



SCIENCE, POLICY AND PRACTICE NOTE I

Meeting the Challenge of Sustainable Intensification – An Introduction to SIP



What is Sustainable Intensification (SI)?

SI is about finding an optimal balance between environmental, social and economic outcomes.

SI has been defined by SIP as:

Changes to a farming system that maintain or increase the production of agricultural products while enhancing or maintaining the delivery of a range of other environmental and societal benefits, measurable from a specified area of land and over a specified time-frame.

As Figure 1 suggests, farmland is at the heart of this. How land is managed at a farm and a landscape scale determines the balance between various outcomes.

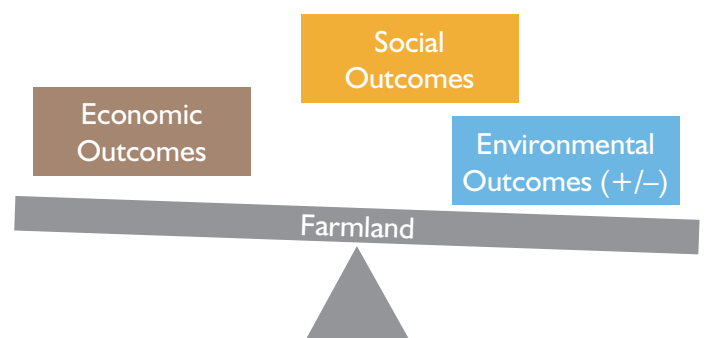


Figure 1. The SI balancing act. Optimisation of environmental, social and economic outcomes





Where Does the Term Come From?

The term SI was first used in the mid-1990s with reference to agriculture in sub-Saharan Africa. It became much more prominent as a result of the global food price rises of 2008 and the re-emergence of food security as a major global issue for agricultural policies and development. In the UK, the concept was promoted by an influential report by the Royal Society, which contributed to the UK government embracing the term and establishing the SI Research Platform (SIP) in 2014.

The SI Challenge

The need to increase agricultural output whilst maintaining or enhancing ecosystem services is widely accepted. Many previous studies have focused on a single or narrow set of issues at farm-level. However, coordination at the scale of river catchments (landscapes) or larger is necessary to achieve many environmental and social outcomes, for example, an improvement in river quality requires action across a catchment. So, there is a need to look at the challenges of SI across a range of scales and disciplines. This is what SIP was designed to achieve.

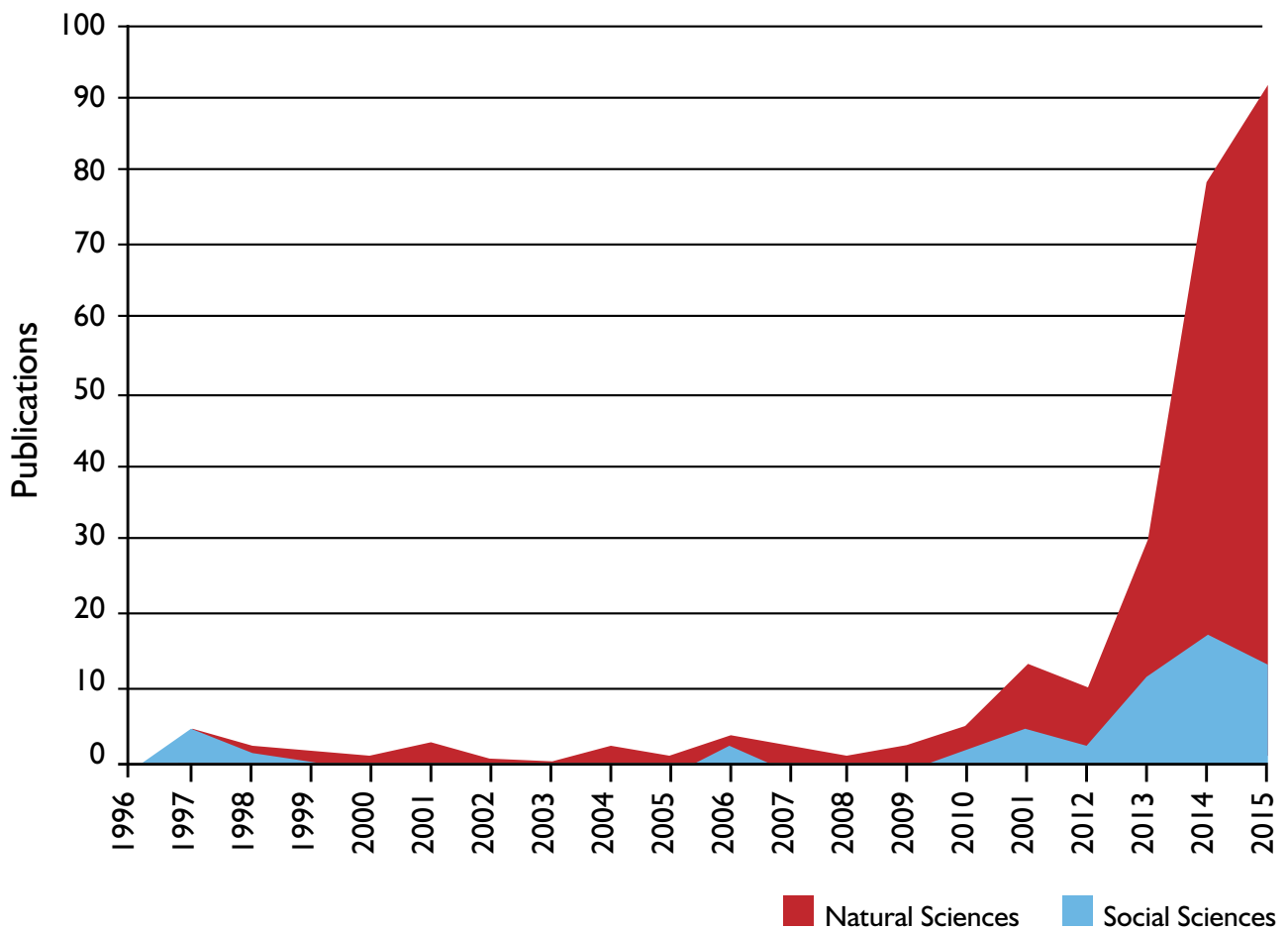


Figure 2. The number of academic articles with titles or abstracts highlight the term 'sustainable intensification' up to the end of 2015 (Source: ISI Web of Science, Reproduced from: Gunton et al., 2016, Figure 1).



The SIP Platform: Who is Involved?

SIP is a collaboration of over 30 partners spanning universities, research organisations, farming industry and environmental organisations, working with farmers, advisers, stakeholders and policymakers. The research has been focused on six main study farms in seven study areas, representing some of the main agricultural land uses and geographies in England and Wales.



Figure 3. The 35 organisations involved directly in SIP research

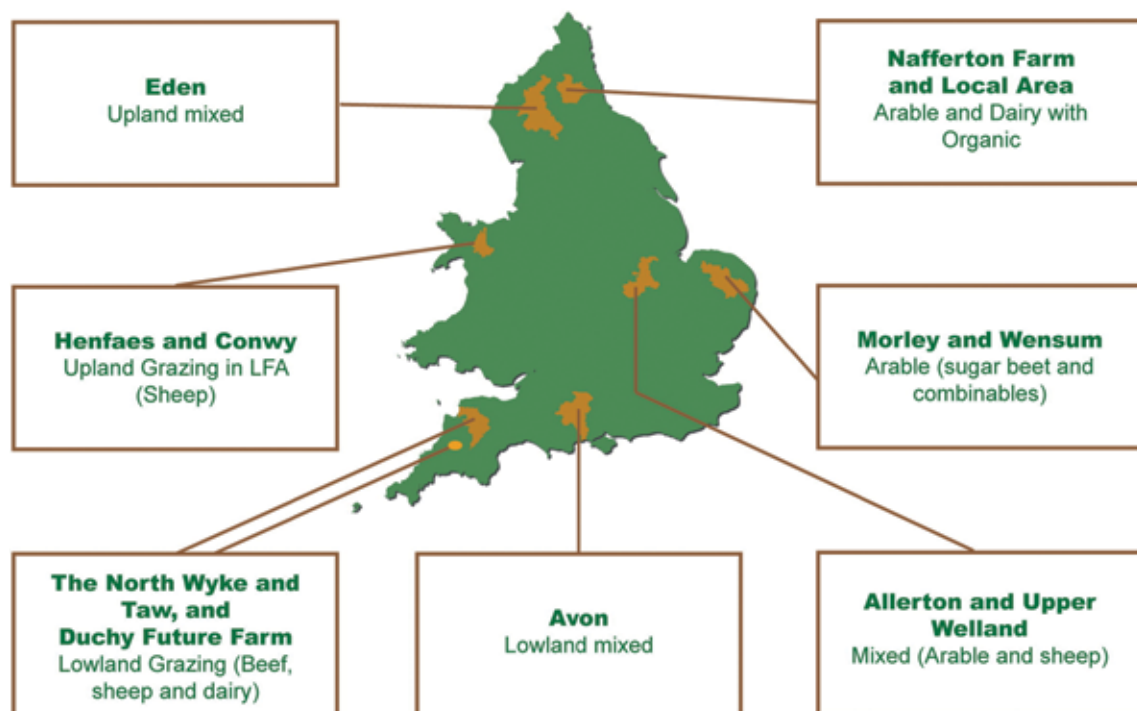


Figure 4. SIP study areas and farms across a range of sectors, farming systems and landscapes in England and Wales



What Did SIP Do?

SIP took a holistic approach that examined SI through three research projects investigating the farm (SIP 1), landscape (SIP 2), supply chain and market (SIP 3) perspectives.

SIP provided the tools, knowledge and practical guidance to help individuals and groups to identify and prioritise opportunities for SI, and put into place approaches and practices to help deliver it.

SIP also developed stronger links between scientists, farmers, economists, policymakers and environmental and agricultural organisations.

So what were the Objectives of SIP?

SIP 1 – Integrated Farm Management (IFM) for improved economic, environmental and social performance:

1. Develop **improved indicators** and standardised methodologies for farmers, land managers and advisers to measure the economic, environmental and social performance of farms
2. Identify and demonstrate **farm management interventions** (practices) for the sustainable intensification of agriculture
3. Investigate ways of better communicating complex messages to farmers, and propose approaches for more innovative and effective **decision support** around IFM

SIP 2 – Opportunities and risks for farming and the environment at landscape scales:

1. **Understanding farmer collaboration** (literature review, survey across study areas and follow up focus groups)
2. Developing and applying a **Dynamic Landscape Typology Tool**
3. Applying and **testing landscape interventions** in Platform case study areas
4. Design and develop an **SI benchmarking system**

SIP 3 explored how farmers respond to external influences such as market forces and climate change, and looked for opportunities to encourage SI through the food chain.

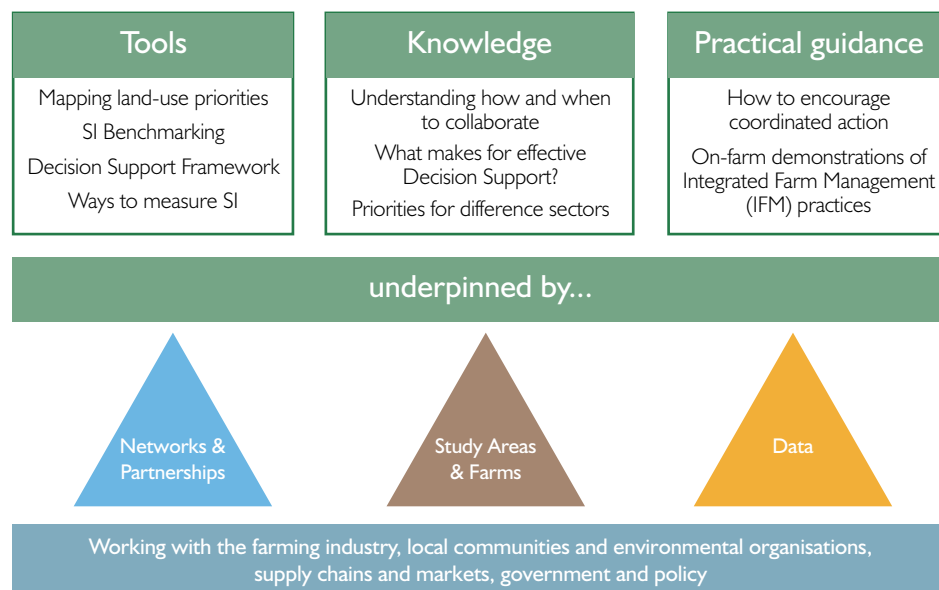


Figure 5. The Sustainable Intensification Research Platform



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Further Resources

SIP 1 reports will appear here: <http://bit.ly/2sN9WUW>

SIP 2 reports will appear here: <http://bit.ly/2tYtWnx>

SIP 3 report is available here: <http://bit.ly/2uxsRA2>

Gunton, R., Firbank, L., Inman, A. and Winter, M. (2015). Defining Sustainable Intensification and Developing Metrics with respect to Ecosystem Services for the SIP Research Platform. Report for Defra project LM0302 Sustainable Intensification Research Platform Project 2: Opportunities and Risks for Farming and the Environment at Landscape Scales <http://bit.ly/2tYtWnx>

Gunton, R.M., Firbank, L.G., Inman, A., Winter, D.M. (2016) 'How scalable is sustainable intensification?', Nature Plants, 2, Article No: 16065 www.nature.com/articles/nplants201665

Royal Society (2009). Reaping the Benefits: Science and the Sustainable Intensification of Global Agriculture. Royal Society, London <https://royalsociety.org/topics-policy/publications/2009/reaping-benefits>

Acknowledgements

Front Cover Image: Wheat Field and Trees, JPC24M, Flickr

Page 2 Image: Solar Trade Association, Flickr

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.

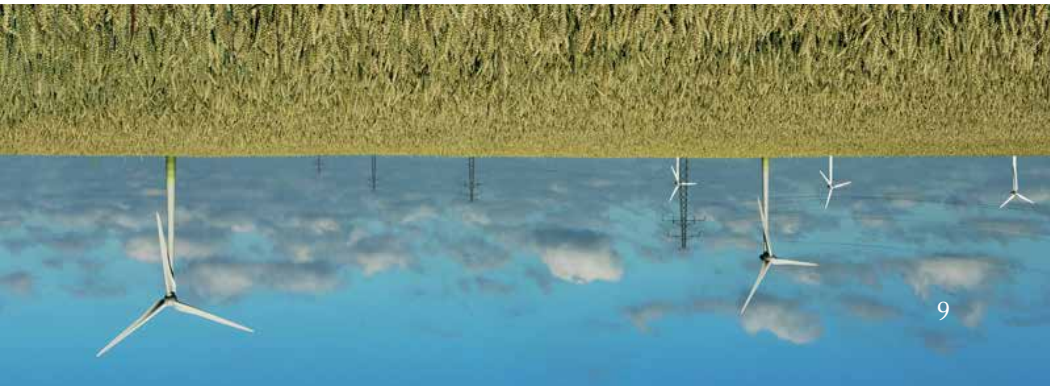


More Information

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Adnoddau pellach

Bydd adnoddiau SIF 1 yn ymddangos yma:
<http://bit.ly/2sN9WUW>

Bydd adnoddiau SIF 2 yn ymddangos yma:
<http://bit.ly/2tYtWnx>

Mae adroddiad SIF 3 ar gael yma: <http://bit.ly/2uxsRA2>

Gunton, R., Firbank, L., Inman, A. and Winter, M. (2015).
Defining Sustainable Intensification and Developing Metrics
with respect to Ecosystem Services for the SIF Research
Platform. Report for Defra project LM0302 Sustainable
Intensification Research Platform Project 2: Opportunities
and Risks for Farming and the Environment at Landscape
Scales <http://bit.ly/2tYtWnx>

Rhaglen ymchwil aml-bartner yw'r Platform Ymchwil i Ddwystrau Cynaliadwy
(SIF) sy'n cynnwys academiâ, ffermwyr, arbenigwyr y diwydiant, sefydliadau
amgylcheddol, a gwneuthurwyr polisi.

Arvennir y platfform gan Defra a Llywodraeth Cymru, ac mae'n archwilio'r
cyfleoedd a'r risgiau sydd ynghlwm wrth Ddwystrau Cynaliadwy o amrywiaeth
o sefwynnau a graddfeydd tirwedd ar draws Cymru a Lloegr.
Mae'r Platfform, a oedd yn gweithredu o 2014-17, wedi ymchwilio i ffyrdd o
gynyddu cynhyrchiant ffermydd, lleihau effeithiau amgylcheddol, a chynyddu
mantelion tir amaethyddol i'r gymdeithas.



Mwy o Wybodaeth

Ymwelwch â: www.siplatform.org.uk

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Gunton, R.M., Firbank, L.G., Inman, A., Winter, D.M. (2016)
'How scalable is sustainable intensification?', Nature Plants, 2,
Article No: 16065 www.nature.com/articles/nplants201665
Royal Society (2009). Reaping the Benefits: Science and
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Society, London [https://royalsociety.org/topics-policy/
publications/2009/reaping-benefits](https://royalsociety.org/topics-policy/publications/2009/reaping-benefits)

Cydnabyddiaethau

Llun y Clawr Blaen: Wheat Field and Trees, JPC24M, Flickr
Page 2 Llun: Solar Trade Association, Flickr



Beth wnaeth SIP?

Mabwysiadodd SIP ddull gweithredu cyfannol gan edrych ar Ddwystrau Cynaliadwy drwy dri phrosiect ymchwil gan ymchwilio iddo o safbwynt y fferm (SIP 1), y dirwedd (SIP 2), y gadwyn gyflênwi a'r farchnad (SIP 3). Darparodd SIP yr offer, y wybodaeth a'r canllawiau ymarferol i helpu unigolion a gwpiâu i nodi a blaenoriaethu cyflleoedd ar gyfer Dwystrau Cynaliadwy, a rhoi dulliau ac arferion ar waith i helpu i gyflawni Dwystrau Cynaliadwy. Llwyddodd SIP hefyd i ddatblygu cysylltiadau cryfach rhwng gwyyddonwyr, ffermwyr, economegwyr, gwneuthurwyr polisi a sefydliadau amgylcheddol ac amaethyddol.

Felly beth oedd Amcanion SIP?

SIP 1 – Dull Integredig o Reoli Ffermydd ar gyfer perfformiad economaidd, amgylcheddol a chymdeithasol gwell:

1. Datblygu dangosyddion gwell a methodolegau safonedig ar gyfer ffermwyr, rheolwyr tir a chynghorwyr i fesur perfformiad economaidd, amgylcheddol a chymdeithasol ffermydd

2. Nodi a dangos yr ymrynau (arferion) rheoli ffermydd ar gyfer dwystrau amaethyddiaeth mewn dull cynaliadwy

3. Ymchwilio i ffyrdd o gyfathrebu negeseuon cymhleth yn well, a chynig dulliau ar gyfer cynig cymorth mwy arloesol ac effeithiol mewn perthynas â gwneud penderfyniadau ynghylch Dull Integredig o Reoli Ffermydd

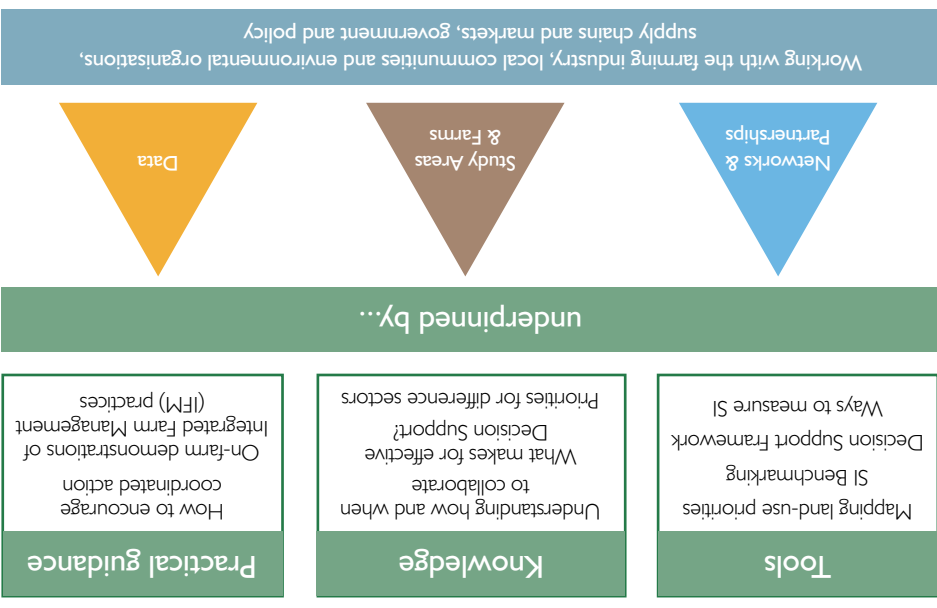
SIP 2 – Cyflleoedd a risgiau ar gyfer ffermio a'r amgylchedd ar raddfeydd tirweddau:

1. Deall cydweithredu ymhlith ffermwyr (adolygiad o lenyddiaeth, arolwg ar draws ardaloedd yr astudiaeth a grwpiau ffocws dilynol)

2. Datblygu a chymhwyso Offeryn Teipoleg Tirwedd Dynamig

3. Cymhwyso a phrofi ymrynau tirwedd mewn ardaloedd sy'n rhan o astudiaethau achos y Platform

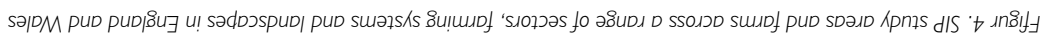
4. Dylunio a datblygu system feincnodi ar gyfer Dwystrau Cynaliadwy



Archwiliodd SIP 3 sut y mae ffermwyr yn ymateb i ddylanwadau allanol fel grymoedd y farchnad a newid Archwiliodd SIP 3 sut y mae ffermwyr yn ymateb i ddylanwadau allanol fel grymoedd y farchnad a newid

Figur 5. Platform Ymchwil i Ddwystrau Cynaliadwy

Cydwethrediaeth o dros 30 o bartneriaid yw SIF, sy'n cynnwys prifysgolion, sefydliadau ymchwil, sefydliadau amgylcheddol a'r diwydiant ffermio, gan weithio gyda ffermwyr, cynghorwyr, rhanddeiliaid a gwneuthurwyr polisi. Mae'r gwaith ymchwil wedi canolbwyntio ar astudio chwe phrif fferm mewn satth ardal astudio, gan gynrychioli rhai o'r prif fathau o ddefnydd tir a daearyddiaeth amaethyddol yng Nghymru a Lloegr.



Figur 3. Y 35 sefydliad sy'n ymwneud yn uniongyrchol ag ymchwil SIP

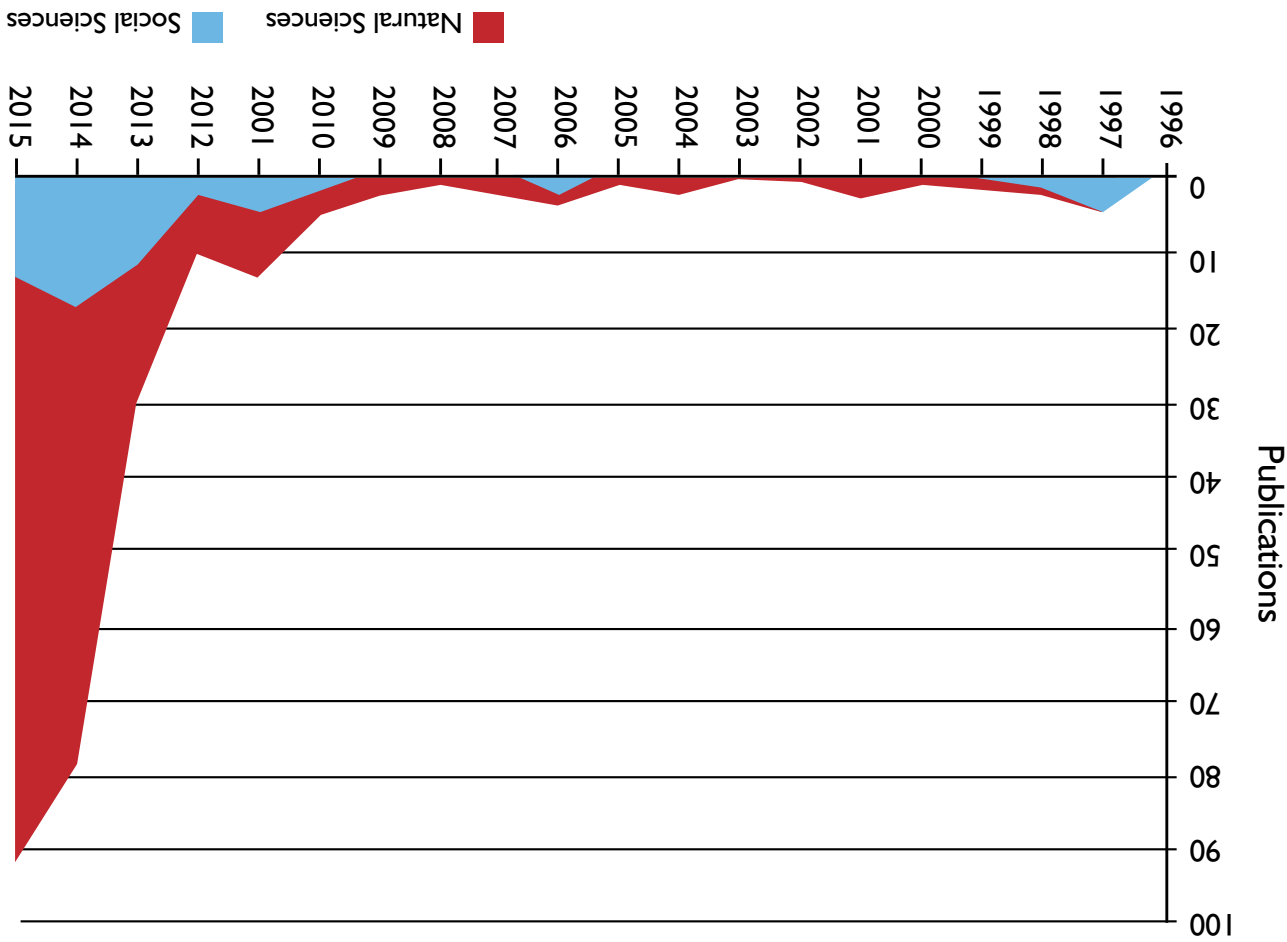


O Ble y Daw'r Term?

Defnyddiwyd y term Dwysau Cynaliadwy am y tro cyntaf yng nghanol y 1990au wrth gyfeirio at amaethyddiaeth yn Affrica Is-Sahara. Daeth yn llawer mwy amlyg o ganlyniad i'r cynnydd byd-eang ym mhrisiau bwyd yn 2008 a'r ffaith bod diogelu'r cyflenwad bwyd wedi codi ei ben eto fel problem fyd-eang fawr i bolisiau a datblygiad amaethyddol. Yn y DU, hyrwyddwyd y cysyniad gan adroddiad dylanwadol y Gymdeithas Frenhinol, a gyfrannodd at benderfyniad llywodraeth y DU i fabwysiadu'r term a sefydlu'r Platform Ymchwil Dwysau Cynaliadwy (SLP) yn 2014.

Yr Her Dwysau Cynaliadwy

Caiff yr angen i gynyddu cynnyrch amaethyddol tra'n cynnal neu'n gwella gwasanaethau ecosystem ei dderbyn yn eang. Mae llawer o astudiaethau blaenorol wedi canolbwyntio ar un set, neu set gul, o faterion ar lefel fferm. Fodd bynnag, mae angen cydlynu'r gwaith ar raddfa dalgylchoedd afonydd (tirweddau) neu ardaloedd mwy er mwyn cyflawni llawer o ganlyniadau amgylcheddol a chymdeithasol, er enghraifft, mae gwella ansawdd afon yn gofyn am weithredu ar draws dalgylch. Felly, mae angen edrych ar yr heriau sy'n gysylltiedig â Dwysau Cynaliadwy ar draws amrywiaeth o raddfeydd a disgyblaethau. Nod SLP yw cyflawni hyn.



Figur 2. Nifer yr erthyglau academaidd sydd â theitlau neu gynnwysau sy'n amlgu'r term 'dwysau cynaliadwy' hyd ddiwedd 2015 (Ffynhonnell: ISI Web of Science, Allgynhyrchwyd o: Gunton et al., 2016, Ffigur 1).

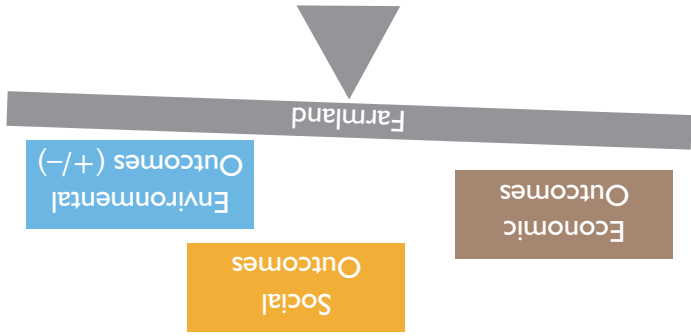


Beth yw Dwysâu Cynaliadwy?

Mae Dwysâu Cynaliadwy yn ymwneud â dod o hyd i'r cydbwysedd gorau posibl rhwng canlyniadau amgylcheddol, cymdeithasol ac economaidd. Diffiniwyd Dwysâu Cynaliadwy gan SIP fel:

Newidiadau i system ffermio sy'n cynnal neu'n cynyddu faint o gynnyrch amaethyddol a gynhyrchir gan wella neu gynnal y broses o ddarparu amrywiaeth o fantestion amgylcheddol a chymdeithasol eraill, y gellir eu mesur o ardal benodedig o dir a thros gyfnod penodedig o amser.

Fel y mae Ffigur 1 yn ei awgrymu, tir fferm sydd wrth wraidd hyn. Mae'r ffordd y caiff tir ei reoli ar lefel fferm a thirwedd yn pennu'r cydbwysedd rhwng amrywiol ganlyniadau.



Ffigur 1. Taro'r cydbwysedd gyda Dwysâu Cynaliadwy. Sicrhau'r canlyniadau amgylcheddol, cymdeithasol ac economaidd gorau posibl



NODYN GWYDDONIAETH, POLISI AC YMARFER I
Ymateb i'r Her Dwysau Cynaliadwy –
Cyflwyniad i SIP

