

有機與健康

台灣大學農藝學系
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REVIEW

Annals of Internal Medicine

Are Organic Foods Safer or Healthier Than Conventional Alternatives?

A Systematic Review

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Background: The health benefits of organic foods are unclear.

Purpose: To review evidence comparing the health effects of organic and conventional foods.

the estimate for phosphorus; phosphorus levels were significantly higher than in conventional produce, although this difference is not clinically significant. The risk for contamination with detectable pesticide residues was lower among organic than conventional produce

Between 1997 and 2010, U.S. sales of organic foods increased from \$3.6 to \$26.7 billion (1, 2). Although prices vary, consumers can pay up to twice as much for organic than conventional foods (3-5).

Organic certification requirements and farming practices vary worldwide, but organic foods are generally grown without synthetic pesticides or fertilizers or routine use of antibiotics or growth hormones (6, 7). Organic livestock are fed organically produced feed that is free of pesticides and animal byproducts and are provided access to the outdoors, direct sunlight, fresh air, and freedom of movement (7). In addition, organic regulations typically require that organic foods are processed without irradiation or chemical food additives and are not grown from genetically modified organisms (6, 8). The International Federation of Organic Agriculture Movement endorses the principles of "health, ecology, fairness, and care" (9).

Consumers purchase organic foods for different reasons, including concerns about the effects of conventional farming practices on the environment, human health, and animal welfare and perceptions that organic foods are safer than their conventional alternatives (2, 10-13).

The purpose of this study is to comprehensively synthesize the published literature on the health, nutritional, and safety characteristics of organic and conventional foods. Previous reviews comparing the nutritional content of organic and conventional foods have summarized studies narratively (13-18), reported differences in nutrient levels without assessing the statistical significance of those differences or weighting outcomes by sample size (19-22), or considered only harms (23).

METHODS

Data Sources and Searches

We used a professional librarian, we developed search strategies for 7 databases: MEDLINE (January 1966 to May 2010), EMBASE, CAB Direct, Agricola, TOXNET, and Cochrane Library (January 1966 to May 2009) with such terms as organic, vegetable, fruit, and beef (Supple-

See also:
Web-Only
Supplement

1000 | 2012 American College of Physicians

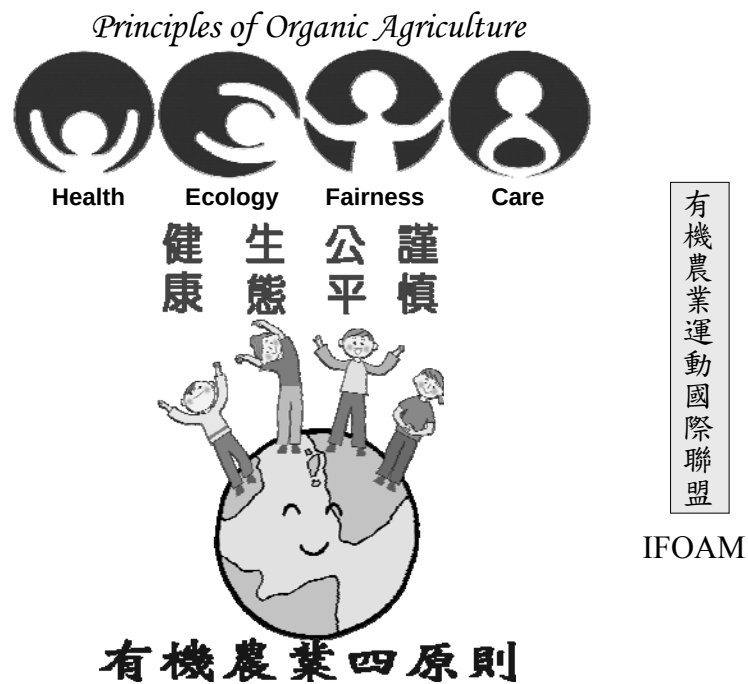
The evidence does not suggest **marked** health benefits from consuming organic versus conventional foods, although organic produce may reduce exposure to pesticide residues and organic chicken and pork may reduce exposure to antibiotic-resistant bacteria.

Ann Intern Med. 2012;157:348-366.



慣行 vs 有機 何者健康？





有機農業的原則

IFOAM 有機農業運動國際聯盟

健康

有機農業維護並且增進土壤、植物、動物、人類、以及地球之間作為不可分割，同為一體之健康。

生態

有機農業乃是基於生態系統及其循環，其操作需要仰賴、學習、以及維護生態循環的生產體系。

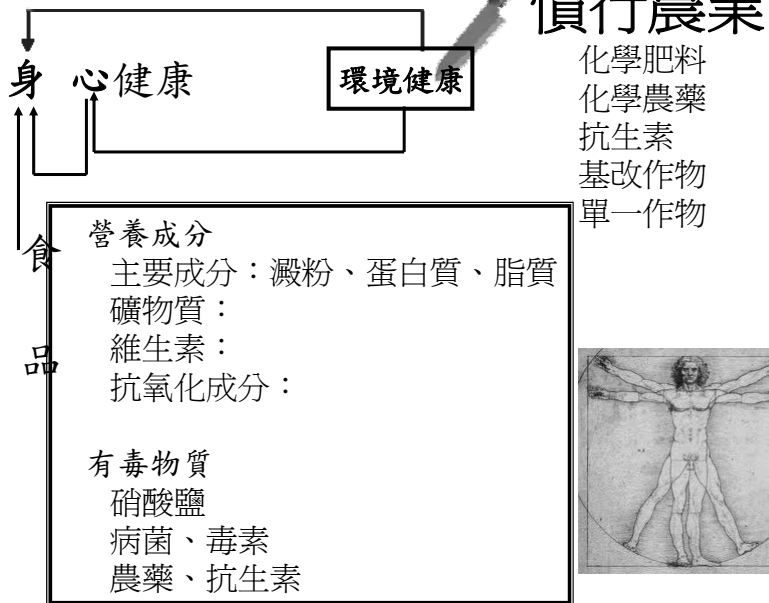
公平

有機農業的運作需要建立各種關係，以確保各類環境與生命機會的公平。

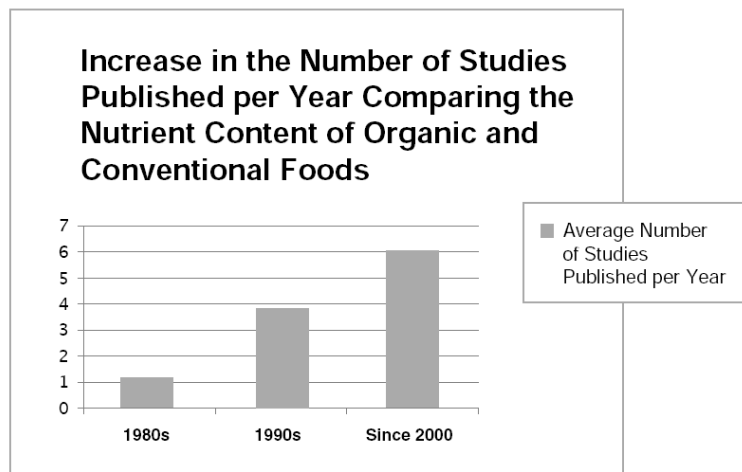
謹慎

有機農業的運作需要採取預警的以及負責的態度，來保護環境與今生來世人類的健康與福祉。

何謂健康？

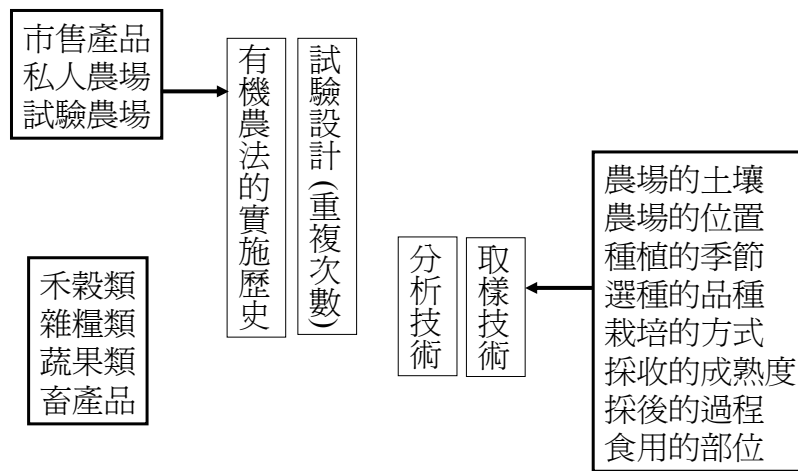


有機產品的成分與營養



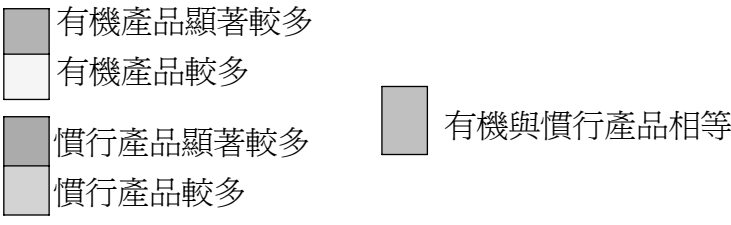
研究報告越來越多

研究的複雜程度

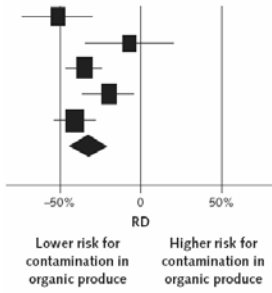


2008 ①	Benbrook et al., New evidence confirms nutritional superiority of plant-based organic foods. <i>The Organic Center</i> , pp. 53. (美國，農業科學)
2009 ①	Dangour et al., Nutritional quality of organic foods: a systematic review. <i>American Journal of Clinical Nutrition</i> 90: 680-685. (英國，營養學)
2010 ②	Lima & Vianello Review on the main differences between organic and conventional plant-based foods. <i>International Journal of Food Science & Technology</i> 46: 1-13. (巴西，生化)
2011 ②	Huber et al., Organic food and impact on human health: assessing the status quo and prospects of research. <i>NJAS—Wageningen Journal of Life Sciences</i> . 58:103-109. (荷蘭，營養學)
2011 ③	Lairon, D. Nutritional Quality and Safety of Organic Food. <i>Sustainable Agriculture</i> 2: 99-110. (法國，營養學)
2011 ④	Hunter et al., Evaluation of the micronutrient composition of plant foods produced by organic and conventional agricultural methods. <i>Critical Reviews in Food Science and Nutrition</i> 51: 571-582. (澳洲，分子生物學)
2011 ⑤	Palupi et al., Comparison of nutritional quality between conventional and organic dairy products: a meta-analysis. <i>Journal of the Science of Food and Agriculture</i> . DOI 10.1002/jsfa.5639 (德國，食品學)
2012 ③	Smith-Spangler et al., Are organic foods safer or healthier than conventional alternatives. <i>Annals of Internal Medicine</i> 157: 348-366. (美國，醫學)

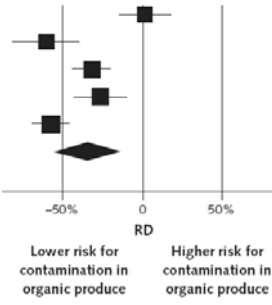
	1	2	3	4	5	1	2	3
鎘								
硝酸鹽								
嘔吐毒素								
其他毒素								
病菌								
抗抗生素菌								**
農藥								
抗生素/賀爾蒙								
多胺								



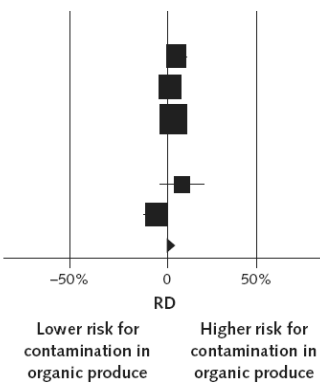
≥3 Antibiotics



Ampicillin



大腸桿菌



RD risk differences

	1	2	3	4	5	1	2	3
總抗氧化能力								
總酚類								
槲皮素Quercetin								
山奈酚Kaempfero								
水楊酸								
總維他命								
維他命C								
維他命A (Carotene)								
維他命 E								
磷								
鈣								
鎂								
鐵								
不飽和脂肪酸/Omega 3					**			**
蛋白質					**			

有機作物產品在硝酸鹽、農藥殘留上較安全

有機作物產品在多酚、磷的含量較高

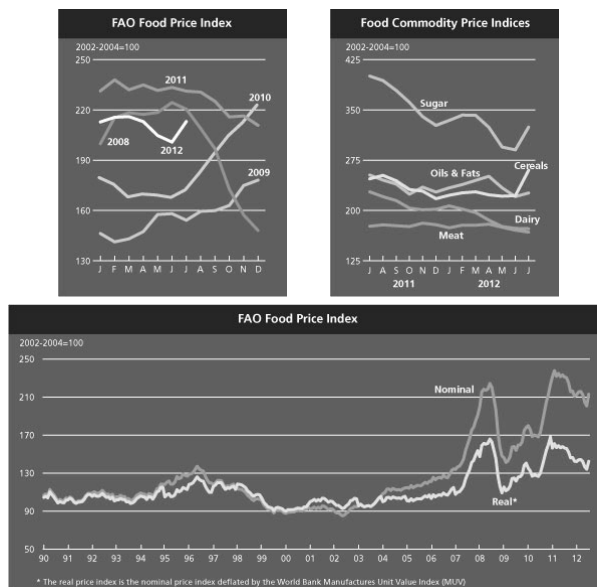
有機作物產品在其他營養成份上或許略高

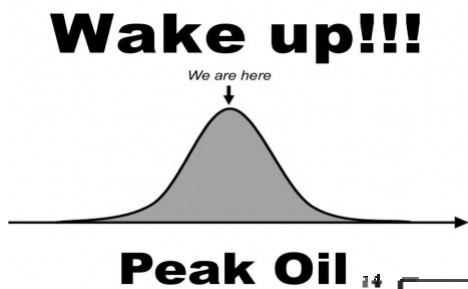
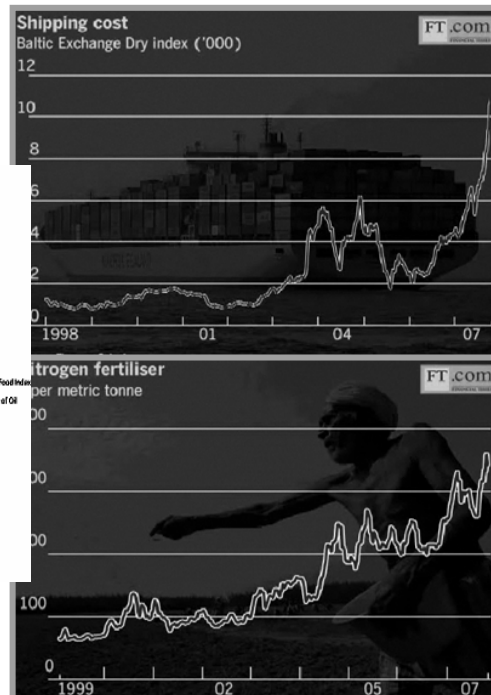
有機畜產品抗生素較少、優質脂肪酸較多

有機不只是益健康

有機更是攸關生存

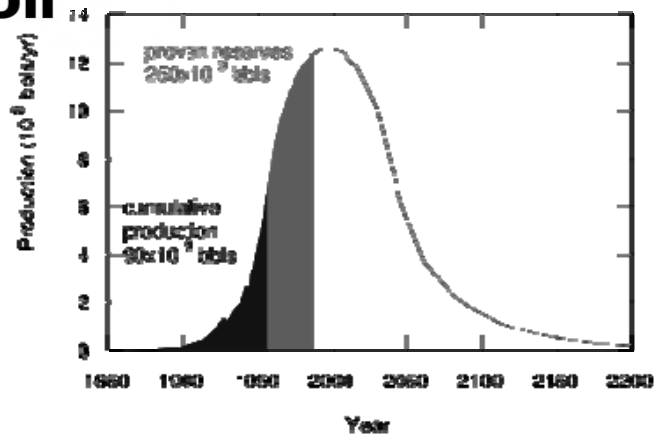
FAO Food Price Index ~2012/07

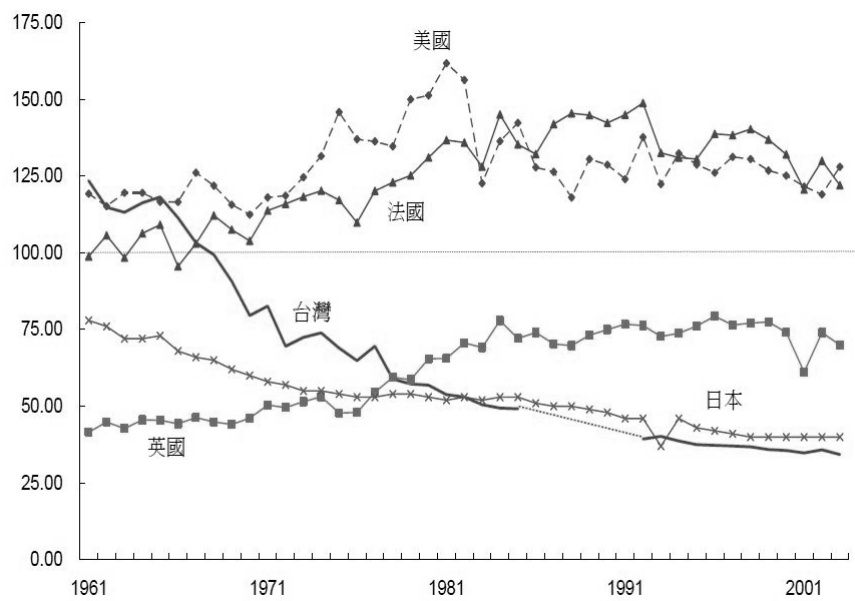




富國家也難以倖免

石油供應已開始減少





<http://www.safegreenfood.com.tw/>

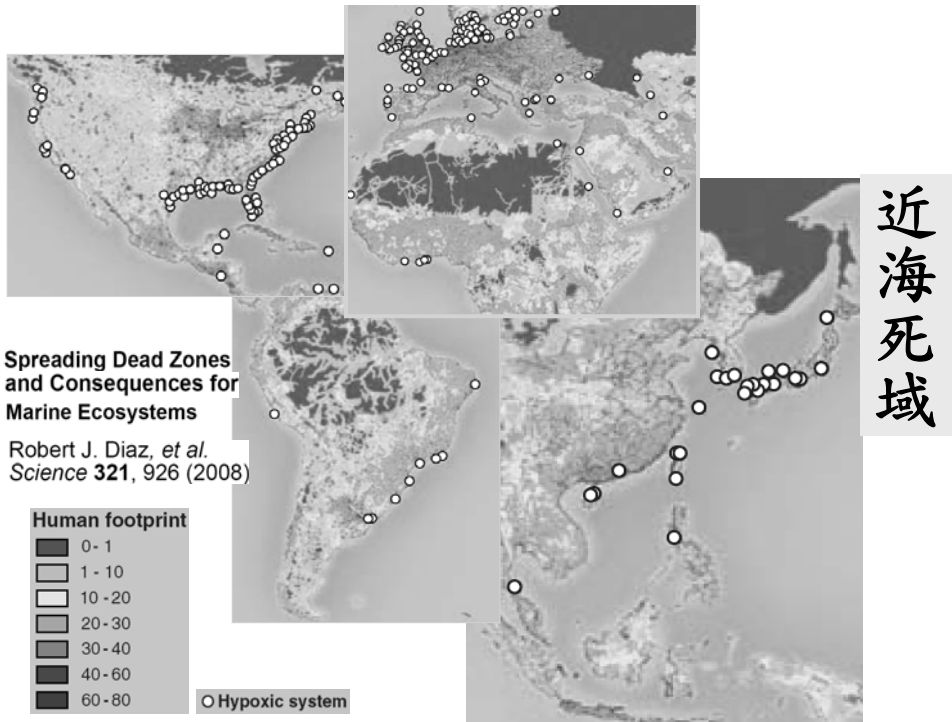


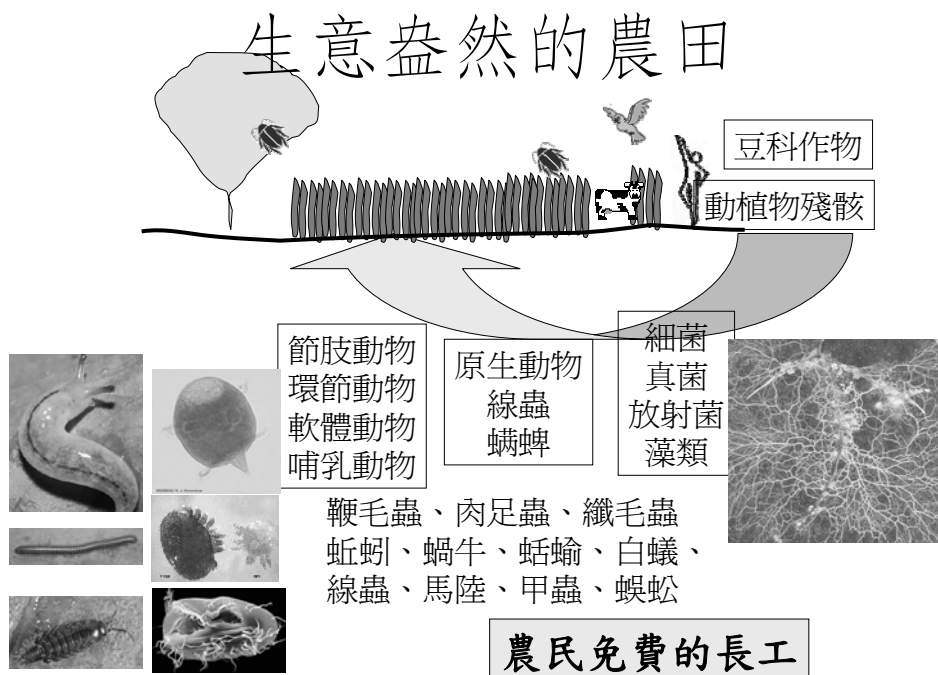
<http://www.safegreenfood.com.tw/>

加護病房式的農業



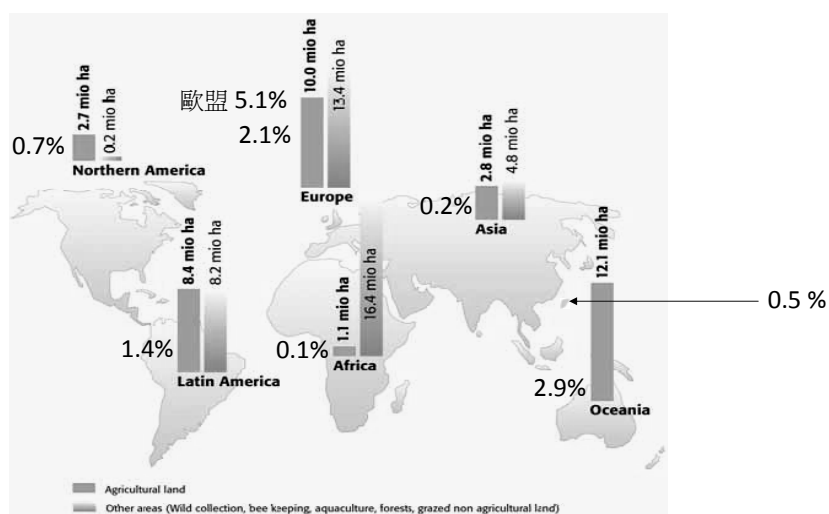
化學肥料管
化學農藥管





各洲有機農地面積佔耕地面積的百分比

- 目前約有110個國家實施有機農業且持續增長中。



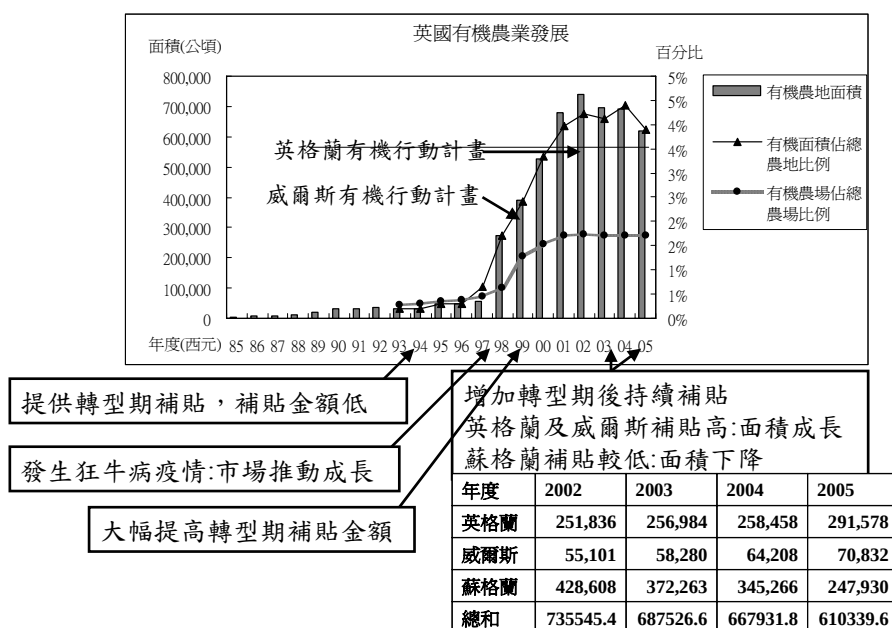
2010 Organic area / total agricultural area = 0.9%

觀念難以改變



最不相信有機農業的人

1. 老農
2. 農藥與肥料企業
3. 農委會官員
4. 農學院教授



農民轉型作有機

政策轉型挺有機



政策轉型

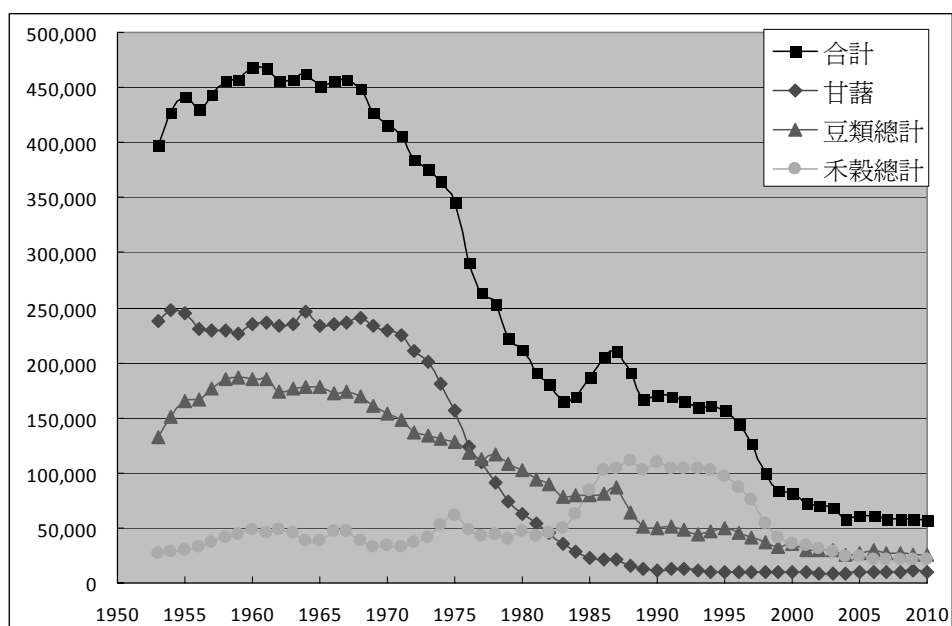
有機雜糧救國論

農業休耕導致農業生產體系的斷層，必須恢復耕作

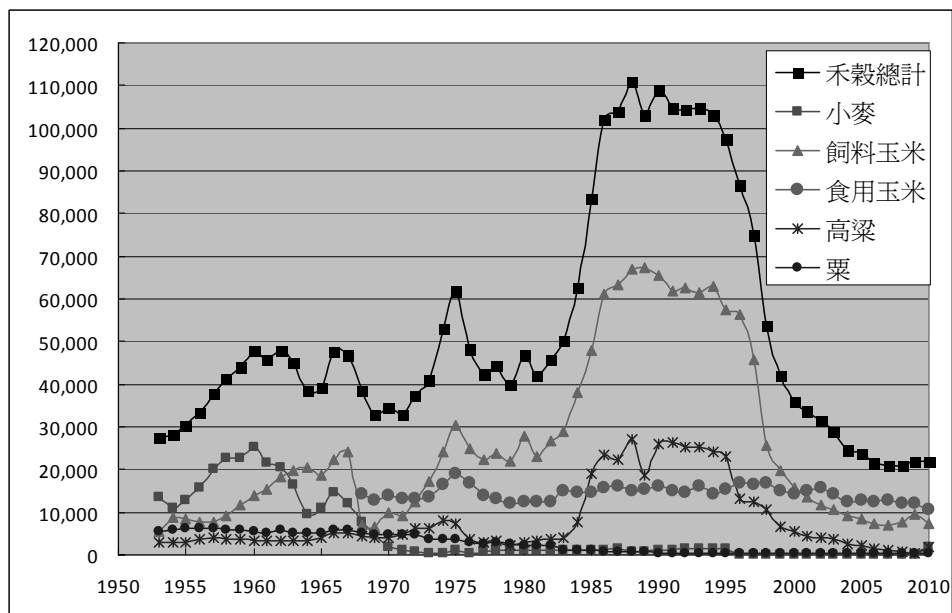
雜糧是進口的大宗農產品，提高耕作面積不會導致生產過剩

只有以有機/友善環境農法生產雜糧，配合環境補貼政策，農民才可能種得下去，農地才可能恢復生產力

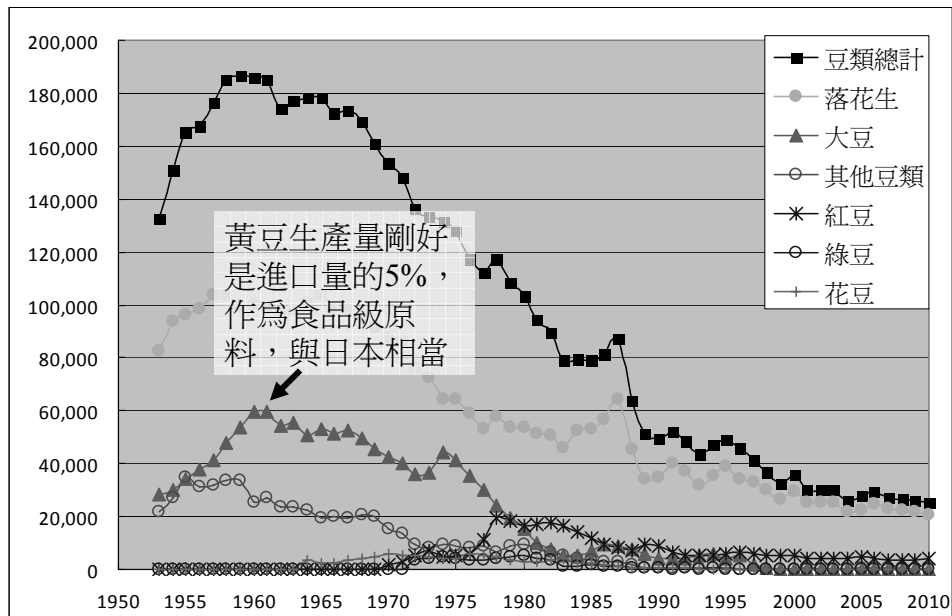
主要雜糧收穫面積(公頃)



禾穀雜糧收穫面積(公頃)



豆類雜糧收穫面積(公頃)



FIN

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種子研究室

<http://seed.agron.ntu.edu.tw>