

FOOD SCIENCE RESEARCH

Purwiyatno Hariyadi

Dept of Food Science & Technology
Faculty of Agricultural Engineering & Technology
Bogor Agricultural University

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Readings

Daryl B. Lund (2002). Food Engineering in the 21st Century. College of Agriculture and Life Sciences, Cornell University, Ithaca, NY

Anonymous. Introduction to Research. Research Methods in Kinesiology ([http://faculty.fullerton.edu/leebrown/KNES 510 Research Methods/01 - Introduction to Research.ppt](http://faculty.fullerton.edu/leebrown/KNES_510_Research_Methods/01_-_Introduction_to_Research.ppt))

Nayda G. Santiago. Scientific Research in Computer Science and Computer Engineering (<http://ece.uprm.edu/~nayda/Courses/grad/Orientation.ppt>).

Jones, C and Jia, X. Research Concepts.
(myemail.tut.edu.tw/~z9501002/file/research.ppt)

Dan berbagai sumber lain dari internet lainnya

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History of Research?

- Humans have been researching since the beginning of time
 - Invention of the wheel
 - Building material
 - Weapons
 - Agriculture
 - Medicine
 - And on and on and on...

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What is Research?

*Research is not a vocation
but a way of living*

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What is Research?

- **Research** is a diligent and **systematic*** inquiry or investigation into a subject in order to discover or revise facts, theories, applications etc.
- **Research** is **systematic** study directed toward fuller scientific knowledge or under-standing of the subjected studied. Research is classified as either basic or applied according to the objectives of the sponsoring agency (National Science Foundations, US).

*having, showing or involving a system, method or plan

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What is Research?

- **Research** is a diligent and **systematic** inquiry or investigation into a subject in order to discover or revise facts, theories, applications etc.
- **Research** is **systematic** study directed toward fuller scientific knowledge or under-standing of the subjected studied.
- The **systematic** part of this activity is what allows us to fly into space, cure diseases, feed the hungry and live fruitful lives
- Through research, we build on the discoveries of those who have investigated before us and often improve their findings

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What is Research?

- Research often results in a synergy or the putting together of two or more ideas to arrive at a new or better solution
- Academic research *could be* reading the works of several scholars about a particular topic and then forming and reporting your own opinion about the same topic

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What is Research?

- The value added is that you have the luxury of reviewing the work of many researchers who may have individually worked only on one facet of a research question
- You get the advantage of seeing the big picture
- You get to put it all together!

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What is Research?

Nature of Research

- **Systematic** – plan, identify, design, collect data, evaluate
- **Logical** – examine procedures to evaluate conclusions
- **Empirical** – decisions are based on data (observation)
- **Reductive** – general relationships are established from data
- **Replicable** – actions are recorded

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What is Research NOT?

- **Research isn't** information gathering:
 - *Gathering information from resources such books or magazines isn't research.*
- **Research isn't** the transportation of facts:
 - *Merely transporting facts from one resource to another doesn't constitute research.*
 - *Paraphrasing or rearranging the work of others*
 - *Cutting and pasting the work of others*

- **No contribution to new knowledge** (although it might make existing knowledge more accessible).
- There is no room for it in academia
- Beware of **PLAGIARISM**

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What is Research NOT?

What is Plagiarism?

- Presenting as one's own the ideas, words, or products of another
- “Kidnapping” the work of another
- Plagiarism includes use of any source to complete academic assignments without proper acknowledgement of the source

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What is Research NOT?

Plagiarism is Costly: **destructing scientific community**

The cost of plagiarism (for students):

- A failing grade on an assignment
- A failing grade for the course
- Suspension from the university
- “Drop Out” from the university

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What is Research NOT?

Plagiarism is Costly: **destructing scientific community**

- **Plagiarism is stealing**
 - Robs an author or researcher of money, respect and prestige in his or her industry for work honestly performed
- **Plagiarism steals from you**
 - You do not learn → so you lose
 - You do not practice research skills → so you lose out on training your mind to think and organize

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What is Research NOT?

Plagiarism is Costly: **destructing scientific community**

The screenshot shows a news article on Kompas.com. The title is "Profesor HI Unpar Diduga Lakukan Plagiat". The author is Yuhianus Harjono. The article text includes a disclaimer: "BANDUNG, KOMPAS.com — Guru besar Jurusan Hubungan Internasional Universitas Katolik Parahyangan, Anak Agung Banyu Perwita (43), diduga melakukan serangkaian tindakan plagiat di artikel-artikel harian nasional. Kabar ini terkuak dari keterangan (disclaimer) editorial kolom Opini Harian The Jakarta Post yang ditulis pada 4 Februari lalu. Dalam disclaimer ini disebutkan bahwa artikel Banyu Perwita berjudul 'Ri as A New Middle Power'." The article was published on 9 February 2010 at 17:54 WIB. There are 92 views and 0 comments. A cartoon illustration of a head with gears and text is also present.

<http://edukasi.kompas.com/read/2010/02/09/17044541/Profesor.HI.Unpar.Diduga.Lakukan.Plagiat>

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What is Research NOT?

Plagiarism is Costly: **destructing scientific cummunity**



Universitas Negeri Makassar

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Center of Education, Research, Science, Techn

PROFIL

- Beranda
- Pimpinan Universitas
- Struktur Organisasi
- Visi Misi
- Sejarah
- Fasilitas

Deteksi Plagiat, PPs UNM Gaet Perusahaan Hongkong

KAMIS, 14 FEBRUARI 2013 11:57 HUMAD - ANDI AZHAR HTS: 636

Keseruan mencegah tindakan plagiat dalam penyusunan tesis dan disertasi mahasiswa bakal diwujudkan oleh Program Pascasarjana Universitas Negeri Makassar (PPs UNM). Tak tanggung tanggung pihak PPs UNM menggaet perusahaan pembuat software anti plagiat dari Hongkong, I Paradigms.

Instruktur I Paradigms cabang Jakarta, Treesia telah melakukan kunjungan dan mempresentasikan software yang telah dirancang sejak 1996 lalu tersebut dihadapan sejumlah pejabat PPs UNM, baru-

PRESTA

- FK - N
- Tanggal 2013
- FPSI - Juara 1
- FE - M UNM E
- NAC S
- Mabac

<http://www.unm.ac.id/component/content/article/31-kabar-pendidikan/424-deteksi-plagiat-pps-unm-gaet-perusahaan-hongkong.html>

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What is Research NOT?

Plagiarism is Costly: **destructing scientific cummunity**

Tersandung Skanda **Plagiarisme**, Menteri Pendidikan Jerman Mundur

Sabtu, 09 Februari 2013, 21:54 WIB

<http://www.republika.co.id/berita/internasional/global/13/02/09/mhyk2q-tersandung-dandal-plagiarisme-menteri-pendidikan-jerman-mundur>



Menteri Pendidikan Jerman Annette Schavan mengundurkan diri.

A+ | Reset | A-

REPUBLIKA.CO.ID, BERLIN -- Kanselir Jerman Angela Merkel mengalami pukulan politik besar karena menteri pendidikan yang merupakan sekutu dekatnya mengundurkan diri pada Sabtu (9/2) atas dugaan plagiat.

Merkel mengatakan, ia menerima pengunduran diri Annette Schavan dengan "berat hati" setelah bekas universitasnya mencopot gelar doktor (PhD) menteri itu, dan menyatakan Schavan mencontek tanpa menyebutkan sumber-sumbernya (plagiarism) di bagian-bagian dari disertasinya "Person and Conscience" 33 tahun lalu.

Schavan berulano-ulano mengatakan tekadnya untuk melawan tuduhan-

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What is Research NOT?

Plagiarism is Costly: destructing scientific cummunity

KOMPAS.com agus suharyono mengomentari artikel Golkar Lirik Jokowi untuk Dangingsi Ical -

Presiden Hongaria Mundur karena Kasus Plagiat

<http://www.nasional.kompas.com/read/2012/04/03/07454695/Presiden.Hongaria.Mundur.karena.Kasus.Plagiat>

Selasa, 3 April 2012 | 07:45 WIB

331 people like this. Be the first of your friends.



Presiden Hongaria Pal Schmitt dalam konferensi pers di Istana presiden di Budapest pada 22 Maret 2012. Gelar doktor Schmitt dicabut karena sebagian besar karyanya merupakan plagiat.

BUDAPEST, KOMPAS.com — Presiden Hongaria Pal Schmitt meletakkan jabatan pada Senin (2/4/2012) setelah gelar doktornya pada 1992 dicabut sesudah adanya pernyataan ia menjiplak sebagian dan disertai sebesar 200 halaman.

TERKAIT:
- Ditubuh Plagiator, Presiden Hongaria Diminta Mundur

"Berdasarkan undang-undang, presiden harus mewakili persatuan rakyat Hongaria. Sayangnya, saya telah menjadi lambang perpecahan, saya merasa menjadi tugas saya untuk melepaskan jabatan

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What is Research NOT?

Plagiarism is Costly: destructing scientific cummunity

→ SO??

KOMPAS, JUMAT, 13 MEI 2011

Hentikan Plagiat di Perguruan Tinggi

Sejumlah Perguruan Tinggi Membuat Komitmen Bersama

JAKARTA, KOMPAS — Sejumlah perguruan tinggi negeri dan swasta membuat komitmen bersama untuk tidak melakukan kegiatan mencontek dan plagiat di kampus. Sudah saatnya perguruan tinggi menjunjung tinggi norma dan budaya akademik serta nilai-nilai kejujuran.

Komitmen bersama ini dilakukan rektor/pimpinan perguruan tinggi, direktur politeknik, ketua sekolah tinggi, dan koordinator perguruan tinggi swasta yang didukung Direktorat Jenderal Pendidikan Tinggi Kementerian Pendidikan Nasional.

"Harus kita akui, di kampus masih terjadi kegiatan mencontek dan plagiat. Bukan cuma mahasiswa, guru besar juga ada yang melakukan. Karena itu, kejujuran akademik harus kembali ditegakkan," kata Musliar Kasim, Ketua Majelis Rektor Perguruan Tinggi Negeri, Kamis (12/5).

Direktur Jenderal Pendidikan Tinggi Kemdiknas Djoko Santoso mengatakan, kampus bukan hanya bertujuan mencetak lulusan yang cerdas, "Selain kecerdasan, kampus harus mampu berperan dalam mencetak generasi muda yang unggul, bermoral, dan berkarakter baik," ujarnya.

Rochmat Wahab, Rektor Universitas Negeri Yogyakarta, mengatakan, plagiarisme sebagai kejahatan berat di kampus dan harus dihindari, sejak awal sudah disosialisasikan kepada mahasiswa. Imbauan untuk tidak melakukan plagiarisme karya ilmiah mulai dikenalkan sejak masa orientasi mahasiswa baru.

"Kini hukun cuma imbauan. Saat membuat karya ilmiah, dosen dan mahasiswa harus membuat surat pernyataan bahwa karyanya asli bukan hasil plagiat," kata Wahab.

Muhammad Anis, Wakil Rektor Bidang Akademik dan Kemahasiswaan Universitas Indonesia (UI), mengatakan, perguruan tinggi harus membuat aturan tegas dan sanksi bagi pelaku plagiarisme, serta disosialisasikan sejak awal pada semua kalangan.

"Di kampus kami, sudah ada sistem yang terus dikembangkan untuk melawan antimencontek dan plagiarisme. Tapi ujian, mahasiswa harus memahami tata tertib tentang ketentuan tidak mencontek. Jika sejak awal direncanakan mencontek, mahasiswa dapat nilai E untuk semua mata kuliah pada semester tersebut," ujar Anis.

Adapun untuk menghindari plagiarisme mahasiswa dalam menyusun skripsi, UI menerapkan aturan, mahasiswa paling sedikit melakukan 10 kali tatap muka dengan dosen pembimbing. "Setiap pertemuan, apa yang dibahas mahasiswa dan dosen pembimbing itu tercatat secara online," ujarnya. (ELN)

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What is Research NOT?

Recycling

Rehashing material you already know thoroughly or, submitting a paper that you have completed for another course

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Research Characteristics?

1. Originates with a question or problem.
2. Requires clear articulation of a goal.
3. Follows a specific plan or procedure.
4. Often divides main problem into subproblems.
5. Guided by specific problem, question, or hypothesis.
6. Accepts certain critical assumptions.
7. Requires collection and interpretation of data.
8. Cyclical (helical) in nature.

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Research Characteristics?

- ✚ Penelitian = Riset
- ✚ RISET = RESEARCH
- ✚ RISET = RE + SEARCH
- ✚ *there is no guaranteed recipe for success at research*
- ✚ *Research = experiment*

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Research Characteristics?

- Research begins with a problem.
 - This problem need not be Earth-shaking.
- Identifying this problem can actually be the hardest part of research.
- In general, good research projects should:
 - Address an important question.
 - Advance knowledge.

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Research Characteristics?

- The following kinds of projects usually don't make for good research:
 - Self-enlightenment.
 - Comparing data sets.
 - Correlating data sets.
 - Problems with yes / no answers.

GOOD Research Characteristics?

→ 1

1. The scope and limitations of the work to be clearly defined.
2. The process to be clearly explained so that it can be reproduced and verified by other researchers.
3. A thoroughly planned design that is as objective as possible.

GOOD Research Characteristics?

→ 2

4. Highly ethical standards be applied.
5. All limitations be documented.
6. Data be adequately analyzed and explained.
7. All findings be presented unambiguously and all conclusions be justified by sufficient evidence.

WHY Research?

- Ekspresikan ide/pemikiran
 - Inovasi → *the practical applications of knowledge*
 - Berkontribusi pada misi universitas → Lulus
 - Meningkatkan karir/pekerjaan
 - Menjadi anggota aktif masyarakat ilmiah ...
peneliti
- partisipasi pada **daya saing bangsa**

WHY Research?

→ Daya Saing Bangsa ??

Manusia selalu melakukan Penelitian dan menghasilkan penemuan-penemuan untuk mencapai “hal yang lebih baik”, di berbagai bidang :

- Penelitian dan penemuan roda
- Bahan bangunan
- Senjata
- Pertanian
- Obat

Dst ...

WHY Research?

→ Daya Saing Bangsa ??

Knowledge as a Key Factor in Development (WB, 2002)

- The ability of a society to produce, select, adapt, commercialize, and use knowledge is critical for sustained economic growth and improved living standards.
- Knowledge has become the most important factor in economic development.
- (OECD, 1988). on the determinants of growth → “underlying long-term growth rates in OECD economics depend on maintaining and expanding the knowledge base”
- *World Development Report 1998/1999* concurred, stating that “today’s most technologically advanced economies are truly knowledge-based ... creating millions of knowledge-related jobs in an array of disciplines that have emerged overnight”

WHY Research?

→ Daya Saing Bangsa ??

Faktor Penentu Keunggulan Suatu Negara (Hasil evaluasi Bank Dunia (1995) terhadap 150 negara di dunia)

Faktor	Peranan (%)
Innovation	45
Networking	25
Technology	20
Natural Resources	10

WHY Research?

→ Daya Saing Bangsa ??

Program Penelitian yang **baik** akan melahirkan :

- SDM berkualitas
- Pengetahuan Baru
- Produk baru
- Model/Desain (termasuk software) baru
- Publikasi
- Nilai baru

PERLU :
Pemahaman
yg Baik ttg
Penelitian

GOOD Researchers?

→ **Integritas peneliti** : *a commitment to intellectual honesty and personal responsibility for ones action and to a range of practices that characterize the responsible conduct of research,*

- **Intellectual honesty** in proposing, performing, and reporting research
- **Accuracy** in representing contributions to research proposals and reports
- **Fairness** in peer review
- **Collegiality** in scientific interactions, including communications and sharing of resources
- Protection of human subjects;
- Humane care of animals in the conduct of research
- Adherence to the **mutual responsibilities** between investigators and their research teams

RESPONSIBLE CONDUCT OF RESEARCH

www.cise.columbia.edu/nsec/outreach/courses/ethics/zwolenik.ppt

Penelitian ILMU PANGAN ??

Definition of the Field of Study



Food Science is a convenient name used to describe the application of scientific principles to create and maintain a wholesome food supply

(Dept of Food Science & Technology, UC-Davis)

Penelitian ILMU PANGAN ??

Definition of the Field of Study



Food Science is a very applied field, one that requires in-depth knowledge in several disciplines

(Hartel, UW-Madison)

Penelitian ILMU PANGAN ??

Definition of the Field of Study



Food science is the science of food.

Food science is a **multidisciplinary** field that applies disciplines such as chemistry, microbiology, engineering and nutrition to develop new food products and design new processes to improve the safety and quality of foods.

Food scientists use cutting-edge technology to develop new foods, add value to raw food commodities and improve the quality and safety of existing food products.

Penelitian ILMU PANGAN ??

Definition of the Field of Study



Food Science is the **multidisciplinary** study of food and the application of knowledge thus gained to the development of food products and processes, the preservation and storage of foods, and the assurance of food safety and quality.

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Penelitian ILMU PANGAN ??

Definition of the Field of Study



Food Science is the discipline in which the **engineering, biological, and physical** sciences are used to study the nature of foods, the causes of deterioration, the principles underlying food processing, and the improvement of foods for the consuming public.

Food Technology is the application of food science to the selection, preservation, processing, packaging, distribution, and use of safe, nutritious, and wholesome food.

(In practice, the terms food science and food technology are often used interchangeably).

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Penelitian ILMU PANGAN ??

Definition of the Field of Study



Departemen Ilmu dan Teknologi Pangan, Fateta, IPB

Ilmu pangan : ilmu dasar yang menggabungkan prinsip-prinsip ilmu biologi, kimia, fisika dan teknik (*engineering*) yang digunakan mempelajari karakteristik bahan pangan, mekanisme kerusakan dan pencegahannya, serta dasar-dasar pengolahannya.

Teknologi pangan : aplikasi **ilmu pangan** kedalam sistim seleksi, pengawetan, pengolahan, pengemasan, distribusi, dan pemanfaatan bahan pangan yang baik, aman, dan bergizi.

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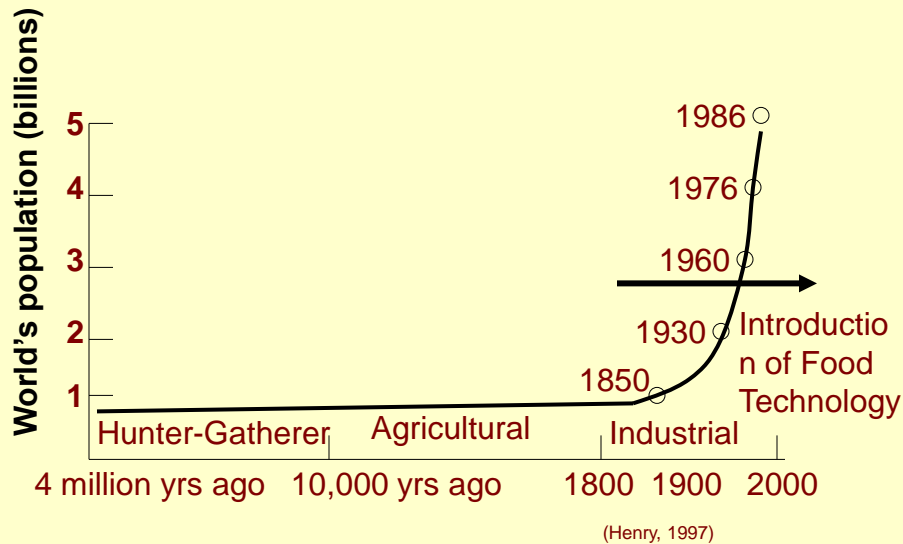
Penelitian ILMU PANGAN ??

- Ten billion by the first quarter of 22nd Century
- Lessons of the 20th century:
 - Science and its application can enhance our ability to produce food
 - Equally important to have the capacity to preserve the food for our use
- Population increases related to increased capacity of man to cultivate and domesticate animals

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Penelitian ILMU PANGAN ??



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Food Science Research

At The USDA-ARS :



- Conducts research on the processing technology, quality and safety of acidified and fermented vegetables (pickles, sauerkraut, peppers) and sweetpotatoes.
- We work with processors and trade organizations throughout the United States to improve the quality and availability of processed vegetable products to consumers in this country and abroad.
- We do research on the safety of acidified foods which assists FDA and state regulatory agencies in performing their responsibilities to protect the safety of the food supply.

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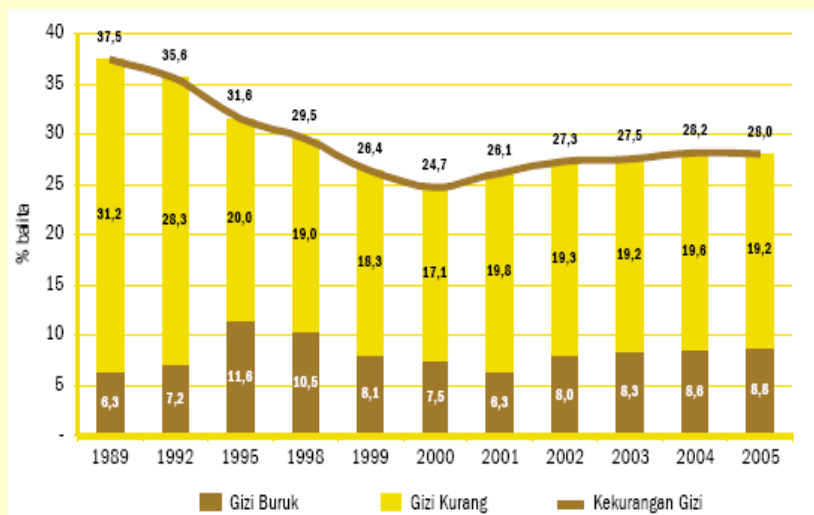
Penelitian ILMU PANGAN ??

- Jumlah penduduk miskin (penduduk yang berada dibawah Garis Kemiskinan) di Indonesia pada bulan Maret 2007 sebesar 37,17 juta atau 16,58 persen dari populasi (BPS (2007)).
- Umumnya 3 x jumlah tersebut beresiko tinggi mengalami kekurangan zat gizi mikro.
- Kekurangan zat gizi mikro akan berakibat pada :
 - Penurunan kemampuan kognitif
 - Meningkatkan kematian Ibu Melahirkan
 - Bayi yang dilahirkan rentan cacat dan penyakit
 - Produktivitas rendah

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Penelitian ILMU PANGAN ??



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- Diskusi?
- Tugas membuat essay pendek ttg :
“Peranan Ilmu Pangan/Bioteknologi dalam Pembangunan di Indonesia”