



Menter Mynyddoedd y Cambrian: Dyfodol a Chanfyddiadau Tirwedd a Ecosystemau yn Mynyddoedd y Cambrian

Cambrian Mountains Initiative: Landscape and Ecosystems Futures and Perceptions in the Cambrian Mountains

Adroddiad Terfynol / Final Report

Wedi'i baratoi gan LUC a Catrin Ellis Associates ar gyfer Cyfoeth Naturiol Cymru ar ran Menter Mynyddoedd y Cambrian

Prepared by LUC and Catrin Ellis Associates for Natural Resources Wales on behalf of the Cambrian Mountains Initiative

Gorffennaf / July 2013



Contents

1	Crynodeb Gweithredol o’r amcanion, y gweithgareddau a’r cyraeddiadau	i
	Amcanion y broses o ymgysylltu	i
	Gweithgareddau yn ystod y prosiect	i
	Yr hyn a gyflawnwyd o’r broses	ii
1	Executive summary of objectives, activities and achievements	i
	Objectives of the engagement process	i
	Activities during the project	i
	Achievements from the process	ii
2	Project aims and objectives	1
	Overall purpose	1
	Policy context and key issues	1
	Why public dialogue on decisions about the delivery of EGS?	2
3	Activities	4
	Dialogue with the Welsh Government and its agencies and with business representatives	4
	Dialogue with land managers – producers of EGS	4
	Dialogue with the public – consumers of EGS	4
	The ecosystem goods and services covered by the dialogue	7
	The use of hypothetical scenarios to inform dialogue	8
4	Outputs and findings	10
	Participants’ awareness of the value of the environment and perceptions of EGS	10
	Insights on perceptions of risk associated with future scenarios	15
	Insight on perceptions of influence	19
5	Conclusions	23
	Opportunities to engage stakeholders more fully in change	23
	Opportunities to develop effective PES mechanisms	24
	Opportunities for future action by the CMI	25
	Abbreviations	26
	Appendix 1 – Facilitators’ briefing paper describing the scenarios	27
	Appendix 2 – Table of results from recruitment questionnaires	39
	Appendix 3 – Table of results from scoring of scenarios by participants and focus groups and workshop	44

Version	Date	Version Details	Prepared by	Checked by	Approved by
V4	22/07/13	Final report	Robert Deane & Catrin Ellis Jones	CEJ & IG	RD

1 Crynodeb Gweithredol o'r amcanion, y gweithgareddau a'r cyraeddiadau

Amcanion y broses o ymgysylltu

- 1.1 Dechreuodd y prosiect hwn, a gafodd ei gyllido gan raglen Sciencewise-ERC¹ a'r Cyngor Cefn Gwlad i Fenter Mynyddoedd y Cambrian (MMC), er mwyn ymgysylltu â grwpiau o bobl, y cwbl ohonyn nhw wedi'u cysylltu i, a/neu wedi cael eu heffeithio gan, brosesau naturiol sy'n digwydd ym Mynyddoedd y Cambrian, i ystyried y cwestiwn:

Cyfoeth Naturiol Mynyddoedd y Cambrian – beth yw ei werth i ni?

- 1.2 Roedd briff y prosiect yn diffinio pedwar o amcanion allweddol y gellir eu crynhoi fel a ganlyn:
1. Hysbysu a sicrhau dealltwriaeth a chefnogi'r agwedd ecosystemau a awgrymwyd yn strategaeth Cymru Fyw Llywodraeth Cymru.
 2. Ennill dealltwriaeth o ganfyddiadau cyhoeddus, y tu mewn a thu allan i ardal astudiaeth nwyddau a Gwasanaethau Ecosystemau (NGE) sy'n cael eu darparu gan Fynyddoedd y Cambrian.
 3. Datblygu cynrychiolaeth weledol o gydgyssylltiad canfyddiad y rhanddeiliaid o safbwynt cyfleoedd NGE.
 4. Creu trafodaeth o gwmpas mentrau posibl neu fecanweithiau'r farchnad a fyddai eu hangen er mwyn cyflawni agwedd NGE tuag at reoli tir ym mynyddoedd y Cambrian.
- 1.3 Cynlluniwyd proses ymgysylltu er mwyn archwilio'r amcanion hyn. Enwebwyd pedwar NGE allweddol gan grŵp llywio'r prosiect, y cyfan wedi'u cysylltu efo rheoli tir, sef:
- **Bwyd o ffermio** - cig oen a chig eidion o'r ucheldiroedd
 - **Dŵr yfed o ansawdd uchel** - o'r cronfeydd a'r dyfrhaenau
 - **Rheoli llifogydd** - wedi'i ddarparu gan gynefinoedd a phriddoedd y glwyptiroedd
 - **Rheoleiddio'r hinsawdd** - drwy storio carbon mewn priddoedd a llystyfiant
- 1.4 Roedd y broses ymgysylltu ynarchwilio, mewn perthynas â'r NGE, y graddau y mae'r gymdeithas ar hyn o bryd yn cymryd yn ganiataol elfennau'r gost o gynhyrchu'r buddion hyn, tra'i bod ar yr un pryd yn tybio y byddan nhw bob amser ar gael inni.
- 1.5 Roedd y cyfranogwyr yn ystyried sbardunau ar gyfer newid a'r tebygrwydd o dri senario damcaniaethol yn y dyfodol. Roeddent yn ystyried y posibilrwydd o ganlyniadau negyddol, annisgwyl. Er mwyn cyflawni busnes fel arfer, neu senario a gynlluniwyd yn fwy cadarnhaol yn y dyfodol ar gyfer pob un o'r pedwar NGE, archwiliodd y cyfranogwyr fecanweithiau ar gyfer sicrhau bod buddion sy'n cael eu mwynhau heddiw ar gael inni mewn blynyddoedd i ddod ac ar gyfer cenedlaethau'r dyfodol. Y diben oedd peidio â rhoi gwerth fel y cyfryw ar unrhyw gostau sy'n cael eu trosglwyddo ar hyn o bryd neu'n cael eu 'hallanoli' i'r amgylchedd neu i'r cymunedau. Yn hytrach, roedd y sgwrs yn ceisio ystyried y systemau talu a oedd yn cael eu dylanwadu gan y farchnad a ellid eu defnyddio er mwyn cyllido cynnal ecosystem wydn (sy'n cael ei alw'n Daliad ar gyfer Gwasnaethau Ecosystemau neu TGE). Roedd cyfranogwyr yn meddwl am y rhwystrau a allai lesteirio datblygiad y TGE a sut y gellir eu goresgyn.

Gweithgareddau yn ystod y prosiect

- 1.6 Cafwyd sgwrs efo pedwar o grwpiau gwahanol o bobl:
- **Defnyddwyr pell o NGE Mynyddoedd y Cambrian:** Cymerodd bron i 200 o bobl yn Nhrefynwy a'r Amywythig ran mewn arolwg er mwyn casglu data ynglŷn â'u barn am NGE. Roeddent nhw'n cael eu hannog i roi eu barn ar effaith ymarferion rheoli tir ar eu bywydau eu hunain a bywydau cenedlaethau yn y dyfodol, sut roeddent nhw'n gwerthfawrogi nwyddau a gwasnaethau natur (yr NGE) a'u gwybodaeth a'u dealltwriaeth o wasanaethau rheoli llifogydd natur. Gwahoddwyd detholiad o'r ymatebwyr hyn (dau grŵp o bump a chwech o bobl) i gymryd rhan mewn trafodaethau mewn grwpiau bychain cydgyngorol.

¹ Sciencewise Expert Resource Centre (Sciencewise-ERC) yw canlofan genedlaethol y DU ar gyfer deialog gyhoeddus wrth lunio polisiau sy'n ymwneud â materion gwyddoniaeth a thechnoleg.

- **Defnyddwyr lleol o NGE Mynyddoedd y Cambrian:** Trefnwyd tri o weithdai cydgynghorol yn Rhaeadr (chwech o bobl), Llanymddyfri (chwech o bobl), a Thalybont (saith o bobl) er mwyn cysylltu a chasglu barn y cymunedau lleol ym Mynyddoedd y Cambrian.
- **Ffermwyr:** Cynhaliwyd dau weithdy bychan gyda ffermwyr a phorwyr tir comin Mynyddoedd y Cambrian, yn Llanymddyfri (saith o denantiaid a phorwyr yr Ymddiriedolaeth Genedlaethol) ac yn Nhalybont (wyth aelod o Grŵp Ffermwyr y Dyfodol Menter Mynyddoedd y Cambrian).
- **Rhanddeiliaid arbenigol:** Cynhaliwyd gweithdy yn Aberystwyth ar gyfer cynrychiolwyr cyrff statudol ac undebau ffermio (19 o bobl) a oedd yn cael eu hystyried fel 'rhanddeiliaid arbenigol' gyda gwybodaeth am bolisi cyhoeddus tuag at ddefnyddio a rheoli tir.

Yr hyn a gyflawnwyd o'r broses

- 1.7 Gellir crynhoi canfyddiadau a chyraeddiadau'r prosiect o dan bump o wahanol benawdau, fel a ganlyn:

1 Gwybodaeth feintiol ac ansoddol o ansawdd uchel ar safbwyntiau a oedd gan grwpiau o randdeiliaid allweddol,

- 1.8 Roedd y prosiect hwn yn defnyddio proses gydgynghorol i gynhyrchu mesurau meintiol syml ac asesiadau ansoddol er mwyn disgrifio canfyddiadau'r grwpiau gwahanol, yn cynnwys y cyhoedd, at y pedwar NGE sy'n cael eu cynnwys yn yr astudiaeth a'r posibilrwydd am TGE.

- Casglwyd cronfa helaeth o ddata o drawstoriad amrywiol o'r gymdeithas (rhyw, oed, yn weithredol neu'n anweithredol yn economiadd, gwerthoedd sy'n cymell, ayyb).
- Gwerthusiad annibynnol o'r broses sy'n cadarnhau ansawdd y data.
- Mae'r data yn aeddfed i'w ddadansoddi gan arbenigwyr technegol a gwneuthurwyr polisi
- Mae cytundeb mewn egwyddor gan bob sector sy'n cyfrannu yn yr astudiaeth hon y dylai TGE gael ei ddatblygu. Wedyn, mae angen mwy o waith technegol er mwyn ychwanegu cyd-destun i drafodaeth bellach sydd wedi'i hanelu at ddatblygu mecanweithiau TGE ffafriol. Dylai'r sgwrs hon gynnwys yn ogystal rhanddeiliaid allweddol nad oedd wedi cymryd rhan yn yr astudiaeth hon, fel y diwydiannau dŵr, cyfleustodau ac yswiriant, a'r cynllunwyr.

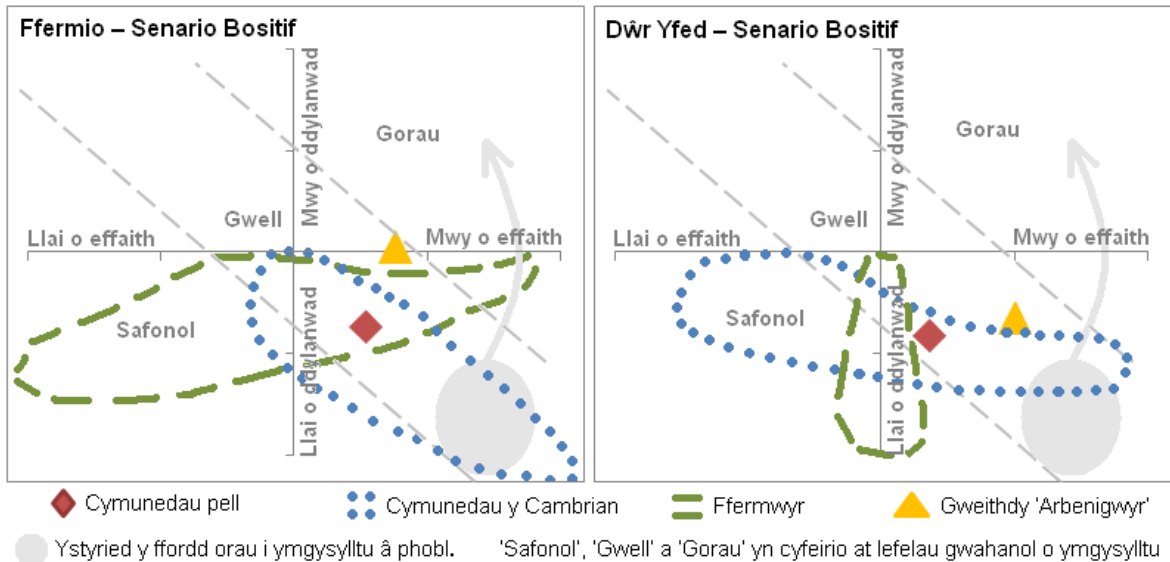
2 Codi ymwybyddiaeth; adeiladu dealltwriaeth a'r gallu i ymgorffori cymhlethdod ac asesu cyfnewidiadau.

- 1.9 Dangosodd y prosiect bod amrediad eang o bobl, pan ofynnwyd iddyn nhw'n uniongyrchol ac yn nhermau sy'n osgoi iaith dechnegol, yn ymwybodol o'r gwasanaethau sy'n cael eu darparu gan natur (NGE) ac yn eu gwerthfawrogi.

- Mae pobl yn fwy ymwybodol o NGE os ydyn nhw'n ynghlwm wrth ddarparu'r gwasanaeth mewn unrhyw ffordd, neu os ydyn nhw wedi cael eu heffeithio gan fethiant yn y gwasanaeth (e.e llifogydd neu gyfyngiadau ar ddefnydd dŵr). Yn ogystal, maen nhw'n cael eu dylanwadu gan straeon o'r newyddion sy'n amlygu methiant a dadl, yn hytrach na chyflawni'r gwasanaeth yn effeithiol. Tra'n ddylanwadol, ni ellir dibynnu ar y cyfryngau i gefnogi dadansoddiadau gwrthrychol a helaeth o'r materion.
- Mae yna ddigon o ddiddordeb a chefnogaeth oddi wrth y cyhoedd a'r cymunedau fferm ar gyfer adnabod ffyrdd o allu talu am warchod systemau naturiol fel y gallan nhw barhau i ddarparu amodau lle gall bywyd ffynnu (TGE).
- Gall cyfranogwyr ar draws yr holl sectorau archwilio materion cymhleth, ac ystyried cyfnewidiadau sy'n gysylltiedig efo cyflawni TGE. Dywedodd y cyfranogwyr yn y gweithdai o grwpiau bychain fod y broses gydgynghorol wedi cynyddu eu dealltwriaeth o'r themâu a oedd yn cael eu trafod, ac roedden nhw yn teimlo eu bod yn gallu cyfrannu tuag at y drafodaeth, gan fynegi ffyrdd yr oedden nhw'n teimlo y gallai atebion gael eu cyflawni.
- Adlewyrchodd un cyfranogwr yn y gweithdy yn yr Amwythig farn y gweddill, gan ddweud bod cynnwys aelodau o'r cyhoedd yn y math hon o sgwrs "yn ddefnydd mor bwysig ag amser dinesydd ar wasanaeth rheithgor".

3 Asesu cefnogaeth i ddatblygu polisiau sy'n hwyluso TGE

1.10 Nid yw trafodaeth agored fel hyn, wedi'i hyrwyddo'n annibynnol, yn amcanu i 'sichrau cefnogaeth' er gall trafodaeth effeithiol helpu galluogi pobl i ddylanwadu ar y broses o wneud penderfyniadau. Casglodd y gweithdai wybodaeth, ar ffurf sgoriau'r cyfranogwyr eu hunain, ynglŷn â faint yr oeddau nhw wedi'u heffeithio gan NGE (fel drwy TGE). Mae'r siartiau isod yn dangos sgoriau'r cyfranogwyr unigol ar y ddau fater hwn ar gyfer y senarios cadarnhaol a gafodd eu trafod am ddau o'r NGE yn yr astudiaeth. (Mae mwy o fanylion am y broses sgorio yn cael ei ddarparu yn y prif adroddiad - gweler paragraff 4.16 o'r adroddiad terfynol).



1.11 Mae'r siartiau hyn yn dangos canlyniadau cyfartaledd pwysol ar gyfer rhanddeiliaid arbenigol a defnyddwyr pell, a 'meysydd' i gynrychioli amrediad barn ffermwyr a chymunedau Mynyddoedd y Cambrian. Maen nhw'n dangos rhai pwyntiau arwyddocaol:

- Mae cyfranogwyr ar draws yr holl grwpiau o rhanddeiliaid yn cwmpasu amrediad o safbwyntiau a gwerthoedd. Dangosodd cymunedau Mynyddoedd y Cambrian a ffermwyr y gwahaniaeth mwyaf eang yn nhermau graddau dylanwad yn erbyn y graddau y maen nhw'n rhagweld y gallan nhw gael eu heffeithio, wedi'u hasesu eu hunain. Mae ffermwyr, yn nhermau cynhyrchu bwyd, yn teimlo y gallan nhw ddewis ymuno neu eithrio o gael eu heffeithio. Mae cymunedau'r Cambrian yn gweld eu hunain yn cael eu heffeithio'n gryf gan newid, ond gydag ychydig o rym i ddylanwadu arno.
- Yn gyffredinol, nid oes un o'r grwpiau rhanddeiliaid yn teimlo y gallan nhw ddylanwadu ar ddatblygu dulliau NGE a TGE, er bod rhanddeiliaid arbenigol yn gweld eu hunain gyda lefelau uwch o ddylanwad gyda'i gilydd na grwpiau eraill. Mae defnyddwyr pell yn teimlo bod ganddyn nhw fwy o ddylanwad, o'i gymharu gyda chanfyddiadau ffermwyr neu gymunedau'r Cambrian.
- Mae dangos sgoriau ymatebwyr ar y siartiau yn helpu ystyried pa fath o ymgysylltiad gyda rhanddeiliaid fyddai'n briodol yn ystod camau nesaf y broses wrth ystyried addasu dulliau TGE, er enghraifft mewn cynllun peilot.
- Defnyddwyr pell NGE fydd yn elwa fwyaf o lefelau cynyddol o ymgysylltiad, efallai yn ymwneud â nhw drwy grwpiau ffocws. Mae llawer yn y gymuned ffermio yn awyddus i ymgysylltu'n agos gyda'r broses, ac i helpu ddatblygu cynigion, tra'i bod yn well gan eraill gael eu hysbysu neu efallai gyfrannu barn i atgyfnerthu syniadau a ddyfeisiwyd gan eraill.
- Mae'r siartiau'n awgrymu y dylid cymryd gofal i ymgysylltu'n weithredol gyda chymunedau lleol Mynyddoedd y Cambrian a'u galluogi i gyfranogi. Maen nhw'n teimlo y posibilrwydd o gael eu heffeithio'n fawr neu hyd yn oed eu bygwth gan gynigion NGE, ond yn teimlo mai nhw yw'r lleiaf galluog i ddylanwadu ar ddatblygu polisi. Mae rhai aelodau o gymunedau lleol yn gweld eu hunain yn llai fel 'defnyddwyr NGE lleol' a mwy fel cyd-ddioddefwyr. Gall peidio â pharhau i ymgysylltu gyda'r grŵp hwn arwain at ddatblygu dulliau NGE a TGE llai cadarn, a/neu anawsterau gweithredu cynigion.

4 Y drafodaeth am gymhellion posibl / mecanweithiau'r farchnad sydd eu hangen er mwyn cyflawni agwedd NGE tuag at reoli tir ym mynyddoedd y Cambrian.

1.12 O ystyried lled y drafodaeth, yn amrywio o ddiffinio problem i archwilio am atebion posibl (ac agwedd NGE), nid oedd yna fawr o amser i archwilio mecanweithiau TGE penodol yn fanwl. Fodd bynnag, roedd pobl yn cynnig rhywbeth i feddwl amdano ar fodolau a materion TGE.

- Awgrymodd mwy na hanner o'r cyfranogwyr ymysg y cyhoedd a oedd yn y sgwrs gyhoeddus eu bod yn fodlon cefnogi treth ar filiau cyfleustodau ac yswiriant ar gyfer cynnal cyfoeth naturiol a NGE. Nododd dros draean y byddai tystiolaeth o gefnogaeth i brosiectau cyfoeth naturiol yn dylanwadu ar eu dewis o ddarparwr cyfleustodau / yswiriant. Byddai dim ond o dan draean yn fodlon i weld mwy o refeniw treth i gefnogi gwelliannau cyfoeth naturiol. Fodd bynnag, ychydig o dan un rhan o bump o'r rhai hynny a oedd wedi ymgysylltu a fyddai'n fodlon i gefnogi treth oherwydd eu bod yn meddwl y dylai hyn gael ei gynnwys drwy drethu presennol.
- Cynigiodd cyfranogwyr yn ogystal syniadau mwy radical eu hunain mewn perthynas â TGE e.e. ysgogi agwedd ar y cyd fel John Lewis i NGE a TGE, lle mae gan bawb gyfranddaliadau ac maen nhw'n derbyn buddion, cysylltiedig gydag ardal wledig neu ddalgylch, ac yn ymgymryd â chyfrifoldebau rhanddeiliaid am ofalu am eu buddsoddiad.
- Mae themâu sy'n ymddangos yn cael eu gweld fel allweddi posibl i ddatgloi TGE sy'n perthyn i ymddiriedaeth ac effeithiolrwydd. Mae aelodau o'r cyhoedd yn gyffredinol angen prawf bod unrhyw arian y byddan nhw'n ystyried ei gyfrannu tuag at systemau TGE yn cael eu defnyddio'n effeithiol ac yn dryloyw ar gyfer gwydnwch a gwellhad amgylcheddol.
- Bydd ffermwyr yn angenrheidiol ar gyfer cynlluniau TGE llwyddiannus. Mae ffermwyr sy'n cymryd rhan yn yr astudiaeth hon, yn arbennig felly o'r genhedlaeth ieuengaf, yn fodlon ystyried dyfodol lle gall eu swyddogaeth pennaf symud o gynhyrchu bwyd i reoli NGE, os oes yna ddigon o bosiblirwydd cynhyrchu incwm a marchnadoedd ar gyfer NGE. Roedd ganddyn nhw ddi-ddordeb mewn parhau gyda'r trafodaethau gyda CNC ac eraill am sut y gellir datblygu peilot lleol i TGE
- Un syniad a gynigiwyd gan y grŵp rhanddeiliaid arbenigol a gwneuthurwyr polisi oedd y gallai'r CDG sydd ar y ffordd fod yn fodd hollbwysig o greu polisi amgylchedd addas, a chanolbwyntio arian er mwyn cefnogi mentrau NGE, a fydd o les i ffermwyr a rheolwyr tir yn ogystal ag i'r cymunedau lleol.

5 Cytundeb bras am y camau nesaf

1.13 Mae yna gytundeb bras ymysg y grwpiau rhanddeiliaid am y camau nesaf, fel a ganlyn.

- Mae'r holl gyfranogwyr yn cefnogi lledaenu canlyniadau'r prosiect hwn. Y gobaith yw y bydd MMC a CNC yn cyhoeddi canlyniadau'r prosiect hwn drwy eu gwefannau a chymryd cyfleoedd eraill i ledaenu'r wybodaeth.
- Mynegwyd awydd, hyd yn oed awydd brys, ar draws bob sector i ddefnyddio ac adeiladu ar ganfyddiadau'r sgwrs hon, i gyd-drafod, datblygu a chytuno ar y camau ymarferol nesaf er mwyn darparu gwell canlyniadau ar gyfer NGE ac i ddyfeisio systemau teg ar gyfer TGE. Mae pob grŵp rhanddeiliaid yn cefnogi sgwrs bellach am y materion a godwyd gan y prosiect hwn.
- Yr NGE sydd â'r gallu mwyaf i ysgogi dadl gynhyrchiol a dyfeisgar rhwng defnyddwyr, rheolwyr tir a gwneuthurwyr polisi/rheoleiddwyr, a'r mwyaf tebygol i arwain at gynigion ar gyfer TGE newydd, yw darparu ansawdd dŵr, wedi'i ddilyn yn agos gan (ac yn gysylltiedig â) rheoli llifogydd. Mae un neu fwy o ddalgylchoedd afonydd sy'n tarddu ym Mynyddoedd y Cambrian yn darparu daearyddiaeth gofodol delfrydol er mwyn datblygu trafodaeth am gynlluniau TGE ar gyfer yr NGEau hyn sy'n seiliedig ar ddŵr.
- Os yw'r cynnig hwn i'w symud ymlaen, bydd ymgysylltiad gyda chwmnïau cyfleustodau dŵr a diddordebau masnachol eraill yn cynnwys, ar gyfer rheoli llifogydd, y diwydiant yswiriant yn hanfodol. Bydd segmentiad mwy yn niddordebau'r defnyddwyr yn werthfawr yn ogystal.
- Mae pobl yn awyddus i archwilio sut y buasai dull ecosystem yn edrych yn debyg iddo yn ymarferol. Bydd angen i brosiectau peilot ddangos bod dulliau TGE yn gallu gweithio'n wyddonol (rheoli tir), yn economaidd ac yn gymdeithasol/ddiwylliannol, cyn y gall cynlluniau cyflawn gael eu sefydlu. Dylai'r MMC barhau i ddatblygu cynigion ar gyfer sylw Llywodraeth Cymru a'i asiantaethau ar gyfer un neu fwy o brosiectau peilot NGE sy'n cymryd mantais o'r rhwydweithiau a'r ewyllys da mai staff a phrosiectau MMC a'r CCG blaenorol wedi'u datblygu eisoes.

1 Executive summary of objectives, activities and achievements

Objectives of the engagement process

- 1.1 This project, which was funded by the Sciencewise-ERC programme² and the Countryside Council for Wales for the Cambrian Mountains Initiative (CMI), set out to engage groups of people, all of whom are connected to, and/or are affected by natural processes occurring in the Cambrian Mountains, to reflect on the question:

The Natural Wealth of the Cambrian Mountains – what does it do for us?

- 1.2 The project brief defined four key objectives which can be summarised as follows:
1. To inform and secure understanding and buy-in to the suggested ecosystems approach of the Welsh Government's Living Wales strategy.
 2. To develop a visual representation of the interconnectivity of stakeholder perception in regard to EGS opportunities.
 3. To gain an understanding of public perceptions, both within and without the study area of Ecosystem Goods and Services (EGS) provided by the Cambrian Mountains.
 4. To create discussion around the potential incentives or market mechanisms that would be required to deliver an EGS approach to land management in the Cambrian Mountains.
- 1.3 An engagement process was designed to explore these objectives. Four key EGS were nominated by the project steering group, all connected with land management, namely:
- **Food from farming** – lamb and beef from the uplands
 - **Flood control** – provided by wetland habitats and soils
 - **High quality drinking water** – from the reservoirs and aquifers
 - **Climate regulation** – by storing carbon in soils and vegetation
- 1.4 The engagement process explored, in relation to these EGS, the extent to which society currently takes for granted elements of the cost of producing these benefits, while at the same time assuming they will always be available to us.
- 1.5 Participants considered drivers for change and the likelihood of three theoretical futures scenarios coming to pass. They considered the possibility of unexpected, negative outcomes. To achieve business as usual, or a more positively planned future scenario for each of the four EGS, participants explored mechanisms for ensuring that benefits enjoyed today will be available to us in years to come and to future generations. The purpose was not to put a value *per se* on any costs currently transferred or 'externalized' to the environment or communities. Rather, the dialogue sought to consider the market-driven payment systems that could be used to fund the maintenance of a resilient ecosystem (termed Payment for Ecosystems Services or PES). Participants reflected on barriers that may hinder the development of PES, and how they might be overcome.

Activities during the project

- 1.6 Dialogue took place with four distinct groups of people:
- **Distant consumers of Cambrian Mountains EGS:** Nearly 200 people in Monmouth and Shrewsbury took part in a survey to gather data about their views of EGS. They were encouraged to provide their opinions on the effect of land management practices on their own and future generations' lives, how they value nature's services and products (the EGS) and their knowledge and understanding of nature's flood-regulating services. A selection of these

² The Sciencewise Expert Resource Centre (Sciencewise-ERC) is the UK's national centre for public dialogue in policy making involving science and technology issues

respondents (two groups of five and six people) were invited to participate in small-group deliberative discussions.

- **Local consumers of Cambrian Mountains EGS:** Three deliberative workshops were convened in Rhayader (six people), Llanymddyfri (six people), and Talybont (seven people) to involve and gather the views of local communities in the Cambrian Mountains.
- **Farmers:** Two further small group workshops took place with farmers and commons graziers of the Cambrian Mountains, in Llanymddyfri (seven National Trust tenants and graziers) and in Talybont (eight members of the Cambrian Mountains Initiative Future Farmers Group).
- **Expert stakeholders:** A workshop was held in Aberystwyth for representatives of statutory bodies and farming unions (19 people) who were considered to cover 'expert stakeholders' with knowledge of public policy towards land use and management.

Achievements from the process

- 1.7 The findings and achievements of the project can be summarised under five different headings, as follows:

1 High quality, quantitative and qualitative data on views held by key stakeholder groups,

- 1.8 This project used a deliberative process to generate simple quantitative measures and qualitative assessments to describe the perceptions of different groups, including the public, to the four EGS included in the study and the potential for PES.

- A very substantial body of data has been gathered from a varied cross-section of society (gender, age, economically active & inactive, motivational values, etc.).
- Independent evaluation of the process corroborates the quality of the data.
- The data is ripe for analysis by technical experts and policy makers
- There is agreement in principal by all sectors participating in this study that PES should be developed. More technical work is needed next to inform and add context to further dialogue aimed at developing favoured PES mechanisms. This dialogue should also include key stakeholders who did not take part in this study such as the water, utilities and insurance industries, and planners.

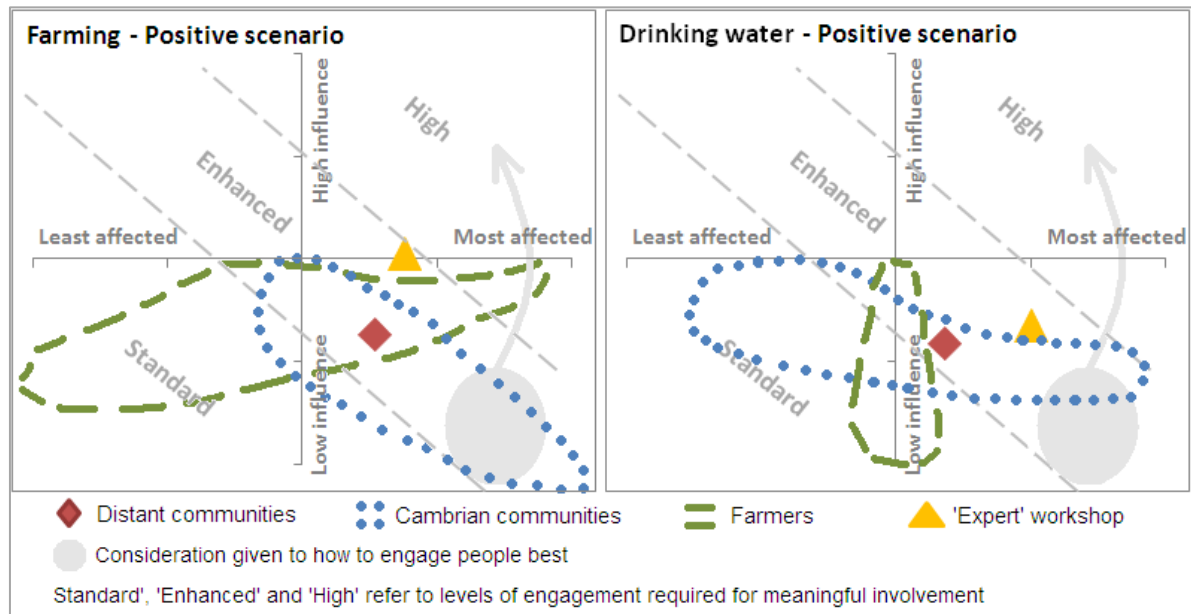
2 Awareness raising; building understanding and capacity to incorporate complexity and assess trade-offs

- 1.9 The project showed that a broad range of people, when asked directly and in terms that avoid technical language, are aware of and value the services provided by nature (EGS).

- People are more aware of EGS if they are involved in the delivery of the service in some way, or if they are affected by service failure (e.g. flooding or restrictions on water use). They are also influenced by news stories which highlight break-down and controversy, rather than effective service delivery. While influential, media coverage cannot be relied upon to support objective and expansive analyses of issues.
- There is significant interest and buy-in from the public and farming communities for identifying ways of covering the costs of protecting natural systems so that they can continue to provide the conditions for life to flourish (PES).
- Participants across all sectors are able to explore complex issues, and consider trade-offs associated with delivering PES. Participants in the small-group workshops stated that the deliberative process had increased their understanding of the themes covered, and felt able to contribute to the dialogue, expressing ways in which they felt solutions could be delivered.
- One participant in the Shrewsbury workshop reflected the views of others, saying that involving members of the public in this kind of dialogue is "*as important a use of citizens' time as jury service*".

3 Assessing buy-in to the development of policies that enable PES

1.10 Independently facilitated open dialogue such as this, does not aim to 'secure buy-in', although effective dialogue can help to empower people to influence the decision-making process. The workshops collected information, in the form of participants' own scores, on how affected they felt by EGS and how much influence they felt they had over the delivery of EGS (such as through a PES). The charts below plot the scores of individual participants on these two issues for the positive scenarios that were discussed for two of the EGS in the study. (More detail on the scoring process is provided in the main report – see para 4.16).



1.11 These charts plot weighted average results for expert stakeholders and distant consumers, and 'fields' to represent the range views of farmers and of Cambrian Mountain communities. They illustrate some significant points:

- Participants across all stakeholder groups encompass a range of views and values. Cambrian Mountain communities and farmers displayed the widest variance in terms of self-assessed degree of influence versus degree to which they anticipate being affected. Farmers, in terms of food production, feel they can opt in or opt out of being affected. Cambrian communities perceive themselves to be strongly affected by change but with little power to influence it.
- Generally speaking, none of the stakeholder groups feel able to influence the development of EGS approaches and PES, although expert stakeholders do perceive themselves to have higher levels of influence collectively than other groups. Distant consumers feel they have greater influence, compared to the perceptions of farmers or Cambrian communities.
- Portraying respondents' scores on the charts helps to consider what kind of stakeholder engagement might be appropriate during the next steps of the process when considering refining PES approaches, for example in a pilot scheme.
- Distant consumers of EGS will gain most from enhanced levels of engagement, perhaps involving them via focus groups. Many in the farming community are keen to engage closely with the process, and help to shape proposals, while others prefer to be kept informed or may contribute views to strengthen ideas formulated by others.
- The charts suggest that care should be taken to actively engage with and empower the participation of local Cambrian Mountain communities, who feel potentially highly affected or even threatened by EGS proposals, but feel least able to influence policy shaping. Some members of local communities see themselves less as 'local consumers of EGS' and more as fellow-sufferers. Not continuing to engage effectively with this group may result in less robust EGS and PES approaches being developed, and/or difficulties implementing proposals.

4 Discussion around the potential incentives / market mechanisms required to deliver an EGS approach to land management in the Cambrian Mountains

1.12 Given the breadth of the dialogue, ranging from problem definition, to exploration of potential solutions (and EGS approach), there was not much time to explore specific PES mechanisms in detail, however people did offer food for thought on particular PES models and issues.

- More than half of public participants involved in the public dialogue suggested they were willing to support a levy on utility and insurance bills to help pay for sustaining natural wealth and EGS. More than a third indicated that evidence of support for natural wealth projects would influence their choice of utility / insurance provider. Just under a third would be willing to see more tax revenue used to support natural wealth improvements. However just under one fifth of those engaged would not be willing to support a levy because they think this should be covered through current taxation.
- Participants also offered more radical ideas of their own in relation to PES e.g. evoking a John Lewis-collective approach to EGS and PES, where all have shares and receive benefits, associated with a specific rural/catchment area, and in return assume stakeholders' responsibilities for the care of their investment.
- Emergent themes seen as potential keys to unlocking PES related to trust and efficiency. Members of the public generally require proof that any monies they might contribute towards PES systems are used effectively and transparently for environmental resilience and enhancement.
- Farmers will be essential to successful PES schemes. Farmers participating in this study, particularly from the younger generation, are willing to contemplate futures in which their primary role may shift from food production to EGS management, provided there is sufficient income generating potential and markets for EGS. They were interested in continuing discussions with NRW and others around how a local pilot PES could be developed.
- A suggestion offered by the expert stakeholder and policy-makers' group, was that the forthcoming RDP could be a crucial vehicle to create an appropriate policy environment and focus funds to support EGS initiatives, that will benefit farmers and land managers as well as local communities.

5 Broad agreement around next steps

1.13 There is broad agreement among stakeholder groups regarding next steps, as follows.

- All participants strongly support the dissemination of the results of this project. It is hoped that the CMI and NRW will publicise the results of this project through its website and take other opportunities to disseminate the findings.
- A desire, even an urgency, was expressed across all sectors to use and build on the findings of this dialogue process, to deliberate, develop and agree practical next steps to provide better outcomes for EGS and to devise equitable PES systems. All stakeholders groups support further dialogue over the issues raised by this project.
- The EGS with greatest potential to stimulate productive and innovative debate between consumers, land managers and policy makers/regulators, and most likely to lead to proposals for a new PES, is the provision of water quality, closely followed by (and allied to) flood control. One or more of the river catchments originating in the Cambrian Mountains provide an ideal spatial geography to develop dialogue over PES schemes for these water-based EGS.
- If this proposal is to be taken forward, engagement with the water utility companies and other commercial interests including, for flood control, the insurance industry will be essential. Greater segmentation of consumer interests will also be worthwhile.
- People are keen to explore what an ecosystems approach would look like in practice. Pilot projects will need to demonstrate that PES approaches can work scientifically (land management), economically and socially/culturally, before fully-fledged schemes can be established. The CMI should continue to develop proposals for the attention of the Welsh Government and its agencies for one or more pilot EGS projects that take advantage of the networks and goodwill that CMI and former CCW, personnel and projects have already developed.

2 Project aims and objectives

Overall purpose

- 2.1 As stated in the original brief for this project, the scope of the study was to develop and deliver a public dialogue project, funded by the Government's Sciencewise-ERC programme³ and the Countryside Council for Wales, that:
- Informs and secures understanding and buy-in to the suggested ecosystems approach of the Natural Environment Framework / Living Wales, through the development of a number of Ecosystems Goods & Service (EGS) proposals for the Cambrian Mountains
 - Gains an understanding of the public perception to the EGS proposals, both within and without the study area, and how the challenges and opportunities of the ecosystems approach are linked to external social and economic factors
 - Develops a visual representation of the interconnectivity of stakeholder perception in regard to EGS opportunities that can inform / influence the development of policy designed to deliver the ecosystems approach
 - Creates discussion around the potential incentives / market mechanisms required to deliver an EGS approach to land management in the Cambrian Mountains

Policy context and key issues

- 2.2 In 2010 the Cambrian Mountains Initiative (CMI) developed a Defra funded Adaptive Landscapes project in the NW Cambrians. The project, was a case study looking at the development of a discussion tool capable of mapping locations within a landscape where climate change mitigation measures, such as tree planting or re-wetting of blanket bog, could be most effectively undertaken after taking into account existing / competing land uses.
- 2.3 The Adaptive Landscapes project was followed up by a Sciencewise-ERC funded dialogue, 'Dyfodol y Cambria'. The dialogue sought to engage a range of community and land management stakeholders in the study area around ecosystems futures. One of the key findings was the need to further accommodate the 'societal' values in the discussion tools 'trading off' of competing land uses.
- 2.4 In wishing to follow up on the 'Dyfodol y Cambria' dialogue, it is this perception of the value arising from the landscape of the Cambrian Mountains, and the means of realising it, that the CMI wished to focus on. The Initiative wanted further work to help it understand how community and other stakeholders perceive the connectivity of the challenges and opportunities that have been identified for the landscape and thus identify the potential barriers to the adoption of an ecosystems approach to land management in the study area.
- 2.5 In addition, as part of a comprehensive Business Plan developed for the wider Cambrian Mountains Initiative, another piece of research looked at the potential additional value that could be gained from enhanced land use and management within the Cambrian Mountains, primarily in relation to soil carbon and water storage, quality and flood management. The conclusion drawn by this EGS Valuation Paper was that the potential value arising to society from enhanced management of these services was in the order £8.3M annually - less the costs of delivering these benefits by land managers in the Cambrian Mountains.

³³ The Sciencewise Expert Resource Centre (Sciencewise-ERC) is funded by the Department for Business, Innovation and Skills (BIS). Sciencewise-ERC aims to improve policy making involving science and technology across Government by increasing the effectiveness with which public dialogue is used, and encouraging its wider use where appropriate to ensure public views are considered as part of the evidence base. www.sciencewise-erc.org.uk

- 2.6 In addition to the valuing work, the paper looked at examples of Payment for Ecosystems Service (PES) schemes elsewhere in the UK and suggested the need to develop a carbon accreditation scheme along the lines of the Woodland Carbon Code, that could attract investment in peat restoration projects by large companies through their Corporate Social Responsibility (CSR) commitments. Similarly scope was identified for engaging with the water companies with holdings in the Cambrian Mountains, 'to develop measures that incentivise both improved agricultural land management (to improve water quality and provide other benefits) and also to rewet peat and restore viable blanket bog habitats'. These and other opportunities to develop 'Payments for Ecosystem Services' schemes (PES) have recently been identified in work commissioned in England by Defra's Ecosystem Markets Task Force⁴.
- 2.7 Ecosystems Goods and Services and the opportunity to reinforce the way that society values and pays for these goods and services is a key policy area of the Welsh Government and for the new body Natural Resources Wales that starts work in April 2013.

Why public dialogue on decisions about the delivery of EGS?

- 2.8 In line with the Welsh Government's citizen-centred approach to policy-making, Natural Resources Wales (NRW) seeks to ensure the formulation, interpretation and effective delivery of systemic policies that go with (rather than against) the grain of the public's views and values. A systems approach to considering EGS, where people are enabled to contribute to the exploration and definition of problems that must be addressed, as well as the formulation of solutions and decisions on how to implement them, is most likely to achieve positive outcomes, if co-delivered by a society that is able to adapt and contribute.
- 2.9 Very many people are unfamiliar with the language and concepts encompassed by phrases such as ecosystems goods and services and payment for ecosystems goods and services, and this in itself presents a challenge to citizen-centred decision-making. Meaningful discussions of these themes require an appreciation of complex interactions between natural and human processes, occurring at local, regional and global scales. Meaningful discussions need to reflect on risk, and the levels of probability that something will come to pass that society is willing to accept, before taking action. They need to contemplate trade-offs and uncertainties about the consequences of acting, in order to prevent greater probabilities of harm associated with inaction (precautionary principle).
- 2.10 Therefore in order to conduct an informed and expansive public dialogue, where people can develop their views, open up and connect issues that they feel are relevant, care was taken to work with the conveners of the dialogue to develop accessible, evidence-based materials to stimulate and underpin participants' thinking.
- 2.11 In order to ensure a diverse mix of citizens, with a range of views and values, were engaged in the dialogue, efforts were made to recruit participants from a cross-section of society. Recognising participants should not have any particular or pre-existing interest in the themes to be discussed, it was made clear during the recruitment phase that their time and contribution would be acknowledged through the provision of a modest incentive. Sciencewise, sponsors of the project, offer some guidance regarding public dialogue on complex and or controversial issues: <http://www.sciencewise-erc.org.uk/cms/assets/Uploads/Publications/What-is-public-dialogue-FAQ-Report-V2.pdf>
- 2.12 Carefully structured, facilitated small-group workshops within the Cambrian Mountains and downstream, among more urban communities were conducted to enable public dialogue, and take-on board an understanding of the range of public concerns, risk assessment, motivational values and suggestions for positive change. Separate discussions took part with farmers and graziers living and working in the Cambrian Mountains.
- 2.13 A suggestion that a final meeting would enable members of the public – proximal and distal consumers of EGS; the farming and land-management group – local experts and practitioners involved in harnessing EGS; and scientists and policy-makers to come together to deliberate

⁴ <http://www.defra.gov.uk/ecosystem-markets/>

developing an approach to PES was deemed impractical by the steering group. Instead, the policy makers and representatives of the scientific community, considered the same materials and followed the same deliberative process as the public and farmers had done previously. The results of their deliberations were quickly synthesised and they compared the outputs of all these conversations, in order to assess the areas where public and political thinking is aligned, and where it is more divergent. They went on to explore mechanisms that might most appropriately deliver PES and rural development in relation to the Cambrian Mountains.

- 2.14 A report of the final meeting is available at <http://cambrianmountains.co.uk/environment/ecosystems>. The report describes the views of citizens, relevant policy makers and experts, and policy makers and expert stakeholders exploration of potentially appropriate policy responses to public and land managers' attitudes, concerns and appetite to contribute to solutions.
- 2.15 This reports provides a comprehensive description of all the quantitative and qualitative data gathered during the public dialogue process as a whole.
- 2.16 This project is concerned with the way that the Cambrian Mountains provides goods and services that are used and valued by people (residents, visitors and communities further afield), contributing to their economic development and social wellbeing.
- 2.17 When seeking to understand the delivery of ecosystem services, it is important to understand, on the one hand, how the services deliver benefits to people (who may or may not live in the area where the services are provided) and, on the other hand, how the services are generated by the natural assets present in ecosystems. These interactions can be portrayed as a pathway, the nature of which varies for each service and over space and time. These relationships are shown in **Figure 2.1** below.

Figure 2.1. The ecosystem services pathway from environmental attributes to human benefits

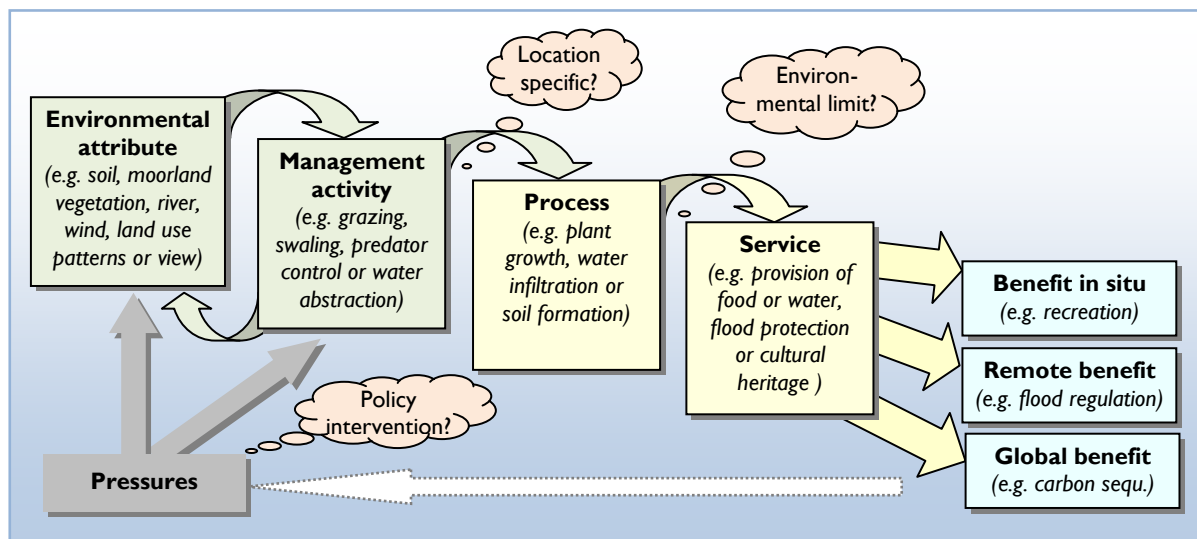


Figure adapted by LUC from Haines-Young and Potschin, 2008.

- 2.18 Such a pathway approach helps us to identify who the key audiences for this study should be. Based on the requirements set out in the brief for the study which were further developed during the project, a process of dialogue has been undertaken with four key audiences:
- Welsh Government and its agencies involved in the environment and land use (in regard to the overall policy and regulatory framework in Wales);
 - Businesses and representatives of business sectors (as purchasers of EGS);
 - land managers (as producers of EGS); and
 - a cross section of the general public (as consumers of EGS), split between residents living in the Cambrian Mountains area and those living further away.

3 Activities

- 3.1 This Chapter describes the work that has been undertaken during this project. The first part of the Chapter is structured according to the four audiences for this project, described above and the second part describes how the scenarios that formed the basis of the dialogue were prepared.

Dialogue with the Welsh Government and its agencies and with business representatives

- 3.2 An expert stakeholder workshop was held in IBERS, Aberystwyth on 14th March, 2013. The workshop report is available from the Cambrian Mountains Initiative website <http://cambrianmountains.co.uk/environment/ecosystems/>. This report also contains a summary of views held by other participating stakeholders.
- 3.3 The Countryside Council for Wales, on behalf of the Cambrian Mountains Initiative, assumed responsibility for inviting the participation of appropriate WG officers, including members of the RDP programme / advisors / representatives to participate in the programme, as members of a steering group and as participants in the 'expert stakeholder workshop'.
- 3.4 Work undertaken to date suggests that most businesses (other than the farming and forestry sectors) do not yet recognize compelling drivers to participate actively in EGS and PES scenario-planning. Therefore, this element of the work could only be approached in a very preliminary and somewhat indirect way. The non-land-based business sector seeks advice from trusted independent advisors, regarding how the national, political EGS-PES landscape is developing, as for example, the Independent Environment Advisory Panel of Dŵr Cymru. We advocated engaging with a sample of such 'influencers' also within the context of an 'expert stakeholder workshop', as well as members of the Cambrian Mountains Partnership Board. CMI-CCW invited individuals from both these groups, however take-up was disappointing.

Dialogue with land managers – producers of EGS

- 3.5 The brief required engagement with active land managers in the Cambrian Mountains. Two focus groups were sought to actively engage as stakeholders in the process. A natural decision was to request the knowledge of a part-established Cambrian Mountains Future Farmers Group based in the Tal-y-Bont area. These were eight young Farmers, mostly under 30 years old that were actively farming in the catchments of the Afon Leri and Afon Ceulan. Some of these had already been in some discussion with the CMI on knowledge transfer and understanding EGS. A workshop was convened in Tal-y-Bont on 5th March, 2013. Another key group of stakeholders was arranged through the National Trust's Head Warden at Brecon, Joe Dagget, who invited Dolaucothi tenants and Abergwesyn Common graziers to an evening discussion. Their workshop was convened in Llanymddyfri on 27th February, 2013.

Dialogue with the public – consumers of EGS

- 3.6 The brief required engagement with the public within the area where the EGS are produced, as well as further afield. The conversations with members of the public from areas 'downstream' of the Cambrian Mountains (literally, down the catchments of main rivers rising in the Mountains, and metaphorically, in areas receiving the relatively distant benefits of services produced in the Mountains) took place in Monmouth on 25th February and in Shrewsbury on 28th February.

- 3.7 Understanding differences, if any exist, between the perceptions and choices of 'in situ' and 'downstream' consumers of services is important. Intuitively, one might expect that 'in situ' communities have a more direct relationship with the services, with higher levels of understanding and appreciation of how services are delivered, and a greater willingness to see them better valued through PES initiatives. Conversely, 'downstream' communities (who may overall be more significant as consumers of services than 'in situ' communities) may have a less direct relationship, possibly different levels of understanding and appreciation and may therefore have distinct attitudes regarding PES initiatives. This study sought to test these differences for the selected services covered by this pilot.

Recruitment of participants

On Street / Direct Recruiting of public participants

- 3.8 The experience of the study team of recruiting participants for focus group studies is that, providing the sample to be tested is relatively small, it is best undertaken by team-members; if there is a chance that the participant is Welsh speaking that this be undertaken by a bilingual team-member. The interviewer / recruiter is able to talk sufficiently knowledgeably about the purpose of the study being undertaken, about the use that will be made of the resulting outputs, in sufficiently independent terms about the theme being discussed, and about the commitment and contribution required of the participant. This methodology results in both greater levels of participant confidence in the study and delivers more control over the type / profile and appropriate mix of participants required for the focus group work and increases certainty levels that there will be good turn-out at the focus group event.
- 3.9 A combined information-gathering and recruiting process was adopted. This started by inviting passers-by in the town centre or shopping centre where the recruitment took place to complete a paper questionnaire survey – formulated to gain knowledge of the respondent, to introduce the theme, and to gain initial insight into the respondents views on the theme. Respondents were then asked if they might be willing to participate in an evening focus-group event. If they responded, yes, they were asked to provide contact details, including their address and telephone number. This was followed-up with an official invitation to participate, from CMI staff with a follow-up call from the study team to confirm attendance.
- 3.10 This methodology naturally involves an element of "self-selection". The questionnaire – see **Appendix 2** for the questions and results – was designed to make it easy (rather than being entirely neutral) for participants to self-assess the value they place on nature's role in modern life, thereby encouraging the widest possible participation. It also focussed on flooding and flood-control – issues that are pertinent to communities living in / around Monmouth and Shrewsbury, especially at this time of year – again a deliberate attempt to encourage the participation of a wide-range of EGS consumers (rather than people with a particular interest in the environment, and/or environmental policy) However, participants had several opportunities to opt-in or out of the study, and therefore many (though not all) participants perhaps had a greater interest in / knowledge of environmental policy and decision-making than might be encountered among the general public.

Other deliberative workshop recruitment

- 3.11 Direct recruiting of members of the public (in their role as consumers of EGS) for the 'within-Cambrian Mountain Area-sample', was through local schools initially. This worked well in Rhayader and in Llanymddyfri, but was less successful in the Talybont area where a local resident asked some of her contacts to participate, and in this sense, this group was perhaps the least diverse group to take part. Interestingly the attitudes of participants at the Talybont workshop align more closely with those of the urban, distant consumers. Several participants do not hail originally from the Cambrian Mountain area, several work in Aberystwyth, and/or their livelihoods have little/no connection to the land.

Numbers of events and participants

- 3.12 While the study covers a very large area, it is a pilot. Thus while the evidence produced is certainly not considered to be exhaustive, it offers valuable preliminary insights on which further

work may be built. Given the limited time resource, the number of focus groups held was considered to be more than adequate, as follows:

- Farmers x2 focus groups of 6-8 participants
- General public within the Cambrian Mountains x3 focus groups of 5-8 participants
- General public beyond the Cambrian Mountains x2 focus groups of 5-8 participants

- 3.13 A small incentive to participation comprising £20, plus a £15 contribution towards travel expenses was given to participants not attending as part of any professional duty (all non-expert participants, i.e. consumers, local residents of the Cambrian Mountains and farmers).
- 3.14 CEA and LUC discussed with the conveners the merits of inviting local and distant consumers as well as farmers / graziers to the final workshop. As some 40 participants from among the expert stakeholder group, including members of Dŵr Cymru, were expecting to attend it was felt that only a handful of others could be accommodated. If this were the case, then public participants may have felt uncomfortable, and outnumbered. In the end the steering group decided it was not appropriate or practical to invite them. In retrospect, had the workshop brought together local and distant consumers, the dynamic and outcomes of the meeting would have been very different.

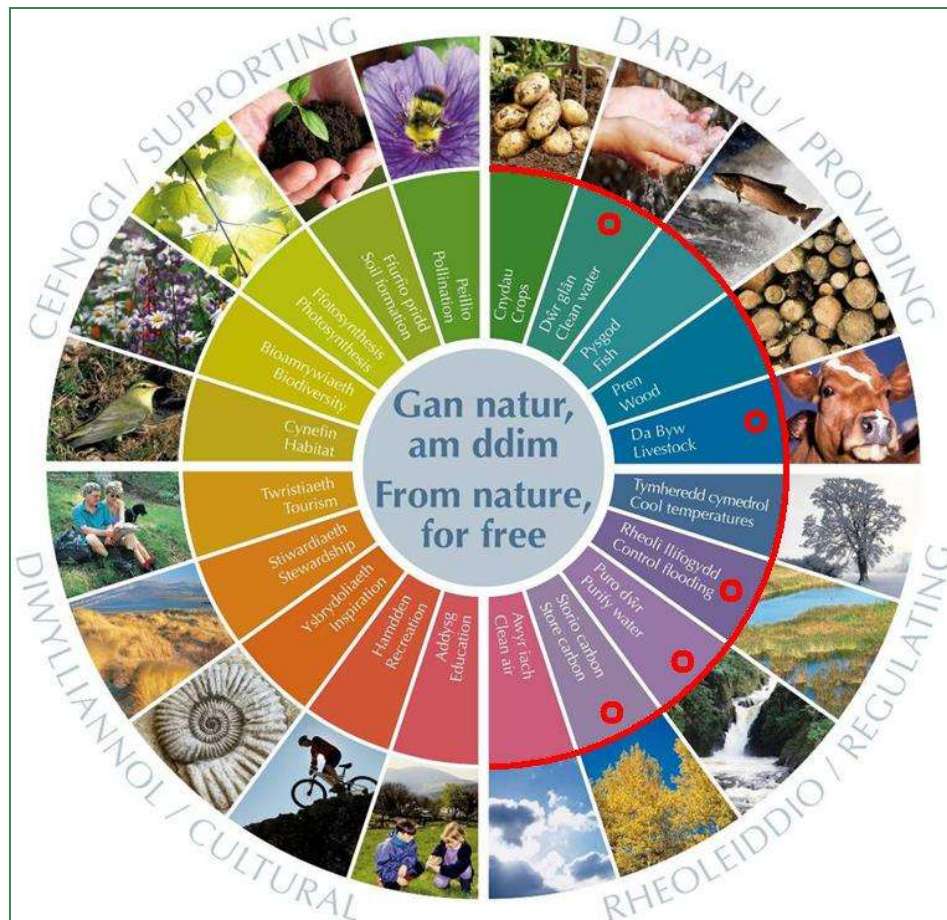
Providing structure to the deliberative events, and ensuring comparable information was gathered from all stakeholder groups

- 3.15 The same protocol was followed for all seven small group workshops, to enable comparison of results. Each was two and a quarter hours long, and began by talking a little about people's lifestyles, and their connection [if any] to the Cambrian Mountains. Then we moved on to discussing each EGS in turn, and specifically an exploration of three potential futures scenarios, depicting a business as usual scenario, a scenario resulting from negative, un-planned for events, and a scenario planned in order to result in multiple positive outcomes. Information was presented to participants, via diagrams, images, schematic cartoons, and verbally. Time was allowed for discursive, collective exploration of and reflection on the themes suggested by the stimulus material. The facilitator managed the discussion, ensuring people considered issues from all perspectives represented among the group and allowing people to introduce ideas they thought relevant. Related issues raised by participants ranged from wind farms, micro-hydro power generation, tourism and leisure opportunities associated with EGS, to the power of super-markets, the role of utility and insurance companies, the global nature of trade and environmental interdependency, and the balance of power between Welsh Government, Westminster, Brussels and global geo-politics.
- 3.16 Following deliberation, time was allocated to allow participants to respond individually to questions on a proforma, assessing in a semi-quantitative and qualitative way, why they believed certain futures might be more likely to be realised, the effect on them of each future scenario, their own influence on EGS futures' and how they might gain greater influence. They were also invited to make any additional comments. Ideas were offered about how to encourage a positive future for the EGS under consideration; several participants suggested potential incentives / market mechanisms and new approaches to land management in the Cambrian Mountains.
- 3.17 Expert stakeholders and policy-makers came together for a full-day workshop. In the morning, they were led through a process nearly identical to that described above. Over the lunch break, as participants networked, the facilitation team typed up and rapidly transferred their results to charts illustrating the quantitative element of the data gathered from all four stakeholder groups.
- 3.18 The visual representation of the interconnectivity and divergence of different of stakeholder groups' perceptions in regard to EGS, allowed the expert stakeholders to review the comparative data, and to explore opportunities and options for co-delivery of positive futures'.

The ecosystem goods and services covered by the dialogue

- 3.19 As noted above, the concept of ecosystem services is central to the Welsh Government's 'Sustaining a Living Wales'⁵ green paper. This emphasises the need to manage our environment as an integrated system, recognising the multiple functions that ecosystems perform and the many benefits we get from them.
- 3.20 The United Nation's Millennium Ecosystem Assessment⁶ recognises four types of ecosystem services which have been adopted by the UK National Ecosystems Assessment⁷.
- **Supporting services** necessary for the production of all other ecosystem services, such as soil formation, nutrients cycling and primary production
 - **Provisioning services** such as crops, fish, timber and genetic material.
 - **Regulating services** such as water purification, biological control mechanisms, carbon sequestration, pollination of commercially valuable crops, etc.
 - **Cultural services** providing a source of, aesthetic, spiritual, religious, recreational or scientific enrichment.
- 3.21 CCW has prepared a diagram applying this approach and showing the range of different individual services that are commonly provided by in Wales (**Figure 3.1.**).

Figure 3.1. Representation of ecosystem services found in Wales



⁵ <http://wales.gov.uk/consultations/environmentandcountryside/sustainingwales/?lang=en>

⁶ Millennium Ecosystem Assessment (2005). Millennium Ecosystem Assessment Ecosystems and Human Wellbeing: General Synthesis. <http://www.millenniumassessment.org/en/Synthesis.aspx>

⁷ <http://uknea.unep-wcmc.org/Home/tabid/38/Default.aspx>

3.22 In this project, four services were selected. These are indicated in **Figure 3.1** with a red circle. Three of these are 'regulating' services and one is a 'provisioning' service. These services are defined in this project as follows:

- Food from farming – lamb and beef from upland pastures
- High quality drinking water – from the reservoirs and aquifers
- Flood control – provided by wetland habitats and soils
- Reducing climate change – by storing carbon in soils and vegetation

3.23 These services have been selected for the following reasons:

1. They are services that are significant in the Cambrian Mountains
2. They are services where there significant potential to enhance their delivery through new market measures or other incentives
3. They have been described in previous work commissioned for the Cambrian Mountains Initiative⁸ and there is therefore a baseline of information about them.

The use of hypothetical scenarios to inform dialogue

3.24 At the start of the study, it was agreed that the largely expert-led deliberation that has to date contributed to society's understanding of ecosystem goods and services, and payments for ecosystem services, is often inaccessible to non-specialist groups, sounding abstract and lacking obvious connections to the immediate concerns of 'ordinary' people. The hypothesis agreed at the start of the study is that civic society is able to engage in creative and particularly useful ways with complex systems, providing engagement materials are thoughtfully prepared. It was therefore essential that this project was able to make the ideas and issues to be explored relevant and interesting and, to do this, a series of tangible scenarios were developed to guide the dialogue which present 'real life' choices (though still hypothetical) that affect the things that the audiences regard as important.

3.25 Furthermore, in order to illustrate the findings of the dialogue in an easily assimilated and visual manner, questions and discussion points in the dialogue were designed to provide information that could be plotted on simple charts. These charts were designed to compare the perceptions of the different audiences on issues such as the likelihood of the selected scenarios occurring, the impact that each of the scenarios would have on their lives and the influence they have to affect the outcomes. This approach to charting key perceptions of risks and opportunities followed the approach used by the World Economic Forum in its 2012 Global Risks report

3.26 The scenarios were intended to frame debate at the focus groups on the way the natural wealth of the Cambrian Mountains may be used and valued by society in future, over a horizon of the next 10 to 20 years. **Appendix 1** shows paper that was prepared to provide an internal briefing note for facilitators.

3.27 Three alternative scenarios were presented for each of the four services covered by this project.

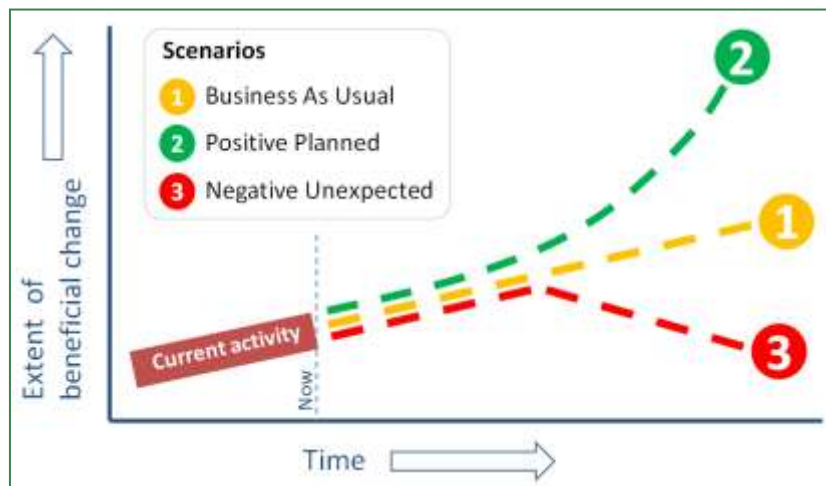
- The first is the '**Business as usual**' scenario, in which current trends in service activities and trends have continued. The four services provided by the Cambrian Mountains are used and valued on much the same basis as now but have come under increased pressure from the 'known' external forces of climate change and population growth. There has been no development of new initiatives that help pay for or enhance the delivery of the services (called 'Payment for Ecosystem Services', or PES, schemes).
- The second is the '**Positive - Planned**' scenario, in which policy aspirations have been developed and implemented. This might be considered as the 'best realistic' outcome in which enlightened actions are successful in bringing about the future we hope for.

⁸ CCW (2009). Sustainable Rural Development. A Potential Pilot for the Cambrian Mountains. Phase 1 Report. Defra (2010) Adaptive Landscapes Project in the Cambrian Mountains. CCW (was) Valuing the ecosystem services provided by the Cambrian Mountains.

Ecosystem services are better understood and more completely valued through the introduction of suitable new PES initiatives.

- The third is the '**Negative – Unexpected**' scenario in which 'wildcard' external events have caused significant variation from current trends and thrown our best intentions off course. External forces (which might be social, economic or environmental) mean that the outcomes we currently hope for have been thwarted. PES initiatives have not been introduced successfully and the services have come under more pressure.

Figure 3.3. Schematic graph showing trajectories of the three scenarios



3.28 Each of these scenarios were described under the following headings:

- **Drivers of change**, which are the external forces acting on the Cambrian Mountains, giving rise to...
- **Impacts**, affecting the way the services are delivered and benefits received by people, in turn leading to ...
- Potential **responses** of Government, businesses or consumers to these changes.

3.29 The narrative of future change for services, as described in each scenario, was intended to be hypothetical and not in any sense a policy proposal on behalf of the project sponsors. While the scenarios were intended to be credible and 'of the place' (i.e. constructed around a narrative that is firmly rooted in the characteristics of the Cambrian Mountains), it was made clear to participants that they were potential outcomes put forward for the purpose of discussion. A series of visual prompts (photographs and diagrams) were created and handed around at the focus meetings to stimulate discussions. However, no maps were used that attached outcomes to specific communities.

4 Outputs and findings

- 4.1 This Chapter reports on the results arising from the dialogue process undertaken in this study, drawing on four sources of evidence:
- The questionnaire used during the recruitment process for the focus groups with local and more distant communities
 - The qualitative discussions that took place during the focus groups with local residents, more distant residents and farmers, and during the workshop with expert stakeholders
 - The numerical scores that measured the focus group and workshop participants perceptions on issues related to the EGS scenarios.
- 4.2 The Chapter is split into three sections covering the following topics
- Citizens' awareness of the value of the environment and perceptions of EGS, gathered via the survey
 - Participants' perceptions of the future scenarios, gathered via deliberative dialogue in workshop settings
 - Participants' perceptions on the influence they have to affect the outcomes they want also gathered at the workshops

Participants' awareness of the value of the environment and perceptions of EGS

- 4.3 Evidence to address this topic comes from the questionnaire that was used as part of the recruitment process for the focus groups in Llandoverly, Rhayader and Talybont (the local communities) and in Monmouth and Shrewsbury (the more distant communities). Land-managers (farmers and graziers) and expert stakeholders did not complete the introductory survey, hence the following descriptions of findings derived from the survey do not refer to either of these two stakeholder groups.
- 4.4 The questionnaire asked a range of questions covering participants' interest in the natural environment, their awareness of the different goods and services provided by the environment, their perceptions of change in the quality of the environment and the actions that they undertake to protect the environment.
- 4.5 A total of 179 people completed the survey. This is clearly not a large or statistically significant sample. However, the broad characteristics of the sample are thought to be relatively representative of the larger populations from which it is drawn and the results are worth considering. The characteristics of respondents are summarised in **Table 4.1**.
- 4.6 Key differences between the two types of respondents are that more of those from the local communities were in the age group 25 to 44 (those from the more distant communities had a more even spread of ages). Linked to this, a higher proportion of those from local communities were in employment (particularly self-employed and part-time) and a smaller proportion were retired, in comparison to participants from the more distant communities.

Table 4.1. Characteristics of respondents to the questionnaire

Characteristic	Local communities	More distant communities
Number of respondents	39	140
Men	36%	49%
Women	64%	51%
Aged 16-24	0%	11%
Aged 25-44	64%	29%
Aged 45-64	28%	39%
Aged 65+	8%	19%
Self-employed full or part-time	21%	16%
In paid employment working 30 hours or more per week	36%	42%
In paid employment working less than 30 hours per week	29%	8%
Out of work and claiming unemployment benefit	0%	1%
Looking after the home/dependants	10%	4%
In full-time education at college or university	0%	6%
Wholly retired from work	5%	20%

Concern about how the environment is managed

4.7 Figures 4.1 and 4.2 show the responses to survey questions about participants’ concern for the way the environment is currently being managed, and the effects on their lives, and secondly on the lives of the next generation. Most respondents were fairly or very concerned, with a significantly higher proportion being very concerned about the effects on the next generation, suggesting a great concern for the future over the timescale covered by this study (the next 10 to 20 years). Although based on a small sample, the results suggest higher levels of concern amongst local communities.

Figure 4.1. Responses to the question: How concerned are you about how the environment is being managed and the effects on your life?

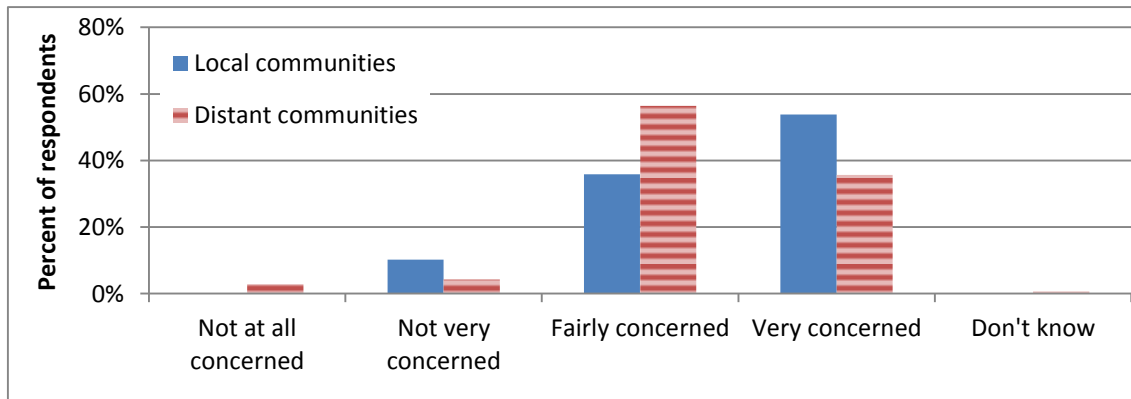
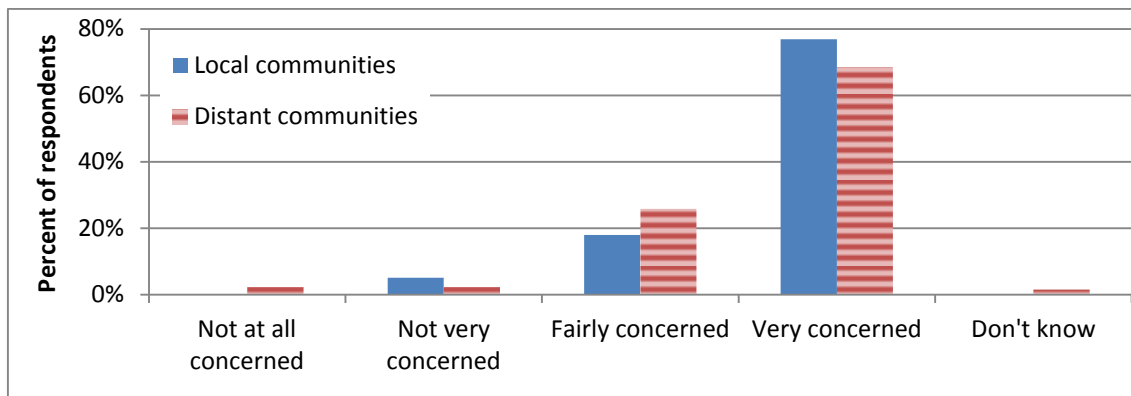


Figure 4.2. Responses to the question: How concerned are you about how the environment is being managed and the effects on the lives of the next generation?



4.8 **Figures 4.3 and 4.4** show that a majority of respondents in both groups stated that the quality of both their local and global environments had become more of an issue for them in the last year or two, with greatest concern being expressed in the state of the global environment. Whereas local communities expressed more concern than distant communities about the state of their local environment, distant communities were more concerned about the global environment. Most of those who strongly disagreed or tended to disagree that the environment (either local or global) was not becoming more of a concern for them over the last few years explained that this reflected a long-standing and continuing concern (rather than a lack of concern). This implies that there is a high level of concern (in excess of 60%) among the public about how the environment is managed.

Figure 4.3. Responses to the statement: The quality of my local natural environment has become more of an issue for me in the last year or two

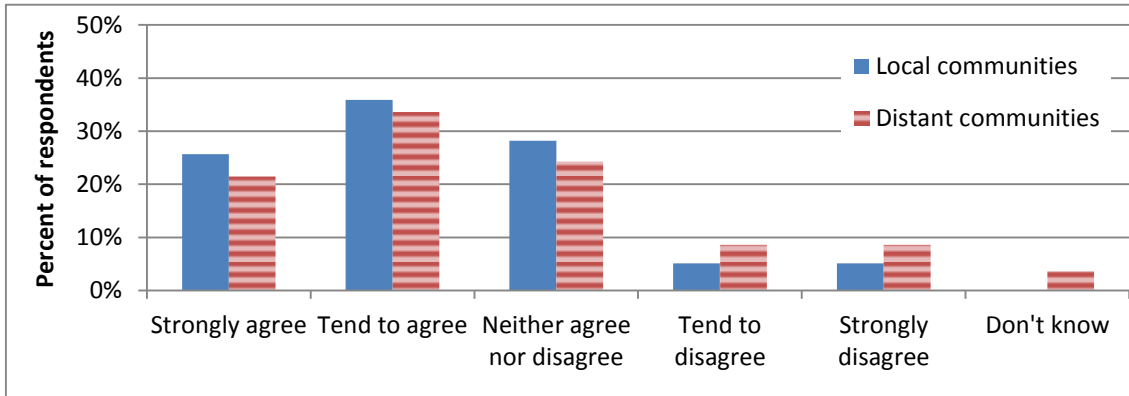
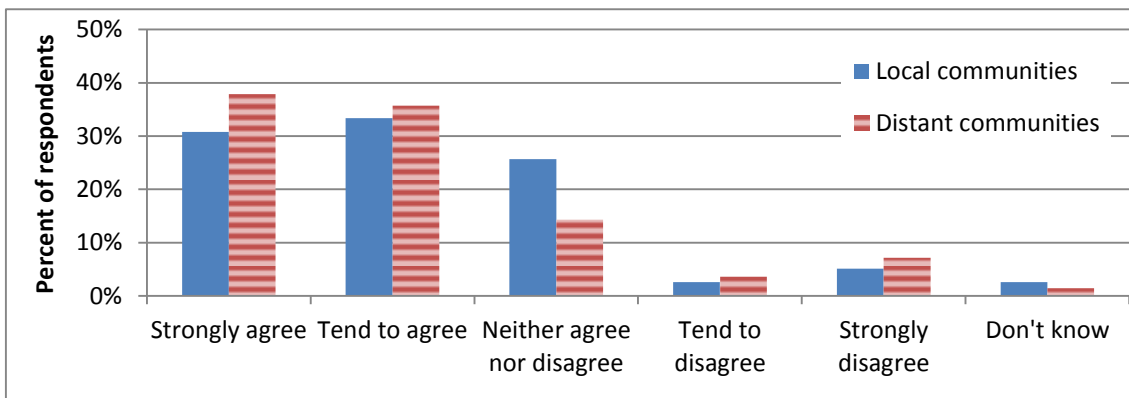


Figure 4.4. Responses to the statement: The quality of the global natural environment has become more of an issue for me in the last year or two



Perceptions of the benefits received from the environment

4.9 Respondents reported a strong awareness that the natural environment provides us with many benefits and services (95% agreeing with this statement – **Figure 4.5**) and similarly high levels of awareness about the role of the environment in providing products, supporting cultural and social development and the conditions to sustain life (**Figure 4.6**).

Figure 4.5. Responses to the statement: The natural environment provides us with many benefits and services

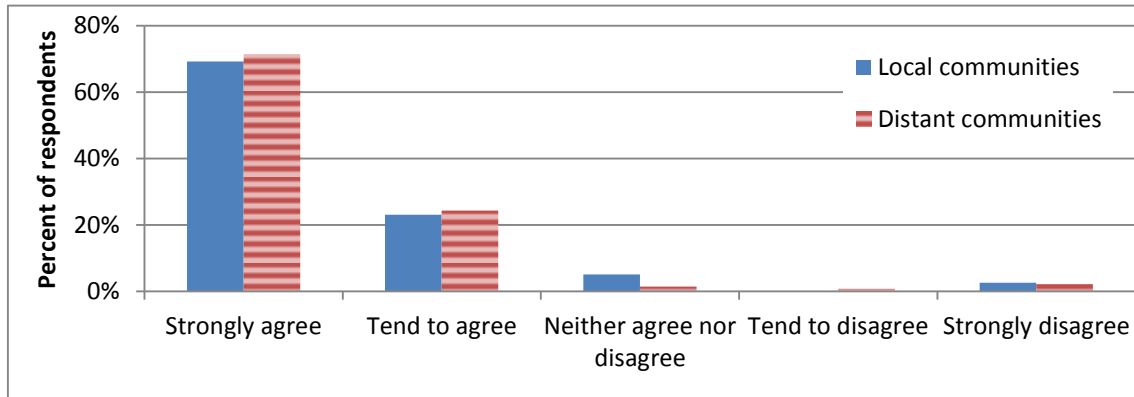
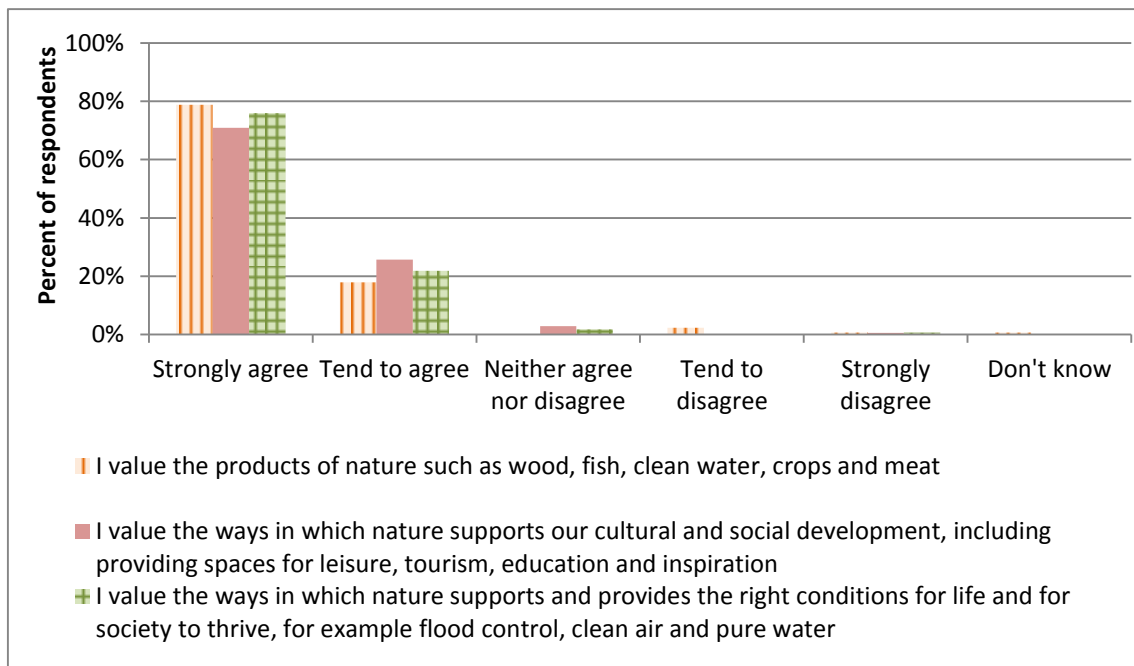


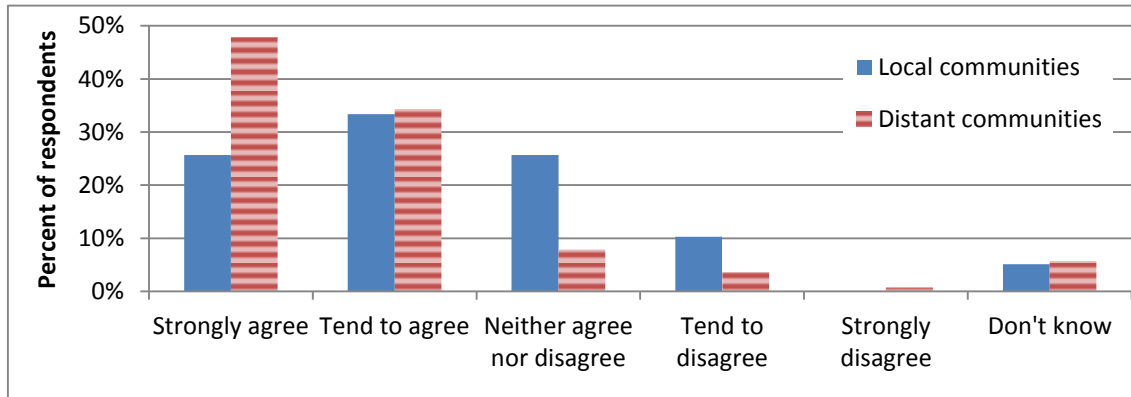
Figure 4.6. Responses to statements about the type of benefits the environment provides (both participant groups)



Responsibility for paying for the benefits the natural environment provides

4.10 Figure 4.7 shows that most respondents agreed that government and society should pay for the goods and services the natural environment provides (with a high proportion of respondents from distant communities agreeing strongly with this statement). However, compared to other issues covered in the questionnaire, there was a larger minority of respondents who either did not agree or disagree with the statement (12% overall) or who tended to disagree with the statement (5%). There is a differential here between the attitudes of local and distant communities. Participants tended to respond according to their personal willingness to pay additional charges, and local communities regard themselves to some extent as part of the vital social and economic infrastructure of the Cambrian Mountains, that supports farming communities to manage nature and the environment and contribute [directly – many perform some form of farming or land management role] or indirectly to EGS already. Several people also explained that as they live at / near the source of the goods and services provided by nature, their willingness to support rural life and the difficulties it entails (e.g. bad weather, a lack of well-paid job opportunities, limited cultural opportunities etc.) felt that they should be exempt from further charges.

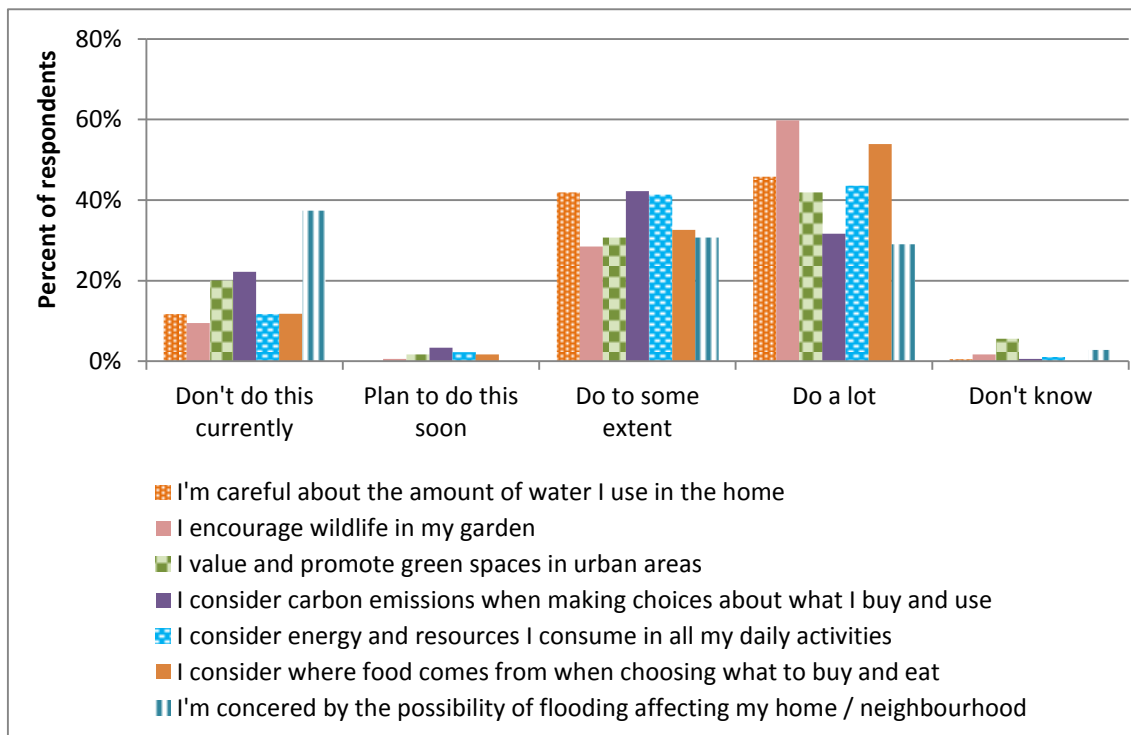
Figure 4.7. Responses to the statement: The natural environment provides goods and services that government and society should pay for



Personal actions and issues relating to environmental goods and services

4.11 **Figure 4.8** shows the responses from all participants in relation to the actions they take, or the things they think are important, about the benefits received from the environment. The majority of respondents reported that they do to some, or a large extent, undertake actions to support the environment. The most popular actions were encouraging wildlife in the garden and considering where food they consume comes from. The least popular action was considering carbon emissions when making choices about what to buy and use (not done by 24% of distant communities and 15% of local communities). Flooding of their home or communities was a concern of 60% of respondents, with more concern being expressed by local communities (79%) than distant communities (54%).

Figure 4.8. Responses to statements about the actions or issues that people have in relation to their relationship with the benefits received from the environment



4.12 Many of the questions asked subsequently in the questionnaire were about flooding and flood control. There was less general knowledge proffered unprompted about flood prevention and making-space-for-water by respondents, however, when asked to assess the effectiveness of particular upstream (soft) schemes and hard flood defences, people were engaged by the ideas raised and gave considered answers.

- 4.13 The level of awareness among all consumer and local community groups seems to be high. There also seems to be an acceptance and desire to embrace of some level of personal responsibility – this was borne out in the subsequent workshop discussions. Many people stated that they felt they could be encouraged to do more, and cited examples of countries where people do both considerably less (e.g. USA) and considerably more (e.g. Germany) with respect to resource (recycling), water and energy efficiency.
- 4.14 Among the distant consumer and local community workshops, the level of awareness displayed was not always broad ranging or detailed, however the willingness and capacity to understand the issues and explore complexity was high. People did not accept uncritically the scenarios presented to them, they questioned the drivers for change suggested by the stimulus materials and the degree to which the futures' impacts would affect them positively or negatively (see next section for detail).
- 4.15 Distant consumers, local communities and farmers / producers of EGS were keen to explore the role of intermediaries - namely supermarkets, insurance companies, water companies, large CO2 emitters, government and large public sector consumers – and suggested that they currently are part of the problem, and have an interest in maintaining systems that externalise environmental costs. They were critical of a lack of leadership from government and public sector consumers with considerably more (procurement) power than their own. This was particularly the case among some of the local community groups, as they reflected on the poor quality meals being procured by LAs for their children. Some Welsh LAs were forced during the time of the study to discontinue some types of meals, implicated in the horsemeat scandal.

Insights on perceptions of risk associated with future scenarios

- 4.16 During the workshops held with distant and local communities, with farmers, and with expert stakeholders / policy makers, participants were asked to consider and then give a score on a response sheet their perceptions in relation to three separate criteria, as follows.

The likelihood of each scenario coming to pass in the future

- 4.17 For EGS in turn and for each of the three scenarios under each EGS, after a brief discussion with the group as a whole, each participant was asked to score how likely they felt the future described in the scenario was. They could choose from the following six options: Highly unlikely; Unlikely; 50:50 likelihood; Likely; Highly likely; and Don't know.

How affected participants feel by the delivery of EGS

- 4.18 Again, for each of the three scenarios under each EGS, after a brief group discussion, each participant was asked to score how affected they felt they were by the issues discussed in the scenario. For the expert stakeholder group, this was the effect of their professional rather than personal role. Participants could choose from the following six options: Significant negative effect; Slight negative effect; Zero effect; Slight positive effect; Significant positive effect; and Don't know

How much influence participants feel they have over the delivery of each service

- 4.19 Next, participants were asked to score the influence they feel they have in relation to the delivery of the service. Again, for the expert stakeholders this was related to their professional rather than personal influence. Participants were asked to choose from the following five options: No influence at all; Only a little influence; Moderate influence; Significant influence; and Powerful influence.
- 4.20 The Charts in the remainder of this Chapter provide a visual representation of the scores that participants provided on these three criteria. Some of the charts (Figures 4.9 to 4.11) plot two of the criteria against each other, showing how people's score on how affected they feel against their perception of the likelihood of the scenario. For simplicity, these charts show the average scores within each group. The average scores hide what is often a large range within the group, but careful analysis of the data showed that using the averages provides a useful and valid

comparison between groups. Other charts (Figures 4.12 to 4.15) plot the level of influence that different groups feel they have in relation to each EGS.

- 4.21 It should be noted that the focus groups with the farmers did not cover as much breadth as other workshop deliberations, because fewer issues were explored in more depth. Hence there is no data available describing the attitudes of this stakeholder group towards the flood control service.

Figure 4.9. Plots of average participant scores for Business as Usual scenarios



Note: Flood control was not discussed with farming / grazier groups – time did not permit.

- 4.22 For all EGS discussed, stakeholder groups regard business as usual as slightly more likely than not. With two exceptions, they believe that business as usual will result in change for the worse over the next 20-25 years, as opposed to the modest beneficial change depicted in the stimulus materials (Figure 3.3).
- 4.23 The farming community reflect a slight divergence from this general picture. They expect to be slightly better off with respect to drinking water if business as usual continues. Many have their own water supply, and don't perceive drought nor water quality issues as posing significant risk for them, not their livestock; they may even recognise an opportunity to help ensure water supply and quality. They also do not perceive any risk associated with climate regulation should business as usual continue. They are not overly interested in current policies controlling C-sequestration in soils and peat restoration.
- 4.24 In terms of food from farming, both local communities and farmers themselves report similar estimates of the likelihood of business as usual, and suggest that, in that case there will be no effect – things will continue more or less as at present, with farmers just about surviving the vagaries of the market, helped by / despite changing agri-environment schemes.
- 4.25 Distant communities are more worried about the negative effects of continuing erosion of food quality and confidence in food if business as usual continues. They feel most distant from, and most powerless with respect to this ecosystems service. They are relatively confident that if

things deteriorate much more with respect to flooding (for example, culminating in deaths) and water scarcities, then regulators and government will intervene, but they are less confident that government will intervene with respect to food standards – the trend they argue is of ever decreasing quality, ever cheaper foods. They consider that market forces are very strong, and in part [other] consumers are to blame for the growing demand for cheap food.

- 4.26 Expert stakeholders identify the highest levels of risk associated with business as usual for climate regulation and flood-control. Many reflect how their role will become increasingly difficult, as climate change exacerbates the likelihood of extreme weather events and prolonged rainfall resulting in flooding, and how their role in terms of maintaining habitats in favourable conditions will become increasingly challenging.
- 4.27 Consumers and local communities perceive the risk for climate regulation and flood control associated with business as usual similarly. They identify negative effects on their lifestyles, reporting flooding becoming more frequent, and climate change effects impacting negatively on many aspects of life.

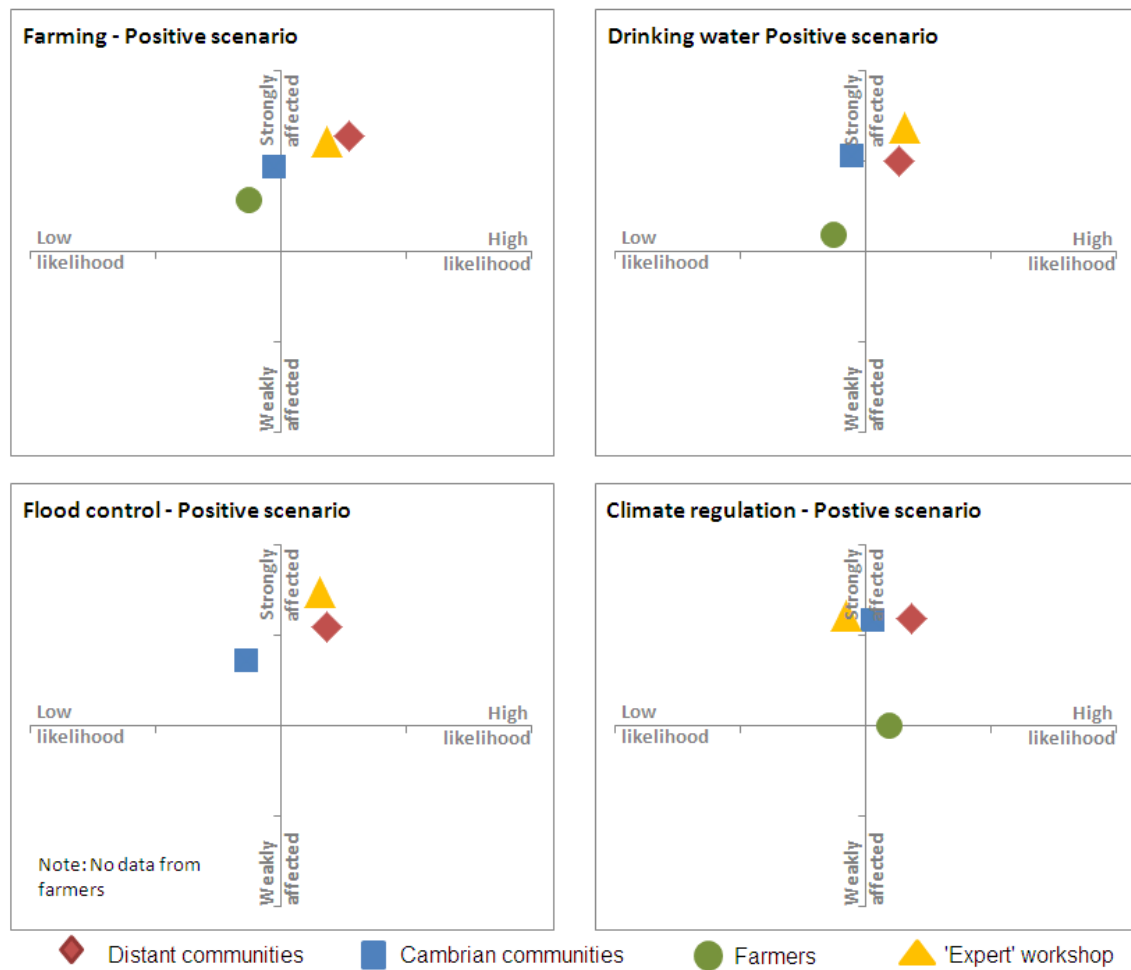
Figure 4.10. Plots of average participant scores for Negative Unexpected scenarios



- 4.28 There is multilateral agreement that negative unexpected will bring negative effects.
- 4.29 For food from farming, the expert stakeholders/policy shapers, assess the risk both in terms of probability (only slightly higher than 50:50%) and affect as slightly higher.
- 4.30 For drinking water, farmers are least worried about the probability of negative unexpected futures' and distant consumers are most concerned. Should negative scenarios unfold, expert stakeholders, regulators and policy-shapers consider the effect on them/ the consequences for the duties they have to perform, will be worst.
- 4.31 Flood control and climate regulation – distant communities (currently experiencing regular negative and direct impacts associated with flooding) and expert stakeholders assess the risks

(probability and degree of affect, though of course not it's nature) similarly. They consider negative unexpected more likely than not.

Figure 4.11. Plots of average participant scores for Positive Planned scenarios

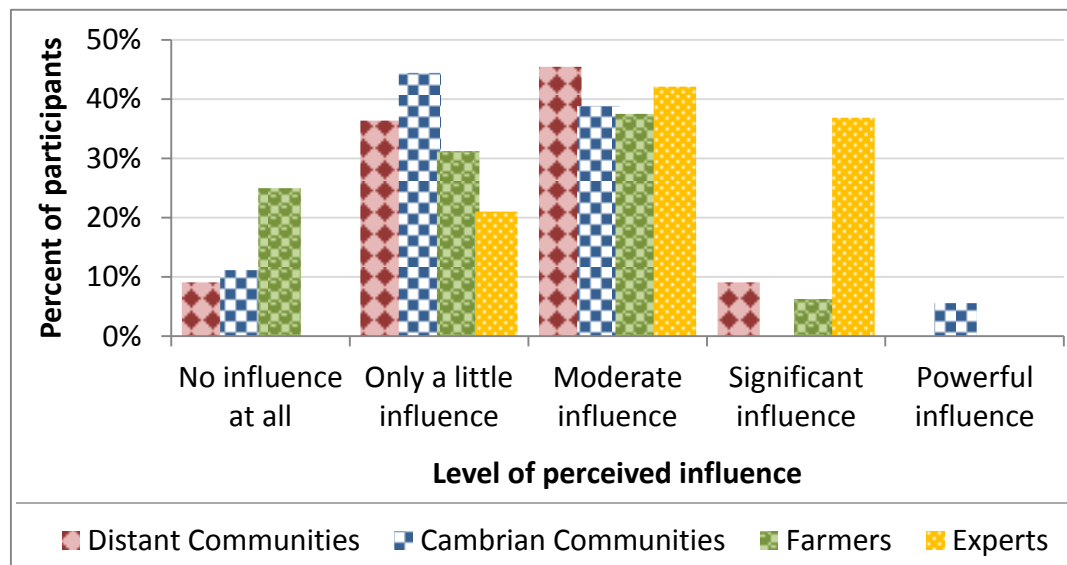


- 4.32 No stakeholder groups appear very confident that positive futures will be secured. The scores all fall between an even change (50:50) and it being likely – i.e. no stakeholder groups think positive planned even approaches 'highly likely'.
- 4.33 Expert stakeholders and policy shapers are the most optimistic about the potential positive affects of positive planning. This positive outlook is more pronounced with respect to drinking water and flood control than food from farming and climate regulation. They are more confident than not of positive planning being realised for all EGS other than climate regulation. This perhaps reflects the catchment /national scale of the system for water-related challenges (i.e. less intervention / complexity from international parties to contend with). Expert stakeholders also recognise that while there is not universal agreement about all the detail of what might be done, they agree sufficiently to act on the precautionary principle, and suggest that delivering pilot schemes will ensure progress is made.
- 4.34 Farmers assess the probability as lowest and the affects less positive than other stakeholders with respect to food from farming, and drinking water.

Insight on perceptions of influence

Influence on the provision of food from farming

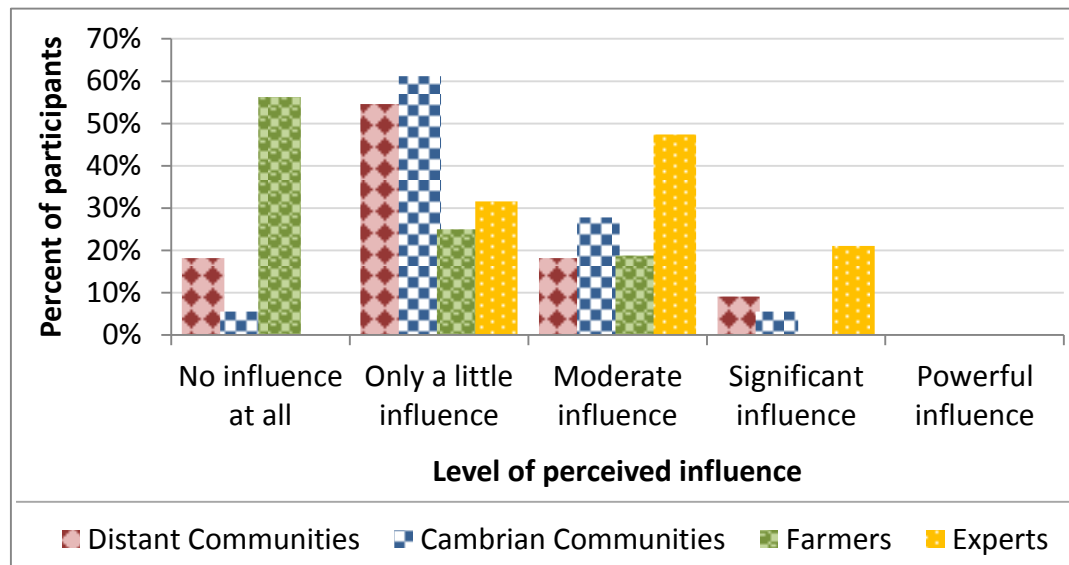
Figure 4.12. Chart showing perceptions of influence in relation to Food from farming



- 4.35 Generally, we see that a lower percentage of farmers than any other group consider themselves to have moderate or significant influence on determining the future scenario that comes to pass. In a way, their stake in this EGS may be greatest, and perhaps it is not surprising that they might judge their capacity, or lack of it, to manage financial and political control on their livelihoods most critically.
- 4.36 Local residents and consumers seemed to be most at ease with the levels of influence they exert on food futures for themselves and their families, describing a choice freely exercised between local meat bought at a local butchers and economy buys from the supermarket. Where this did fall-down somewhat was with respect to meals provided by schools, for their children (and staff / teachers). The processed foods procured cheaply by the LA, make it hard to educate children about valuing fresh, local produce.
- 4.37 Generally distant consumers believe they have only a little or moderate influence, as consumers and through joining civil society lobbying and campaign groups such as "38 degrees", and for many this lack of control is very worrying.
- 4.38 No expert stakeholders and Welsh policy advisors / makers consider themselves to have powerful influence on food from farming scenarios – perhaps because there is a global trade in food, and decisions made outside Wales, particularly in Brussels may override / derail national interventions.
- 4.39 Distant consumers, local communities and farmers themselves – complained of the power of supermarkets to skew markets, and that tighter control should be exerted on them, as they make vast profits, but seem to pass additional costs on to producers and processors. People also talked about the fragmentation and complexity of the food industry, with food being transported many hundreds or thousands of miles for processing and packaging, and they wondered how it could possibly be economic to provide profits for all the middlemen, and still remain "cheap" for the consumer. They suggested that greater regulation is necessary. They desire greater transparency and influence/ leadership from regulators & public sector organisations, for example via procurement.

Influence on the provision of high quality drinking water

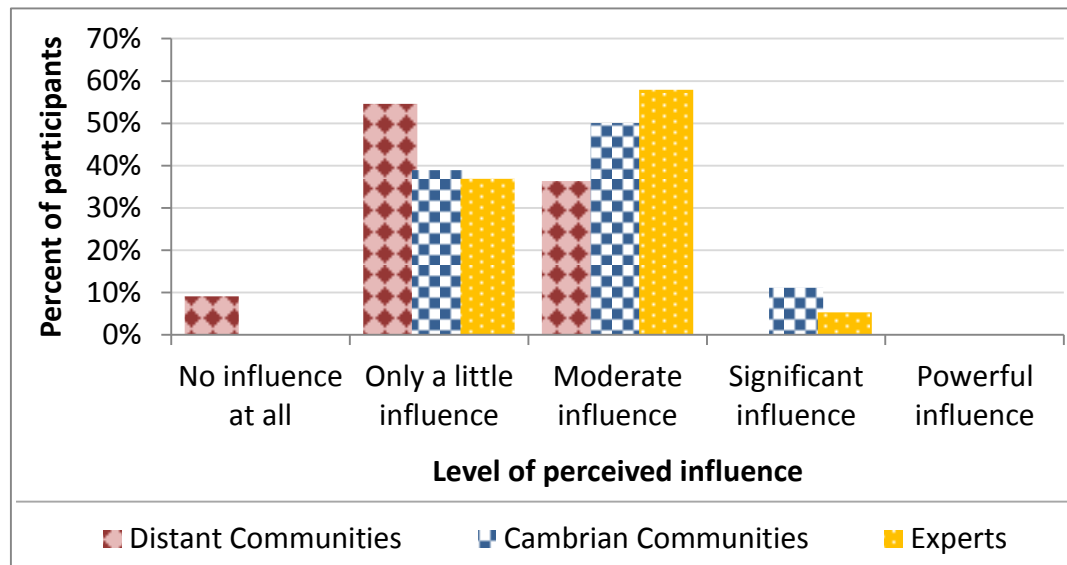
Figure 4.13. Chart showing perceptions of influence in relation to provision of drinking water



- 4.40 With respect to influencing the delivery of good quality water to market, the farmers judged themselves least influential as a whole. Given that many are not even consumers of the service administered by water companies, they consider themselves to be quite separate from water as a consumer commodity.
- 4.41 Expert stakeholders involved in water regulation recognised an enhanced opportunity for farmers if the effects of climate change continue along current trends, suggesting that more could be made of their small on-farm reservoirs in certain circumstances.
- 4.42 Distant consumers suggest they have consumer influence, and several suggested that they would be willing to pay a small levy on water charges. Of these, several also suggested that they would like to receive information regarding precisely how their money was being spent – they require greater accountability and transparency in the provisioning of what we have grown accustomed to regarding as a basic right and necessity.
- 4.43 Local consumers reflected that they are dissatisfied with the influence they have over the commoditisation of their local natural resource – one which they reflect (only half-jokingly) that they should benefit from because after all, they have to live under the rain that ultimately provides the water for drier parts of the country.
- 4.44 They reflect that the Welsh Government does not have real control over our water resources, and that decisions about water are shaped during the electoral cycles of Westminster, not Cardiff, where their democratic leverage is considerably less than the constituencies where great volumes of Welsh water are consumed!
- 4.45 Expert stakeholders and Welsh policy-makers and regulators are more confident regarding their influence to bring about a positive planned future for quality water provision, at least in part because this is a local commodity, not subject to international negotiation. There is difference of opinion as to whether more, less or similar levels of regulation are required – but that the regulation should be different if it is to bring about positive futures’.

Influence on flood control

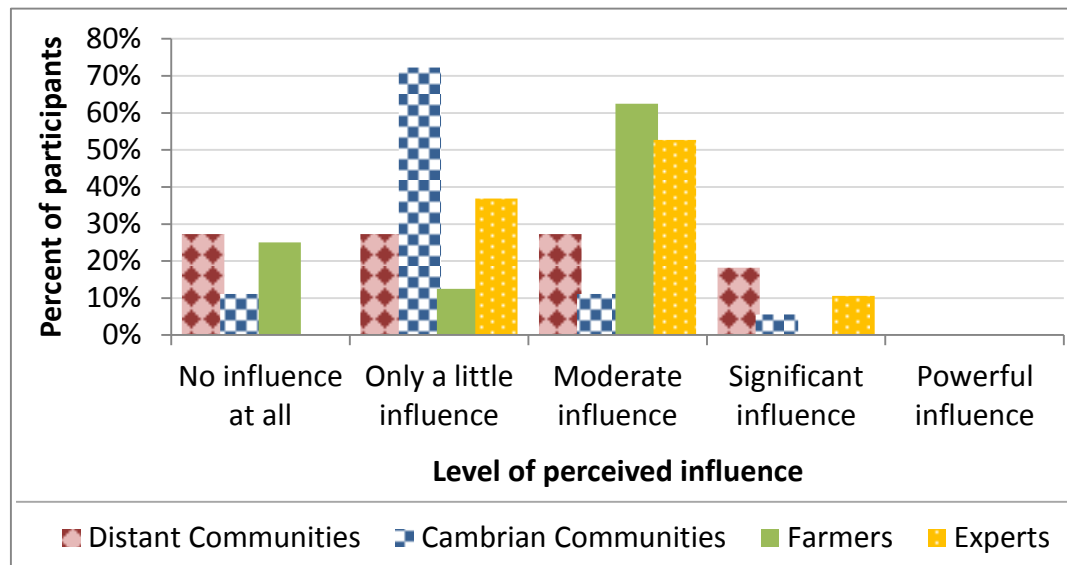
Figure 4.14. Chart showing perceptions of influence in relation to flood control



- 4.46 Flooding is quite a topical and high-public interest issue for many consumers of the Cambrian Mountains' EGS – both distant and local. Residents of Shrewsbury, and Monmouth to a lesser extent, are regularly inconvenienced by flooding events; for some the impact is significant and personally disturbing. Residents of the Talybont area too, have the events of last summer when Ceredigion suffered terrible flooding fresh in their minds. As a result, none of the groups are terribly enthusiastic about business as usual; furthermore the difference in aspiration / hope for positive planned, versus concern regarding both the likelihood and the effect of negative unexpected is large.
- 4.47 Here, distant consumers report the lowest levels of perceived influence on futures. They are interested in the capacity of highland areas of river catchment systems to provide solutions that address the causes of flooding, and are dissatisfied with very localised solutions like hard flood defence schemes that defer problems to other areas further downstream. They favour the protection of strategic infrastructure (like Shropshire County Council offices). Again, they suggested that they might be willing to pay reasonable levies on insurance and water rates (they see water provision and flood control as closely connected), on the condition that careful reporting shows how investment addresses flooding effectively.
- 4.48 Local consumers/communities are interested in practical measures that can be taken close to source too, and are aware of different schemes, including using vegetation to help slow water movement. The Talybont consumers reflected dissatisfaction at the lack of clarity regarding who the responsible body is with respect to flood control in their area – the LA or the EAW. They reported forming their own practical work parties to ensure river courses and drains are cleared and managed appropriately during wetter months.
- 4.49 Expert stakeholders and Welsh policy makers seem most confident about an ability to influence positive futures for flood control because while it requires a landscape scale or catchment system scale approach, this can be achieved given the greater self-determination / independence of working at this scale than at the scale of influencing factors affecting the other EGS. Agri-environment schemes and local / consumer interest means that all key stakeholders are likely to have a shared interest in effective action.
- 4.50 While some among the expert group would like further research to provide detailed evidence, most agree that positive change is possible and suggest that a precautionary approach would involve delivering pilot studies right now.

Influence on climate change regulation

Figure 4.15. Chart showing perceptions of influence in relation to climate change regulation from storage of carbon in peat soils



- 4.51 Again, farmers are rather detached from the views of others with respect to risk assessment of climate change over the next 20 or so years. They regard themselves as least negatively affected by business as usual as well as negative unexpected, and least positively affected by positive planned. They consider negative unexpected to be less likely than others.
- 4.52 One distant consumer voiced the concern that “worrying about these issues is a middle class luxury” – the implication being “because we can afford to”. If farmers are detached from Climate change regulation it might be for similar reasons, implying their engagement with the theme needs to be incentivised.
- 4.53 Several of the distant communities suggested systems founded on commercial advantage, and profit and responsibility sharing as a way to fund C-sequestration projects in the Cambrian Mountains – along the cooperative lines adopted by John Lewis and Waitrose, where workers are shareholders and benefit from their labours.
- 4.54 The perception of limited effect reported by farmers is somewhat in contrast with their (self-assessment of) influence – a higher proportion of farmers than any other group suggesting that their influence on climate regulation is moderate. Discussion of C-storage in soils, and peaty soils in particular centred around the practical necessity of keeping soils wetted, and in good, moist, though not necessarily over-saturated condition, through measures such as grip blocking, and timely and appropriate grazing. Farmers recognised activities that fall in their area of expertise and could provide win:win scenarios if they are part of agri-industrial schemes.
- 4.55 Consumers show a range of levels of perceived influence, but also reflected an enthusiasm for gaining a greater understanding about the role of soils, compared to say trees, in reducing CO₂ emissions to the atmosphere. Some local consumers reflected on, in their words – disastrous peat destruction - resulting from the siting of wind turbines on highland areas. It is clear that not much is understood with any great certainty about the relative capacity of peat to sequester C, versus say the C-reduction technology of renewable energy, and the embedded C of wind turbines, and their concrete bases, nor for that matter versus the C-emissions of N American drivers, and Chinese coal fired power stations. For this reason and the international (pan European) collaboration and agreement required to establish effective C-credit systems, many expert stakeholders are less than confident about their ability to influence Climate regulation futures through Cambrian Mountain Initiatives. Several of the expert stakeholders adopt quite a pragmatic view, suggesting that by “building policy and incentives around the other functions for upland peat, climate regulation functions would follow”. Conversely others feel that incentivising C-capture and management in soils through agri-environment schemes would be very positive.

5 Conclusions

- 5.1 This final chapter considers what the findings from this study say about the potential for future action by the CMI and its partners to enhance understanding and delivery of EGS and develop specific market mechanisms (PES).

Opportunities to engage stakeholders more fully in change

- 5.2 During the study, **distant consumers** expressed a desire for consumer / citizen power and responsibility to be encouraged and facilitated. For this to happen political and institutional space needs to be created for them to affect change. Distant consumer participants suggested that this could be helped by making information more available and accessible. This could be done by involving the news media or through staffed exhibitions or facilitated open meetings. The opportunity they valued most during this exercise was that of structured deliberation.
- 5.3 Effective media-based mechanisms suggested by distant community participants included challenging educational programmes like Hugh Fearnly Whittingstall's recent documentary series on fish and marine conservation or Jamie Oliver's school diners. However they recognised that there are limitations to this one-way exchange.
- 5.4 Distant consumer participants expressed their appreciation for the opportunity provided by the small group workshop to hear about issues from a number of different perspectives, explore and contribute their own views. One person suggested that issues of public interest should be considered by groups of people, in much the same way as jury service is arranged.
- 5.5 It is interesting that the distant consumers self-identified as the 'voice of the nation' or the majority, in the sense that they believed democratic processes can serve them well. However in respect to EGS, participants recognised that the issues need to become politically relevant, so that they become vote winners.
- 5.6 This stakeholder group also evoked citizen groups and campaigning organisations (e.g. 38 Degrees, and campaigns to stop the privatisation of woodlands) as a means of channelling their views, and gaining influence through powerful representation on single issues. There was a sense that these campaigns are unfettered by short-term cycles of influence and power (c.f. the "normal democratic process").
- 5.7 Turning to **local communities**, some participants expressed discontent because they share with nature some of the inequity of current market externalisations, with respect to EGS. Their "habitats" are rural areas, but they do not feel they enjoy the rural benefits of past generations, or even recent years. Examples cited included local retailers supplying local foods being priced out of the market by the global food industry; the quality of life through association with nature is not as it was; their localities generate power for other people to use; unless they own land, they receive no/few direct benefits for the march of modernisation/development).
- 5.8 Local communities ascribed feelings of powerlessness to the rural vote not counting for much, ineffective representatives and little political leverage. They also felt they had little economic leverage with big businesses because of the relatively small size of the market they represent. This suggests that many rural citizens would welcome support to strengthen effective local policy forums, exercising deliberative democracy. They are also interested in localised supply chains (still inimitably surviving in some areas), where communities can exercise relatively more 'buying power'. Given their disengagement with the usual channels of communication and engagement, "rural-citizen-centred democracy" to give local communities more confidence in being able to affect outcomes could be explored.
- 5.9 Some **farmers** were concerned that they are not well represented by the media, and that both the public and expert stakeholders / policy shapers have only a poor understanding of their

relationship with the land they farm. When offered dialogue that allows them to explore options to enhance EGS, they were interested in co-developing and delivering solutions.

- 5.10 Very few **expert stakeholders and policy shapers** declared themselves to have significant influence on any EGS. From the citizen's perspective this is likely to be surprising and disheartening. A suggestion was made that lack of perceived influence reflects participants' individual perspectives as officers, rather than from the perspective of organisations with influence greater than the sum of their parts. If so, significantly more internal engagement within the organisations to embed a sense of joined-up power may facilitate positive action and co-delivery, as may more engagement with external stakeholders, including citizens and commerce.
- 5.11 Another possible explanation to the feeling of powerlessness by expert stakeholders is offered. This is that, ultimately, policies are driven by politicians via a democratic process which public servants influence via evidence and advice. As many of the participating expert stakeholders were public servants they judge themselves to have only 'moderate' influence rather than a decision-making mandate.

Opportunities to develop effective PES mechanisms

- 5.12 Both distant and local consumers of EGS said they might be willing to pay a bit more for EGS, although local communities were less keen on this because they felt they already pay, in the sense that they support rural contribution and EGS just by being part of it. They commented that living in the Cambrian Mountains involves less favourable economic options than the distant urban consumers and that their environmental conditions are less favourable too, with poor weather conditions and in poorly connected parts of the country. They point out that farmers and land managers need communities around them, and they are integral to the rural system.
- 5.13 Participants from both distant and local communities agreed that they would be willing to pay more only if there was a corresponding increase in levels of transparency and openness from the utilities and insurance companies (as collectors of a levy to support EGS). Consumers expect it to be transparently clear that their levy is being spent effectively, such as to fix leaky water distribution systems, prevent flood prevention at source, restore peatland to mitigate CO₂-emissions, improve water quality etc. This suggests that a level of trusted third party involvement (such as provided by independently verified quality assurance) will help to increase consumers' approval for PES schemes.
- 5.14 During the focus groups, opportunities to increase the role of markets to deliver the EGS were briefly discussed.
- 5.15 **Food from farming.** Local people generally place a higher value on, and said they were willing to pay more for locally produced beef and lamb. Distant consumers were a bit less concerned as a whole about whether they eat Welsh or English lamb of known provenance for example, compared to New Zealand lamb. Stakeholders agreed that increased confidence in the livestock and meat processing supply chain (against a background of consumer mistrust accentuated by the horse meat scandal which was topical when focus groups were taking place) would be needed to increase demand for local food.
- 5.16 Farmers themselves questioned what proportion of their product can be sold locally or as a high value-added item. They pointed out that much of the livestock produced in the Cambrian Mountains is not directly consumed as meat but sold for fattening or breeding outside the area. It is important that the potential for farmers' income from local food production is not over sold.
- 5.17 **Drinking water and flood control** tended to be discussed together by the groups, although it was recognised that the mechanisms for delivering PES for these EGS would be very different. For water quality, several UK water utility companies (but not yet Dŵr Cymru or Severn Trent Water) already add a small levy onto water consumers bills which is used to pay for measures to improve land management by farmers. There are no working examples of PES for flood regulation which would probably need to operate through a levy on property insurance premiums.
- 5.18 Consumers, especially distant consumers were relatively more optimistic than expert stakeholders about the potential to develop PES for flood risk management and water quality provision. Lack of scientific certainty about the land management interventions that a PES would pay for were

recognised as a barrier by expert stakeholders. However, they agreed that the precautionary principle should encourage them to take more risks with the evidence and to embark on catchment-scale pilot studies to test the effectiveness of measures.

- 5.19 Scientific uncertainty was also highlighted by expert stakeholders in relation to the land management interventions (peat conservation) needed to address **climate regulation**. The highly technical and regulated nature of the developing markets for carbon offsets meant that awareness of this topic was low amongst most stakeholders. While many showed an interest in the topic, there would appear to be few opportunities for direct consumer engagement with a PES for carbon sequestration in the Cambrian Mountains at the moment. However, expert stakeholders recognised the need for more dialogue between themselves, farmers and carbon-intensive business sectors.

Opportunities for future action by the CMI

- 5.20 All participants strongly support the dissemination of the results of the dialogue. Members of the public in particular, see dialogue and transparent communication of results of the deliberative process, as enabling ordinary people to influence policy. **It is hoped that the CMI will publicise the results of this project through its website and take other opportunities to disseminate the findings.**
- 5.21 A desire, even an urgency, was expressed across all sectors to use and build on the findings of this dialogue process, to deliberate and develop and agree practical steps – to secure better conservation and enhancement of our natural resources, to support rural communities, and to provide better outcomes for consumers of EGS and to ensure equitable PES systems are devised. **All stakeholders groups would support further dialogue over the issues raised by this project.**
- 5.22 The EGS with greatest potential to stimulate productive and innovative debate between consumers, land managers and policy makers/regulators, and most likely to lead to proposals for a PES, is the provision of water quality, closely followed by (and allied to) flood control. **One or more of the river catchments originating in the Cambrian Mountains provide an ideal spatial geography to develop dialogue over PES schemes for the water-based EGS of drinking water and flood control.**
- 5.23 The exploration of market-driven PES solutions will need to be open and expansive and involve a wider range of stakeholders, including representatives of groups who did not take part in this project. If the proposal for further dialogue over PES for water-based EGS is to be taken forward, **engagement with the water utility companies and other commercial interests including, for flood control, the insurance industry will be essential. Greater segmentation of consumer interests will also be worthwhile** (going beyond the relatively simplistic distinction between local and distant communities in this project).
- 5.24 People are keen to explore what an ecosystems approach would look like in practice. There are shared expectations that policy intervention and funding will need to demonstrate that PES approaches can work (in both a scientific land management and economic sense), before fully-fledged schemes can be established with industry and government support. **The CMI should continue to develop proposals for the attention of the Welsh Government and its agencies for one or more pilot EGS projects that take advantage of the networks and goodwill that the CMI has already developed.**

Abbreviations

BAU	Business As Usual
CCW	Countryside Council for Wales
CMI	Cambrian Mountains Initiatives
EGS	Ecosystem Goods and Services
ERC	Environmental Research Council
IBERS	The Institute of Biological, Environmental and Rural Sciences at Aberystwyth University
NRW	Natural Resources Wales
PES	Payment for Ecosystem Services

**Appendix 1 – Facilitators’ briefing paper
describing the scenarios**

The Natural Wealth of the Cambrian Mountains

What can it do for you?

Outline of scenarios of future ecosystem service delivery

Introduction

This paper describes the scenarios for future ecosystem service delivery that will form the basis for the dialogue with focus group participants during this project. These scenarios will be presented to, and discussed with, four different groups as follows:

- members of local communities on the edge of the Cambrian Mountains,
- members of more remote communities, 'downstream' of the Cambrians,
- farmers managing land in the Cambrian Mountains, and
- representatives of statutory and other stakeholder organisations involved in land management.

The **purpose** of the dialogue is to gain a better understanding of the perceptions of different groups of people (as producers or consumers of the services) to the ways that the services may be provided in future, focussing particularly on the role of market mechanisms and other incentives that better value the services and encourage better delivery.

Selecting the services

The concept of ecosystem services is central to the Welsh Government's 'Sustaining a Living Wales'⁹ green paper. This emphasises the need to manage our environment as an integrated system, recognising the multiple functions that ecosystems perform and the many benefits we get from them.

The United Nation's Millennium Ecosystem Assessment¹⁰ recognises four types of ecosystem services which have been adopted by the UK National Ecosystems Assessment¹¹.

- **Supporting services** necessary for the production of all other ecosystem services, such as soil formation, nutrients cycling and primary production
- **Provisioning services** such as crops, fish, timber and genetic material.
- **Regulating services** such as water purification, biological control mechanisms, carbon sequestration, pollination of commercially valuable crops, etc.
- **Cultural services** providing a source of, aesthetic, spiritual, religious, recreational or scientific enrichment.

Natural Resources Wales uses a diagram applying this approach and showing the range of different individual services that are commonly provided by in Wales (**Figure 1.**).

⁹ <http://wales.gov.uk/consultations/environmentandcountryside/sustainingwales/?lang=en>

¹⁰ Millennium Ecosystem Assessment (2005). Millennium Ecosystem Assessment Ecosystems and Human Wellbeing: General Synthesis. <http://www.millenniumassessment.org/en/Synthesis.aspx>

¹¹ <http://uknea.unep-wcmc.org/Home/tabid/38/Default.aspx>

Figure 1. Representation of ecosystem services found in Wales.
Those covered by this study are indicated by a red circle.



In this project, four services have been selected. These are indicated in Figure 1 with a red circle. Three of these are 'regulating' services and one is a 'provisioning' service. These services are defined in this project as follows:

- Food from farming – lamb and beef from upland pastures
- High quality drinking water – from the reservoirs and aquifers
- Flood control – provided by wetland habitats and soils
- Reducing climate change – by storing carbon in soils and vegetation

These services have been selected for the following reasons:

4. They are services that are significant in the Cambrian Mountains
5. They are services where there significant potential to enhance their delivery through new market measures or other incentives

6. They have been described in previous work commissioned for the Cambrian Mountains Initiative¹² and there is therefore a baseline of information about them.

Defining the scenarios

The scenarios are intended to frame debate at the focus groups on the way the natural wealth of the Cambrian Mountains may be used and valued by society in future, over a horizon of the next 10 to 20 years. The paper provides briefing context to the scenarios, to inform not only the focus groups but also the recruitment of focus group participants. It is intended as an internal briefing document for the focus group facilitators¹³. Non-technical text, to be shared with participants, will be added in a later version.

Three alternative scenarios are presented for each of the four services covered by this project.

- The first is the '**Business as usual**' scenario, in which current trends in service activities and trends have continued. The four services provided by the Cambrian Mountains are used and valued on much the same basis as now but have come under increased pressure from the 'known' external forces of climate change and population growth. There has been no development of new initiatives that help pay for or enhance the delivery of the services (called 'Payment for Ecosystem Services', or PES, schemes).
- The second is the '**Positive - Planned**' scenario, in which policy aspirations have been developed and implemented. This might be considered as the 'best realistic' outcome in which enlightened actions are successful in bringing about the future we hope for. Ecosystem services are better understood and more completely valued through the introduction of suitable new PES initiatives.
- The third is the '**Negative - Unexpected**' scenario in which 'wildcard' external events have caused significant variation from current trends and thrown our best intentions off course. External forces (which might be social, economic or environmental) mean that the outcomes we currently hope for have been thwarted. PES initiatives have not been introduced successfully and the services have come under more pressure.
- Each of these scenarios are described under the following headings:
- **Drivers of change**, which are the external forces acting on the Cambrian Mountains, giving rise to..
- **Impacts**, affecting the way the services are delivered and benefits received by people, in turn leading to ...
- Potential **responses** of Government, businesses or consumers to these changes.

Food from farming – lamb and beef from upland pastures

Agriculture, practiced mainly as sheep and beef farming, is underpins many of the communities and the culture of the Cambrian Mountains and has shaped the landscape. There are about 1,500 farm holdings in the Cambrian Mountains and information obtained by the Welsh Government in 2008¹⁴ shows that these farms kept around 400,000 breeding ewes (amounting to 9% of Wales' sheep flock) and 15,800 suckler cows (or 5% of the country's beef herd), as well as a smaller number of dairy cattle.

Looking at recent trends in animal numbers, the Wales Agricultural Survey shows that, between 2002 and 2006 sheep numbers in the Cambrian Mountains fell by 8.4% (compared to a fall of 7% across Wales as a whole) while cattle numbers rose by 8% (compared to a Wales wide rise of 5.6%). The fall in sheep numbers is likely to be the result of changes in the subsidies paid to farmers from the Common Agricultural Policy (CAP) introduced in 2004, in which payments per head of livestock were converted to area payments. The rise in cattle numbers may be attributable to payments under the agri-environment scheme, Tir Gofal, which have favoured cattle for conservation grazing and which has led to something of

¹² CCW (2009). Sustainable Rural Development. A Potential Pilot for the Cambrian Mountains. Phase 1 Report. Defra (2010) Adaptive Landscapes Project in the Cambrian Mountains.

CCW (2012) Valuing the ecosystem services provided by the Cambrian Mountains.

¹³ Although primarily intended as an internal briefing document, the final version of this paper can be issued publicly if requested.

¹⁴ Based on claims for the Single Farm Payment scheme.

a resurgence in traditional hardy cattle breeds on the mountains (although sheep are still much more common as grazing animals than cattle).

Most of the lambs and calves reared in the Cambrian Mountains are either produced as breeding animals (hill breeds for crossing with lowland breeds) or are sold as 'stores' for lowland farmers to fatten before slaughter. Traditionally, many of the lambs that are 'finished' directly for human consumption in upland areas like the Cambrian Mountains are sold as 'light lambs' into continental markets (where there is higher demand for these animals than in the UK). In recent years, partly in response to the changes in the CAP in 2004 referred to above, more lambs reared in the uplands have been finished at heavier weights and sold for consumption in Wales or the UK.

Business as usual

The full implications of the reforms of the Common Agricultural Policy (CAP), which are due to take effect in 2014, are currently unclear and this makes it difficult to foresee this scenario. Recently published analysis by the Welsh Government¹⁵ has been taken into account in the following narrative of change.

Drivers of change

- Reforms of the CAP (in 2014 and with subsequent changes towards the end of the decade) gradually reduce the total amount of public payments that farmers in the Cambrian Mountains receive, and more of the remaining payments come through environmental schemes.
- Consumer interest in locally produced food from iconic areas such as the Cambrian Mountains continues to rise slowly, promoted by CAP rural development schemes.

Impacts

- The reduced level of public payments force further rationalisation in the numbers of farmers, but are still sufficient to maintain viable farm businesses in the hills (reliant on the payments to stay in business).
- Agri-environment schemes ensure that grazing by sheep and beef cattle continues over most of the Cambrian Mountains to maintain valued habitats such as heather moorland, blanket bog and unimproved grassland.
- However, on land not subject to agri-environment payments and which has low levels of agricultural productivity (typically semi-improved grassland and ffridd), grazing densities fall significantly and these areas have a wilder appearance (with more scrub and bracken) than at present. However no large areas have been completely abandoned by farming.

Potential responses

- Consumer demand creates new opportunities for the more innovative farmers and local businesses to sell into premium markets. The Cambrian Mountains Lamb brand (started by the Cambrian Mountains Initiative) develops but still accounts for a small proportion of total production. Traditional markets for hill ewes for breeding and store animals for fattening elsewhere continue to account for most of the livestock produced in the area.

Summary: Farmers' incomes continue to be dominated by public subsidies and the connections between farming and the management of the wild habitats on the Cambrian Mountains weaken. Only a small minority of the lamb and beef produced in the area are sold as premium Cambrian Mountains products, making it difficult for most shoppers to buy locally produced farm products.

Positive - Planned

Drivers of change

- Public policy, through the CAP and domestic initiatives, has recognised the important role that farming plays in maintaining the natural wealth of the Cambrian Mountains. The Single Farm

¹⁵ <http://wales.gov.uk/docs/drah/publications/120522wgresponsecapreform2014en.pdf>

Payment is replaced by targeted scheme to support the environmental and cultural role played by farmers.

- Growing consumer demand for products with a strong local provenance and commitment to quality

Impacts

- Backed by secure long term subsidies that support environmentally sustainable livestock production, farmers have invested in new facilities for breeding and rearing high quality lamb and beef, supported by marketing schemes that promote the Cambrian Mountains as a mark of high eating and environmental quality.
- A renewed focus on traditional livestock breeds and management techniques (such as the hefting of livestock on commons and the slow finishing of livestock on permanent pasture) has made the management of semi-natural habitats such as heather moorland and acid grassland relevant to agricultural production systems. Environmental management of these areas has improved as a result.

Potential responses

- Many consumers have been willing to pay a significant premium on the price of Cambrian Mountains lamb and beef (either on a regular or occasional basis), and this strengthens the functional and financial links between the landscape and farming.

Summary: Government and EU policies are more supportive of hill farming and there is high demand from consumers for premium Cambrian Mountains lamb and beef. This enables farmers to invest in marketing their products and in their local environment. The role of farming in maintaining the landscape increases.

Negative - Unexpected

Drivers of change

- Decisions taken at a European level over the CAP mean that farmers in upland area such as the Cambrian Mountains see a large reduction in their incomes. Not only is the value of the Single Farm Payment eroded, but rural development funding also falls sharply, with only the most environmentally valuable or threatened areas receiving significant resources.
- Rising costs of animal feeds, fertilisers and other farm inputs mean that it has become unprofitable to finish lamb and beef in the Cambrian Mountains compared to more productive lowland areas.

Impacts

- Livestock farming in the Cambrian Mountains is now only sustained at a low level by agri-environment schemes and makes little contribution to the food economy.
- With the eating quality of livestock finished in the Cambrian Mountains often being poor, consumers are unwilling to pay a premium for lamb and beef from the area and the Cambrian Mountains brand has declined.

Potential responses

- The profile of the Cambrian Mountains as a source of high quality food has faded. There is public sympathy for farmers as stewards of a hostile upland environment, but little willingness to seek out food products that have a poor reputation for quality.

Summary: Reform of farming subsidies leads to a large reduction in hill farmers' incomes. Large areas of the Cambrian Mountains are no longer actively farmed. There is virtually no sales of branded Cambrian Mountains beef and lamb.

High quality drinking water – from the reservoirs and aquifers

The Cambrian Mountains have been an important source of public water supply for the urban populations of South Wales and the English Midlands since Victoria times. During the nineteenth and twentieth centuries, large water supply reservoirs were created by damming river valleys at Nant-y-Moch, Clywedog, Elan Valley (made up of the five linked reservoirs of Craig Goch, Pen-y-Gareg, Careg-ddu, Caban Goch and Claerwen) and Llyn Brienne. These reservoirs and the associated water supply infrastructure are maintained by Welsh Water and Severn Trent Water. The Elan Valley Trust owns the land in the catchment around the Elan Valley reservoirs which is tenanted to a number of livestock farmers.

Business as usual

Drivers of change

- Growing populations in the urban centres of South Wales and the English Midlands have increased demand for drinking water.
- More volatile climate conditions (including occasional periods of drought interspersed with periods of intense rainfall) have put pressure on supply within the Cambrian Mountains.
- Partly as a result of a lack of scientific evidence and practical knowledge about the effectiveness of land management interventions to increase 'aquifer recharge', there has been no concerted action to enhance the continuity of supply from habitats and soils in the reservoir catchments in the Cambrian Mountains.

Impacts

- Water quality comes under increasing pressure as peat bogs on the Cambrian Mountains erode and turn water brown.
- These peat bogs are less effective at storing and slowly releasing water and the productive capacity of the Cambrian Mountains for water supply is somewhat lower than at present.
- The functional and financial connections between the way land is management and the need for water supply in the reservoir catchments remain weak which means that the opportunities to maximise supply and improve water quality are not taken.

Potential responses

- Hose pipe bans have become necessary during dry summers.
- Water bills have had to rise to pay for enhanced water treatment.
- Looking further into the future, there might be a need to flood several river valleys in the higher parts of the Cambrian Mountains to create new reservoirs.

Summary: The supply of water from the Cambrian Mountains has not kept up with rising demand from surrounding populations. Hose-pipe bans are imposed in dry summers and, in the long term, there might be a need for new reservoirs, paid for by higher water bills. Water bills have also had to rise to pay for enhanced water treatment.

Positive - Planned

Drivers of change

- New scientific evidence, and knowledge of best practice, has demonstrated that land management interventions to improve the health of natural wetland habitats (blanket bogs and valley mires) can improve their ability, at a catchment scale, to store and slowly release water.
- Investment in environmental land management through CAP-funded agri-environment schemes has virtually eradicated source of water pollution, such as faecal contamination from sheep and cattle, around reservoirs.
- Rising demand has been managed by reducing leakage in the distribution network and encouraging water conservation by end users (including by extending the use of metering).

Impacts

- These measures have meant that, despite more volatile rainfall patterns, supply of water from the Cambrian Mountains has kept pace with demand.
- Water quality has also improved as the health of the wetland ecosystems has improved and sources of pollution have been controlled.

Potential responses

- As the effectiveness of the measures described above have been proved, Government has allowed water companies to collect a small levy on consumers' water bills to fund investment in improved environmental management in the catchments around reservoirs. This is seen as more cost effective and convenient to the alternative of hose pipe bans and other restrictions, and has avoided the need for sharper rises in water bills that would have been necessary to pay for new reservoirs and water treatment works.

Summary: Improved management of wetland habitats and farmland in the Cambrian Mountains has meant that supply of high quality water has kept pace with demand. This improved management has been paid for by a small levy on consumers paid through water bills.

Negative - Unexpected

Drivers of change

- Changes to the climate of the Cambrian Mountains have been more severe than anticipated, with regular summer droughts, punctuated by intense rainfall events.

Impacts

- There has been significant deterioration of the wetland habitats and peat soils in the area.
- As a result, less water is stored in these habitats and soils than previously and run off has become strongly discoloured with eroded peat, reducing the quality of the water supplying the reservoirs.

Potential responses

- Plans are well advance for several new reservoirs that will flood river valleys in the Cambrian Mountains to create new storage and water bills have already started to rise significantly to pay for this.
- Water rationing during the summer months has been introduced for industries using large amounts of water.
- All households are metered and those with high water use are charged correspondingly more.

Summary: Climate change (including periods of drought punctuated by intense rainfall) has reduced the ability of wetland habitats and soils to store water and has reduced the quality of water. Supplies have been maintained by building new reservoirs paid for through higher water bills. Public use of water is limited by rationing and higher bills for those who use the most.

Flood control – provided by wetland habitats and soils

The Cambrian Mountains are the major watershed in the centre of Wales with the Severn and Wye rising on Pumlumon and flowing east and south in the Severn Estuary, the Dovey, Rheidol, Ystwyth and Teifi draining the western side of the Cambrians into Cardigan Bay and the Towy and Cothi flowing south to the Bristol Channel. Several large towns have grown up in the flood plains of some of these rivers, including Aberystwyth, Monmouth, Chepstow, Shrewsbury and Tewkesbury, and these towns are at risk of flooding after periods of high rainfall or snow-melt in the Cambrian Mountains. Land use in the upper reaches of these catchments has a significant effect on the speed of flood run-off. Habitats such as blanket bog, moorland, woodland and wet grassland can retain and slowly release water in soils and vegetation, evening out river flows and providing temporary storage of floodwater that reduces the risk of downstream flooding.

Business as usual

Drivers of change

- Projections of climate change have been proved accurate. Periods of high intensity rainfall have become more regular and flood events have become more frequent.
- New development in flood plains at risk from flooding has been reduced, but the legacy of previous development (created with relatively low levels of flood defence provision) has increased flood risk to these areas.
- Lack of scientific consensus about the catchment scale benefits to reduce peak river flows arising from changes to land use and management, means that there has been no concerted attempt to alter flood propagation in the headwaters of rivers in the Cambrian Mountains.

Impacts

- Flooding of property and infrastructure (such as roads and sewage treatment works) has become a more regular occurrence in several of the towns that lie down stream of the Cambrian Mountains.
- This has had direct economic consequences for the households and businesses concerned and broader consequences for the communities and regions affected.

Potential responses

- As well as the inconvenience to households and businesses suffering flooding, their insurance premiums have risen.
- High levels of new public investment in 'hard' flood defences (i.e. flood banks) has been funded from general taxation.

Summary: Flooding of properties and roads in the floodplains of rivers that rise on the Cambrian Mountains has become more frequent. Insurance premiums have increased, particularly for properties at most risk. Government has invested in flood defences to protect critical infrastructure (such as roads) but little has been done to reduce the way flooding is generated in the headwaters of the rivers.

Positive - Planned

Drivers of change

- Changes to the climate are at the lower end of what was predicted but high intensity rainfall events have nevertheless become more frequent.
- Research and pilot projects have demonstrated that planning of land use and management at a catchment scale can have a significant impact on flood propagation. Investment in favourable land use and management practices has been funded from agri-environment schemes.
- There has been investments in sustainable drainage systems and soft flood defences in urban areas and farmland (including retrofitting into existing developments).

Impacts

- In the Cambrian Mountains, the condition of wetland habitats such as blanket bog, valley mires, wet grassland and wet woodland has been improved. This has increased interception of water in vegetation and infiltration into soils sufficient to 'desynchronise' and reduce peak river flows.
- At the same time, the creation of temporary flood interception and storage areas close to watercourses and in flood plains has successfully reduced the frequency of flooding of households and businesses.

Potential responses

- The effectiveness of these interventions has demonstrated to Government and the insurance industry that they are a cost effective addition to the range of flood defence measures that should be adopted.

- Going forward, investment in upland land management to reduce flood risk is comes from a mix of public expenditure (from general taxation) and schemes developed by the insurance industry, funded through a small levy on all insurance premiums.

Summary: Improved management of wetland habitats and soils in the headwaters of rivers, and of farmland in the floodplains, has reduced the risk of flooding in towns and villages, despite more frequent stormy weather. These improvements in land management have been paid for by a mix of Government spending and a small levy on insurance premiums.

Negative - Unexpected

Drivers of change

- Climate change has accelerated faster than expected with more frequent and severe intense rainfall events and also periods of drought.
- As in the 'business as usual' scenario, lack of scientific consensus about the catchment scale benefits from changes to land use and management, means that there has been no concerted attempt to alter flood propagation in the headwaters of rivers in the Cambrian Mountains.

Impacts

- The periods of drought have weakened many wetland plants and damaged peat soils so that they are less effective at absorbing and holding back high amounts of rainfall (peat being difficult to 'rewet' once it has dried out).
- The ability of the habitats and soils of the Cambrian Mountains to cope with periods of drought interspersed with high intensity rainfall has declined

Potential responses

- There has been no agreement from their Government or the insurance industry that the higher costs of protection of at risk homes and businesses should be shared by all tax payers and properties owners. The costs of protecting and insuring properties in the highest risk flood areas has risen very sharply and significant areas are effectively uninsurable.
- Investment in 'hard' flood defences for nationally important infrastructure such as motorways is funded by Government from general taxation, but the defence of locally important assets such as housing is met from Council Tax receipts.

Summary: Flooding has become a frequent occurrence due an acceleration in climate change and a reduction in the ability of wetland habitats and soils to hold back rainfall. Low-lying houses, businesses, roads and railways are regularly inundated causing expense and disruption for many people. Insurance premiums for at risk properties have risen sharply and some areas have become uninsurable.

Reducing climate change – by storing carbon in soils and vegetation

The Cambrian Mountains have very significant areas of peat soils and organo-mineral soils that are rich in carbon. These soils are storing carbon-dioxide as organic matter accumulated from thousands of years of plant growth in habitats such as blanket bog and heather moorland. The amount of carbon stored in soils in Wales is far greater than the amount stored in trees and other living plant material. If these soils were to dry out and be eroded the carbon would be returned to the atmosphere as carbon dioxide which is a greenhouse gas known to contribute to climate change. If the condition of these soils and the habitats growing on them can be improved so that they continue to convert carbon dioxide from the air into organic matter, they can help reduce the risk of climate change.

Business as usual

Drivers of change

- Annual temperatures in the Cambrian Mountains have risen, and summer rainfall has fallen, in line with projections.

- International agreement under the United Nation's Framework Convention on Climate Change (UNFCCC)¹⁶ has meant that Government action to safeguard soil carbon through peatland restoration counts towards post-Kyoto targets, providing an additional incentive for increased Government intervention. Funding directed through agri-environment schemes has started to raise water levels and re-wet peat soils and wetland habitats

Impacts

- Agri-environment schemes have started to address the poor state of wetlands and peat soils but this has not reversed the overall decline in their condition. As a result net releases of carbon dioxide have accelerated somewhat.

Potential responses

- Public awareness of the role of peat soils as a store of atmospheric carbon and a significant factor in climate change has remained low.
- The level of funding to safeguard these resources is not increased.

Summary: Changing climate conditions, with drier hotter summers, have worsened the condition of wetlands and peat soils in the Cambrian Mountains. International agreements have encouraged the Government to protect soil carbon but improved management hasn't been enough to stop and increase in the release of carbon dioxide from these soils.

Positive - Planned

Drivers of change

- Changes to the climate are at the lower end of what was predicted but the condition of wetlands and peat soils in the Cambrian Mountains remains a concern.
- In addition to receiving recognition under the UNFCCC (as above), the protection and enhancement of major soil carbon reserves is now supported through an extension of the EU Emissions Trading Scheme¹⁷. Under this scheme, carbon emitting companies are entitled to purchase 'carbon credits' from initiatives that are conserving soil carbon, to offset their emissions of carbon above the capped level.

Impacts

- The change to the EU Emissions Trading Scheme has released a major source of new funding. Large scale initiatives across the Cambrian Mountains peat and organo-mineral soils have been put in place to re-vegetate exposed carbon-rich soils and extend the area of wetland habitats.
- This has involved raising water levels in peat soils by blocking drainage ditches and paying farmers to continue low levels of sheep and cattle grazing to suppress scrub and encourage wetland plants.

Potential responses

- There is much greater political and public awareness of the important role that the soils of the Cambrian Mountains play in storing carbon and potentially mitigating (or slowing the pace of) climate change.

Summary: Changing climate conditions continue to pose a significant threat to the condition of peat soils and the wetlands that support them, but significant progress is being made to improve them through large scale 'rewetting' and wetland management projects funded by carbon emitting industries through the EU Emissions Trading Scheme.

Negative - Unexpected

Drivers of change

¹⁶ http://unfccc.int/kyoto_protocol/items/3145.php

¹⁷ http://ec.europa.eu/clima/policies/ets/index_en.htm

- Climate change has accelerated faster than expected, with more frequent periods of drought and high temperatures during the summer.
- Work to protect peat soils has been discredited by a number of failed projects which have failed to achieve the expected results. There is lack of scientific and political consensus on the way forward.

Impacts

- Large areas of the blanket bog and valley mire habitats that overlie the peat soils are rapidly changing to drier acid grassland and the peat soils underneath are oxidising and releasing CO₂ into the atmosphere.

Potential responses

- Despite rising concern from environmental bodies, public and political awareness of the role of peat soils in climate regulation, and scientific consensus on the most effective management, remains low.

Summary: The condition of peat soils in the Cambrian Mountains has deteriorated significantly and the area is now a large net emitter of carbon dioxide, accelerating climate change. Lack of scientific consensus about the most effective way forward, and lack of public and political will, mean that little action is being taken on the ground to address this.

Appendix 2 – Table of results from recruitment questionnaires

Audiences	Llan-doverly	Rhayader	Talybont	Mon-mouth	Shrewsbury	Local communities	Distant communities
Number of participants	27	6	6	67	73		
Q1. Gender?							
Male	7	1	6	31	37	36%	49%
Female	20	5		36	36	64%	51%
Q2. Age range							
16-24				8	8		11%
25-34	8	1		8	12	23%	14%
35-44	9	5	2	10	11	41%	15%
45-54	6		1	17	19	18%	26%
55-64	1		3	8	11	10%	14%
65-74	3			7	7	8%	10%
75+				8	5		9%
Refused				1			1%
Q3a. How concerned are you about how the environment is being managed and the effects on your life?							
Not at all concerned				3	1		3%
Not very concerned	3	1		4	2	10%	4%
Fairly concerned	11	1	2	34	45	36%	56%
Very concerned	13	4	4	26	24	54%	36%
Don't know					1		1%
Q3b. How concerned are you about how the environment is being managed and the effects on the lives of the next generation?							
Not at all concerned				1	2		2%
Not very concerned	2			2	1	5%	2%
Fairly concerned	5	1	1	17	19	18%	26%
Very concerned	20	5	5	45	51	77%	69%
Don't know				2			1%
Q4a. The natural environment provides us with many benefits and services							
Strongly agree	17	4	6	49	51	69%	71%
Tend to agree	9			12	22	23%	24%
Neither agree nor disagree	1	1		2		5%	1%
Tend to disagree				1			1%
Strongly disagree		1		3		3%	2%
Don't know							
Q4b. I value the products coming from nature, including for example wood, fish, clean water, crops, meat environment provides us with many benefits and services							
Strongly agree	23	4	6	54	54	85%	77%
Tend to agree	4	1		11	16	13%	19%
Neither agree nor disagree							
Tend to disagree				1	3		3%
Strongly disagree		1				3%	
Don't know				1			1%
Q4c. I value the ways in which nature supports our cultural and social development, including providing spaces for leisure, tourism, education, inspiration							
Strongly agree	17	3	4	53	50	62%	74%
Tend to agree	9	1	2	11	23	31%	24%
Neither agree nor disagree	1	1		3		5%	2%
Tend to disagree							
Strongly disagree		1				3%	
Don't know							

Llan-doverly	Rhayader	Talybont	Mon-mouth	Shrewsbury
--------------	----------	----------	-----------	------------

Local communities	Distant communities
-------------------	---------------------

Audiences

Q4d.I value the ways in which nature supports and provides the right conditions for life and for society to thrive, for example flood control, clean air, pure water, temperature regulation, providing habitats for wildlife, soil formation, pollination

Strongly agree	20	3	3	53	57
Tend to agree	6	2	3	13	15
Neither agree nor disagree	1			1	1
Tend to disagree					
Strongly disagree		1			
Don't know					

67%	79%
28%	20%
3%	1%
3%	

Q4e. The environment and nature need to be managed and taken care of or we'll all lose out

Strongly agree	23	3	4	55	60
Tend to agree	4	2	1	10	9
Neither agree nor disagree			1		3
Tend to disagree				1	
Strongly disagree		1			1
Don't know					

77%	82%
18%	14%
3%	2%
	1%
3%	1%

Q4f. The quality of my local natural environment has become more of an issue for me in the last year or two

Strongly agree	6	1	3	18	12
Tend to agree	12	1	1	28	19
Neither agree nor disagree	6	4	1	11	23
Tend to disagree	1		1	4	8
Strongly disagree	2			3	9
Don't know				3	2

26%	21%
36%	34%
28%	24%
5%	9%
5%	9%
	4%

Q4g. The quality of the global natural environment has become more of an issue for me in the last year or two

Strongly agree	11	1		27	26
Tend to agree	9		4	26	24
Neither agree nor disagree	4	5	1	6	14
Tend to disagree			1	2	3
Strongly disagree	2			4	6
Don't know	1			2	

31%	38%
33%	36%
26%	14%
3%	4%
5%	7%
3%	1%

Q4h. It is up to all of us to do something to safeguard nature and natural environments

Strongly agree	18	3	1	48	55
Tend to agree	9	2	5	19	14
Neither agree nor disagree					3
Tend to disagree					
Strongly disagree		1			1
Don't know					

56%	74%
41%	24%
	2%
3%	1%

Q4i. The natural environment provides goods and services that government and society should pay for

Strongly agree	9	1		32	35
Tend to agree	11		2	24	24
Neither agree nor disagree	5	1	4	5	6
Tend to disagree	1	3		4	1
Strongly disagree					1
Don't know	1	1		2	6

26%	48%
33%	34%
26%	8%
10%	4%
	1%
5%	6%

Q5a. Careful about the amount of water you use in the home

Don't do this currently			1	9	11
Plan to do this soon					
Do to some extent	12	2	2	27	32
Do a lot	15	4	3	31	29
Don't know					1

3%	14%
41%	42%
56%	43%
	1%

Q5b. Encourage wildlife in your garden

Don't do this currently	1	1	1	7	7
Plan to do this soon					1
Do to some extent	12	1	1	15	22
Do a lot	14	3	4	43	43
Don't know		1		2	

8%	10%
	1%
36%	26%
54%	61%
3%	1%

Q5c. Value and promote green spaces in urban areas

Don't do this currently	3	2	3	12	16
Plan to do this soon				1	2
Do to some extent	11		1	22	21
Do a lot	8	3	1	30	33
Don't know	5	1	1	2	1

21%	20%
	2%
31%	31%
31%	45%
18%	2%

Audiences	Llan-doverly	Rhayader	Talybont	Mon-mouth	Shrewsbury	Local communities	Distant communities
Q5d. Consider carbon emissions when making choices about what you buy and use							
Don't do this currently	3	2	1	15	19	15%	24%
Plan to do this soon	1			4	1	3%	4%
Do to some extent	19	1	5	26	25	64%	36%
Do a lot	3	3		22	29	15%	36%
Don't know	1					3%	
Q5e. Consider energy and resources you consume in all your daily activities							
Don't do this currently	3	1		8	9	10%	12%
Plan to do this soon				3	1		3%
Do to some extent	12	1	6	23	32	49%	39%
Do a lot	11	4		32	31	38%	45%
Don't know	1			1		3%	1%
Q5f. Consider where food comes from when choosing what to buy and eat							
Don't do this currently	1	1		9	10	5%	14%
Plan to do this soon	1				2	3%	1%
Do to some extent	13	1	2	24	18	41%	30%
Do a lot	12	4	4	34	42	51%	54%
Don't know							
Q5g. Are concerned by the possibility of flooding affecting your home / neighbourhood							
Don't do this currently	3	3		21	40	15%	44%
Plan to do this soon							
Do to some extent	14	3	3	20	15	51%	25%
Do a lot	8		3	23	18	28%	29%
Don't know	2			3		5%	2%
Q6a. Flooding incidents are becoming increasingly common in the UK and projections on climate change suggest they will become more frequent							
Strongly agree	17	2	5	41	50	62%	65%
Tend to agree	8	3		19	17	28%	26%
Neither agree nor disagree	2			5	2	5%	5%
Tend to disagree					2		1%
Strongly disagree		1			2	3%	1%
Don't know			1	1	1	3%	1%
Q6b Over the next 30-40 years, it is projected that the UK will get wetter winters, dryer summers, and more extreme weather events. These changes in weather patterns increase the likelihood of soils drying out in summer, and allowing greater run off during heavy rainfall							
Strongly agree	10	1	1	34	39	31%	52%
Tend to agree	12	1	4	18	22	44%	29%
Neither agree nor disagree	3	2	1	9	5	15%	10%
Tend to disagree		1		2	2	3%	3%
Strongly disagree		1		2	2	3%	3%
Don't know	2			2	2	5%	3%
Q6c. Developing ways of managing the environment to reduce the risk of flooding is important							
Strongly agree	19	3	6	46	53	72%	71%
Tend to agree	8	2		15	19	26%	24%
Neither agree nor disagree				6	1		5%
Tend to disagree		1				3%	
Strongly disagree							
Don't know							
Q6d. Local flood defence schemes address the symptoms not the cause of flooding							
Strongly agree	11	2	3	23	49	41%	51%
Tend to agree	9	3	3	25	17	38%	30%
Neither agree nor disagree	4			7	2	10%	6%
Tend to disagree		1		2		3%	1%
Strongly disagree				1			1%
Don't know	3			9	5	8%	10%
Q6e. Slowing down water drainage into rivers upstream is as important as managing floodplains downstream							
Strongly agree	16	2	4	35	47	56%	59%
Tend to agree	9	3	1	20	15	33%	25%
Neither agree nor disagree	2	1	1	4		10%	3%
Tend to disagree					1		1%
Strongly disagree					1		1%
Don't know				8	9		

Audiences	Llan-doverly	Rhayader	Talybont	Mon-mouth	Shrewsbury	Local communities	Distant communities
Q6f. I live in an area of flood risk (e.g. as identified by the Environment Agency [Wales])							
Strongly agree	8	1	4	13	24	33%	26%
Tend to agree	5			5	10	13%	11%
Neither agree nor disagree	4			4	2	10%	4%
Tend to disagree	3	4	1	1	2	21%	2%
Strongly disagree	3	1		40	34	10%	53%
Don't know	4		1	5	1	13%	4%
Q7. Have you ever been directly affected by flooding?							
Yes	2		2	15	22	10%	26%
No	22	6	4	52	51	82%	74%
Don't know	3					8%	
Q9. Are you aware of any measures that might help reduce the risk of flooding?							
Yes	9	3	4	39	52	41%	65%
No	15	2	2	23	20	49%	31%
Don't know	3	1		5	1	10%	4%
Q11a. Regulating / not building in floodplains and avoiding hard landscaping over soils, helps to prevent run-off and surface water flooding							
Very effective	19	3	3	37	41	64%	56%
Effective	5	3	2	19	24	26%	31%
Only slightly effective	2			3	3	5%	4%
No effect				2			1%
Might increase the risk of flooding				1			1%
Don't know	1		1	5	5	5%	7%
Q11b. Erecting "hard" flood defences like walls, around areas at risk of flooding							
Very effective	5	1		19	18	15%	26%
Effective	13		3	25	22	41%	34%
Only slightly effective	4	4	2	12	20	26%	23%
No effect	1			1	1	3%	1%
Might increase the risk of flooding	1			3	10	3%	9%
Don't know	3	1	1	7	2	13%	6%
Q11c. Managing upland areas including bogs, wet grassland and woodland, helps them to absorb, and then slowly release rainfall and snow melt.							
Very effective	9	3	1	32	44	33%	54%
Effective	9	3	4	21	24	41%	32%
Only slightly effective	4			2	2	10%	3%
No effect				1			1%
Might increase the risk of flooding				1			1%
Don't know	5		1	10	3	15%	9%
Q11d. Low value farmland in floodplains can be set aside as flood storage areas to take floodwater that would otherwise flood homes and businesses							
Very effective		2	1	18	31	8%	35%
Effective	10	2	2	23	26	36%	35%
Only slightly effective	6			9	7	15%	11%
No effect	3	1		2		10%	1%
Might increase the risk of flooding							
Don't know	8	1	3	15	9	31%	17%
Q12.							
Self-employed full or part-time	6	1	1	13	10	21%	16%
In paid employment working 30 hours or more per week	7	3	4	16	43	36%	42%
In paid employment working at least 16 but less than 30 hours per week	10			6	1	26%	5%
In paid employment working less than 16 hours per week	1			2	2	3%	3%
Apprenticeships / Advanced Apprenticeships or similar							
Doing unpaid work for the voluntary sector / charity							
Out of work and claiming unemployment benefit (includes : jobseekers allowance/income support/national insurance credits)				2			1%

Audiences	Llan-doverly	Rhayader	Talybont	Mon-mouth	Shrewsbury	Local communities	Distant communities
	Out of work and not claiming benefit but have looked for work in the past 4 weeks						
Looking after the home/dependants	2	2		5		10%	4%
Not able to work due to illness/disability							
In full-time education at college or university				4	4		6%
In part-time education at college or university							
Wholly retired from work	1		1	18	10	5%	20%
Refused				1	3		3%

Appendix 3 – Table of results from scoring of scenarios by participants and focus groups and workshop

Scores for how affected participants felt they would be by the Flood Control Scenarios

Audience	Distant communities						Cambrian Communities								Farmers								Expert workshop																																																																	
Location	Monmouth			Shrewsbur			Rhayader			Talybont -			Llandovery -			Llandovery				Talybont																																																																				
Respondent ID	40	45	46	52	66	68	S023	S001	S010	S004	S006H	R001	R007	R008	R009	R010	L001	L002	L003	L004	L005	L006	L007	L009	L010	L011	L012	L013	L014	L001	L002	L003	L004	L005	L006	L007	L008	T008	T009	T010	T011	T012	T013	T014	T015	EW1	EW2	EW3	EW4	EW5	EW6	EW7	EW8	EW9	EW10	EW11	EW12	EW13	EW14	EW15	EW16	EW17	EW18	EW19																								
Business as usual																																																																																								
1 - Significant negative effect																																																																																								
2 - Slight negative effect	1				1		1	1						1																																																																										
3 - zero effect		1	1	1		1				1				1	1	1																																																																								
4 - Slight positive effect										1									1																																																																					
5 - Significant positive effect																																																																																								
9 - don't know																																																																																								
Positive planned																																																																																								
1 - Significant negative effect																																																																																								
2 - Slight negative effect																																																																																								
3 - zero effect		1				1													1			1																																																																		
4 - Slight positive effect	1			1	1			1	1	1					1	1	1	1	1	1		1																																																																		
5 - Significant positive effect			1				1			1	1	1	1							1																																																																				
9 - don't know																																																																																								
Negative unexpected																																																																																								
1 - Significant negative effect	1		1	1			1	1	1						1	1						1	1																																																																	
2 - Slight negative effect		1			1					1					1	1																																																																								
3 - zero effect						1													1																																																																					
4 - Slight positive effect																																																																																								
5 - Significant positive effect																																																																																								
9 - don't know										1										1																																																																				

