

# DOA BELAJAR

رَضِيتُ بِاللَّهِ رَبًّا وَبِالْإِسْلَامِ دِينًا وَبِمُحَمَّدٍ نَبِيًّا وَرَسُولًا  
رَبِّي زِدْنِي عِلْمًا وَارزُقْنِي فَهْمًا

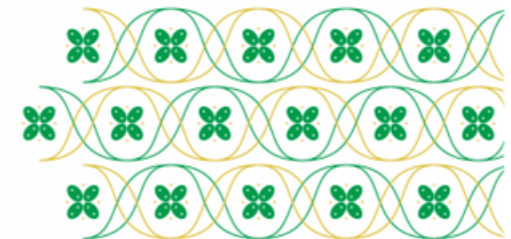
“Kami ridho Allah SWT sebagai Tuhanku, Islam sebagai agamaku,  
dan Nabi Muhammad sebagai Nabi dan Rasul, Ya Allah,  
tambahkan kepadaku ilmu dan berikanlah aku kefahaman”



# Social issue of biotechnology

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- In determining the ethics of biotechnology, one must consider: the distribution of winners and losers, who owns and controls the technology; food safety and the consumer acceptance; and the impact on the environment.
- Plant biotechnology includes all efforts over the past 6000 years to select seeds in order to improve yield or quality or to reduce susceptibility to diseases or environmental risks.
- Through traditional selection and breeding, plant scientists have created highly efficient and effective plant products that form the basis for the world's food supply



- Traditional breeding, however, is limited because it ultimately depends on selecting for traits at the level of the whole organism level and attempting natural reproduction, which can occur only within or between close species.
- As we know, there is almost no rejection to products from traditional biotechnology, people accept all that. But, it's different reaction with modern biotechnology products.
- The fundamental difference between traditional and modern biotechnology is that the new technologies allow breeders to work at the molecular level



- Many date the beginning of modern biotechnology from 1970, when for the first time DNA, often called the “blueprint of life,” was moved between unrelated organisms.
- A large number of the techniques since developed such as maps of the genome and marker-assisted breeding are used by conventional plant breeders to selectively enhance their breeding efforts.
- But it's different from traditional breeding because in this era, DNA technology was used for increasing quality and quantity of products. People can accept this technology.



- Transgenic biotechnology, the third and most controversial approach, involves technologies that enable scientists to isolate, multiply, insert, and activate genes from unrelated species, thereby changing the molecular makeup of the host organism.
- This last is what is commonly understood by the term genetically modified (GM) as applied to plants.
- The introduction of genetically modified (GM) crops into the environment and the food chain has become highly controversial in the United Kingdom (UK), parts of Europe and in other parts of the world.



- The genetic modification of plants involves transferring DNA (deoxyribonucleic acid), the genetic material, from a plant or bacterium, or even an animal, into a different plant species.
- Because we can increasingly identify which gene or genes determine particular characteristics, the appropriate genes can now be inserted directly into the plants we wish to modify.
- Although techniques required to create GM crops are recent and relatively sophisticated, genetic modification is in most respects an extension of what has been happening for ten thousand years.

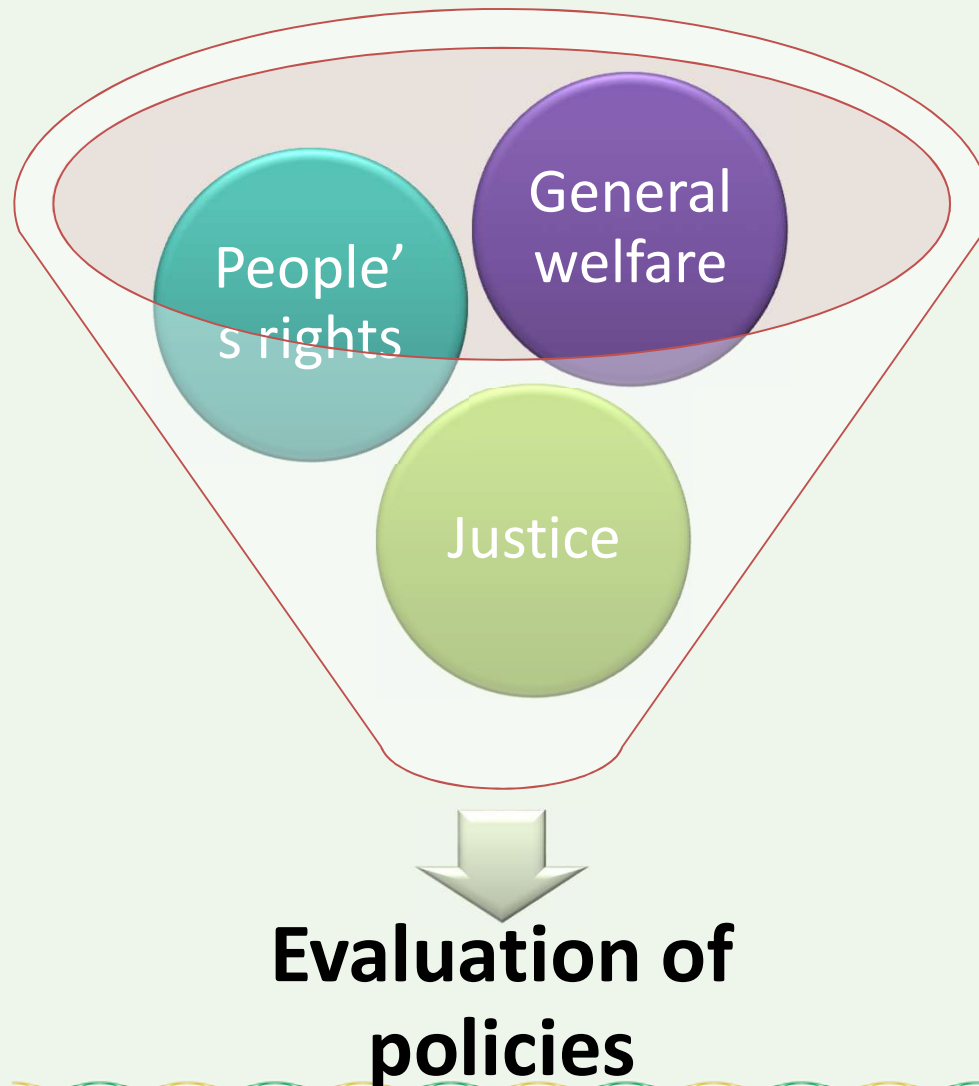


- There are three main types of principle that are relevant to the evaluation of policies or practices, include transgenic products.
  1. The first principle is a principle of *general welfare* which enjoins governments (and other powerful institutions) to promote and protect the interests of citizens.
  2. The second is the maintenance of people's *rights*, for example their rights to freedom of choice as consumers.
  3. The third is the principle of *justice*, and it requires the burdens and benefits of policies and practices to be fairly shared among those who are affected by them.





# Evaluation of policies



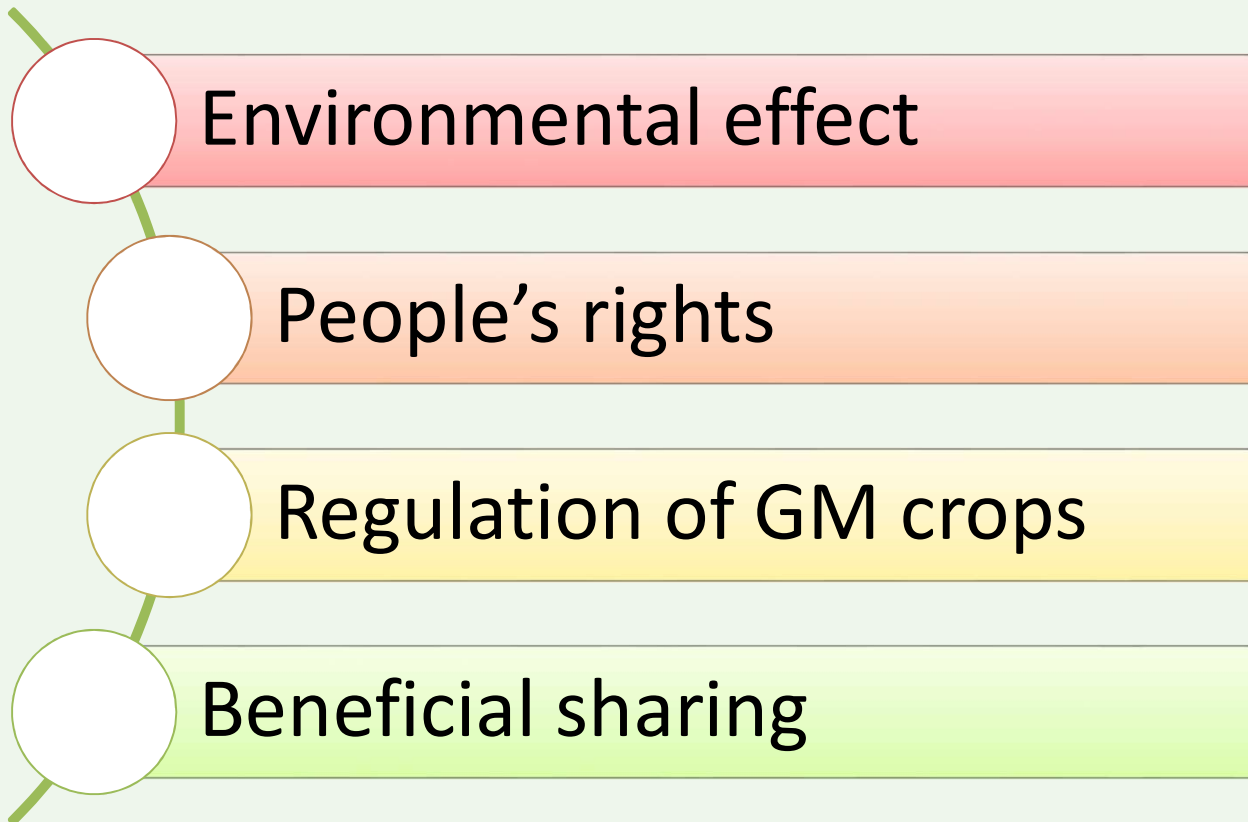
- Three main types of principle that are relevant to the evaluation of policies or practices

- Many issues that develop in the community related to GM crops. These issues can be divided into 4 questions:
  1. Will the technology promote the general welfare by making for improved food safety or reducing the use of chemical pesticides in agriculture? Or does the technology pose unknown risks for consumers and the environment that we would be wise not to run if we are concerned about the general welfare?
  2. What implications does the technology have for the rights of consumers, for example the right to be informed about the food one is eating?



3. What implications does it have for the rights of scientists to be free to conduct their research in ways that protect their intellectual integrity?
4. Who will be the principal beneficiaries from the introduction of the new technologies and what obligations do they have to compensate the losers?

- There are 4 basic issues that arise in society if we conclude that question:



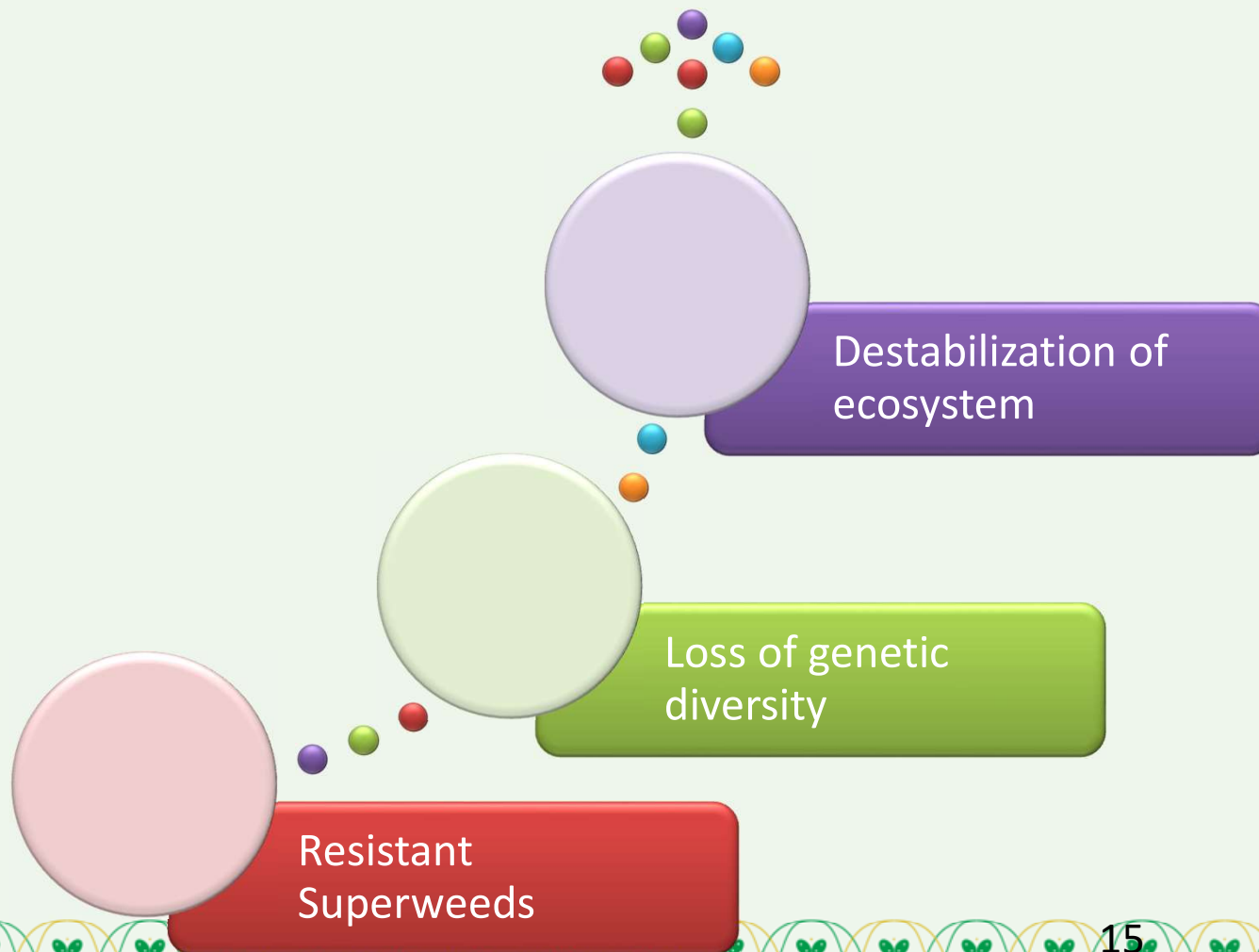
- One of the major concerns about introducing GM crop varieties is the uncertain impact on the environment.
- One of the potential problems is that the novel gene might be unintentionally transferred by pollination to other plants, including weeds and also wild relatives of the crop species.
- There are fears that such transfers could lead to the development of resistant “superweeds”, loss of genetic diversity within crop species, and possibly even the destabilization of some ecosystems.



- Environmentalists argue that the toxin of GM crops might unintentionally be taken up by non-targeted organisms, which might destroy populations of benign insect species.
- However, it is clear that some of the feared impacts are likely to be ecosystem-specific.
- As a result, field trial results in one country or ecosystem may not provide conclusive evidence of environmental safety for other countries or ecosystems.
- In-depth research on specific ecosystems could provide answers to these questions.



- Environmental effect of GM crops



- Concerns have also been expressed about the risks to human health of food products derived from genetically modified crops.
- This is particularly the case where novel genes have been transferred to crops from organisms that are not normally used in food or animal feed products.
- Many people who oppose genetic engineering suggest that this might lead to the introduction of previously unknown allergens into the food chain.
- Logically, the allergen was specifically tested for during the development process, and as a result of the positive results, the product was never developed for commercial use.





- One of the fear about food safety is the possible production of toxic compounds resulting from genetic modification.
- Many scientists argue, however, that by introducing one, or a very few, welldefined genes into a crop, toxicity testing is actually easier for GM crops.
- In traditional breeding, entire genomes, or parts of chromosomes are transferred, and this often requires a lengthy breeding process to remove undesirable genes from the variety being developed.



- Another concern for food safety is the use of antibiotic resistance genes as “markers” in the genetic transformation process.
- Some of the antibiotics used for this purpose are still used to treat human illnesses, and there is concern that resistance to the antibiotics could be transferred to humans and animals through food and feed products.
- However, no evidence of this has so far emerged, and scientists have now developed techniques to remove these “marker” genes before crops are developed for commercial use.



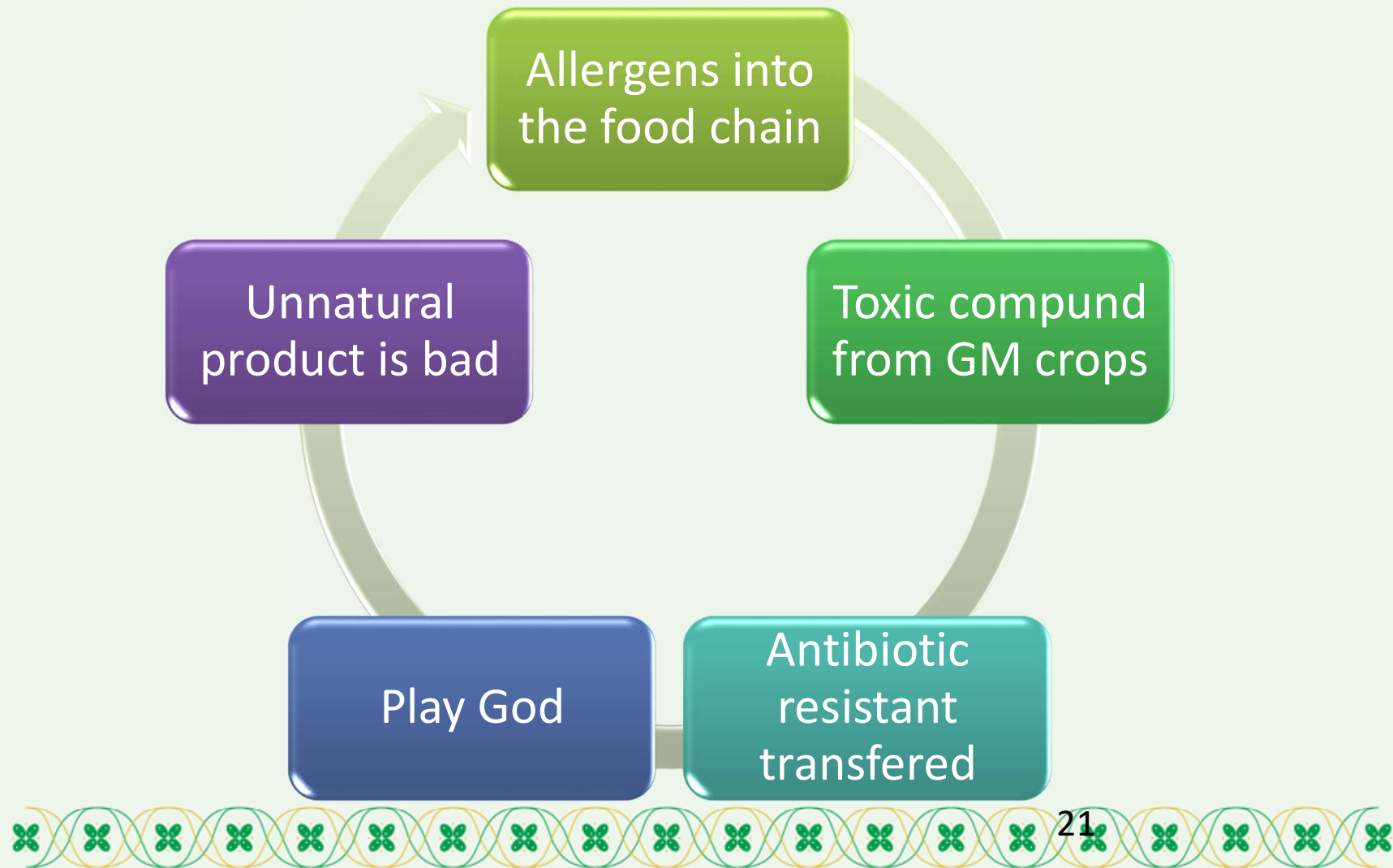
- The religious people believe that God created a perfect, natural order and to manipulate DNA and to cross species boundaries, as is done in genetic engineering (GE) , is to 'play God' and therefore wrong.
- However, not all religious believers have this view of creation; many accept that species have changed in evolution and recognize continued interference is reasonable.
- Others claim that man, in acting out God's purpose, should be a steward of nature and as such, should not interfere with nature via GE, whereas others feel man is part of nature and in carrying out GE is using gifts given to him by God to adapt to his environment.



- Some individuals take the view that since biotechnology is artificial it is wrong.
- The basis for this view is that all that is natural is good and all that is unnatural is bad.
- In any case, the lack of a clear cut definition of or distinction between natural and unnatural activities places the unnatural viewpoint of biotechnology on a very unsound base.



- People arguments about GM crops



- The release of GM plants into the environment and food chain is subject to regulatory regimes so that products and releases are carefully assessed before approval is given.
- The existing regulatory controls, which have concentrated on the impact of individual cases, have been quite appropriate for the early stages of GM development.
- Now that GM crops and food materials are reaching the marketplace, the Government considers that a broader view of the objectives of public policy needs to be taken.



- Integrated policy stance needed to regulate and measure the broader consequences of the spread of the use of GM plants in the environment and of GM material in food, include:
  1. a broadly-based environmental audit of the likely cumulative impact of GM crops on agricultural practices and the environment;
  2. measures to ensure appropriate labelling of GM and non-GM food and to encourage food producers to produce lines of non-GM food, and retailers to stock them.



- Regulation for GM crops



**Broadly-based  
environmental audit**

**Labelling GM product  
and non GM**



- Pro-biotechnology scientists and firms have pointed out that GM food products have now been on the market for several years, without a single reported case of adverse effects on human health.
- As scientists readily admit, no technology is ever 100 per cent safe.
- Potential risks must be weighed against potential benefits and compared with risks and benefits of traditional agriculture.
- Such risk-benefit analyses should be done at different levels: at a national level, by Governments and regulatory agencies; at production level, by farmers and firms; and at the individual level, by consumers.

- The first group of GM crops introduced mostly yields benefits for commercial farmers and private sector firms.
- For farmers, insect-resistant and herbicide-tolerant crops produce somewhat higher yields and lower costs in respect of chemical inputs, tractor fuel and labour.
- Profits accrue to the firms that developed the seeds. As a result, revenues at national level are boosted.
- Furthermore, potential environmental risks might be offset against the environmental benefits of reduced agrochemical use and more efficient land use.



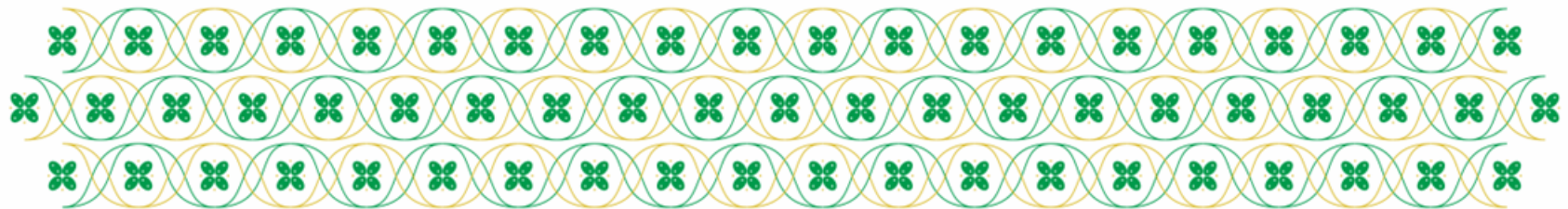
- But for consumers, these early GM crops, food products derived from them, and the perceived benefits are not evident.





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# PENUTUP BELAJAR

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

اللَّهُمَّ أَرِنَا الْحَقَّ حَقًّا وَارْزُقْنَا اتِّبَاعَهُ  
وَأَرِنَا الْبَاطِلَ بَاطِلًا وَارْزُقْنَا  
اجْتِنَابَهُ

Ya Allah Tunjukkanlah kepada kami kebenaran sehingga kami dapat mengikutinya,

Dan tunjukkanlah kepada kami keburukan sehingga kami dapat menjauhinya.

