



**Second (and last) update search query: 77,956 document results**

TITLE-ABS-KEY ( ( {land tenure rights} OR ( smallholder AND ( farm OR forestry OR pastoral OR agriculture OR fishery OR { food producer} OR {food producers} ) ) OR malnourish\* OR malnutrition OR undernourish\* OR {undernutrition} OR {agricultural production} OR {agricultural productivity} OR {agricultural practices} OR {agricultural management} OR {food production} OR {food productivity} OR {food security} OR {food insecurity} OR {land right} OR {land rights} OR {land reform} OR {land reforms} OR {resilient agricultural practices} OR ( agriculture AND potassium ) OR fertilizer OR {food nutrition improvement} OR {hidden hunger} OR {genetically modified food} OR ( gmo AND food ) OR {agroforestry practices} OR {agroforestry management} OR {agricultural innovation} OR ( {food security} AND {genetic diversity} ) OR ( {food market} AND ( restriction OR tariff OR access OR {north south divide} OR {development governance} ) ) OR {food governance} OR {food supply chain} OR {food value chain} OR {food commodity market} AND NOT {disease} ) ) AND PUBYEAR < 2018 AND PUBYEAR > 2012

## PROCESS

The first stage of this review was to compare the original search string to the targets listed under the Sustainable Development Goal (SDG).

SDG targets listed here: <https://sustainabledevelopment.un.org/sdg2>

The purpose of this stage was to understand whether the Scopus results correctly reflected the theme of the SDG. The SDGs were unanimously agreed by member states of the United Nations, with very deliberate language and scope/ exclusions, so the results of this analysis should accurately reflect the specific SDG themes.

SDG 2 and its targets aim to **end hunger, undernourishment and malnutrition**. SDG 2 aims to ensure **food security** for all people, all year round. The prevalence of stunting and food waste among children should be ended. Special care should be taken to ensure nutritional needs of adolescent girls, pregnant and lactating women and elderly persons.

**Agricultural productivity and incomes of smallscale food producers** – particularly women, indigenous people, family farmers, pastoralists and fishers – **should be doubled**. **Secure and equal access to markets, resources and opportunities for value addition** should be ensured. **Sustainable food production systems** and **resilient agricultural practices** are promoted, which progressively improve production and land – and soil quality. **Genetic diversity** of seeds, cultivated plants, domestic animal species and their wild counterparts, should be conserved and maintained. International support to achieve these aims is promoted, especially regarding least developed countries. **Trade restrictions in world agricultural markets should be prevented** to ensure equity, equal access rights for all and food security. This also includes timely access to market information to **limit food price volatility**.

**A Scopus search was conducted using the original search string. This returned 761,275 document results.**

The top 20 cited articles were reviewed. Nineteen of the 20 articles did not closely reflect the theme of the SDG. One article related to engineering studies and eighteen articles related to disease and healthcare studies. One of these eighteen articles is a book on nutritional epidemiology. This article has been classified as irrelevant as it covers the impact of a variety of diets on health and the prevalence of 'first world' diseases such as cancer and cardiovascular disease.

Top 20 most cited articles listed in Scopus from the original search string:

\*red text shows articles which do not closely match the theme of the SDG

| Title  | Year | Source title                    | Cited by |
|--|------|---------------------------------|----------|
| Nutritional Epidemiology   | 2013 | Nutritional Epidemiology        | 4657     |
| Heart Disease and Stroke Statistics - 2014 Update: A report from the American Heart Association  | 2014 | Circulation                     | 3693     |
| Nivolumab versus docetaxel in advanced squamous-cell non-small-cell lung cancer  | 2015 | New England Journal of Medicine | 3236     |
| Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: A systematic analysis for the Global Burden of Disease Study 2013 | 2015 | The Lancet                      | 3197     |
| Nivolumab versus docetaxel in advanced nonsquamous non-small-cell lung cancer  | 2015 | New England Journal of Medicine | 3145     |

|  |      |                                   |      |
|--|------|-----------------------------------|------|
| Standards of medical care in diabetes-2014   | 2014 | Diabetes Care                     | 2883 |
| 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure   | 2016 | European Heart Journal            | 2838 |
| PD-1 blockade in tumors with mismatch-repair deficiency  | 2015 | New England Journal of Medicine   | 2757 |
| Diet rapidly and reproducibly alters the human gut microbiome  | 2014 | Nature                            | 2422 |
| Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990-2013: A systematic analysis for the Global Burden of Disease Study 2013   | 2015 | The Lancet                        | 2349 |
| Pembrolizumab for the treatment of non-small-cell lung cancer  | 2015 | New England Journal of Medicine   | 2265 |
| Research development on sodium-ion batteries   | 2014 | Chemical Reviews                  | 2196 |
| Increased survival in pancreatic cancer with nab-paclitaxel plus gemcitabine   | 2013 | New England Journal of Medicine   | 2191 |
| Pembrolizumab versus Chemotherapy for PD-L1-Positive Non-Small-Cell Lung Cancer  | 2016 | New England Journal of Medicine   | 2159 |
| Maternal and child undernutrition and overweight in low-income and middle-income countries   | 2013 | The Lancet                        | 2152 |
| Nivolumab versus everolimus in advanced renal-cell carcinoma   | 2015 | New England Journal of Medicine   | 2035 |
| Predictive correlates of response to the anti-PD-L1 antibody MPDL3280A in cancer patients  | 2014 | Nature                            | 1972 |
| Pembrolizumab versus docetaxel for previously treated, PD-L1-positive, advanced non-small-cell lung cancer (KEYNOTE-010): A randomised controlled trial  | 2016 | The Lancet                        | 1882 |
| Microenvironmental regulation of tumor progression and metastasis  | 2013 | Nature Medicine                   | 1848 |
| 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: The Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC). Developed with the special contribution of the Heart Failure Association (HFA) of the ESC | 2016 | European Journal of Heart Failure | 1827 |

In addition, a randomised sample of 20 articles were reviewed taking the same approach. Sixteen of the 20 articles did not closely reflect the theme of the SDG. Half of these articles related to the field of engineering. The other articles were published in the field of healthcare, biology, veterinary studies and food science.

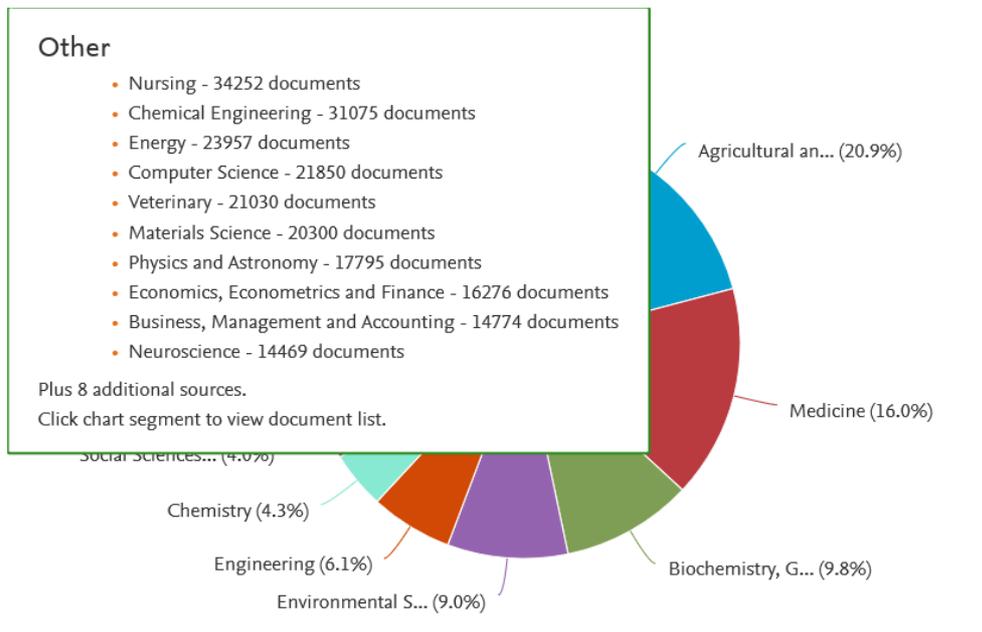
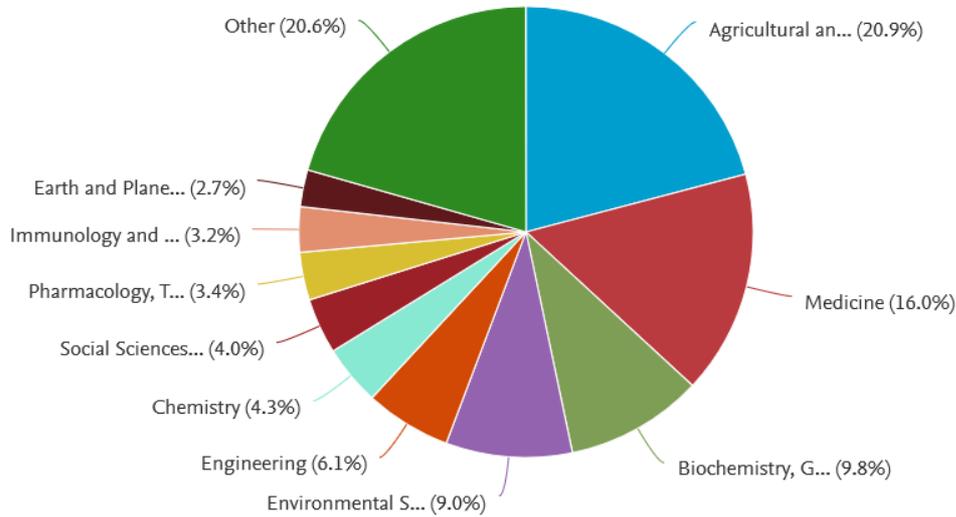
Randomised sample of 20 articles listed in Scopus from the original search string:

\*red text shows articles which do not closely match the theme of the SDG

| Title   | Year | Source title                             | Cited by |
|---|------|--|----------|
| Hydrogen production via acetic acid steam reforming: A critical review on catalysts | 2017 | Renewable and Sustainable Energy Reviews | 28       |

|  |      |   |    |
|--|------|---|----|
| Recommendations regarding splenectomy in hereditary hemolytic anemias  | 2017 | Haematologica   | 26 |
| Microalgae: Antiquity to era of integrated technology  | 2017 | Renewable and Sustainable Energy Reviews                                | 14 |
| High cover of forest increases the abundance of most grassland butterflies in boreal farmland  | 2017 | Insect Conservation and Diversity                                       | 12 |
| Listeria occurrence in poultry flocks: Detection and potential implications  | 2017 | Frontiers in Veterinary Science   | 8  |
| Virtual mutation and directional evolution of anti-amoxicillin ScFv antibody for immunoassay of penicillins in milk                  | 2017 | Analytical Biochemistry   | 6  |
| Autotrophic starch production by Chlamydomonas species   | 2017 | Journal of Applied Phycology  | 5  |
| Comparative study of deterioration procedure in chemical-leavened steamed bread dough under frozen storage and freeze/thaw condition | 2017 | Food Chemistry  | 4  |
| Prevalence and predictors of weight change post discharge from hospital: A study of the Canadian Malnutrition Task Force             | 2017 | European Journal of Clinical Nutrition                                  | 4  |
| Clustering of adherence to personalised dietary recommendations and changes in healthy eating index within the Food4Me study         | 2016 | Public Health Nutrition   | 4  |
| Discrepancy between knowledge and perceptions of dietary omega-3 fatty acid intake compared with the omega-3 index                   | 2017 | Nutrients   | 3  |
| Increasing water productivity in arid regions using low-discharge drip irrigation: a case study on potato growth                     | 2017 | Irrigation Science  | 3  |
| Recovering hydromorphological functionality to improve natural purification capacity of a highly human-modified wetland              | 2017 | Ecological Engineering  | 3  |
| Effects of the herbicides benfluralin, metribuzin and propyzamide on the survival and weight of earthworms (Octodrilus complanatus)  | 2017 | Plant, Soil and Environment   | 2  |
| Behavioral determinants of supply chain integration and coexistence  | 2016 | Journal of Forest Economics   | 1  |
| Short-Range order of TlIn <sub>1-x</sub> Sn <sub>x</sub> Te <sub>2</sub> thin films  | 2017 | Journal of Surface Investigation  | 0  |
| Modern scholarship and the land and underwater excavations   | 2017 | The Roman Port and Fishery of Cosa: A Center of Ancient Trade           | 0  |
| 12th International Symposium on Environmental Software Systems, ISESS 2017   | 2017 | IFIP Advances in Information and Communication Technology               | 0  |
| Fast tunable blazed MEMS grating for external cavity lasers  | 2017 | Proceedings of SPIE - The International Society for Optical Engineering | 0  |
| An industrial application of a TRIZ based eco-design approach  | 2017 | Smart Innovation,   | 0  |

### Documents by subject area



The dominance of medical health studies and engineering studies, as indicated by the top 20 most cited articles and the randomised sample, are underscored by the general analysis of documents retrieved by the original search query. The field of 'agricultural and biological sciences' accounts for 1/5<sup>th</sup> of the documents retrieved by the search query. Disregarding the 'Other' field, this is followed by 'Medicine' and 'Biochemistry, genetics and molecular biology'. While the latter could provide document results that are relevant for the theme of the SDG, for example through genetic

improvement of crops, the field of medicine is not closely related to the SDG. The retrieval of document publications related to the field of medicine should be minimised in future updates. The 'Other' field accounts for another 1/5<sup>th</sup> of the document results, which brings in a variety of fields that are not relevant for SDG2. The different analyses show that this search query needs to be cleaned up and more narrow keywords should be added to provide search results that are directly relevant for the SDG theme.

**Update 1) The search keywords were edited to remove the broader search terms, or to make them more specific by combining with other search keywords.**

Original search string: 761,275 document results

TITLE-ABS-KEY((hunger OR {land tenure} OR farm\* OR smallholder\* OR malnourish\* OR undernourish\* OR agricultur\* OR food OR {land right} OR {land rights} OR {land reform} OR {land reforms} OR malnutrition OR undernutrition OR {good nutrition} OR {land ownership} OR drought\* OR potassium OR fertili?er OR rainfed OR rain-fed OR pre-harvest\* OR post-harvest\* OR {nutrition improvement} OR {improvement of nutrition} OR {genetically modified food} OR (GMO AND food) OR anemia OR anaemia OR {vitamin deficiency} OR {vitamin deficiencies})) AND PUBYEAR BEF 2018 AND PUBYEAR AFT 2012

Rationale for edits to the search keywords:

| <u>query term</u> | <u>decision</u>  | <u>Rationale</u>  |
|-------------------|--|---|
| Hunger            | DELETED  | Hunger is quite a broad keyword and leads to hits in a variety of fields of research. Well-used keywords to indicate hunger and a lack of nutrition are already in the query (undernourish*, undernutrition, malnutrition, malnourish*). Deleted. |
| Land tenure       | Changed to {land tenure rights}  | Land tenure as a keyword does not reflect the theme of the SDG, one of the targets emphasizes equal land ownership / tenure rights. Hence, it is changed to a narrower keyword.   |
| Farm*             | DELETED  | Deleted as agriculture* is in the query. Agriculture is a more common keyword for anything related to farming. Farm* is deleted to clean up the keyword.  |
| Agricultur*       | Changed to {agricultural production} OR {agricultural productivity} OR {agricultural practices} OR {agricultural management}           | Narrowed down to acquire more relevant results  |
| Smallholder       | Changed to ({smallholder} AND {farm} OR {forestry} OR {pastoral} OR {agriculture} OR {fishery} OR {food producer} OR {food producers}) | Smallholder can relate to a variety of small holder businesses and enterprises, narrowed down to exclude other enterprises other than (categories of) food producers.   |
| Food              | Changed to {food production} OR {food productivity} OR {food security} OR {food insecurity}  | Too broad as a keyword, narrowed down to keywords that reflect the targets of the SDG theme.  |
| Good nutrition    | DELETED  | Not needed as a keyword, part of any of the keywords on malnutrition and undernutrition, therefore deleted.   |
| Land ownership    | DELETED  | Part of {land right} / {land rights} / {land tenure rights}; deleted.   |

|                            |  |  |
|----------------------------|--|--|
| Drought                    | Changed to {resilient agricultural practices}              | Drought is one of the disasters that threaten food security, instead of adding all these potential threats, I changed this to {resilient agricultural practices} which are designed to adapt agricultural practices in such way that these are less affected by drought, climate change, etc.  |
| Potassium                  | Changed to (agriculture AND potassium)                     | Narrowed down to merely include potassium in the soil which affects agriculture and food security.   |
| Rain-fed                   | DELETED  | Too broad and not directly relevant as a keyword.  |
| Rainfed                    | DELETED  | Too broad and not directly relevant as a keyword.  |
| Pre-harvest                | DELETED  | Not sure what the addition is to this query, deleted.  |
| Post-harvest               | DELETED  | Not sure what the addition is to this query, deleted.  |
| {nutrition improvement}    | Changed to {food nutrition improvement} OR {hidden hunger} | Narrowed down to provide hits that relate to food security and nutrition.  |
| {improvement of nutrition} | Deleted  | Synonym for {nutrition improvement}.   |
| Anemia                     | Deleted  | Related to disease / healthcare and a consequence of malnutrition / undernutrition, keywords which are already included – will lead to hits on medical studies. Deleted.   |
| Anaemia                    | Deleted  | Related to disease / healthcare and a consequence of malnutrition / undernutrition, keywords which are already included – will lead to hits on medical studies. Deleted.   |
| Vitamin deficiency         | Deleted  | A consequence of malnutrition / undernutrition, keywords which are already included – will lead to hits on medical studies. Deleted.   |
| Vitamin deficiencies       | Deleted  | A consequence of malnutrition / undernutrition, keywords which are already included – will lead to hits on medical studies. Deleted.   |
| AND NOT {disease}          | Added  | Added an excluding factor on studies related to disease and healthcare as the keywords malnutrition / undernutrition often lead to hits on the effects of malnutrition / undernutrition on specific diseases such as cancer or cardiovascular diseases and global life expectancy. While related to hunger and the food crisis, these topics are not closely related to the targets of the SDG: ending malnutrition / undernutrition. As such, it is important to exclude disease related studies to retrieve relevant findings. It should be noted that some studies on (for example) crop disease will be excluded, but excluding the majority of health / disease studies seems to outweigh the exclusion of studies on crop disease. |

Updated search string (first update): 76,796 document results

TITLE-ABS-KEY ( ( {land tenure rights} OR ( smallholder AND ( farm OR forestry OR pastoral OR agriculture OR fishery OR { food producer} OR {food producers} ) ) OR malnourish\* OR malnutrition OR undernourish\* OR {undernutrition} OR {agricultural production} OR {agricultural productivity} OR {agricultural practices} OR {agricultural management} OR {food production} OR {food productivity} OR {food security} OR {food insecurity} OR {land right} OR {land rights} OR {land reform} OR {land reforms} OR {resilient agricultural practices} OR ( agriculture AND potassium ) OR fertili?er OR {food nutrition improvement} OR {hidden hunger} OR {genetically modified food} OR ( gmo AND food ) AND NOT {disease} ) ) AND PUBYEAR < 2018 AND PUBYEAR > 2012

The results of the updated search were reviewed to check whether they aligned closely with the SDG theme.

The updated search returned 76,796 document results, compared to 761,275 document results for the original search.

The top 20 cited articles and a randomised sample of 20 articles were reviewed.

Three of the 20 most cited articles are not closely related to the theme of the SDG. These three articles cover topics in the field of marine ecology, biofuel, general water use models. The articles came up in the search results due to hits on the keywords ‘food security’, ‘agricultural production’ and ‘agricultural practices’. These keywords were often given in the abstract or introduction of an article, whereas the remainder of the article focussed on a topic that was not closely related to the SDG (e.g. biofuel from a source that does not threaten food security).

Top 20 most cited articles listed in Scopus from search string v1:

\*red text shows articles which do not closely match the theme of the SDG

| Title   | Year | Source title  | Cited by |
|---|------|---|----------|
| Assessing agricultural risks of climate change in the 21st century in a global gridded crop model intercomparison     | 2014 | Proceedings of the National Academy of Sciences of the United States of America | 658      |
| The contentious nature of soil organic matter   | 2015 | Nature  | 573      |
| Gut microbiomes of Malawian twin pairs discordant for kwashiorkor   | 2013 | Science   | 564      |
| Sustainable intensification in agriculture: Premises and policies   | 2013 | Science   | 556      |
| Ground water and climate change   | 2013 | Nature Climate Change   | 547      |
| Finer resolution observation and monitoring of global land cover: First mapping results with Landsat TM and ETM+ data | 2013 | International Journal of Remote Sensing   | 534      |
| Uncertainty in simulating wheat yields under climate change   | 2013 | Nature Climate Change   | 532      |
| Global obesity: Trends, risk factors and policy implications  | 2013 | Nature Reviews Endocrinology  | 521      |
| Multimodel assessment of water scarcity under climate change  | 2014 | Proceedings of the National Academy of Sciences of the United States of America | 511      |

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|---|------|---|-----|
| Ecological intensification: Harnessing ecosystem services for food security   | 2013 | Trends in Ecology and Evolution   | 511 |
| Record-setting algal bloom in Lake Erie caused by agricultural and meteorological trends consistent with expected future conditions   | 2013 | Proceedings of the National Academy of Sciences of the United States of America | 506 |
| Nutrition-sensitive interventions and programmes: How can they help to accelerate progress in improving maternal and child nutrition? | 2013 | The Lancet  | 504 |
| A meta-analysis of crop yield under climate change and adaptation   | 2014 | Nature Climate Change   | 462 |
| Genome-wide comparative diversity uncovers multiple targets of selection for improvement in hexaploid wheat landraces and cultivars   | 2013 | Proceedings of the National Academy of Sciences of the United States of America | 459 |
| Yield gap analysis with local to global relevance-A review  | 2013 | Field Crops Research  | 459 |
| Mechanism of nitrogen fixation by nitrogenase: The next stage   | 2014 | Chemical Reviews  | 447 |
| Liquid fuels, hydrogen and chemicals from lignin: A critical review   | 2013 | Renewable and Sustainable Energy Reviews  | 442 |
| Health and climate change: Policy responses to protect public health  | 2015 | The Lancet  | 440 |
| Bringing ecosystem services into economic decision-making: Land use in the United Kingdom   | 2013 | Science   | 425 |
| Rising temperatures reduce global wheat production  | 2015 | Nature Climate Change   | 424 |

In addition, a randomised sample of 20 articles were reviewed taking the same approach.

Five of the 20 articles did not closely reflect the theme of the SDG. Two articles were published in the field of medicine. The others were published in the field of paleoclimatology, tourism studies and water chemistry. The keywords 'food production', 'agricultural practices', 'malnutrition' and 'fertilizer'.

Randomised sample of 20 articles listed in Scopus from search string v1:

\*red text shows articles which do not closely match the theme of the SDG

| Title  | Year | Source title                                      | Cited by |
|--|------|---|----------|
| Deciphering 'Islamic hospitality': Developments, challenges and opportunities  | 2014 | Tourism Management                                | 59       |
| A 2500-year multi-proxy reconstruction of climate change and human activities in northern Spain: The Lake Arreo record   | 2013 | Palaeogeography, Palaeoclimatology, Palaeoecology | 47       |
| Life cycle analysis of an alternative to the haber-bosch process: Non-renewable energy usage and global warming potential of liquid ammonia from cyanobacteria | 2014 | Environmental Progress and Sustainable Energy     | 18       |
| Vulnerability to climatic change in riparian char and river-bank households in Bangladesh: Implication for policy, livelihoods and social development          | 2017 | Ecological Indicators                             | 16       |

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|---|------|---|----|
| Enhanced recovery after surgery (ERAS) strategies: Possible advantages also for head and neck surgery patients?   | 2014 | European Archives of Oto-Rhino-Laryngology  | 14 |
| Consumer attitudes towards nanotechnology in food products: an attribute-based analysis   | 2016 | British Food Journal  | 10 |
| Identification of putative transmembrane proteins involved in salinity tolerance in chenopodium quinoa by integrating physiological data, RNAseq, and SNP analyses                | 2017 | Frontiers in Plant Science  | 6  |
| Response of Solanum melongena L. seedlings grown under saline calcareous soil conditions to a new organo-mineral fertilizer   | 2015 | Journal of Animal and Plant Sciences  | 6  |
| Potential for mitigating atmospheric ammonia in Canada  | 2017 | Soil Use and Management   | 5  |
| Effects of landscape context and agricultural practices on the abundance of cotton bollworm Helicoverpa armigera in cotton fields: A case study in northern Benin                 | 2013 | International Journal of Pest Management  | 5  |
| Effect of genetic improvement of grain yield and nitrogen efficiency of mid-season indica rice cultivars  | 2015 | Journal of Plant Nutrition and Soil Science   | 4  |
| Early nutritional therapy in trauma: After A, B, C, D, E, the importance of the F (FEED) [Terapia nutricional precoce no trauma: Após o A, B, C, D, E, a importância do F (FEED)] | 2013 | Revista do Colegio Brasileiro de Cirurgioes   | 3  |
| Community food hubs: an economic and social justice model for regional Australia?   | 2017 | Rural Society   | 1  |
| Improving monitoring precision of soil moisture by assimilation of HYDRUS model and remote sensing-based data by ensemble Kalman filter   | 2017 | Nongye Gongcheng Xuebao/Transactions of the Chinese Society of Agricultural Engineering | 1  |
| Reactant purification of wastewaters of ammonium compounds  | 2015 | Journal of Water Chemistry and Technology   | 1  |
| The effect of pre-sowing plants and different levels of nitrogen consumption on quantitative and qualitative yield of grain maize   | 2014 | Advances in Environmental Biology   | 1  |
| System dynamics analysis on soil heavy metal As in sewage irrigation area of Kuihe River  | 2013 | Nongye Gongcheng Xuebao/Transactions of the Chinese Society of Agricultural Engineering | 1  |
| Land reforms, landlessness, and poverty in Kenya: The postcolonial experience   | 2017 | Poverty Reduction Strategies in Africa  | 0  |
| A study of nutritional status of pre school children in Muzaffarnagar district (Uttar Pradesh)  | 2017 | Indian Journal of Public Health Research and Development                                | 0  |
| Economic efficiency, Allen / Uzama and Morishima elasticities of smallholder agriculture in Dedza district, Malawi  | 2013 | Journal of Central European Agriculture   | 0  |

The new search results were compared to the original search results to check if the updated search was primarily removing irrelevant results.

The original and updated searches were combined using AND NOT function in Scopus. This returned 684,479 document results – i.e. the publications that were excluded from the first search in the second search.

One article of the 20 articles excluded by the first update is closely related to the theme of the SDG. The removal of the keyword ‘anemia’ and the exclusion of the keyword ‘disease’ led to the exclusion of this article. All other articles are rightfully excluded, and mainly relate to the field of medicine.

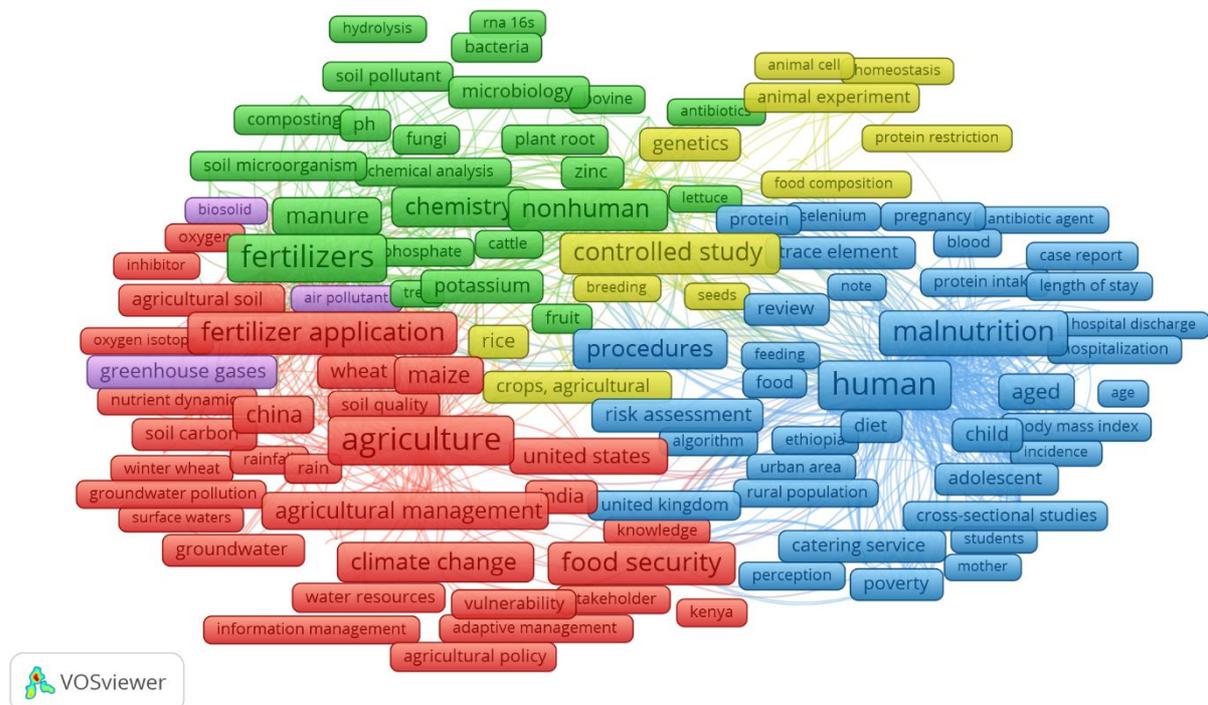
Top 20 cited articles included in the original search results but not in the updated search results:

\*red text shows articles which do not closely match the theme of the SDG

| Title  | Year | Source title                    | Cited by |
|--|------|---------------------------------|----------|
| Nutritional Epidemiology   | 2013 | Nutritional Epidemiology        | 4657     |
| Heart Disease and Stroke Statistics - 2014 Update: A report from the American Heart Association  | 2014 | Circulation                     | 3693     |
| Nivolumab versus docetaxel in advanced squamous-cell non-small-cell lung cancer  | 2015 | New England Journal of Medicine | 3236     |
| Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990-2013: A systematic analysis for the Global Burden of Disease Study 2013   | 2015 | The Lancet                      | 3197     |
| Nivolumab versus docetaxel in advanced nonsquamous non-small-cell lung cancer  | 2015 | New England Journal of Medicine | 3145     |
| Standards of medical care in diabetes-2014   | 2014 | Diabetes Care                   | 2883     |
| 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure   | 2016 | European Heart Journal          | 2838     |
| PD-1 blockade in tumors with mismatch-repair deficiency  | 2015 | New England Journal of Medicine | 2757     |
| Diet rapidly and reproducibly alters the human gut microbiome  | 2014 | Nature                          | 2422     |
| Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990-2013: A systematic analysis for the Global Burden of Disease Study 2013 | 2015 | The Lancet                      | 2349     |
| Pembrolizumab for the treatment of non-small-cell lung cancer  | 2015 | New England Journal of Medicine | 2265     |
| Research development on sodium-ion batteries   | 2014 | Chemical Reviews                | 2196     |
| Increased survival in pancreatic cancer with nab-paclitaxel plus gemcitabine   | 2013 | New England Journal of Medicine | 2191     |
| Pembrolizumab versus Chemotherapy for PD-L1-Positive Non-Small-Cell Lung Cancer  | 2016 | New England Journal of Medicine | 2159     |
| Maternal and child undernutrition and overweight in low-income and middle-income countries   | 2013 | The Lancet                      | 2152     |
| Nivolumab versus everolimus in advanced renal-cell carcinoma   | 2015 | New England Journal of Medicine | 2035     |
| Predictive correlates of response to the anti-PD-L1 antibody MPDL3280A in cancer patients  | 2014 | Nature                          | 1972     |

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|--|------|-----------------------------------|------|
| Pembrolizumab versus docetaxel for previously treated, PD-L1-positive, advanced non-small-cell lung cancer (KEYNOTE-010): A randomised controlled trial  | 2016 | The Lancet                        | 1882 |
| Microenvironmental regulation of tumor progression and metastasis  | 2013 | Nature Medicine                   | 1848 |
| 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: The Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC). Developed with the special contribution of the Heart Failure Association (HFA) of the ESC | 2016 | European Journal of Heart Failure | 1827 |

**Graphical summary of co-occurrence of terms from 2000 randomly selected results:**



The analyses show that the first update provides an important step toward a search query that retrieves document publications that are relevant for SDG 2. The majority of medical and engineering studies are excluded and more emphasis is placed on agricultural management.

However, current search query and the co-occurrence of keywords shows that this first update could be further improved by adding keywords on targets related to food security, innovation, food markets and supply chains. In addition, agroforestry is still excluded from the search query while this sector provides an important source of income and food in countries in Southern America and Asia, thus should be included in a future update. Moreover, more emphasis could be placed on results on genetic diversity of existing food sources (both plant and animal species).

**Update 2) A second update was made to the search string to cover topics such as agroforestry, innovation and food markets and supply chains.**

To bring these articles into the search results, the following were added to the search string:

|   |  |
|---|--|
| By 2030, <b>end hunger and ensure access</b> by all people, in particular the poor and people in vulnerable situations, including infants, <b>to safe, nutritious and sufficient food all year round</b>  | Included   |
| By 2030, <b>end all forms of malnutrition</b> , including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons  | Included   |
| By 2030, <b>double the agricultural productivity and incomes of small-scale food producers</b> , in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment   | {agroforestry practices} OR {agroforestry management} OR {{food market} AND (restriction OR tariff OR access OR {north south divide} OR {development governance})} OR {food governance} OR {food supply chain} OR {food value chain} ( <i>latter is also related to world agricultural markets</i> ) |
| By 2030, <b>ensure sustainable food production systems and implement resilient agricultural practices</b> that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality  | {agricultural innovation}  |
| By 2020, <b>maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species</b> , including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed | {{food security} AND {genetic diversity}}  |
| <b>Increase investment, including through enhanced international cooperation</b> , in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries   | Included in other keywords   |
| <b>Correct and prevent trade restrictions and distortions in world agricultural markets</b> , including through the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in   | Included in other to be added keywords   |

|   |                         |
|---|-------------------------|
| accordance with the mandate of the Doha Development Round   |                         |
| Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help <b>limit extreme food price volatility</b> | {food commodity market} |

### Second update search: 77,956 document results

TITLE-ABS-KEY ( ( {land tenure rights} OR ( smallholder AND ( farm OR forestry OR pastoral OR agriculture OR fishery OR { food producer} OR {food producers} ) ) OR malnourish\* OR malnutrition OR undernourish\* OR {undernutrition} OR {agricultural production} OR {agricultural productivity} OR {agricultural practices} OR {agricultural management} OR {food production} OR {food productivity} OR {food security} OR {food insecurity} OR {land right} OR {land rights} OR {land reform} OR {land reforms} OR {resilient agricultural practices} OR ( agriculture AND potassium ) OR fertili?er OR {food nutrition improvement} OR {hidden hunger} OR {genetically modified food} OR ( gmo AND food ) OR {agroforestry practices} OR {agroforestry management} OR {agricultural innovation} OR ( {food security} AND {genetic diversity} ) OR ( {food market} AND ( restriction OR tariff OR access OR {north south divide} OR {development governance} ) ) OR {food governance} OR {food supply chain} OR {food value chain} OR {food commodity market} AND NOT {disease} ) ) AND PUBYEAR < 2018 AND PUBYEAR > 2012

The results of the updated search were reviewed to check whether they aligned closely with the SDG theme.

The top 20 cited articles and a randomised sample of 20 articles were reviewed.

No changes were found in the top 20 most articles, compared to the top 20 most cited articles generated by search query v1. Three of the 20 most cited articles are not closely related to the theme of the SDG. These three articles covered topics in the field of marine ecology, biofuel, general water use models. The articles came up in the search results due to hits on the keyword 'food security' (often used in the introduction), 'agricultural production' and 'agricultural practices'. These keywords were often given in the abstract or introduction of an article, whereas the remainder of the article focussed on a topic that was not closely related to the SDG (e.g. biofuel from a source that does not threaten food security).

Top 20 most cited articles listed in Scopus from search string v2:

\*red text shows articles which do not closely match the theme of the SDG

| Title   | Year | Source title  | Cited by |
|---|------|---|----------|
| Assessing agricultural risks of climate change in the 21st century in a global gridded crop model intercomparison | 2014 | Proceedings of the National Academy of Sciences of the United States of America | 658      |
| The contentious nature of soil organic matter   | 2015 | Nature  | 573      |
| Gut microbiomes of Malawian twin pairs discordant for kwashiorkor   | 2013 | Science   | 564      |

|   |      |   |     |
|---|------|---|-----|
| Sustainable intensification in agriculture: Premises and policies   | 2013 | Science   | 556 |
| Ground water and climate change   | 2013 | Nature Climate Change   | 547 |
| Finer resolution observation and monitoring of global land cover: First mapping results with Landsat TM and ETM+ data                 | 2013 | International Journal of Remote Sensing   | 534 |
| Uncertainty in simulating wheat yields under climate change   | 2013 | Nature Climate Change   | 532 |
| Global obesity: Trends, risk factors and policy implications  | 2013 | Nature Reviews Endocrinology  | 521 |
| Multimodel assessment of water scarcity under climate change  | 2014 | Proceedings of the National Academy of Sciences of the United States of America | 511 |
| Ecological intensification: Harnessing ecosystem services for food security   | 2013 | Trends in Ecology and Evolution   | 511 |
| Record-setting algal bloom in Lake Erie caused by agricultural and meteorological trends consistent with expected future conditions   | 2013 | Proceedings of the National Academy of Sciences of the United States of America | 506 |
| Nutrition-sensitive interventions and programmes: How can they help to accelerate progress in improving maternal and child nutrition? | 2013 | The Lancet  | 504 |
| A meta-analysis of crop yield under climate change and adaptation   | 2014 | Nature Climate Change   | 462 |
| Genome-wide comparative diversity uncovers multiple targets of selection for improvement in hexaploid wheat landraces and cultivars   | 2013 | Proceedings of the National Academy of Sciences of the United States of America | 459 |
| Yield gap analysis with local to global relevance-A review  | 2013 | Field Crops Research  | 459 |
| Mechanism of nitrogen fixation by nitrogenase: The next stage   | 2014 | Chemical Reviews  | 447 |
| Liquid fuels, hydrogen and chemicals from lignin: A critical review   | 2013 | Renewable and Sustainable Energy Reviews  | 442 |
| Health and climate change: Policy responses to protect public health  | 2015 | The Lancet  | 440 |
| Bringing ecosystem services into economic decision-making: Land use in the United Kingdom   | 2013 | Science   | 425 |
| Rising temperatures reduce global wheat production  | 2015 | Nature Climate Change   | 424 |

In addition, a randomised sample of 20 articles were reviewed taking the same approach. Two of the 20 articles did not closely reflect the theme of the SDG. Both articles related to agriculture, however one reported on archaeological findings and one on cotton weed production.

Randomised sample of 20 articles listed in Scopus from search string v2:

\*red text shows articles which do not closely match the theme of the SDG

| Title   | Year | Source title  | Cited by |
|---|------|---|----------|
| The effects of mulching on maize growth, yield and water use in a semi-arid region  | 2013 | Agricultural Water Management   | 117      |
| Identification of soil quality indicators for assessing the effect of different tillage practices through a soil quality index in a semi-arid environment | 2016 | Ecological Indicators   | 34       |
| Invasive mammals and habitat modification interact to generate unforeseen outcomes for indigenous fauna   | 2013 | Ecological Applications   | 32       |
| Municipal composts reduce the transfer of Cd from soil to vegetables  | 2016 | Environmental Pollution   | 28       |
| Iron Deficiency Is Associated with Food Insecurity in Pregnant Females in the United States: National Health and Nutrition Examination Survey 1999-2010   | 2014 | Journal of the Academy of Nutrition and Dietetics                       | 26       |
| Influence of long-term application of organic and inorganic fertilizers on soil properties  | 2014 | Plant, Soil and Environment   | 18       |
| CO <sub>2</sub> emissions from tropical drained peat in Sumatra, Indonesia  | 2014 | Mitigation and Adaptation Strategies for Global Change                  | 17       |
| Impact of wheat/faba bean mixed cropping or rotation systems on soil microbial functionalities  | 2016 | Frontiers in Plant Science  | 13       |
| Analyzing nutritional impacts of price and income related shocks in Malawi: Simulating household entitlements to food                                     | 2016 | Food Policy   | 8        |
| Gadachrili Gora: Architecture and organisation of a Neolithic settlement in the middle Kura Valley (6th millennium BC, Georgia)                           | 2016 | Quaternary International  | 8        |
| Enabling adaptation? Lessons from the new 'Green Revolution' in Malawi and Kenya  | 2014 | Climatic Change   | 7        |
| Malthus is still wrong: We can feed a world of 9-10 billion, but only by reducing food demand   | 2015 | Proceedings of the Nutrition Society                                    | 6        |
| Phosphorus and potassium fertilizer effects on alfalfa and soil in a non-limited soil   | 2013 | Agronomy Journal  | 6        |
| Physiological processes associated with high yield traits in modern rice varieties  | 2016 | International Journal of Plant Production                               | 3        |
| Financing agricultural production from a value chain perspective: Recent evidence from South Africa   | 2015 | Outlook on Agriculture  | 3        |
| Evaluation of Integrated Nutrient Management Interventions for Cotton ( <i>Gossypium hirsutum</i> ) on a Vertisol in Central India                        | 2017 | Communications in Soil Science and Plant Analysis                       | 1        |
| Expansion of food products range for functional and prophylactic nutrition with usage of fruits and vegetables of Tambov region                           | 2015 | Ecology, Environment and Conservation                                   | 1        |
| Dynamic simulation of psychrophilic anaerobic digestion of swine manure   | 2015 | Proceedings, Annual Conference - Canadian Society for Civil Engineering | 0        |
| Residual effects of INM on humus fractions, micronutrient content and their uptake by rabi greengram under rice-pulse cropping system                     | 2014 | Research on Crops   | 0        |
| Are the findings in these boys signs of malnutrition?   | 2013 | Consultant  | 0        |

Graphical summary of co-occurrence of terms from 2000 randomly selected results:

