



## SCIENCE, POLICY AND PRACTICE NOTE 5

# Assessing the Performance of Commercial Farms





## The Issue

Sustainable intensification involves balancing farm performance in terms of production, environment and socio-economic goods, in ways that enhance (or at least do not threaten) the viability of the farm business. Understanding this balance is critical to the development of policies and practices to support SI on commercial farms. Yet it clearly varies between farms, according to the kind of enterprise (eg between arable and upland livestock), the farming system (eg between indoor and outdoor dairy), the priorities set to different farm outputs, the present performance of the farm and the capacity to change. The challenge is to be able to measure a farm's performance in agronomic, economic, environmental and social terms that are sufficiently flexible to be able to cope with this tremendous variation between farms, yet sufficiently robust to be used to develop and monitor policies.

Information on farm economic and agronomic performance is routinely collected through the Farm Business Survey. But while there are various tools to measure the environmental quality of farming, these have not been standardised, and it is not clear how they should be used and interpreted.

## SIP's Response

The Sustainable Intensification research Platform (SIP) undertook a major survey of the performance of commercial farms selected from the major farm types across England and Wales.

The first task was to decide what to measure. A working group of scientists, agronomists and other stakeholders reviewed 83 potential indicators that could be derived from interviews with farmers. These covered farm financial performance, production, environmental and social characteristics. Estimates of pollution require the use of models from data about the farm and land management, while a new indicator was developed to infer biodiversity levels just from data available to a farmer. A small group of highlight indicators was selected for data analysis and presentation following expert consultation, but most of the other indicators were also recorded for more detailed analyses.

Highlight indicators of sustainable intensification:

- Farm Type
- Virtual Farm Area, that takes into account land actually managed by the farm or used to grow feed for the farm (ha)
- Profit excluding indirect costs (£)
- Proportion of income arising from sales of farm goods
- Net Energy content of food removed from the farm (GJ)
- Farm Assurance Score
- Farmer age
- Farmer education level
- Total hours worked by all staff on the farm
- Total hours spent on staff training
- Co-operative farming score
- Length of footpaths across the farm (km)
- Area of open access land (ha)
- Potential GHG emissions (kg CO<sub>2</sub> eq)
- Potential nitrate losses to water (Kg)
- Biodiversity score

SIP undertook a detailed farm survey to collect values for these indicators from 59 farms, including arable, mixed, lowland and upland livestock and dairy, using interviews (see figure opposite).

The farm types differed because of their suitability for different crops and livestock. At the whole farm scale, upland farms has the greatest areas of open access land, while cereal farms produced the most food, in terms of energy. When corrected for area, mixed farms also produced high levels of food, while biodiversity scores were high for cereal, mixed and upland farms. There was no single farm type that shows best all round performance. Indeed, other research comparing organic and non-organic farms, and indoor versus outdoor livestock, also suggests that no one approach to farming scores more highly in all respects to others.



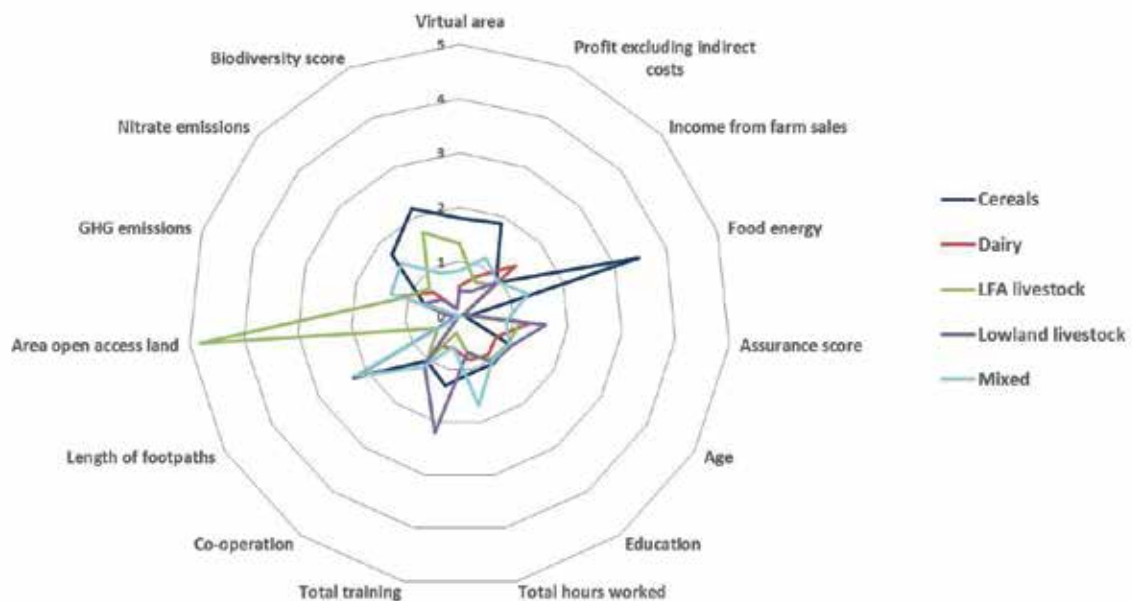
We found that, across all farm types, the more profitable the farm, the greater the estimated losses of nitrates. However, there were no obvious relationships between farm performance and any of the social variables collected; it was not possible to identify strongly performing farms from farmer age or education. It seems that improving the performance of a farm is something that any farmer can do, but the options for improvement depend on the farm type and the potential of the land.

Data were also collected from the farms about their engagement with the SIP concept, especially on how many SI practices (including the use of zero tillage, installing wildlife and buffer strips) they were actually using. We could find no relationship between the numbers of SI practices adopted by farmers and their performance. There are many possible reasons for this, not least that some practices only affect small areas of land, and others take time for their benefits to show.

## Opportunities for Policy and Practice

SI seems to be an option open to all farmers, on all farm types. There is no single ideal farming system, and no sign that the social background of the farmer determines farm performance.

SI indicators are not sensitive enough to capture the benefits of everything that farmers can do. But they still provide useful snapshots of farm performance, especially when comparing performance among farms of the same types and, ideally, over time, and they have the potential to guide policies when a potential problem appears. For example, the relationships between profitability and levels of pollution may require some form of policy intervention, but more analysis is needed first, to check how typical our results are, and whether they are being unduly influenced by other factors.



Mean values for Farm performance of different farming systems, showing differences between farm types. Data are at the whole farm scale.



## Authors

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## Further Resources

The below report can be accessed via the Defra website. Please visit: <http://bit.ly/2sN9WUW>

Firbank, L., Elliot, J., Turner, C., Cao, Y., Clark, J., Green, K., Field, R., and Peach, W. (2017) Final Report for Work Package 1.2A: *Observe and assess the performance of commercial farms to identify factors that contribute to high economic, environmental and social performance*. Report for Defra project LM0201 Sustainable Intensification Research Platform Project 1: Integrated Farm Management for Improved Economic, Environmental and Social Performance

## Acknowledgements

With sincere thanks to all those who volunteered their valuable time and expertise during the development of this work

Front Cover Image: Used with the kind permission of LEAF (Linking Environment and Farming)

Page 2 Image: The Deputation, John Spooner, Flickr

Page 3 Image: Oddly inquisitive sheep, Peer Lawther, Flickr

Back Cover Image: Potato Harvest, David Wright, Flickr

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*The Sustainable Intensification Research Platform (SIP) is a multi-partner research programme comprising academia, farmers, industry experts, environmental organisations, and policymakers.*

*Funded by Defra and the Welsh Government, the platform explores the opportunities and risks of Sustainable Intensification (SI) from a range of perspectives and landscape scales across England and Wales.*

*The Platform, run from 2014-17, has investigated ways to increase farm productivity, reduce environmental impacts, and increase the benefits that agricultural land provides to society.*



**SUSTAINABLE INTENSIFICATION  
RESEARCH PLATFORM**

## More Information

Visit: [www.siplatform.org.uk](http://www.siplatform.org.uk)

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Rhaglen ymchwil aml-bartner yw'r Platform Ymchwil i Ddwyddau Cynaliadwy (SIP) sy'n cynnwys academaïa, fffermywyr, arbenigwyr y diwydiant, sefydliadau amgylcheddol, a gwneuthurwyr polisi.

Arbeniair y platfform gan Defra a Llywodraeth Cymru, ac mae'n archwilio'r cyfnewid a'r risgiau sydd ynghlwm wrth Ddwyddau Cynaliadwy o amrywiaeth o safbwyntiau a g'raddfeydd tirwedd ar draws Cymru a Lloegr.

Mae'r Platform, a oedd yn gweithredu o 2014-17, wedi ymchwilio i ffyrdd o gyfyngu cynhyrchiant fferydd, lleihau effeithiau amgylcheddol, a chynyddu manteision tir amaethyddol i'r gymdeithas.

Performance

for Improved Economic, Environmental and Social Research Platform Project 1: Integrated Farm Management for Defra project LM0201 Sustainable Intensification economic, environmental and social performance. Report commercial farms to identify factors that contribute to high Package 1.2A: Observe and assess the performance of Firbank, L., Elliott, J., Turner, C., Cao, Y., Clark, J., Green, K., Field, R., and Peach, W. (2017) Final Report for Work

Ymwelwch â: <http://bit.ly/2SN9WUW>

Gellir darllen yr adroddiad isod ar wefan Defra.

Adnoddau pellach

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Awduron

Diolch iadau

Diolch yn fawr iawn i baw a wirfoddolodd eu hamser gwerthfawr a'u harbenigedd wrth i ni ddatblygu'r gwaith hwn

Llun y Clawr Blaen: Defnyddiwyd drwy garedigrwydd LEAF (Linking Environment and Farming/Gwneud Cysylltiad rhwng yr Amgylchedd a Ffermio)

Llun ar Dudalen 2: The Deputation, John Spooner, Flickr

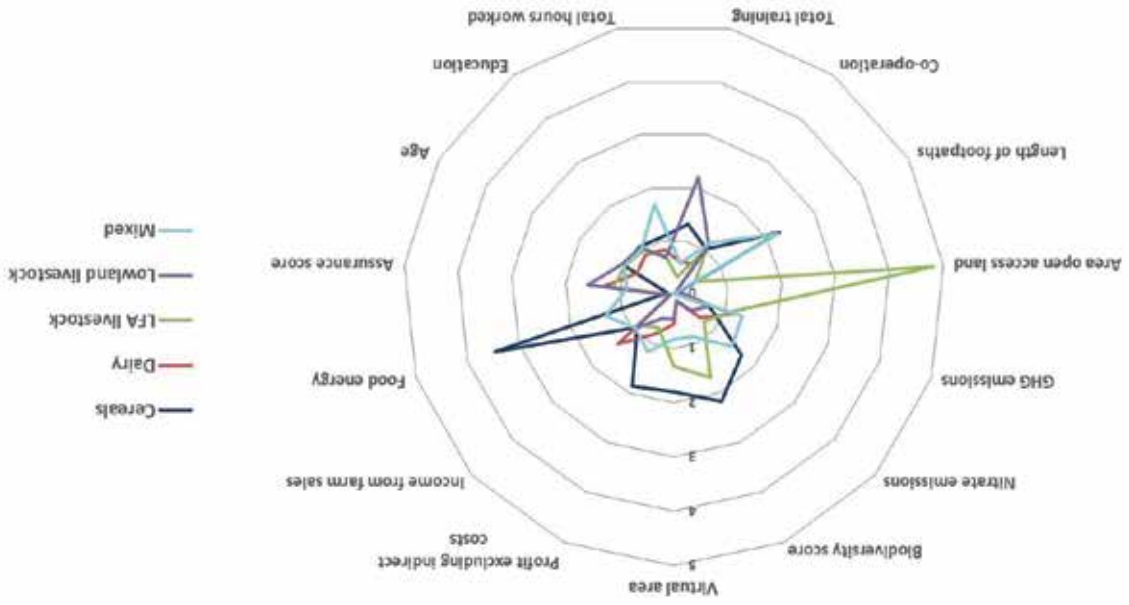
Delwedd ar Dudalen 3: Oddly inquisitive sheep, Peer

Lawther, Flickr. Delwedd ar y Clawr Cefn: Potato Harvest,

David Wright, Flickr



Gwerthoedd cymedr ar gyfer perfformiad ffermydd ar systemau ffermio gwahanol, gan ddangos gwahanolaethau rhwng y mathau o ffermydd. Mae'r data ar raddfa fferm gyfan.



Canfuwyd, ar draws pob math o fferm, mai'r ffermydd sy'n gwneud y gollied amcangyfrifedig fwyaf o ran nitradau yw'r ffermydd sy'n gwneud y mwyaf o elw. Fodd bynnag, nid oedd perthynas amlyg rhwng perfformiad y fferm ac unrhyw rai o'r newidynnau cymdeithasol a gasglwyd; nid oedd yn bosibl nodi ffermydd a oedd yn perfformio'n gryf yn ôl oedran neu addysg y ffermwr. Ymddengys fod gwella perfformiad fferm yn rhywbeth y gall unrhyw ffermwr ei wneud, ond mae'r opsiynau ar gyfer gwella yn dibynnu ar y math o fferm a photensial y tir.

Casglwyd data hefyd o'r ffermydd ynghylch eu hymgyssiliad â chysniad SIR, yn enwedig faint o arferion Dwysau Cynaliadwy (gan gynnwys dim troi tir, gosod lleiniau clustogi a lleiniau bywyd gwylt) yr oeddent yn eu defnyddio mewn gwirionedd. Ni chafwyd perthynas rhwng nifer yr arferion Dwysau Cynaliadwy a fabwysiadwyd gan ffermyr a'u perfformiad. Mae llawer o resymau posibl dros hyn, ag un o'r rhai pennaf yw'r ffaiith bod rhai arferion yn effeithio ar ardaloedd bach o dir yn unig, ond hefyd bod eraill yn cymryd amser cyn i'r manteision dodod i'r amlwg.

### Cyflioedd ar gyfer Polisi ac Ymarfer

Ymddengys fod Dwysau Cynaliadwy yn opsiwn i bob ffermwr ar bob math o fferm. Nid oes un system ffermio sy'n ddefnyddol, ac nid oes arwydd bod ceffndir cymdeithasol y ffermwr yn pennu perfformiad y fferm.

Nid yw dangosyddion Dwysau Cynaliadwy yn ddigon sensitif i gofnodi'r holl fanteision y gall ffermyr eu cyflawni. Ond maent yn rhoi cipolwg defnyddiol o berfformiad y fferm, yn enwedig wrth gymharu perfformiad ymhlith ffermydd o fathau tebyg ac, yn ddefnyddol, dros amser, ac mae ganddynt y potensial i arwain polisiâu pan fydd problemau bosibl yn codi. Er enghraifft, etallai y bydd angen rhyw fath o ymyrraeth o ran polisi ar gyfer y berthynas rhwng profffidioldeb a lefelau llygredd, ond mae angen mwy o ddadansoddi yn gyntaf, i wirio pa mor nodweddiadol y mae ein canlyniadau, ac a ydynt yn cael eu dylanwadu'n ormodol gan ffactorau eraill.





## Y Problem

Mae dwysau cynaliadwy yn cynnwys cydbwysio perfformiad ffermydd yn nhermâu cynhyrchu, yr amgylchedd a nwyddau economaidd-gymdeithasol, mewn ffyrdd sy'n gwella (neu o leiaf ddim yn bygwth) hyfswydd y busnes ffermio. Mae deall y cydbwysedd hwn yn hanfodol wrth ddatblygu polisiau ac arferion i gefnogi Dwysau Cynaliadwy ar ffermydd masnachol. Serch hynny, mae'n amlwg yn amrywio rhwng ffermydd, yn unol â'r math o fenter (e.e. rhwng da byw ar dir ar neu ucheldir), y system ffermio (e.e. rhwng llaethdal dan do neu awyr agored), y blaenoriaethau a osodwyd i gynhyrch fferm gwahanol, perfformiad presennol y fferm a'r capasiti i newid. Yr her yw gallu mesur perfformiad fferm yn nhermâu agorlyddol, economaidd, amgylcheddol a chymdeithasol sy'n ddigon hyblyg i allu ymdopi â'r amrywiol fawr rhwng ffermydd, ond eto'n ddigon cryf i'w defnyddio i ddatblygu a monitro polisiau.

Caffi gywbodaeth am berfformiad economaidd ac agorlyddol ffermydd ei chasglu'n rheolaidd drwy'r Arolwg o Fusnesau Ffermio. Er bod offer amrywiol y gellid eu defnyddio i fesur ansawdd amgylcheddol ffermio, nid yw'r rhain wedi cael eu safoni, ac nid yw'n glir sut y dylid eu defnyddio a'u dehongli.

## Ymateb SIP

Y dasg gyntaf oedd penderfynu beth i'w fesur. Bu gweithgor o 83 o wyddonwyr, agronomegwyr a rhandddeiliaid eraill yn adolygu 83 o ddangosyddion posibl sy'n deillio o gyfweiliadau gyda ffermwyr. Ymhlith y rhain roedd perfformiad arianol y fferm, cynhyrchu, nodweddion amgylcheddol a chymdeithasol. Mae amcangyfrifon llygred yn gofyn am ddefnyddio modelau o ddata am y dulliau o reoli'r fferm a'r tir, a datblygwyd dangosydd newydd i gasglu lefelau bioamrywiaeth o'r data sydd ar gael i ffermwyr yn unig. Dewiswyd grŵp bach o brif ddangosyddion ar gyfer dadansoddi a chyflwyno data yn dilyn ymgynghoriad arbenigol, ond cafodd y rhan fwyaf o'r dangosyddion eraill eu cofnodi hefyd ar gyfer dadansoddiadau manylach.

Prif ddangosyddion ar gyfer dwysau cynaliadwy:

- Math o Fferm
- Rhith-ardal Fferm, sy'n ystyried tir a reolir gan y fferm neu a ddefnyddir i dyfu bywyd ar gyfer y fferm (ha)
- Elw ac ethrio costau anuniongyrchol (£)
- Cyfran yr incwm sy'n deillio o werthu nwyddau'r fferm
- Cynnwys Ynni net y bywyd a gaiff ei symud o'r fferm (GJ)
- Sgôr Sicrwydd y Fferm
- Oedran y ffermwr
- Lefel addysg y ffermwr
- Cyfanswm yr oriau a weithiwyd gan yr holl staff ar y fferm
- Cyfanswm yr oriau a dreuliodd ar hyfforddiant staff
- Sgôr ffermio cydweithredol
- Hyd y llwybrau troed ar draws y fferm (km)
- Ardai tir mynediad agored (ha)
- Gollngiadau Nwyon Ty Gwydr posibl (kg CO<sub>2</sub> eq)
- Collision nitrad posibl i ddŵr (kg)
- Sgôr bioamrywiaeth

Cynhaliodd SIP arolwg manwl o ffermydd i gasglu gwerthoedd ar gyfer y dangosyddion hyn o 59 o ffermydd, gan gynnwys ffermydd â'r cymysg, da byw i seilid ac ucheldir a godro, gan ddefnyddio cyfweiliadau (gweler y ffigur gyferbyn). Roedd y mathau o ffermydd yn amrywio oherwydd eu haddasrwydd ar gyfer cynydu a da byw gwahanol. Ar raddfa fferm gyfan, roedd gan ffermydd ucheldir yr ardaloedd mwyaf o dir mynediad agored, tra roedd ffermydd grawnwlyd yn cynhyrchu'r mwyaf o fwyd yn nhermâu ynni. Pan wiriwyd y manylion ar gyfer ardai, roedd ffermydd cymysg hefyd yn cynhyrchu lefelau uchel o fwyd, tra roedd sgoriau bioamrywiaeth yn uchel ar gyfer ffermydd grawnwlyd, cymysg ac ucheldir. Nid oedd un math arbennig o fferm a oedd yn dangos y perfformiad gorau ym mhob maes. Yn wir, mae ymchwil arall sy'n cymharu ffermydd o'r ganig ac anorğanig, a da byw dan do yn erbyn da byw awyr agored, hefyd yn awgrymu nad oes un dull o ffermio yn llwyddo i gael sgôr uwch mewn perthynas â phob effen.



NODYN GWYDDONIAETH, POLISI AC YMARFER 5  
Aseu Perfformiad Ffermydd  
Masnachol

