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KEGIATAN-KEGIATAN PENYELIDIKAN DAN PENYEBARAN MAKLUMAT DI MARDI

Cawangan Penerbitan
Bahagian Perkhidmatan
MARDI

Fungsi

Institut Penyelidikan dan Kemajuan Pertanian Malaysia (MARDI) telah ditubuhkan pada 13 Februari 1969, sebagai sebuah organisasi penyelidikan pertanian yang ulung di negara ini. Penyelidikan yang dijalankan merangkumi semua aspek pertanian yang terdapat di negara ini kecuali getah dan kepala sawit; dan bertujuan memajukan teknik dan teknologi yang bersesuaian dengan kehendak dan keperluan tempatan. Ada dua fungsi penting yang dipikul oleh institut ini iaitu menjalankan penyelidikan dari segi saintifik, teknikal, ekonomi dan sosiologi berhubung dengan pengeluaran, penggunaan dan memproses segala jenis tanaman (kecuali getah dan kelapa sawit), ternakan dan perikanan air tawar; dan sebagai pusat menyebarkan maklumat, nasihat dan hasil penyelidikan melalui penerbitan-penerbitan yang diusahakannya.

Beberapa matlamat telah dijadikan panduan asas oleh MARDI kearah memainkan peranannya sebagai sebuah agensi kerajaan. Umumnya, matlamat MARDI ialah untuk mempergiatkan kegiatan penyelidikan pertanian selaras

dengan faedah teknologi baru agar dapat diterima oleh petani, dengan tujuan meningkatkan hasil dan seterusnya pendapatan sejajar dengan Dasar Ekonomi Baru kerajaan.

Sebagai satu-satunya institut penyelidikan pertanian di negara ini, MARDI juga merupakan pusat pengembangan kepakaran dalam industri pertanian. Dalam hal ini MARDI sentiasa berhubung dengan lain-lain organisasi sama ada swasta atau awam, di dalam atau di luar negeri yang menjalankan penyelidikan pertanian.

Struktur

Untuk menjalankan kegiatannya dengan teratur dan berkesan, MARDI dibahagikan kepada beberapa bahagian tertentu berdasarkan kepada jenis bahan tanaman dan ternakan. Bahagian-bahagian ini pula dipecahkan kepada beberapa cawangan yang berfungsi secara lebih khusus dan mendalam.

Dalam menjalankan berbagai penyelidikan, terdapat empat bahagian yang dikhususkan. Bahagian-bahagian ini ialah Bahagian Pengeluaran Tanaman Semusim, Bahagian Pengeluaran Tanaman Saka, Bahagian Penyelidikan Asas dan Bahagian Pengeluaran Ternakan. Penyelidikan tentang segala aspek pertanian dijalankan dari semasa kesemua oleh bahagian-bahagian tersebut.

Penyelidikan Pertanian

Empat jenis tanaman iaitu padi, tembakau, tanaman ladang (seperti kacang, jagong, ubi kayu dan tebu) dan sayuran diletakkan di bawah Bahagian Pengeluaran Tanaman Semusim. Penyelidikan yang dijalankan adalah bermatlamat meningkatkan pengawalan terhadap serangan musuh dan penyakit. Untuk mencapai hakikat ini pihak MARDI khususnya bahagian ini berusaha mendapatkan benih tanaman yang baik dan bersesuaian dengan keperluan tempatan, memperbaiki cara bertani dan penggunaan baja yang betul dan mempraktikkan teknologi yang boleh mendatangkan hasil maksima dan bermutu tanpa mengeluarkan perbelanjaan yang banyak.

Bahagian Pengeluaran Tanaman Saka menjalankan penyelidikan ke atas tiga kumpulan iaitu koko dan kelapa, buah-buahan dan bahan rempah dan minuman. Kegiatan penyelidikan koko dan kelapa termasuk pemilihan jenis yang sesuai untuk sistem penanaman selingan, memajukan penanaman dengan mendapatkan baka yang baik, menitikberatkan sistem penanaman seperti perlindungan, pengawalan dan kepadatan tanaman.

Penyelidikan buah-buahan diutamakan pada buah-buahan tempatan seperti nenas, gajus, pisang, betek, nangka, durian, mangga, limau, jambu, manggis, rambu-

MPM ialah sebuah buletin setengah tahunan yang diterbitkan oleh Perpustakaan Universiti Pertanian Malaysia. Pandangan dan pendapat penyumbang tidak semestinya mencerminkan pandangan atau pendapat jemaah pengarang. Buletin ini diberi secara percuma atas permintaan. Sila alamatkan semua surat menyurat/pertanyaan kepada: — Ketua Pengarang, Buletin Maklumat Pertanian Malaysia, Perpustakaan, Universiti Pertanian Malaysia, Serdang, Selangor.

Ketua Pengarang: Ibrahim Kassim

Pengarang-pengarang: Kamariah Abdul Hamid; Jamaliah Ahmad; Nor Hajar Abu Bakar.

tan dan ciku. Kegiatan penyelidikan ditumpukan pada cara berladang yang lebih teratur seperti sistem dusun dan pengkhususan dalam perusahaan penanaman buah-buahan yang boleh diproses.

Antara tanaman yang termasuk dalam rancangan penyelidikan bahan rempah dan minuman ialah lada hitam, kopi dan teh. Keutamaan diberikan kepada tiga jenis tanaman ini memandangkan ketiga-tiganya amat penting dalam sektor pertanian di negara masa kini. Kegiatan penyelidikan ditumpukan pada pemilihan dan pembiakan, pemakanan, amalan penanaman dan pengurusan serta pengawalan tanaman itu. Kajian juga dijalankan pada tanaman lain seperti halia dan cengkik.

Penyelidikan mengenai pengeluaran ternakan dijalankan mengikut pengkhususan tertentu. Pengkhususan ini meliputi pengeluaran daging lembu, pengeluaran susu, ternakan ayam itik dan babi, pengeluaran kambing dan biri-biri, pengeluaran ikan air tawar dan juga pemakanan dan punca pemakanan binatang-binatang ternakan ini. Bidang kajian utama yang dijalankan ialah dari segi pembiakan dan pemilihan baka demi meningkatkan hasil, memajukan teknik pengurusan dan sistem pengeluaran dengan melibatkan kos yang rendah, kajian ke atas sumber makanan ternakan dan pemilihan kawasan yang sesuai untuk ternakan ini.

Semua penyelidikan yang dijalankan bertujuan meningkatkan hasil dan sekali gus mutu pengeluaran binatang-binatang ternakan dan hasil-hasil darinya. Di samping berusaha meningkatkan mutu ternakan tempatan, baka dari luar negeri juga dibawa ke negara kita untuk disesuaikan dengan kehendak dan keadaan tempatan. Berdasarkan kepada kejayaan yang telah lalu cara ini sesungguhnya dapat menambahkan lagi hasil pengeluaran selaras dengan peningkatan dalam permintaan dari semasa kesemasa.

Rancangan penyelidikan Bahagian Penyelidikan Asas mengutamakan pengumpulan penerangan dan maklumat asas di samping menyediakan teknik-teknik baru dalam membantu menjayakan rancangan-rancangan penyelidikan pengeluaran tanaman. Penyelidikan sains tanah meliputi penggunaan, kesuburan, penggunaan baja dan lain-lain aspek mengenainya.

Dalam penyelidikan sains tumbuhan, kajian yang lebih mendalam umpamanya dari segi taksonomi dan morfologi, genetik dan sitologi, fisiologi tanaman adalah dijalankan. Kegiatan penyelidikan juga merangkumi pengawalan tanaman, kejuruteraan pertanian dan peng-

urusan air.

Semua aspek penyelidikan ini adalah bertujuan meningkatkan hasil pengeluaran dan memperbaiki mutu tanaman dan ternakan dan sekaligus memperbaiki corak hidup masyarakat petani sejajar dengan dasar ekonomi yang dikehendaki oleh kerajaan. Sebagai agensi kerajaan MARDI bertindak sebagai penyebar maklumat atau hasil penyelidikan yang diperolehi kepada orangramai.

Saluran-Saluran Maklumat

Terdapat berbagai bahan penerbitan diterbitkan oleh MARDI untuk menyampaikan apa saja hasil penyelidikan dan pembaharuan yang sesuai dalam bidang pertanian kepada para petani dan juga organisasi-organisasi serta orang perseorangan yang ada kaitan dengan pertanian.

Menerusi perkhidmatan Perpustakaan yang terdapat di Ibu Pejabat di Serdang di samping di stesen-stesen seperti Bumbong Lima, Kluang dan Hilir Perak; MARDI dapat merapatkan pakar-pakar pertanian bukan sahaja dari dalam negeri, tapi juga dari luar negeri untuk turut sama memainkan peranan meningkatkan mutu pertanian di negara ini serta adanya Unit Perhubungan dan Penerangan. Penyebaran maklumat juga merupakan tugas penting MARDI yang sudah lama dijalankan. Ini terbukti dengan terdapatnya berbagai bentuk bahan bercetak terbitan MARDI seperti *Buletin Penyelidikan*, *Laporan Penyelidikan MARDI*, *Laporan Tahunan*, *Risalah MARDI*, *Berita Penyelidikan* dan lain-lain.

Selain daripada ibu pejabatnya di Serdang, MARDI juga telah menubuhkan cawangan atau stesen di seluruh Semenanjung bertujuan untuk memudahkan dan mempergiatkan lagi peranan dan objektifnya sebagai sebuah organisasi pertanian di negara ini. Dalam menjalankan berbagai penyelidikan, para penyelidik menerima panduan dan nasihat daripada Majlis Sains, supaya tidak terkeluar daripada matlamat asal pertubuhan MARDI. Kini dengan bilangan kakitangan seramai lebih kurang 4,000 orang di Ibu Pejabat di Serdang dan beratus-ratus lagi di stesen-stesen seluruh Semenanjung, MARDI telah berkembang dengan pesatnya. Perkembangan yang dicapai dalam penyelidikan pertanian sesungguhnya telah memberikan perangsang kepada golongan petani untuk melipatgandakan usaha mereka ke arah pembangunan negara khususnya dalam bidang pertanian yang sejak berpuluh-puluh tahun dahulu lagi merupakan salah satu sektor ekonomi utama negara.

IFIS (International food information service): Satu tinjauan ringkas

Kamsiah Mohd. Ali
Perpustakaan Universiti Pertanian Malaysia

Penubuhan dan Objektif IFIS

Dunia maklumat sedang berkembang dengan begitu pesat dalam semua bidang ilmu hingga menyebabkan pakar-pakar dalam satu-satu bidang menghadapi kesukaran untuk mengikuti perkembangan maklumat dalam bidang kepakaran masing-masing. Sistem-sistem Perkhidmatan

Maklumat juga berkembang bilangannya, tiap-tiap satu terhad kepada satu bidang ilmu atau meliputi beberapa bidang ilmu yang berkaitan.

Walaupun ada beberapa organisasi yang memberi Perkhidmatan maklumat dalam bidang Sains & Teknologi Makanan tetapi terdapat satu organisasi, sungguhpun kecil jika dibandingkan dengan Pertubuhan lain tetapi liputan perkara dalam bidang ilmu tersebut dan yang berkaitan adalah lengkap dan menyeluruh. Organisasi yang dimaksudkan itu ialah International Food Information Service (IFIS).

IFIS ditubuhkan pada tahun 1968 oleh sekumpulan Institusi-institusi antarabangsa atas kesedaran betapa pentingnya mengujudkan satu pertubuhan yang boleh

mengendalikan penyebaran maklumat-maklumat dalam bidang Sains & Teknologi makanan di arena antarabangsa. Institusi-institusi berkenaan adalah seperti berikut:

- (1) Institute for Food Technologists (IFI) (Amerika Syarikat)
- (2) Institut für Dokumentationswesen (IDW) dan Zentralstelle für maschinelle Dokumentation (ZMD), yang mana sekarang telah bergabung menggunakan nama Gesellschaft für Information und Dokumentation (GID)
- (3) Commonwealth Agricultural Bureaux (CAB) England.
- (4) Dutch Agricultural Documentation Centre (PUDOC), Belanda, yang memasuki pertubuhan IFIS setahun kemudian.

Objektif utama IFIS pada masa penubuhannya adalah bertujuan mengujudkan satu sistem Perkhidmatan Maklumat dan Abstrak dalam bidang Sains & Teknologi Makanan. Organisasi ini bukan sahaja bertujuan mengumpulkan kesemua maklumat dalam bidang ilmu Sains & Teknologi Makanan dan bidang-bidang ilmu yang berkaitan secara menyeluruh tetapi juga bergiat dalam kerja-kerja abstrak. Penyampaian dan penyebaran maklumat kepada pakar-pakar secara langsung atau tidak langsung dipandang berat oleh IFIS. Cara IFIS menyebarkan maklumat-maklumatnya boleh dibahagikan kepada dua:

(i) melalui jurnal bulanan 'Food Science and Technology Abstracts (FSTA) dengan indeks bulanan pengarang dan perkara serta Indeks Kumulatif tahunan pengarang dan perkara; dan

(ii) dengan menggunakan data asas komputer untuk Perkhidmatan Maklumat Kini (Current Awareness service) dan Penyiasatan kebelakangan (Retrospective Search) bagi perkara-perkara yang tertentu.

Struktur Organisasi

IFIS dikelolakan oleh empat agensi antarabangsa yang bergabung menubuhkan IFIS. Setiap agensi yang bersekutu memainkan peranan yang tertentu dalam pentadbiran IFIS. Kerjasama dan penglibatan Institusi tersebut adalah secara menyeluruh dari segi kewangan dan operasi perkhidmatan.

Jawatankuasa pengurusan IFIS terdiri dari dua perwakilan dari setiap institusi sekutu untuk mentadbir kegiatan perkhidmatannya.

Keempat-empat institusi bersekutu yang memainkan peranan yang tertentu adalah:

1. Commonwealth Agricultural Bureaux, (CAB) melalui cawangannya, Commonwealth Bureau of Dairy Science & Technology di Shinfield, bertanggungjawab di atas keseluruhan aspek redaksi dan pengeluaran 'Food Science & Technology Abstracts (FSTA)'. Tugas ini termasuk memperoleh bahan, membuat abstrak, indeks dan penyuntingan.
2. Institut für Dokumentationswesen di Frankfurt bertanggungjawab di atas percetakan FSTA.
3. Institute of Food Technologist Chicago bertanggungjawab melengkapi FSTA dengan abstrak mengenai paten makanan dari beberapa negara besar dan pemasaran FSTA kepada ahli-ahli.
4. PUDOC di Wageningen Belanda, menyumbang abstrak kepada FSTA melalui satu unit abstrak khas yang ditubuhkan. PUDOC juga memegang jawatan penyari untuk IFIS di National Lending Library dan dipertanggungjawab untuk memajukan FSTA di Eropah.

Perkhidmatan-perkhidmatan IFIS

Sungguhpun IFIS sebuah pertubuhan kecil, memandang ia hanya memproses lebih kurang 18,000 bahan rujukan setahun, tetapi perkhidmatannya bertaraf antarabangsa. Ia bekerjasama dengan berbilang Organisasi dan individu di Britain dan lain-lain negeri. Perkhidmatan-perkhidmatan IFIS adalah seperti berikut:

1. Perkhidmatan utama IFIS adalah melalui terbitan jurnalnya 'Food Science & Technology Abstracts'. Kecepatan jurnal tersebut adalah bulanan dan mengandungi lebih kurang 1,400 abstrak pada tiap-tiap keluaran serta mengandungi indeks perkara berasas kepada 'KWOC' (Key Word Out of Context) indeks. FSTA disusun dalam 19 bahagian, iaitu:—
 - A. Sains Makanan Asas (Kimia, Fisik, Biokimia, Biofizik).
 - B. Mikrobiologi Makanan.
 - C. Ilmu Kesihatan Makanan dan Toksikologi.
 - D. Am — Ekonomi Makanan dan Perangkaan.
 - E. Kejuruteraan Makanan (Peralatan dan Proses).
 - F. Pembungkusan Makanan (Perkakas dan Aturan).
 - G. Teknologi Barangan — Am
(termasuk tulisan mengenai bermacam barangan mengenai makanan yang sudah sedia, makanan sintesis, mutu makanan, dsbnya).
 - H. Minuman yang mengandungi alkohol dan minuman yang tidak mengandungi alkohol.
 - I. Buah-buahan, sayur-sayuran dan Bijian Berkulit Keras.
 - J. Pengeluaran Koko dan Coklat.
 - K. Gula, Sirap, Kanji dan Hablur gula.
 - L. Bijirin dan Pengeluaran "Bakery".
 - M. Lemak, Minyak dan Marjerin.
 - N. Susu dan pengeluaran tenusu (termasuk mentega).
 - O. Telur dan pengeluarannya.
 - P. Ikan dan Penghasilan Laut.
 - Q. Daging, Kambiri dan Binatang Buruan.
 - R. Perasa Makanan, Rempah-Rempah dan Perencah Makanan.
 - S. Standard, Undang-Undang dan Peraturan.
2. Maklumat dalam bentuk pita magnet IFIS boleh dilanggan, jika pengguna mempunyai kemudahan komputer di pertubuhan mereka.
3. Perkhidmatan Penyebaran Maklumat Terpilih (Selective Dissemination of Information) telah diberi dengan percuma kepada dua puluh lima buah organisasi di United Kingdom. Perkhidmatan tersebut dapat dijayakan kerana sokongan dan sumbangan dari 'Office for Scientific and Technical Information' U.K., yang telah membuat satu kajian berkenaan keluasan maklumat makanan serta membuat bandingan mengenai teknik-teknik mendapat kembali maklumat dari 'data base' IFIS. Walau bagaimanapun di masa ini pembayaran adalah dikenakan untuk menggunakan perkhidmatan ini.
4. Perkhidmatan penyiasatan kebelakangan (Retrospective Search) juga diberi oleh IFIS. Bayaran tertentu di kenakan.
5. Penyiasatan kebelakangan yang banyak menerima perhatian dijual dengan harga yang murah seperti, 'Food Annotated bibliographies' (FABS).
6. Akhir sekali IFIS memberi Perkhidmatan Salinan Foto. Bayaran tertentu dikenakan.

Kegiatan IFIS

Setelah duabelas tahun ujud IFIS telah berkembang dengan pesatnya. Pada permulaan kegiatannya tertumpu kepada penerbitan FSTA dan penyimpanan maklumat di pita magnet. IFIS telah bergerak dan mengukuhkan pertubuhannya sikit demi sedikit hingga berjaya menerbitkan 'THESAURUS' (daftar kata-kata) FSTA yang mengandungi lebih daripada 10,000 istilah yang terdapat dari pita asas FSTA secara amnya dan indek perkara khususnya. Satu lagi 'thesurus' yang diusahakannya ialah 'EEC Multilingual Thesaurus' dalam bidang ilmu Sains & Teknologi Makanan (Inggeris-Perancis, Jerman, Itali) dibawah naungan 'European Economic Community'.

Selain daripada kejayaan IFIS yang tersebut di atas, IFIS juga telah berjaya mendapatkan kerjasama dari beberapa institusi-institusi antarabangsa. 'Data base' IFIS berasaskan kepada 1,400 jurnal utama (Primary Journal) dari 75 buah negara, paten dari 20 buah negara dan piawaiian dari 40 buah negara.

Untuk menentukan penerimaan bahan-bahan berterusan dan mengatasi masalah bahasa, IFIS telah menuhkan satu sistem rangkaian bagi organisasi-organisasi antarabangsa yang membuat penyumbangan sebanyak 20% keatas 'data base' IFIS. Organisasi-organisasi ini meneliti dan/atau membuat kerja-kerja abstrak bagi terbitan-terbitan tertentu di negara masing-masing atau kawasan serantaunya.

Organisasi-organisasi yang bekerjasama dengan IFIS adalah seperti berikut:

- (1) Institute of Scientific Information of the Ministry of Food di Prague, Czechoslovakia.
- (2) Institute of Nutrition di Potsdam, Republik Jerman Barat.
- (3) Institute fur Garungsgewerbe und Biotechnologie, Berlin.

- (4) Jawatankuasa Japanese food scientists , Jepun.
- (5) Korean Society of Food Science and Technology , Korea.
- (6) Central Food Technological Research Institute, Mysore, India.
- (7) Chemical Abstract Service , USA
- (8) Institute of Food Technologists, USA
- (9) Swedish Food Institute di Goteborg, Sweden.
- (10) University of the Philippines di Los Banos, Filipina.

'Data Base' FSTA di Pusat Penerangan

"Data Base" FSTA telah menarik perhatian bukan sahaja negara-negara maju tetapi juga di negara-negara yang sedang membangun. 'Data Base' FSTA telah banyak digunakan di beberapa pusat penerangan, terutama untuk Perkhidmatan Maklumat Terpilih (Selective Dissemination of Information). Di Malaysia misalnya, Perpustakaan Universiti Sains Malaysia sebagai projek percubaan telah menggunakan Data Base ini untuk Perkhidmatan Maklumat Terpilih. Negara-negara lain yang telah menggunakan 'Data Base' ini terdiri dari: USA, Jepun, Sweden, United Kingdom, Yugoslavia, Australia, Canada, Czechoslovakia, Republik Bersekutu Jerman, Belanda dan Brazil.

Sungguhpun IFIS tidak mendapat bantuan atau penyer-taan mana-mana negara secara menyeluruh, tetapi telah berjaya memupuk kerjasama dengan beberapa organisasi-organisasi antarabangsa untuk menjayakan rancangan-rancangannya. IFIS telah berjaya dalam usaha-usahnya untuk mengumpul, menyimpan dan menyebarkan maklumat-maklumat dalam bidang ilmu Sains & Teknologi Makanan melalui penggunaan alat-alat dan ilmu teknologi moden.

Dengan adanya struktur organisasi yang baik dan sistem pengurusan dan pentadbiran yang teratur, IFIS akan terus kekal dan dapat memberi sumbangan positif ke arah perkhidmatan maklumat yang luas dan berkesan.

Teknologi dan Penemuan Baru Pertanian

1. Ke Arah Kejuruteraan Gen

Michael Saul dan Anthony Gatensby yang berkhidmat dengan Biochemical Genetics Group di Cambridge Plant Breeding Institute telah berjaya menyuntik gen (yang telah diambil dari kloroplas dan bukan nuklei) dari gandum dan jagung ke dalam bakteria *Escherichia Coli*. Seperkara yang menarik ialah gen-gen ini dapat mempergiatkan bakteria-bakteria ini untuk menghasilkan enzim-enzim yang diperlukan dalam proses fotosintesis. Kemungkinan untuk menambahkan kuantiti enzim-enzim ini dan meningkatkan proses fotosintesis adalah lebih cerah dengan penemuan ini.

Penyelidik-penyelidik berkenaan telah memilih gen kloroplas untuk dipindahkan ke bakteria *Escherichia Coli* kerana ianya mempunyai ciri-ciri genetik yang sama dan ini membolehkan gen-gen tersebut menyesuaikan diri dalam bakteria *Escherichia Coli* dengan cepat dan mudah. Persamaan ini juga boleh menolong kegunaan teknik-teknik yang sedia ada untuk memindah atau menyuntik gen *Escherichia Coli* ke gen kloroplas dengan bertujuan meningkatkan ketahanan bakteria terhadap antibiotik dan lain-lain.

Suatu lagi penemuan berkaitan dengan perkara ini ialah cara penyelidik ini meningkatkan lagi pengeluaran gen dengan menggunakan suatu penggalakan (DNA ke RNA) yang kuat. Apabila penggalakan ini (yang diambil dari suatu PHAGE, iaitu sejenis virus yang boleh menjangkiti bakteria) bersama gen-gen jagung dan gandum disuntik ke dalam bakteria *Escherichia Coli*, pengeluaran gen-gen ini akan dapat dipertingkatkan lagi.

Penemuan untuk memindahkan gen-gen tumbuhan ke bakteria mempunyai kemungkinan dapat dibuat di sebaliknya, iaitu penyuntikan gen-gen bakteria ke dalam tumbuhan. Ini akan merintis jalan ke arah penyelidikan akan datang yang menarik untuk faedah petani-petani.

Sumber: *New Scientist* 13 Ogos, 1981, 91(1266) m.s. 401.

2. Tumbuhan yang berbunyi apabila dahaga

Prof. John Milburn, seorang pakar sains di University of New England Australia telah mendapati bahawa tumbuhan-tumbuhan yang kekeringan akan berbunyi menunjukkan kedahagaannya. Bunyi tersebut adalah disebabkan oleh getaran saluran air di dalam tumbuhan tersebut. Beliau telah mendengar bunyi tersebut dengan menempatkan suatu mikrofon kecil di dalam batang tumbuhan tersebut. Beliau menyatakan bahawa cara ini dapat membantu pembaka untuk mengukur tahan kemarau jenis-jenis tumbuhan yang baru. Ia juga dapat membantu peladang dalam memilih jenis biji benih untuk di tanam di kawasan gersang.

Sumber: New Scientist. 23 Jul 1981, 91 (1263) m.s. 221

3. Pembajaan dengan bantuan bakteria

Tanaman makanan telah didapati boleh mendapatkan nitrogen daripada udara dengan menggunakan bakteria. Kebolehan ini merupakan satu langkah untuk menjimatkan berjuta-juta ringgit dalam pembajaan. P.J. Hooykaas dan rakan-rakannya di University of Leiden telah mendapati satu segmen bakteria DNA yang boleh mengawal penyerbuan bakteria di sel akar, dan kemudian membentuk bintil-bintil di mana kegiatan penetapan nitrogen boleh dijalankan. Kegiatan tersebut hanya boleh dilakukan oleh segelintir bakteria dan dalam beberapa jenis tumbuhan sahaja, biasanya terdiri dari jenis kekacang. Walau bagaimanapun, penemuan ini membuka jalan untuk merancang bakteria-bakteria lain 'menulari' tanaman-tanaman makanan dan mendirikan kilang penetapan nitrogen dalam akarnya.

Sumber: New Scientist. 18 Jun 1981, 90(1258) m.s. 760

4. Pam tenaga suria di Pakistan

Pam-pam pengairan yang menggunakan tenaga matahari sedang diperkenalkan di ladang-ladang di Pakistan. Ujian-ujian di ladang di peringkat kebangsaan sedang dijalankan untuk membolehkan peladang-peladang membandingkan pam-pam tersebut dengan peralatan pengairan yang menggunakan minyak disel. Penganjur ujian-ujian di ladang tersebut ialah Intermediate Technology Industrial Services yang bertujuan untuk memenuhi keperluan peladang kecil yang tiada termasuk ke dalam garisan tenaga letrik kebangsaan, dan mendapatkan satu peralatan yang boleh menambah atau mengganti peralatan pengairan yang biasa digunakan. Harga minyak dalam masa 20 tahun yang akan datang tiada diketahui, tetapi kita mengetahui bahawa tenaga matahari tiada melibatkan sebarang perbelanjaan.

Sumber: New Scientist. 11 Jun 1981, 90(1257) m.s. 693

5. Makanan dari hampas kayu

Para penyelidik di sebuah universiti di Canada telah memajukan satu proses untuk membuat makanan ternak dari hampas selulos. Ini boleh mengatasi masalah pencemaran sambil menjimatkan perbelanjaan dalam mengimpor kacang soya. Penyelidikan tersebut adalah didorong oleh keperluan untuk menggantikan beribu-ribu tan kacang soya yang diimpor oleh Canada tiap-tiap tahun untuk makanan ternak. Sementara itu, ladang-ladang dan kilang-kilang palpa di Canada mengeluarkan bertan-tan hampas yang kaya dengan selulos. Dari itu, proses ini boleh mendatangkan makanan ternak dengan murah sambil mengatasi masalah pencemaran.

Kumpulan para penyelidik tersebut mendapati bahawa sejenis kulat yang menjadi dengan sendirinya di dalam himpunan kompos memakan selulos yang liat dan bersabut. Kulat tersebut boleh memakan batang jagung, jerami dan hampas palpa padat dan kertas tanpa rawatan asid terlebih dahulu. Nilai pemakanan makanan berkulat ini adalah sama jika dibandingkan dengan makanan soya. Kumpulan tersebut mendapati 40% protin, 30% kanji, lemak dan vitamin daripada habuk kayu; hanya 10% dari makanan tersebut mengandungi lignin iaitu bahagian selulos yang tidak hazam. Walau bagaimanapun, lignin merupakan satu keperluan dalam makanan ternak.

Sumber: New Scientist. 23 Apr 181, 90(1250) m.s. 224

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a			b		
aberration	—	aberasi	agronomic investigation	—	penyiasatan agronomi
abortion	—	keguguran	agronomy	—	agronomi
abrasive action	—	tindakan lelas	air-cured	—	peram udara
absciss	—	absis	air-dried sheet	—	keping kering udara
abscission	—	pengabsisian	air dry	—	kering udara
abscission layer	—	lapisan absis	air layering/marcot	—	tut/markot/cangkuk
absorbate	—	terserap/absorbat	albino	—	bulai/saleh/balar
absorbent	—	penyerap/absorben	algae	—	alga
absorber	—	bahan penyerap/absorber	algology	—	algologi
absorption	—	penyerapan/absorpsi	alkaline	—	alkalin
acantha	—	akanta	alkalization	—	alkalisasi
acanthocarpous	—	akantokarpus	alluvium	—	aluvium
acanthocladous	—	akantokladus	alternate (leaf)	—	berselang (daun)
acanthus	—	akantus	amine	—	amina
acarpous	—	akarpus	amitosis	—	amitosis
acaulescent	—	akaulesen	ammonification	—	pengammoniam/ammonifikasi
acclimation	—	suai-iklim/aklimasi	amnion	—	amnion
acclimatization	—	penyesuaian-ikliman/aklimatisasi	amorphophallus	—	amorfofalus
accumulator	—	akumulator	amorphous	—	amorfus
accelerated	—	hakisan percepat	amphibia	—	amfibia
erosion	—		amylase	—	amilase
acerose	—	jejerum/aseros	anabolism	—	anabolisme
acicular	—	asikular	anaerobe	—	anaerob
acid	—	asid/asam	anatomy	—	anatomi
acid soil	—	tanah asid/masam	anatropous	—	anatropus
acidity	—	keasidan	incipital	—	ansipital
acrogen	—	akrogen	androecium	—	androsium
actinomorphic	—	aktinomorfik	androgen	—	androgen
actinomorphic	—	aktinomorfus	androphore	—	androfor
adaptation	—	penyesuaian/adaptasi	angiosperm	—	angiosperma
adaxial	—	adaksial	angiospore	—	angiospor
adenophyllous	—	adenofilus	ani	—	ani-ani/ketam
adenopodus	—	adenopodus	animal manure	—	serasah kandang
adnate anther	—	cepudebunga/anteradnat	animal pest	—	binatang/haiwan perosak
adrenal gland	—	kilang/kelenjar adrenal	animal residues	—	saki/sisa haiwan
adrenalin	—	adrenalin	antelope	—	antelop
adulteration	—	lancungan	anthesis	—	antesis
aduncate	—	adunkat	anthracnose	—	antraknos/penyakit daun Colletotrichum
adventitia	—	adventisia	antibiotic	—	antibiotik
adventitious bud	—	mata tunas adventitius	arid condition	—	keadaan gersang
adventitious	—	embrio adventitius	arid land	—	tanah gersang
embryo	—		aridic	—	kegersangan
aecidium	—	aesidium	aroma	—	aroma/raksi
aeration	—	pengudaraan/aerasi	aromatic plant	—	tumbuhan beraroma/ganda
aerenchyma	—	aerenkima	artificial	—	didikan tiruan
aerial map	—	peta aerial/peta dari udara	brooding	—	saliran buatan
aerial root	—	akar udara	artificial drainage	—	
aerobic	—	respirasi/pernafasan	artificial fertilizer	—	baja buatan
respiration	—	aerobik	artificial incubator	—	pengeram/inkubator buatan
aerobiology	—	aerobiologi	artificial insemination	—	permanian beradas/buatan
agglomerate	—	aglomerat	artificial irradiation	—	penyinaran buatan
agricultural diversification	—	pelbagaian/diversifikasi/penganekaan pertanian	artificial pollination	—	pendebungaan buatan
agricultural economics	—	ekonomi pertanian	available nutrient	—	pemakan tersedia
agricultural engineering	—	kejuruteraan pertanian	axil (leaf)	—	aksil (daun)
agriculture	—	pertanian			
			back bulbs	—	ibu bawang
			balanced food	—	makanan seimbang
			bale	—	bendela
			baler	—	pentendela
			barnyard	—	baja kandang
			manure	—	
			basin irrigation	—	pengairan lembangan
			battery cage (poultry)	—	sangkar bersekat (ayam)
			beef cattle	—	lembu daging
			beverages	—	minuman; bahan minuman
			bird of prey	—	burung pemangsa
			black earth	—	tanah hitam
			bleached sand	—	pasir jernih
			bleed	—	rembes
			blight	—	hawar
			blistering agent	—	bahan pelepuh
			bloat	—	kembung/buncit
			bloater	—	ikan salai
			blood line	—	darah keturunan
			botanical key	—	petunjuk botani
			botanical relationship	—	perhubungan botani
			branchial region	—	bahagian insang
			breeder	—	pembaka; pembiakbaik
			breeding	—	pebiakbaikan; pembakaan
			broodiness	—	citaram
			brooding	—	mengeram
			brown-root disease	—	penyakit akar perang
			bud	—	mata tunas
			bud (flower)	—	kudup (bunga)
			bud grafting	—	cantuman mata tunas
			bud patch	—	keping mata tunas
			budding	—	pebiakan mata tunas/cantuman
			bushy (tree)	—	rimbun (pokok)
			C		
			cage	—	sangkar
			cannibal	—	kanibal/pemangsa jenis
			canopy	—	sudur
			cap (mushroom)	—	payung (cendawan)
			capon (poultry)	—	kembiri (ayam itik)
			carnivore	—	karnivor
			centrifuge	—	emparan
			certified seed	—	bijibenh teraku
			character	—	tabiat; sifat; kelakuan
			clonal seed	—	bijibenh klon
			closed	—	komuniti tertutup
			community	—	hidup bersama
			coexist	—	koheren
			coherent	—	kejereketan
			cohesion	—	kolar
			collar	—	collar-bone
			collar-bone	—	tulang selangka
			collar borer	—	bubuk kolar

commercial — pertanian
 agriculture — dagangan
 compactible — boleh dipadatkan
 compatible — serasi; sesuai; setuju
 complete — baja dagangan
 fertilizer — lengkap; baja kimia

compost — kompos
 compound — baja sebatian

fertilizer — buah majmuk
 compound fruit — pati
 concentrate — pemeliharaan
 confinement — kurang
 rearing — pemuliharaan
 conservation — rumah
 conservatory (plant) — pemuliharaan/
 konservatori
 (tumbuhan)

conserve — pulihara
 creeping — menjalar
 crop cutting — tuai ujian (padi)
 test (padi) — tanaman bergilir
 crop rotation — silara/tajak
 crown — jambul (nenas)
 crown(pineapple) — kesan timbun-
 cumulative — tambah
 effects

d
 dairy — tenusu
 deep water rice — padi apung
 demonstration — tunjukcara
 dibbler — penugal; tugal
 diversification — pelbagaian
 diversify — mempelbagai
 drainage — saliran
 dressing seed — rawatan bijibenh
 dry nursery — semaian darat

e
 economic life — jangka umur ekonomi
 edible — boleh dimakan
 enterprise — perusahaan
 essential — unsur mustahak
 element
 experiment plot — petak percubaan

f
 farm — ladang kebun
 farmer — peladang; petani
 feed — beri makan;
 bahan makanan
 fertility — kesuburan
 fertilizing — membaja
 field nursery — tapak semaian
 di ladang

floor brooding — mengeram di lantai
 food crops — tanaman makanan
 free range — cara lepas
 (poultry)
 fungi — kulat-kulat
 fungus — kulat

g
 grafting — mencantum; cantuman
 granular — bergerintil
 grazing — meragut
 grower mash — makanan penyubur

h
 harvest — pungut; kutip hasil;
 ketam; tuai; panen
 heat — haba
 hedge plant — tanaman pagar
 herbivore — herbivor
 host — perumah
 host plant — tumbuhan/pokok
 perumah
 house plant — pokok hias-rumah
 humid condition — keadaan lembap
 hydrated lime — kapur tawar

i
 immunity — mangli
 implant — tempelan
 inactive bud — mata tunas lengai
 indicator plant — tumbuhan penunjuk
 indigenous — asli
 inflow — aliran masuk
 insect — pendebungaan
 pollinated — serangga
 insemination — pemanian;
 permanian
 introduced — jenis dagang
 variety

j
 juicy flesh — isi berair

l
 land use — kegunaan tanah
 land utilization — penggunaan tanah
 latent bud — mata tunas pendam
 latex — susu pokok;
 getah pokok
 layer mash — makanan penelur
 leaf — daun
 leaf blight — hawar daun
 liquid manure — baja cecair
 livestock — ternakan
 longevity — lanjut usia
 low fertility — kesuburan rendah/
 kurang subur
 lowland — tanah pamah

m
 market garden — kebun sayur
 mass selection — pilihan kasar
 masticatory — ramuan kunyah
 maturation — tempoh matang
 period
 milk animal — binatang susu
 milling offals — dedak; sekam
 multiplication — petak pembiakan
 plot

n
 natural brooding — pengeraman semulajadi
 natural pruning — meluruh
 nursery bed — batas semaian
 nutrition — pemakanan

o
 off season — luar musim
 offtype — jenis ganjil
 open drain — parit dedah
 outbreeding — pembiakbaikan luar
 overflow — limpah

p
 parasitic plant — pokok parasit
 peg — tugal
 permanent crop — tanaman kekal
 pest — perosak
 pickle — jeruk; pekasam
 plant house — rumah tumbuhan
 plantation — ladang
 potentialities of — keupayaan pokok
 entire plant
 preservation — pengawétan
 preservative — bahan pengawet
 preserve — awet
 promiscuous — pembiakan bebas
 breeding
 pruning — mencantas

q
 quincunx — tanaman siku
 planting — keluang

r
 ranch — ladang ternak
 random selection — pilihan rawak
 ridge — batas

s
 saddle grafting — cantuman celapak
 sample — contoh/sampel
 sapling — anak pokok
 seasonal crop — tanaman bermusim
 seedling — anak benih; bibit
 skim milk — susu siring
 small holder — pekebun kecil
 soil — tanah
 soil water — air tanah

t
 thinning — penjarangan
 threshing — mengirik;
 membanting (padi)
 threshing bin — tong banting
 transplanting — pengubahan;
 mengubah;
 pencedungan;
 mencedung (padi)
 true bred — baka tulen
 (pure bred)

u
 upland — tanah tinggi

v
 valley — lembah
 variety — varieti
 vegetative — tampang
 viability — boleh hidup
 viable seed — bijibenh berna

w
 water supply — bekalan air
 watering — menyiram/
 penyiraman
 weeding — merumput
 wet padi — padi sawah
 wind pollination — pendebungaan angin

z
 zonal soil — tanah zon



Kalendar Kongres Pertanian

Kalendar ini menyenaraikan seminar, konferens, simposium dan bengkel peringkat kebangsaan dan antarabangsa mengenai pertanian dan perkara-perkara berkaitan dengannya yang akan diadakan dari bulan Oktober hingga bulan Disember 1981. Untuk melengkapkan lagi senarai ini, anda adalah dipelawa untuk melaporkan apa juga maklumat mengenai lain-lain seminar, konferens dan bengkel pertanian yang tidak termasuk di dalam senarai ini.

Oktober 12-17	Oktober 20-24
Judul: Kursus Pendek Pengurusan Taman dan Rumpun Taman	Judul: Workshop on Bioconversion for Fuel Production
Tempat: Universiti Pertanian Malaysia (UPM)	Tempat: UPM
Anjuran: Fakulti Pertanian, UPM, Serdang.	Anjuran Bersama: Fakulti Pertanian, UPM, UNESCO dan FEISEAP
Oktober 13-14	Oktober 21-28
Judul: Seminar Peranan Program Pembangunan Keluarga Dalam Pembangunan Negara	Judul: ESCAP Workshop on Women's Participation in Paddy Production and Processing
Tempat: UPM	Tempat: Kota Bharu, Kelantan
Anjuran: Fakulti Pertanian, UPM, Serdang	Anjuran: Kementerian Pertanian Malaysia
Oktober 16	Oktober 22-24
Judul: More Thoughts For Food	Judul: Bengkel Teknik Pengurusan untuk Keberkesanan Organisasi
Tempat: UPM	Tempat: UPM
Anjuran: Fakulti Pertanian, UPM, Serdang	Anjuran Bersama: Fakulti Pengajian Pendidikan, UPM, dan The Institute of Higher Education, The University of New England, Armidale, New South Wales, Australia.
Oktober 17-19	November 2-5
Judul: Kursus Memproses Buah-buahan a) Pisang b) Kerepek Pisang c) Cili Sos	Judul: Kursus Memproses Mee dan Tauhu a) Mee Kuning b) Mee Kering c) Tauhu
Tempat & Anjuran: Bahagian Gunaan Hasil Pertanian (APU), MARDI, Kuala Trengganu	Tempat & Anjuran: Bahagian Getah Hasil Pertanian (APU), MARDI, Serdang.
Oktober 19-21	November 2-6
Judul: Bengkel Sistem Maklumat Pengurusan di Institusi Pengajian Tinggi	Judul: Regional Workshop on Hydrological Impacts on Forestry Practices and Re-forestation
Tempat: UPM	Tempat: UPM
Anjuran Bersama: Fakulti Pengajian Pendidikan, UPM, dan The Institute For Higher Education, the University of New England, Armidale, New South Wales, Australia.	Anjuran: UPM dan UNESCO
Oktober 19-21	November 2-13
Judul: The Rubber Research Institute Of Malaysia Biennial Planters Conference for 1981	Judul: Regional Workshop on Financial and Economic Aspect of National Water Supply and Sanitation Planning for the International Water Decade
Tempat: Kuala Lumpur	Tempat: UPM
Anjuran: Pusat Penyelidikan Getah Malaysia	Anjuran: World Health Organisation
Oktober 19-23	
Judul: Seminar Pengurusan Sisa Pepejal	
Tempat: UPM	
Anjuran Bersama: Kementerian Perumahan Kerajaan Tempatan dan Fak. Sains dan Pengajian Alam Sekitar, UPM, Serdang.	

November 7-11

Judul: Kursus Hasil Peraman
a. Jeruk mempelam
b. Jeruk cili
c. Jeruk betik
d. Jeruk halia
Tempat & Anjuran: Bahagian Gunaan Hasil Pertanian (APU), MARDI, Tampoi, Johor

Anjuran Bersama: Australian National University dan Fakulti Ekonomi Sumber dan Perniagaantani, UPM, Serdang.

November 23-27

Judul: Kursus Memproses Air Buah-buahan
a. Air markisa
b. Air durian belanda
c. Air jambu batu
Tempat & Anjuran: Bahagian Gunaan Hasil Pertanian (APU) MARDI, Serdang

November 9-13

Judul: Data Requirements for Rural Development Projects and Programmes in Asian Tropics
Tempat: UPM

Disember 7-10

Judul: Kursus Memproses Kicap
Tempat & Anjuran: Bahagian Gunaan Hasil Pertanian (APU) MARDI, Serdang

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