

CEE11-002 Appendix one: Articles excluded after reading full text

TITLE	AUTHOR(S)	DATE	START PAGE	END PAGE	PUBLICATION	ISSUE	NUMBER	REASON FOR EXCLUSION
Economic impacts of policies affecting crop biotechnology and trade	Anderson K;	2010	558	564	New Biotechnology	27	5, Sp. Iss.	After reading full text this is deemed not to be relevant. It presents a GTAP model to estimate economic welfare consequences of policies affecting GM crop adoption.
Recent developments in intellectual property and power in the private sector related to food and agriculture	Blakeney M;	2011	109	113	Food Policy	36		After reading full text this is deemed not to be relevant. Does not contain any farm level data.
A qualitative multi-attribute model for economic and ecological assessment of genetically modified crops	Bohanec M;Messqan A;Scatasta S;Angevin F;Griffiths B;Krogh PH;Znidarsic M;Dzeroski S;	2008	247	261	Ecological Modelling	215		After reading full text this is deemed not to be relevant. It presents an ex-ante model, not post commercialisation farm level data
Global Impact of Biotech Crops: Socio-Economic and Environmental Effects, 1996-2006	Brookes & Barfoot,	2008	21	38	AgBioForum,	11		1 This article does not provide farm level data but aggregates farm income data up to country and global level. This study is not relevant
GM crops: global socio-economic and environmental impacts 1996-2007	Brookes & Barfoot,	2009			Report by PG Economics Ltd, UK			This is a review of previous research.
GM crops: global socio-economic and environmental impacts 1996-2008	Brookes & Barfoot,	2010			Report by PG Economics Ltd, UK			This is a review of previous research. Much of the report results are presented as aggregated country level or global level impacts.
The impact of using GM insect resistant maize in Europe since 1998	Brookes,	2008	148	166	International Journal of Biotechnology	10	2/3	This is all review. Data is drawn from a wide range of different sources and studies.
Experience from use of GMOs in Argentinian agriculture, economy and environment	Burachik M;	2010	588	592	New Biotechnology	27		5 After reading full text this is deemed not to be relevant. Article describes the situation and conditions leading to adoption of GE crops. Does not present any original farm-level data.
Peer-reviewed surveys indicate positive impact of commercialized GM crops	Carpenter,	2010	319	321	Nature biotechnology	28		4 This does not provide farm level data. Provides a summation of previous studies.

The social-environmental benefits from crop biotechnology in Brazil: 1996 – 2009	Celeres Ambiental,	2010		Study prepared for: Associação Brasileira de Sementes e Mudras (ABRASEM)		Although this presents farm level data it focuses on the environmental impact not economic impact.
The Economics of Bt Cotton Production in India--A Meta Analysis	Chakraborty K;	2010	647	663 Indian Journal of Economics and Business	9	4 After reading full text this is deemed not to be relevant. This is a meta-analysis of 16 empirical studies, many of which used trials data.
Economic assessment of weed management in strip- and conventional-tillage nontransgenic and transgenic cotton	Clewis SB;Wilcut JW;	2007	45	52 Weed Technology	21	1 After reading full text this is deemed not to be relevant. Presents farm level data based on field trials not commercial crops
An econometric analysis of regional adoption patterns of Bt maize in Germany	Consmuller N;Beckmann V;Petrick M;	2010	275	284 Agricultural Economics	41 3/4	Aim to identify the factors that drive regional adoption of bt maize in Germany. After reading full text this is deemed not to be relevant.
REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL on socio-economic implications of GMO cultivation on the basis of Member States contributions, as requested by the Conclusions of the Environment Council of December 2008	EU,	2011		SANCO/10715/2011 Rev. 5		Reports on the socio-economic implications of GMO cultivation in member states. This is too high level to be useful, i.e. is not farm level.
The past, present and future of crop genetic modification	Fedoroff NV;	2010	461	465 New Biotechnology	27	5 Very broad overview of the past, present and future of technology in agriculture. After reading full text this is deemed not to be relevant.
A Meta Analysis on Farm-Level Costs and Benefits of GM Crops	Robert Finger, Nadja El Benni, Timo Kaphengst, Clive Evans, Sophie Herbert, Bernard Lehmann, Stephen Morse and Nataliya Stupak	2011	743	762 Sustainability		3 This is a meta-analysis. Uses global data from more than a decade of field trials and surveys. After reading full text this is deemed not to be relevant.
The social-environmental benefits from crop biotechnology in Brazil: 1996 – 2009	Franke et al,	2011		Plant Research International, part of Wageningen UR, Report 386		This is largely a review of other studies and is not relevant.

The costs and benefits of refuge requirements: The case of Bt cotton	Frisvold GB;Reeves JM;	2008	87	97 Ecological Economics	65	1	Estimates the costs of refuges planted to delay pest resistance to bt crops. After reading full text this is deemed not to be relevant.
Exploring the resilience of B.T. Cotton's 'pro-poor success story'	Glover D;	2010	955	981 Development and change		41	6 This paper is discursive and provides narrative but includes no data. As such, after reading full text this is deemed not to be relevant.
Economic Impact of Dominant GM Crops Worldwide: a Review	Gomez Barbero & Rodriguez-Cerezo,	2006		Report by the Institute for Prospective Technological Studies, JRC			This is a review of previous literature.
Economic impact of GM maize cultivation: room for coexistence costs	Gomez-Barbero M;Rodriguez-Cerezo E;	2008	137	140 Conference paper			This reports the same findings as another study by Gomez Barbero et al (2008) that is already included in the systematic review and therefore is not included
The Adoption of Genetically Modified Papaya in Hawaii and Its Implications for Developing Countries	Gonsalves C;Lee DR;Gonsalves D;	2007		book chapter - same as journal article below			Discusses the key factors that have lead to the adoption of GM papaya in Hawaii. After reading full text this is deemed not to be relevant.
The Adoption of Genetically Modified Papaya in Hawaii and Its Implications for Developing Countries	Gonsalves C;Lee DR;Gonsalves D;	2007	177	191 Journal of Development Studies		43	1 Discusses the key factors that have lead to the adoption of GM papaya in Hawaii. After reading full text this is deemed not to be relevant.
Monsanto's Adventures in Zulu Land: Output and Labour Effects of GM Maize and Minimum Tillage	Gouse et al	2006		Contributed paper prepared for presentation at the International Association of Agricultural Economists Conference, Gold Coast, Australia, August 12-18, 2006			Examines impact of bt maize on yields. There are no economic data in this paper.
Three Seasons of Subsistence Insect-Resistant Maize in South Africa: Have Smallholders Benefited?	Gouse et al	2006	15	22 Agbioforum		9	1 There are no economic data in this paper.
Bt Cotton and Farmer Suicides in India. Reviewing the Evidence	Gruere et al	2008		IFPRI Discussion Paper 00808			The results here are based on a review of previous studies. This reports the same findings as the entry below.
Bt Cotton and Farmer Suicides in India: An Evidence-Based Assessment	Gruere G;Sengupta D;	2011	316	337 Journal of Development Studies		47	2 The results here are based on a review of previous studies

Economic Benefits of Genetically-modified Herbicide-tolerant Canola for Producers	Michael Gusta, Stuart J. Smyth, Kenneth Belcher, and Peter W.B. Phillips	2011	1	13	Agbioforum	14	1	These results are too problematic to be useful. This paper is excluded.
Taking stock: agrarian distress in India - poor Indian farmers, suicides and government	Harper M;	2011	11	16	Enterprise development and microfinance	22	1	This article examines whether crops such as GM cotton, microfinance or other factors are to blame for farmer suicides in India. After reading full text this is deemed not to be relevant.
Impact of Bt cotton adoption on pesticide use by smallholders: A 2-year survey in Makhatini Flats (South Africa)	Hofs JL;Fok M;Vaissayre M;	2006	984	988	Crop Protection	25	9	There are no economics.
Farmers' Seed and Pest Control Management for Bt Cotton in China	Huang et al,	2009			Chapter in: Biotechnology and Agricultural Development Transgenic Cotton, Rural Institutions and Resource-poor Farmers. Edited by Rob Tripp			There are no economics in this chapter.
Productivity difference between Bt and non Bt cotton farms in Karnataka state, India - an econometric evidence	Hugar LB;Amrutha CP;Patil BV;	2009	349	352	Karnataka Journal of Agricultural Sciences	22	2	There are no economics in this paper.
Areawide Suppression of European Corn Borer with Bt Maize Reaps Savings to Non-Bt Maize Growers	Hutchinson et al,	2010	222	225	Science	330		Estimates prevalence of European Corn Borer populations in non-bt maize crops as a result of bt maize planting. After reading full text this is deemed not to be relevant.
Compliance costs for regulatory approval of new biotech crops	Kalaitzandonakes N;Alston JM;Bradford KJ;	2007	509	511	Nature Biotechnology	25	5	Estimates costs to biotech companies of compliance with regulations. After reading full text this is deemed not to be relevant.
Farm-level performance of genetically modified cotton: a frontier analysis of cotton production in Maharashtra	Kambhampati U;	2006	291	297	Outlook on agriculture	35	4	This reports the same data as Bennett et al 2006 (RMD 1887).
Assessment of the economic performance of GM crops worldwide	Kaphengst et al,	2009			Report to the European Commission,			This is a review of previous studies.
Ecological modernization and the 'gene revolution': the case study of Bt cotton in India	Kumbamu A;	2006	7	31	Capitalism, nature, socialism	17	4	This is review

Plant Breeding and Poverty: Can Transgenic Seeds Replicate the 'Green Revolution' as a Source of Gains for the Poor?	Lipton M;	2007	31	62	Journal of Development Studies	43	1	Discusses the impacts of the green revolution and whether GM technology can have similar impacts. After reading full text this is deemed not to be relevant.
Do refuge requirements for biotechnology crops promote economic efficiency? Some evidence for Bt cotton	Livingston MJ;Storer NP;Duyn JW;Kennedy GG;	2007	171	185	Journal of Agricultural and Applied Economics	39	1	Examines producer behaviour, resistance evolution and returns under alternative refuge requirements. After reading full text this is deemed not to be relevant.
Biotechnology for Sustainable Crop Production and Protection: Challenges and Opportunities	Manjunath,	2010	357	359	Electronic Journal of Plant Breeding,	1	4	This is a discursive general overview and as such is not relevant.
Farmer knowledge and risk analysis: postrelease evaluation of herbicide-tolerant canola in Western Canada	Mauro & McLachlan	2008	463	476	Risk analysis	28	2	There are no economics reported in this paper.
First-generation genetically modified organisms in agriculture	Moss CB;	2006	46	57	Journal of public affairs	6	1	Present a general framework for analysing the economic impacts of GM crops. After reading full text this is deemed not to be relevant.
Impact of Genetically Engineered Crops on Farm Sustainability in the United States	National Research Council,	2010			National Research Council report			This is a review
Methodology for measuring the socio-economic impacts of biotechnology: A case study of potatoes in Colombia	Orozco LA;Chavarro-Bohorquez DA;Olaya DL;Villaveces JL;	2007	107	122	Research Evaluation	16		This article sets out a methodology for the measurement of different aspects of national biotechnology programs. After reading full text this is deemed not to be relevant.
The impact of the EU regulatory constraint of transgenic crops on farm income	Park et al	2011			New Biotechnology	28	4	Estimates the revenue foregone by EU farmers based on the potential hectarages of transgenic crops that could have been grown in the EU if the 'moratorium' hadn't been in place between 1999-2004. After reading full text this is deemed not to be relevant.
Agricultural Biotechnology. Transgenics in Agriculture and their Implications for Developing Countries	Pehu & Ragasa,	2007			Background paper for the World Development Report 2008			Paper synthesises peer-reviewed research results

Assessing the profitability of different crop protection strategies in cotton: Case study results from Shandong Province, China	Pemsl & Waibal,	2007	28	36 Agricultural Systems	95	This paper compares the economic performance of different crop protection strategies in cotton including the use of transgenic varieties. Uses a montecarlo simulation model. After reading full text this is deemed not to be relevant.
Genetically modified crops, factor endowments, biased technological change, wages and poverty reduction	Piesse & Thirtle,	2008		International Journal of Biotechnology	10 2/3	This paper uses panel data for Africa, Asia and Latin America to investigate the effects of factor endowments and biased technological change on productivity growth, labour incomes and poverty reduction. After reading full text this is deemed not to be relevant.
Biotechnology Adoption over Time in the Presence of Non-pecuniary Characteristics That Directly Affect Utility: A Derived Demand Approach	Piggott NE;Marra MC;	2008	58	70 AgBioForum	11	1 This article considers the effect that embodied non-pecuniary factors have on the derived demand for a new crop biotechnology. After reading full text this is deemed not to be relevant.
Adoption of Bt Cotton and Impact Variability: Insights from India	Qaim M;Subramanian A;Naik G;Zilberman D;	2006	48	58 Review of Agricultural Economics	28	1 These figures are also reported by Sadashivappa & Qaim RMD 1460.
Economic and Social Considerations in the Adoption of Bt Crops	Qaim M;Pray CE;Zilberman D;	2008	329	356 Chapter in : Integration of Insect-Resistant Genetically Modified Crops within IPM Programs		This is review
The Economics of Genetically Modified Crops	Qaim M;	2009	665	693 Annual Review of Resource Economics	1	1 This is review
Benefits of genetically modified crops for the poor: household income, nutrition, and health	Qaim M;	2010	552	557 New Biotechnology	27	5 This is review
Correspondence to editor	Qaim et al	2009		Nature Biotechnology		The figures provided are from previous studies.
Economic impact of transgenic crops in developing countries	Raney T;	2006	174	178 Current Opinion in Biotechnology	17	2 This is a review
Do peasants need GM crops?	Richards P;	2010	559	574 Journal of peasant studies	37	3 This is a book review
Production Risk, Pesticide Use and GM Crop Technology in South Africa	Shankar B;Bennett R;Morse S;	2008	2489	2500 Applied Economics	40 19-21	There are no economic data reported.

Development, Agronomic Performance and Sustainability of Transgenic Cotton for Insect Control	Showalter et al, 2009	2009			Book chapter in: Biotechnology and Agricultural Development Transgenic Cotton, Rural Institutions and Resource-poor Farmers Edited by Rob Tripp			This chapter summarises the methods used to develop transgenic cotton for insect control, discusses the factors related to its agronomic performance, and describes the resistance management strategies used to enhance its sustainability. After reading full text this is deemed not to be relevant.
Bales and balance: a review of the methods used to assess the economic impact of Bt cotton on farmers in developing economies	Smale M;Zambrano P;Cartel M;	2006	195	212	AgBioForum	9	3	This is a review
Measuring the economic impacts of transgenic crops in developing agriculture during the first decade: approaches, findings, and future directions	Smale M;Zambrano P;Gruere G;Falck-Zepeda J;Matuschke I;Horna D;Nagarajan L;Yerramareddy I;Jones H;	2009	xviii		IFPRI Report		10	This is a review
The economic impact of transgenic crops in developing countries: a note on the methods	Smale M;Zambrano P;Falck-Zepeda J;Gruere G;Matuschke I;	2008	519	551	International Journal of Biotechnology	10	6	Review of the methods used by previous economic studies to measure farm level impacts of transgenic crops
Field versus Farm in Warangal: Bt Cotton, Higher Yields, and Larger Questions	Stone GD;	2011	387		World Development	39	3	There are no economics
Village-Wide Effects of Agricultural Biotechnology: The Case of Bt Cotton in India	Subramanian A;Qaim M;	2009	256	267	World Development	37	1	A micro-social accounting matrix is developed and used to simulate the effects of bt cotton adoption. After reading full text this is deemed not to be relevant.
The Impact of Bt Cotton on Poor Households in Rural India	Subramanian A;Qaim M;	2010	295	311	Journal of Development Studies	46	2	Use a micro-economic modelling approach and survey data to analyse welfare and distribution effects in a village economy
Bt Cotton in China: Are Secondary Insect Infestations Offsetting the Benefits in Farmer Fields?	Wang, Z;Lin, H;Huang, J;Hu, R;Rozelle, S;Pray, C.	2009	83	90	Agricultural Sciences in China	8	1	Does not include economics

Issues in the Political Economy of Agricultural Biotechnology	Wield D;Chataway J;Bolo M;	2010	342	366	Journal of Agrarian Change	10	3	Studies, among other things, the economics of GM plants. Takes a Political economy approach. Does not include any original farm level data. After reading full text this is deemed not to be relevant.
Can the Poor Help GM Crops? Technology, Representation & Cotton in the Makhathini Flats, South Africa	Harald Witt, Rajeev Patel & Matthew Schnurr;	2011	497	513	Review of African Political Economy	109		Does not provide any original farm level data.
The Economic Impact of Genetically Engineered Crops	Zilberman D;Sexton SE;Marra M;Fernandez-Cornejo J;	2010			Choices	25	2	This is all review
The Impact of Agricultural Biotechnology on Yields, Risks and Biodiversity in Developing Countries	Zilberman et al,	2007			Chapter in: Transgenics and the Poor Biotechnology in Development Studies. Edited by Ronald J. Herring			This chapter relies on economic logic to analyse the impacts of transgenic varieties on crop yields and biodiversity. After reading full text this is deemed not to be relevant.

Appendix two: Quality assessment

	1. Did the study include results from one country or more than one country?	2. Did the study include one or more study areas (regions within country)?	3. Did the study include data from one year only or more than one year?	4. Was the study area randomly selected or purposively selected?	5. Were farmers randomly selected or purposively selected?	6. Did the study survey farmers growing both GM and non-GM; farmers who were growing non-GM but who had switched to GM; or some farmers who grow GM and some who grow non-GM?	7. How many farmers were surveyed?	8. Were farmers questioned about previous years or only current year?	9. Did the study test for significance of differences between values in non-GM and GM?	10. Did the study test differences in the characteristics of adopters and non-adopters?	QUALITY SCORE	Number of applicable criteria	AVERAGE QUALITY SCORE
Ali & Abdulai, 2010	One	Seven districts in 1 province	One year	Purposively	Stratified random sampling	Adopters and non-adopters	325	Only current year	Yes	Yes			
QUALITY SCORE	1	3	1	1	3	1	3	3	3	3	22	10	2.20
Bangeree & Martin, 2008	One	One	Four	Purposively	N/a	Data from GM farms and non-GM farms	N/a	N/a	No	N/a			
QUALITY SCORE	1	1	3	1	1	1				1	8	6	1.33
Bennett et al, 2006b	One	One	Three years	Purposively	Purposive	Adopters and non-adopters	32	Only current year	Yes	Yes			
QUALITY SCORE	1	1	3	1	1	1	1	3	3	3	18	10	1.80
Bennett et al, 2006	One	One state and three sub-regions; 16 districts and 1275 villages (year 1);	Two	Purposively	Two random samples	Farmers growing both	2709 (yr 1); 787 (yr 2)	Only current year	Yes	N/a			
QUALITY SCORE	1	1	2	1	3	3	3	3	3	3	20	9	2.22
Crost et al, 2007	One	One state, one district, two areas in the district, 6 villages	Two	State was selected purposively; villages were selected at random	Stratified random sampling	Adopters and non-adopters; and farmers who switched	338	Only current year	Yes	Yes			
QUALITY SCORE	1	1	2	1	3	1.5	3	3	3	3	21.5	10	2.15
Gomez Barbero et al, 2008	One	Three regions	Three years	Purposively	Random sampling	Adopters and non-adopters	379	Previous years	Yes	Yes			
QUALITY SCORE	1	3	3	1	3	1	3	1	3	3	22	10	2.20
Gouse et al, 2009	One	Three areas	One	No information	No information	Not clear	249	Only current year	Yes	No			
QUALITY SCORE	1	3	1				3	3	3	1	15	7	2.14
Gouse, 2009	One	One	Eleven	Purposively	N/a	N/a	N/a	N/a	No	N/a			
QUALITY SCORE	1	1	3	1						1	7	5	1.40

Hofs et al, 2006	One	One	Two	Purposively	Randomly sampled	Adopters and non-adopters	20	N/a	Yes	No					
QUALITY SCORE	1	1	2	1	3	1	1		3	1	14	9			1.56
Hugar et al, 2009	One	One state, three districts	One	Purposively	Not clear	Adopters and non-adopters	179	Only current year	No	No					
QUALITY SCORE	1	3	1	1	1	1	3		3	1	1	15	9		1.67
Morse et al, 2007	One	One district	Two	Purposively	Randomly sampled	Adopters and non-adopters	157	Previous year	Yes	Yes					
QUALITY SCORE	1	1	2	1	3	1	3		1	3	3	19	10		1.90
Morse & Bennett, 2008	One	One	Two	Purposively	Purposive	Farmers who had switched	100	Previous year	No	No	No- not in relation to the data used in the SR				
QUALITY SCORE	1	1	2	1	1	2	3		1	1	1	14	10		1.40
Narayanamoorthy & Kalamkar, 2006	One	One state	One	Purposively	Purposive	Adopters and non-adopters	150	Only current year	Yes	No					
QUALITY SCORE	1	1	1	1	1	1	3		3	3	1	16	10		1.60
Peshin et al, 2007	One	3 districts	One	Purposively	Purposive	Adopters and non-adopters	210	Only current year	No	No					
QUALITY SCORE	1	3	1	1	1	1	3		3	1	1	16	10		1.60
Ramasundaram et al, 2007	One	Two districts	Two	Purposively	Random	Adopters and non-adopters	106	Only current year	No	No					
QUALITY SCORE	1	2	2	1	3	1	3		3	1	1	18	10		1.80
Sadashivappa & Qaim, 2009	One	Four states, 10 districts, 58 villages	Three years	Districts and villages selected randomly	Stratified random sampling	Adopters and non-adopters; and farmers growing both	1124	Only current year	Yes	No					
QUALITY SCORE	1	3	3	3	3	1.5	3		3	3	1	24.5	10		2.45
Skevas et al, 2010	One	One region	One	Purposively	Purposively	Farmers growing both	5	Only current year	No	No					
QUALITY SCORE	1	1	1	1	1	3	1		3	1	1	14	10		1.40
Tripp, 2009	Eight	N/a	One	Countries were not randomly selected	N/a	N/a	N/a	N/a	No	N/a					
QUALITY SCORE	3		1	1						1		6	4		1.50
Wang et al, 2008	One	5 provinces, 10 counties, 20 villages	One	Stratified random sampling	Stratified random sample	Adopters and non-adopters	481	Only current year	Yes	No					
QUALITY SCORE	1	3	1	3	3	1	3		3	3	1	22	10		2.20
Wossink & Denaux, 2006	One	One state	One	Purposively	Not clear whether farms were randomly selected	Compares GM fields with non-GM fields but not clear when or whether these are within farm or on different farms	208 fields not farmers	Only current year	Yes	Yes					
QUALITY SCORE	1	1	1	1	1		3		3	3	3	16	8		2.00
Yorobe & Quicoy, 2006	One	Four	One	Purposively	Randomly	Adopters and non-	470	Only current	Yes	Yes					

2006		provinces			sampled	adopters		year							
QUALITY SCORE	1	3	1	1	3	1	3	3	3	3	3	22	10	2.20	
Zambrano et al, 2009	One	Three 'departments'	One	Purposively	Randomly sampled	Adopters and non-adopters	364	Only current year	Yes	Yes					
QUALITY SCORE	1	3	1	1	3	1	3	3	3	3	3	22	10	2.20	

Appendix three: Articles not obtainable for inclusion in the review

AUTHOR(S)	DATE OF PUBLICATION	ARTICLE TITLE	PUBLICATION	ISSUE	NUMBER	START PAGE	END PAGE
Anon	2007	Returns and economics of Bt cotton vis-a-vis traditional cotton varieties in the state of Maharashtra in India	Agricultural Situation in India	64	6	257	260
Changule RB; Asmatoddin M; Thite AD; Patil HN;	2010	Profitability of Bt cotton production in Marathwada region	International Journal of Commerce and Business Management	3	1	29	33
Pawar DB; Pawar BR;	2008	Profitability of Bt cotton production	International Journal of Agricultural Sciences	4	1	270	273
Rajput HD; Chinchmalatpure UR; Girase CP	2010	Economic impact of Bt cotton technology on cotton growers of North Maharashtra	Journal of Maharashtra Agricultural Universities	35	3	462	463