable outcome beyond current understanding or ability to target),
  - the outcome/benefit is so small in magnitude with few co-benefits that it may not be worth the administration costs,
  - there are significant trade-offs.

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