주최 : 농림수산식품부 Ministry for Food, Agriculture, Forestry and Fisheries 전라북도 익산시 주관 : 국가식품클러스터지원센터

FOODPOLIS
국가식품클러스터

The 1st International Food Cluster Forum

제1회 국제식품클러스터포럼

21 Feb 2012, Seoul Palace Hotel

2012년 2월 21일, 서울 팔래스 호텔

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PROGRAM

TIME	DURATION	PROGRAM
13:30~14:00	30′	Registration
14:00 ~ 14:04	4′	**Opening Address** Chong-Guk Park *(Chairman, Agency for Korea National Food Cluster)*
14:04 ~ 14:09	5′	**Congratulatory Address** Kyu Yong Suh *(Minister, Ministry for Food, Agriculture, Forestry and Fisheries)*
14:09 ~ 14:12	3′	**Congratulatory Address** Hun-Yul Jung *(Deputy Governor for Administrative Affairs of Jeollabuk-do)*
14:12 ~ 14:15	3′	**Congratulatory Address** Han Soo Lee *(Mayor of Iksan city)*
14:15 ~ 14:45	30′	Keynote Speech **The Projection of the Global Food Industry** **Futures of the Global Food Industry** James Allen Dator *(Professor and Director, University of Hawaii at Manoa, USA)*
14:45 ~ 15:05	20′	Q & A
15:05 ~ 15:35	30′	Speech I **Convergence of the Global Food** **Convergence in the Food Industry** Martin Hall *(Director of Science, Campden BRI, UK)*
15:35 ~ 15:45	10′	Q & A
15:45 ~ 15:55	10′	Coffee Break
15:55 ~ 16:00	5′	Korea National Food Cluster Promotional Video Clip
16:00 ~ 16:30	30′	Speech II **Win-win Strategy for Corporates and Food Clusters** **An excellent test bed for our future food ideas** Lotta Torner *(CEO, Skåne Food Innovation Network, Sweden)*
16:30 ~16:40	10′	Q & A
16:40 ~ 17:10	30′	Speech III **Globalisation and Cluster of Convergence of Domestic Food Technology** **Future directions for the food industry: what will the industry at home and abroad look like in the future?** Dong-Hwa Shin *(Chair, Food Industry Promotion Committee)*
17:10~17:20	10′	Q & A
17:20		Closing

프로그램

시 간	소요 시간	프 로 그 램
13:30~14:00	30′	참석자 등록
14:00 ~ 14:04	4′	**개회사** 박종국 *(국가식품클러스터지원센터 이사장)*
14:04 ~ 14:09	5′	**축사** 서규용 *(농림수산식품부 장관)*
14:09 ~ 14:12	3′	**축사** 정헌율 *(전라북도 행정부지사)*
14:12 ~ 14:15	3′	**축사** 이한수 *(익산시장)*
14:15 ~ 14:45	30′	기조강연 **글로벌 식품산업의 미래** **글로벌 식품산업의 미래** 짐 데이토 *(미국 하와이미래연구소 소장, 前세계미래학회 회장)*
14:45 ~ 15:05	20′	질의응답
15:05 ~ 15:35	30′	주제강연 I **글로벌 식품 융복합** **식품산업의 융복합화** 마틴 홀 *(영국 캠든BRI 식품과학부문 최고책임자)*
15:35 ~ 15:45	10′	질의응답
15:45 ~ 15:55	10′	커피 브레이크
15:55 ~ 16:00	5′	국가식품클러스터 동영상 상영
16:00 ~ 16:30	30′	주제강연 II **기업과 클러스터의 상생 방안** **미래식품 관련 아이디어의 훌륭한 시험무대** 로타 토너 *(스웨덴 스코네푸드혁신네트워크 CEO)*
16:30 ~16:40	10′	질의응답
16:40 ~ 17:10	30′	주제강연 III **국내 식품융복합 기술의 세계화와 클러스터** **국내 · 외 식품산업의 조망 및 향후 지향 방향** 신동화 *(식품산업진흥심의회 위원장)*
17:10~17:20	10′	질의응답
17:20		폐회

FOODPOLIS
국가식품클러스터

The 1st International Food Cluster Forum

KEYNOTE SPEECH

The Projection of the Global Food Industry

Futures of the Global Food Industry

James Allen Dator
(Professor and Director, University of Hawaii at Manoa, USA)

기조강연

글로벌 식품산업의 미래

글로벌 식품산업의 미래

짐 데이토 *(미국 하와이미래연구소 소장, 前세계미래학회 회장)*

Speaker's Brief CV

Name	James Allen Dator
Nationality	USA
Current Position	Professor and Director
Organization	University of Hawaii at Manoa
Education	BA Stetson University MA University of Pennsylvania PhD The American University
Degrees Awarded	(see above)
Awards and Scholarships	Woodrow Wilson Fellow Danforth Fellow Fulbright Fellow Former President, World Futures Studies Federation
Professional Experiences	Professor Department of Political Science and Director, Hawaii Research Center for Futures Studies University of Hawaii at Manoa, Honolulu Chair, Space and Society, International Space University, Strasbourg, France

연사 이력

이름	짐 데이토
국적	미국
직책	교수/연구소장
소속	하와이대학교 (마노아캠퍼스)
학력	스테슨대학교 학사 펜실베이니아대학교 석사 아메리칸대학교 박사
학위	(학력과 동일)
수상/표창	우드로윌슨센터 연구원 댄포스 연구원 풀브라이트 연구원 세계미래학회 전임회장
경력	하와이대학 마노아캠퍼스 정치과학부 교수(하와이, 호놀룰루) 하와이대학부설 하와이미래학연구소 소장(하와이, 호놀룰루) 국제우주대학(ISU), 우주와사회 학장(프랑스, 스트라스부르)

Abstract

Futures of the Global Food Industry

After a quick reminder of what futures studies is, and is not, and a glance back at what “the future of food” was when futurists and food experts first interacted in the late 1960s, we will identify several key driving forces now, and possible emerging issues, showing how they might result in varying “alternative futures” of food production, manufacturing, recombination, packaging, marketing, distribution, consumption, and recycling, within a broad global as well as local context. We will conclude by asking if Foodpolis and other food clusters need to be reconceptualized as a consequence of these alternative futures, or if their current visions are robust against all futures.

요약

글로벌 식품 산업의 미래

식품학자와 미래학자간 교류가 시작되던 1960년대 말에 논의된 "식품의 미래"에 관한 내용과 어떤 주제가 미래학의 범주에 포함되는 지를 간략히 살펴봄으로써 현재 주요하게 다뤄지는 여러 동인(動因)과 앞으로 부상할 잠재이슈를 밝히고, 이러한 동인이 어떻게 국제 혹은 지역적 맥락에서 식품의 생산과 제조, 재조합, 포장, 마케팅, 유통, 소비, 재활용의 "대안적 미래"를 형성하는지 살펴볼 것이다. 결론에서는 앞에서 추론한 대안적 미래상에 따라 푸드폴리스(Foodpolis)나 여타 식품클러스터에 대한 개념이 재정립될 필요가 있는지, 식품클러스터에 대한 기존의 비전이 모든 미래모습에 적용될 수 있을지 살펴보고자 한다.

Fullpaper

James Allen Dator

Hawaii Research Center for Futures Studies Department of Political Science University of Hawaii at Manoa, Honolulu

Futures of the Global Food Industry For the First World Food Cluster Forum

H. G. Wells was right: "Civilization is a race between disaster and education."

Thomas Malthus was right too: Life depends on winning the race between population growth and food supply.

Who is winning those races now, in your judgment?

Who will win over the next ten to fifty years, and why?

THE FUTURE FROM THE PAST.

I have been tracking the main contenders in those races since before many of you were born. One of my earliest sources on the subject was written by Archibald McPherson. It appeared in the Bulletin of the Atomic Scientists in 1965. It was titled "Synthetic Food for Tomorrow's Billions" .

McPherson said that conventional methods could not produce enough food to feed the growing world population. "The ultimate solution must lie in a totally new source of food that will relieve the world's population from virtually sole dependence on agriculture" and ocean resources.

"The scientific basis for the synthesis of food has thus been well established; only the engineering remains to be done. Synthetic food products are not inferior to food of plant or animal origin; they are essentially the same substances. They are synthesized in ways that give promise to being quicker, cheaper, and more efficient… Without synthetic food, there will be widespread famine."

A colleague of mine at the University of Hawaii in the early 1970s was a visiting scholar from the Department of Agriculture of the University of Maryland, Jarvis Cain. He specialized in the future of food, and I was establishing futures studies at the University of Hawaii.

In February 1973 Cain wrote "Some psychological aspects of synthetic foods," for the Journal of Food Distribution Research.

"So, what exactly is a 'synthetic food'?" Cain concluded that he could not come up with a definition that distinguishes "synthetic food" from "natural food" .

There is absolutely nothing "natural" about agriculture. To select and save some seeds and discard others; to domestic and breed certain animals (and to acquire some of their diseases); merely to plow the Earth is to "go against Nature," by disturbing the "natural" complex surface of the planet and making things grow according to human desire and management.

Almost everything humans have eaten in the last 8000 years - since the dawn of agriculture?has been "synthetic" in any meaningful sense of the word, Cain decided.

You don't hear much about "synthetic food" or its companion, "artificial food" , any more. Now it is "biotechnology" or, more restrictedly, "genetically-modified food" . "Designed food" might be an even better term. But the argument that a new "Green Revolution" based on biotechnology is necessary to feed the growing billions on Earth is still made. And so is the argument to the contrary that biotechnology is the way to Farmageddon and then to Armageddon; that only "natural foods" should be produced and eaten.

Which view will control the future?

ALTERNATIVE FUTURES.

Futurists insist that it is not possible to "predict" THE futures. Instead, they "forecast" alternative futures, and "envision and invent" preferred futures.

Jarvis Cain wrote " Alternative futures for the United States food industry," Journal of Food Distribution Research, May 1974. He discussed three "alternative futures" for the American food industry:

A. Extension of Present Trends.

1. Increasing concentration of businesses and ownership.
2. Continuing dealing with commodities, but produced by fewer and larger commercial farms.
3. Continuing trend toward food distribution by variety and discount stores, vending machines, and mobile feeding units.

B. Production and Distribution of Complete Meals.

1. A vertically-integrated oligopoly that makes and distributes complete meals to consumers.
2. Meal preparation not done at homes but by retail stores and restaurants, or by processors, wholesalers, and even farmers.

C. Nutrient Delivery System.

1. The population-resource imbalance makes it impossible feed people as we do now.
2. Provide nutrients without using existing commodities, institutions, or technology.
3. Determine nutrients needed to keep people healthy, and supply them using minimal resources.

Cain also observed that "The current food industry system is essentially powered by oil, natural gas and coal" , and we are running out of them, especially oil. "There is no alternative energy technology available for large scale application in the short run."

"Productivity for the future: Energy," Journal of Food Distribution Research, February 1975.

LESSONS FROM THE PAST

Much of what Jarvis Cain forecasted is spot-on, and some of it still sounds "futuristic" , The global food industry is vertically-integrated. Farms are huge and farmers few in "developed"

parts of the world. Processed food dominates. Fewer families prepare and cook their own meals, preferring "complete meals" from fast-food carry-away shops or convenience stores.

Most importantly, Cain makes it clear that whoever thinks about the futures must ALWAYS think in terms of pluralities - of many alternative futures - and never, never ever speak of "THE" (single) future that can somehow accurately be "predicted" and thus "planned for" .

"The Future" cannot be predicted. Alternative futures can be forecasted, and Preferred futures envisioned and created.

I hope none of you believe it is possible to predict the future of food and the food industry. If there are any of you in the room, I advise the rest of you get away from them as soon as possible. At the very least do not blindly follow their advice! You will almost certainly lose your shirt.

A final lesson is what I call "Dator's Second Law of the Futures" . That Law states that in a situation of rapid social and environmental change, "any useful idea about the futures should appear to be ridiculous."

That is rule you should follow very carefully as you think about the future of foods. If you hear something that sounds familiar and reasonable to you, it is probably about the present or the very-immediate future. If it sounds ridiculous, it may be because it is something you have never heard or thought of before, and thus may be useful information about the futures.

So listen very carefully to anyone who says "ridiculous" things to you. Ask them for their evidence, of course, and ask them for a plausible scenario that can turn a "ridiculous" statement into a discernible fact. If they provide neither a microbit of empirical evidence in the present nor a scenario of its emergence and maturity in the futures, then that "ridiculous" idea may be ridiculous indeed!

But don't jump to that conclusion too soon! Be willing to tolerate uncertainty longer than you might otherwise.

THE PRESENT: HUNGER, OBESITY, AND FOOD ABUNDANCE.

The food industry today has clearly resulted from the continuation of the trends the early futurists forecasted, and more.

- Global population has continued to grow. When McPherson and Cain were writing, the world population was less than 4 billion. Now it is 7 billion and growing.
- When McPherson and Cain were writing, most of the people on Earth lived in farms and rural areas. Now 50% live in urban areas?often gigantic urban areas. The ten largest cities at the beginning of the 19th Century had populations between 400,000 and 1 million; at the beginning of the 20th Century, the largest cities were between 1 and 6 million. Now the largest urban areas are between 13 and 35 million.

Global population growth and urbanization continue. The size of the Earth has not grown, and while new technologies have created new resources, most of the resources the new technologies need are declining rapidly.

Nonetheless, even though one in seven of the world's growing population of 7 billion goes to bed hungry, and very many more are malnourished, there is plenty of food produced to feed them and the rest of the world as well. If there is a problem—and there is a huge problem— it is not in the food industry per se. The problem lies on the one hand in the economic system that does not provide adequate food for those who need it, and on the other hand in political systems that thwart the equitable distribution of the abundant food that is available.

Although there are local and chronic incidents of famine, the early concerns of the 1960s and early 70s about widespread global famine because of inadequate food supplies never materialized. World population has continued to grow, but technological and managerial solutions were found to keep food production and distribution growing at an even rate, or better.

Indeed, (as Jarvis Cain also forecasted) for some parts of the world, the problem is not insufficient food but too much food, or too much food processed and consumed in certain ways rather than other ways?so-called "fast food" . A big problem now is obesity from too much calorie intake, not malnutrition from too little.

The food industry, operating according to the perverse incentives of the economic system (including advertising), must accept some of the responsibility for this.

In the early 1800s, Thomas Malthus famously argued that food production can not keep up with population growth, and thus population will continuously rise and crash, rise and crash. That has not happened. Why?

CHEAP AND ABUNDANT OIL.

The prime factor has been a succession of stunning breakthroughs in energy supply and distribution, and other developments based on them. When Malthus wrote, most energy came from humans, animals, running water, and wood burning. The invention and development first of the steam engine, and then of coal and coking, led to railroads and other steam-driven machines. This made the industrial revolution possible which vastly improved agricultural efficiency and productivity, increasing the amount and quality of food while decreasing the number of farms and farm laborers, freeing them for work in factories in cities.

The scientific part of the industrial revolution, especially the creation of research institutes and universities focused on modernizing the production, processing, and distribution of food, is another key element in keeping food production ahead of population growth.

However, it was primarily the historically very recent development of how to use liquid carbon (petroleum), both as fuel and as feedstock, that is overwhelmingly responsible for explosive population growth; extraordinary food production, processing, and distribution; and massive improvements in public health and housing that successfully held off Malthus' prediction of massive starvation.

Without oil, Malthus would have been right.

UNCERTAIN FUTURES FOR OIL.

And therein lies one key for understanding the futures.

There is a finite amount of petroleum in the ground. No new liquid carbon is being produced by nature on a scale of any interest to humans. Petroleum has been used for millennia, but on very small scales. The exact amount of oil remaining in the ground in the mid-1800s when extensive exploitation of oil first began, and how much has been consumed already, cannot be known precisely now. But the total is finite and fixed.

At some point in time, one-half of the petroleum will have been used up, with half remaining. This fact leads to the term "Peak Oil" to mark the time when we are halfway through our oil, and supplies will begin to diminish.

When will Peak Oil occur? Have we already passed it? Does it lie ahead? Soon? In the far future?

No one knows for sure, but more and more experts who once did not worry about Peak Oil have begun to do so, in part because demand for oil is rising almost exponentially (though slowed during the current recession) while new discoveries and immediate supply sources are not keeping up at the same rate existing ones are being depleted. Indeed, the overall supply of petroleum already may be diminishing.

Most demand for oil in the past 150 years came from Europe, North America, and Japan. Future demand may come also from China, India, Brazil and other areas with populations vastly exceeding those of Europe and North America.

There is a difference between the total amount of petroleum in the ground and the amount that can be produced efficiently, whether "efficiency" is measured by "net energy" or by "return on economic investment" .

Net energy refers to the fact that it takes energy to produce energy. To be sustainable, it is necessary to get more energy out than you put in. If you don't, you are simply wasting a declining resource. Oil production is still net energy producing, though the ratio is declining unfavorably. It will eventually take more energy to process petroleum than the energy we will get from the processed petroleum.

When will that be? It may be soon enough for you to begin planning for that.

One of the energy sources touted as an alternative to oil that directly impacts the food industry is biofuel. There is an impressive amount of research going into this, and it may help. However, some of the original enthusiasm has been muted as land and ocean sources have been (or are expected to be) diverted from food production to biofuel production, and as questions of net energy remain generally unresolved.

Indeed, very few, if any, of the energy systems touted as being alternatives to oil are net energy producing now by any standard?certainly not when compared to the current overall petroleum system from exploration and drilling to final consumption. The extremely complex current global petroleum system is a marvel of the world. What can replace it before it can produce no more?

People who are optimistic about the future of cheap and abundant oil believe one of four things (or all): 1) There is plenty of recoverable oil. There is no problem. 2) If oil somehow does become scarce and difficult to produce, then it will become more expensive, and thus there will be increased economic incentives to find and utilize oil that is too expensive to use now. If left to the marketplace, there will always be plenty of oil for the foreseeable future, though it may be expensive. 3) New technology will enable us to find and process petroleum sources that cannot be processed with current technology, and it may do so with such efficiency as to keep oil affordable. 4) Alternatives to cheap and abundant oil will come online in time to prevent any of the crises associated with "the end of oil" .

I suspect that is the way many of you feel, if you have thought about this issue at all seriously.

People who are very much concerned about the future of cheap and abundant oil?and their numbers are growing—basically believe that given current stagnant or declining supplies and increasing world demand for oil, there is not enough time for the optimistic hopes to save the day. There will be a huge "gap" (at best) between the time we effectively "run out of oil" and when a suitably cheap, abundant, and fluid replacement can come online. At worst (and many people feel, more likely), there is not a "gap" ahead that can be bridged, but rather an unavoidable chasm into which we will plunge that will send humanity back to a pre-industrial levels of energy supply or, more hopefully, to modes of the early industrial period because of the efforts being made now to become more efficient and to develop new energy sources.

All the money in the world cannot produce more oil when the stock is depleted. If alternatives equal to oil in abundance, price, and fluidity are not brought online quickly, humanity is in for a wrenching change in lifestyle, many feel.

Where do you stand on this? Are we "running out of oil" , or is there plenty to fuel your food clusters?

Is your answer based on an analysis of the arguments on all sides, or on your hopes, fears, or faith in the word of others.

I cannot find that the leaders of Foodpolis have done an adequate job of assessing overall energy supplies for their project. They appear to have determined how much electricity is needed to run Foodpolis, but not whether there will be sufficient affordable energy to bring material in and export processed products out, as they expect to do.

If I am wrong, I would very much like to see these analyses, and I apologize.

OTHER CHALLENGES: WATER, SOIL, PHOSPHOROUS, CLIMATE CHANGE.

Other skeptics about the future of food say that oil scarcity is nothing compared with water scarcity. Current food production, processing, and distribution techniques are very heavily dependent on their being plenty of water now, and into the future, and that is very uncertain.

Many of the solutions to declining water supplies require great amounts of energy, and so the two issues are intertwined.

Concern about topsoil depletion has been long-standing, and it has been mainly through the use of fertilizers (heavily dependent on cheap and abundant oil!) that its effects have been minimized. But now there is talk about "Peak Soil" as analogous to Peak Oil.

And "Peak Phosphorous" ! The bases of the fertilizers are themselves declining. The most critical are phosphorus, potassium, and nitrogen.

The uncertainty about the future of global and local climate stability and/or sea level rise adds to the confusion.

The rise of industrial societies and food abundance coincided with the beginning of the most stable and benign climate period since agriculture began. This stable period may be over. Whether man-made or natural, the world now does seem to be in the early phases of a new era of climate extremes, including both unusually warm and cold, and wet and dry periods.

We cannot forecast past climate and weather patterns confidently into the future and use them for our food planning.

Many wars, past and recent, have been fought over water scarcity, or because of drought caused by natural climate changes. Anthropogenic climate change may be a huge factor in the future. Like the argument about Peak Oil, there are climate change deniers, but their numbers are fading as ice melts, permafrost thaws, sea levels rise, and as what was once called "abnormal weather" becomes the new norm.

OCEANS AND AQUACULTURE.

So far, my focus has been on land-based agriculture. But fish, algae, and other resources from the oceans have always played a big part in human lives, especially in this part of the world. Unfortunately, not only has the history of ocean exploitation followed the same path as agriculture, but also the ocean itself has often been treated as an infinite garbage dump that is now filling up.

Technology has made it possible not only to extract to extinction fish that have been abundant staples for centuries but we have also obliterated fish that were barely known to exist until recently. The future of ocean resources seems very much in doubt. At the same time, seafood has grown in popularity as incomes rise. As a consequence seafood is shifting from being the last wild ingredient in our diet to being a highly managed and processed commodity. However, current fish farming appears to be a net drain on the world's seafood supply and so may be contributing to an additional strain on the world's food resources. As in so many areas, there are instances offering promise and hope interspersed with good reasons for concern and doubt.

GLOBAL NEOLIBERALISM.

The final factor I want to discuss is the dominance of global neoliberalism over other economic theories and systems. Global neoliberalism privileges growth, finance, and wealth creation over all other forms of human activity.

By its nature, capitalism is unstable, prone to booms, bubbles, and crashes that is the "creative destruction" that makes the survivors stronger, and society better off overall, it is often said. But global neoliberalism may also be unsustainable because all it knows is growth without end or other justification. If the resource base upon which global neoliberalism depends is infinite, then eternal economic growth might make sense (though some might prefer other life goals). If the resource base is finite, and/or if ways cannot be found to make it effectively limitless, then the economic system is unsustainable.

It could be that the near-collapse of the global economic system in 2007 was just the latest in the endless series of booms and busts, with recovery just ahead. But there are reasons to believe that the system, created after the Second World War and then re-focused by "Reaganomics" subsequently since the 1980s, has come to an end; that this specific economic/financial system is over, for all intents and purposes, while no new economic theory and system that can take its place is in sight. There are not even many viable contenders to replace a system that may never function effectively again.

One of the features of the global neoliberal economic system is to treat food as a tradable, hoard-able commodity, like any other commodity.

To many of you, the word "futures" probably means something different from what it means to me. For you "futures" refers to a commodity trading system, created in the late 19th Century, that was intended to allow both farmers and buyers to protect themselves against the uncertainties of weather, funding, and prices of some agricultural products, especially grains and animals. This worked pretty well for a long time. Even speculators could not upset it.

But this system was killed when the Commodities Futures Trading Commission deregulated futures markets in 1999, as part of the general deregulation of industries that global neoliberal economics demanded. This enabled the creation of Commodity Indexes that treated a bundle of things, some agricultural, some not, as an investment product that was sold as a unit. But the CIs had a unique feature. Intended to be long-range investments, they would only buy. They would never sell. A commodity investment became essentially a stock that (with other things) created a cycle that continually raised the price of food, giving more profit to the managers of CIs while harming everyone else.

While seldom discussed, much of the reason for the recent sudden steep rises in the price of food is not food shortages, weather, water, oil, or even politics: it is the normal operation of the current unsustainable financial system. CIs are just one of many opaque "debt instruments" created or expanded over the early 21st Century that led to the crash of 2007. They have not been discontinued or regulated. Their mischief continues to confound the operation of the "real economy."

I am not at all certain that a food industry of the kind you envision will be able to command the capital it needs to do all the wonderful things you have planned. But I do think that in any contest for capital, anything related to providing food for people should be the number one priority over anything else?including funding for technologies for killing people in a world frustrated by food and other shortages.

THE ANTHROPOCENE EPOCH.

According to the terminology of contemporary geology, the Earth has gone through many lengthy periods of substantial change, dynamic stability, substantial change, dynamic stability over its 4.5 billion year history. The Epoch during which humans evolved is called the Holocene Epoch that began about 12,000 years ago. It is a tiny, tiny sliver of the Earth's long history. Nonetheless, even though humans are extremely recent arrivals in the overall evolutionary processes, some scientists are now saying that the Earth and all its inhabitants are moving from the Holocene Epoch into the Anthropocene Epoch.

That is truly something new under the sun.

Those who say we are entering the "anthropocene epoch" wish to show that humans have now become a major geological force. Though we only recently evolved into sentient beings ourselves, we have in the last forty thousand years or so, and especially in the last 8000 years (with the invention and spread of agriculture), and 300 years (with industry), and 100 years (with exponential population growth and urbanization), influenced every geological and biological process on Earth that once operated "naturally" (that is to say, "without human influence"- of course humans are part of "nature" and so we are acting "naturally" whatever we do. It cannot be otherwise).

All living things influence their environment. All evolution is symbiotic—a mutual interrelationship between an organism and its environment. But humans have become something quite unprecedented on this Earth. As someone put it, "there is no place on Earth where the hand of man has not set foot!" We find human influence, more or less significant, everywhere in the biosphere. Moreover, human influence is increasing everywhere, every day.

This is not something new for humans—not something that only industrial humans, or "western man" has done recently. To the contrary, wherever early humans have moved out of Africa and across the globe, the local flora and fauna have all let out the cry: "Here come the humans! There goes the neighborhood"! The evidence is clear that humans have long had a major role in shaping the planet, exterminating species, and modifying existing ones.

The only thing that is different about recent human activity—the last 8,000 and then 200 or so years—is the scope of our abilities to modify "nature"; our biospheric reach across time as well as across space. Humans do things that not only effect life everywhere on the planet now, but also last for thousands of years into the future. It was difficult for us to reach so far into the future and across the planet before the scientific-technological revolution of 200-300 years ago. And now, with our universities and research labs making new scientific discoveries and pouring out new technologies and processes every day, humans are changing the world far faster than ever before.

So we are in a new geological epoch, the Anthropocene.

But there is more to it than that. Humans are changing the world faster than we are understanding it. While what our scientists know about the world is extraordinarily impressive, and while new discoveries are announced every day, there is still much we do not know. Indeed, there may be much we do not even know about. We don't know we don't know because we don't know it. We are discovering our ignorance and errors as fast as we are gaining new understanding, and yet we go on changing the world.

That is the key.

Perhaps it would have been better if we had first understood the processes of nature and then changed them (if we decided they needed changing, or had to be changed in order to achieve some other goal). But we did not do that. And now it is too late to do anything except take responsibility for what we have done and are continuing to do. We absolutely cannot or will not voluntarily stop acting. So we must learn how "to govern evolution", as Walter Truett Anderson has put it, even while we shape it more and more directly.

I challenge food clusters and Foodpolis to serve as beacons of the future of humanity and Earth in an Anthropocene Epoch. The argument between "natural" and "artificial " anything is passe. Everything, certainly food, must now be conceptualized differently. Nature was mortally wounded when we plunged the first hoe into her side. It is now our duty to assemble her remaining viable parts and see if we have the sense and sensibility to breathe life into a new creation.

There are more than enough reasons to doubt our success. There are more than enough reasons to be highly critical of many of the actors and decisions of the current food system. While we of course must let proper economic incentives work, we most certainly cannot allow our current financial structure be the main driver forward. I makes me angry to read a headline saying, "Junk Food Companies Say Eating More Fruits and Vegetables Is a 'Job Killer'" , because of course this makes perfect sense as far as the current economic system is concerned, but it is a true tragedy for the future of human life.

HOPE FOR THE FUTURES.

There are many reasons for being optimistic about the future, and the future of food clusters oriented to it.

First of all, you are a reason for hope. What you have done, are planning to do, and actually do will have great impact on the futures of food and humanity. I am counting on you.

Moreover, population growth has stopped and population is declining in Japan and Korea (and elsewhere, especially Europe and Russia), and may begin stabilizing and eventually declining in many other parts of the world. While global population growth still threatens to make Malthus right, if we can somehow keep food supplies up until global population begins declining - if it does - we might end the threat of Malthus forever.

We absolutely must not try to make fertility rise again just because our current economic system is largely based on growing numbers of consumers. Our economy does not need to grow if population is not growing! Human needs - and environmental sustainability - should drive the economy and not the other way around, as it does currently.

I assume that food clusters will focus on the utilization, research, and development of the

very highest of high tech capabilities. The phenomenon called "Accelerated Evolution" of technologies is one of the major reasons for optimism. Developments in robotics, artificial intelligence, brain science, biological science and technology (especially), nanotechnology, and new materials are truly mindblowing. I expect food clusters to be leaders here.

Though finding the money and energy needed to keep the evolution of technologies accelerating will be a huge challenge, I do believe the food industries have more reason to be optimistic than many others.

The future of "designer foods" has never been brighter. It appears that Foodpolis may be focused on this aspect of the future. If so, it is fully justified - as long as adequate time and attention is also given to the huge challenges of energy and water supplies as well.

So far, I have said little about the current and growing opposition to "artificial" food and the rise of the entire "natural food" movement. I want to list it here among the many good things supporting your efforts. It should not be viewed as an opponent. It should be an ally. They want to end world hunger at least as earnestly as you do!

The natural foods/whole foods/slow food movement has turned what was once a totally marginal and cranky concern into something that "everyone" knows about. "Modern" people living in cities took food for granted. They knew nothing of how to grow food on conventional farms, or how food might be produced to feed future generations - or even their own future selves. Living in cities with abundant food from all around the world them made them oblivious to the challenges.

Now, with the rise of beliefs in "natural foods" and opposition to genetically modified foods, millions of people have begun to think about what "food" is and how it should be produced, processed and delivered. They are personally reversing the long term trend that Jarvis Cain saw: They are planting gardens and trying to grow their own food; they are avoiding meat, even though they may love it, relieving pressure on using scarce land and energy to grow food for animals; even though they live in cities, they are interested in "vertical farming" and microbial farming.

They may seem to you naively uniformed and irrationally focused on some aspects of food production and consumption and oblivious to others, but they are providing a social service that such enthusiasts have played throughout all of human history. Embrace them as welcomed brothers and sisters.

There is still much work we must do together. Unfortunately, there is very little in recent experience to encourage most thinking people automatically to trust what a special interest says about its products and processes. There have been too many lies, distortions, extortions, and tragedies. Slow food plays a role vital for environmental sustainability and hence human survival.

Finally, I want to call your attention to the space community as one you should view as a close partner. Bring them in to your food clusters if they are not already partners.

I am co-chair of the Space and Society Department of the International Space University, headquartered in Strasbourg, France. I am a total space nut. I want to go to Mars NOW.

I also know that in a contest for energy, water, and other resources between the space community and the food industries, food will win out: people would rather eat on Earth than starve on the way to Mars.

But in fact, members of the space community are among the true leaders in the creation of designed environments and designed nutrients. Everything necessary for human space exploration must be planned for, created, maintained, and recycled by humans. The main thing that "space" offers to Earth is how to design for transformed life in transforming environments. Space is the Poster Child of the Anthrocene Epoch.

"Before this decade is out," a President of the United States once promised, "America will land a man on the Moon and bring him safely home again."

His word was true. We did that.

"Within a decade," promised a Secretary of State of the United States, "no man, woman, or child will go to bed hungry."

Since the time he made that promise, in 1974, the number of hungry people worldwide has doubled.

Will it double again?

What do you say? The future of foods is very much up to you.

SPEECH I
Convergence of the Global Food

Convergence in the Food Industry

Martin Hall
(Director of Science, Campden BRI, UK)

주제강연 I
글로벌 식품 융복합

식품산업의 융복합화

마틴 홀 *(영국 캠든BRI 식품과학부문 최고책임자)*

Speaker's Brief CV

Name	Martin Hall
Nationality	UK
Current Position	Director of Science
Organization	Campden BRI
Education	Graduated in chemistry and biological sciences from Coventry University in 1975 Over 35 years of experience of a wide range of food related subjects with specific interests in scientific and research strategy, food safety and quality, food consumer trends, authenticity and analytical techniques.
Degrees Awarded	Bsc Hons degree in Biology Bsc Hons degree in Chemistry
Awards and Scholarships	1980 ~ Member of the Royal Society of Chemistry and Chartered Chemist 1980 ~ Fellow of the Institute of Food Science and Technology since 1980
Professional Experiences	1980 ~ 1980 UN consultant (UNDP) to Korea Food Research Institute (Suweon) 1990 ~ 1990 Food safety advisor to Hong Kong Government 1998 ~ Director of Science at Campden BRI, responsibility for Chemistry and Biochemistry, Microbiology, Statistics and Consumer and Sensory Science 1998 ~ 2005 UK FSA Chemical Contaminants Group 2003 ~ 2007 Vice-president European OEITFL Technical and Legislation Committee 2005 ~ Consultant to Kuwait Municipality on food safety and control laboratory 2005 ~ 2009 Coordinator of European/New Zealand joint food research initiative 2008 ~ Chair of National NMO Chemical and Biological Metrology Group 2011 ~ Government Chemist Working Group

연사 이력

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소속	캠든비알아이(Campden BRI)
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학위	생물 이학사 화학 이학사
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Abstract

CONVERGENCE IN THE FOOD INDUSTRY

The term convergence, or coming together, in relation to the food supply chain is applicable at several levels. First, there is a convergence of drivers - external factors that together present a challenging environment in which the food industry must operate at local, national and international levels. These include globalisation of trade and material sourcing, increased consumerism with converging trends across the world, global issues such as climate change, concerns over future availability of adequate water and energy supplies and unfortunately the serious threat of terrorism.

In order to mitigate and/or adapt to these factors the food industry must embrace innovation, based on high quality R&D. However, to do so it must first define its converging needs. In 2012 Campden BRI published the results of an industry-wide consultation on this subject.

Alongside this there is extensive research activity in a range of technologies, such as predictive biology, biotechnology, nanotechnology and many others, that could provide viable solutions to address the threats and opportunities facing industry.

This talk will set the context in which the industry is operating and review the key needs for technical intervention. It will briefly review some of the convergent technologies that may be important and will consider how innovation and needs can be linked more effectively in the context of a cluster or industrially aligned research facility.

요약

식품산업의 융 · 복합화

융 · 복합이라는 용어는 식품공급체인의 여러 단계에 적용될 수 있다. 첫째로 동인(動因)의 융합이 있다. 즉, 식품산업의 지역, 국가, 국제적 환경을 도전적으로 만드는 모든 외부요소의 융합이다. 이런 요소에는 무역이나 식품원료조달의 글로벌화, 세계적으로 공통된 흐름을 보이는 소비자주권주의의 강화, 기후변화와 같은 글로벌 이슈, 미래 수자원과 에너지 공급에 대한 우려가 있으며, 안타깝게도 테러의 위협도 여기에 포함된다.

식품산업은 이런 요소에 적응하거나 완화하기 위해 양질의 R&D를 바탕으로 혁신을 포용해야 하며, 이를 위해서는 먼저 공통된 니즈를 파악해야 한다. 캠든비알와이(Campden BRI)에서는 공통된 니즈에 관한 산업전반의 논의결과를 취합해 올해 초 출간하기도 했다.

또한, 예측생물학(Predictive Biology)이나 생명공학, 나노기술과 같은 다양한 기술 분야에서는 식품산업이 직면한 위협을 해결하고 기회를 활용하는데 필요한 기술 관련 연구가 다양하게 진행되고 있다.

본 논의에서는 식품산업이 처한 환경을 제시하고 기술개입에 관련한 핵심 니즈와 중요해질 수 있는 일부 융합기술을 간략하게 살펴볼 것이며, 산업클러스터나 산학연협력의 맥락에서 혁신과 니즈를 보다 효과적으로 연계할 수 있는 방법에 대해 고찰하고자 한다.

Campden BRI
food and drink innovation

Convergence in the Food Industry

Martin Hall
Director of Science
Campden BRI, UK

1st World Food Cluster Forum

21 February 2012,
Seoul, Republic of Korea

Campden BRI

- Membership based >2000 companies and organisations
- Industry and Government Clients
- Independent, - Non-profit distributing
- International >60 countries
- Staff: ≈ 400 (£20m)

- Research & Development
- Technical support/services
- Knowledge Management and transfer

Campden BRI
food and drink innovation

Campden BRI – Mission and Vision

Practical application of technical excellence for the food and drink sector:

- Product **safety**
- Product **quality**
- Processing **efficiency**
- Product, package and process **innovation**
- Industrially relevant **knowledge**

To be the partner of choice for the development and application of technical knowledge and commercially viable solution for the food and drink sector.

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Hungary

Outline of Talk

1) What and where is there convergence
2) Convergent drivers
3) Industry needs
4) Bringing together needs and technology
5) Technologies
6) Final considerations

Drivers – external factors

- Global trade:

  Major growth in added value products
  processed for direct consumer sale

- Raw material supply:

  Significant demand/competition
  Shortage of consistent quality materials; fit-for-purpose

What and where is convergence?

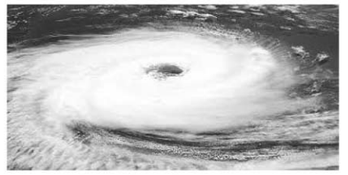
- Convergence of:

  External factors – trade, environment
  Market trends – consumer demands
  Needs arising
  Technological development
  Issues and barriers

Drivers – external factors

- Climate change:

  Mitigation and adaption



  Reduced inputs, minimisation of processes and packaging, more recycling, extended shelf life, emerging chemical and microbiological hazards

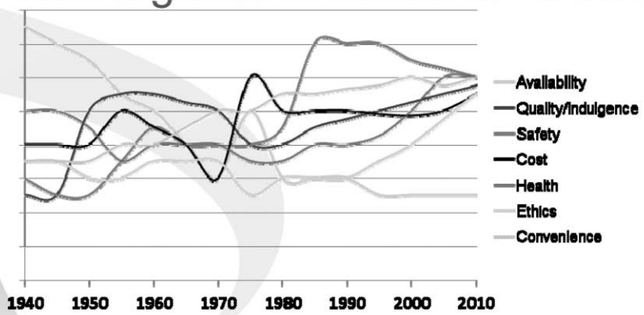
- Energy and water:

  Significant demand/competition

  Reduction in process, transport and storage energy, less water use and more recycling

Drivers – consumer factors

- Development of consumerism and convergence of trends to "wellbeing"



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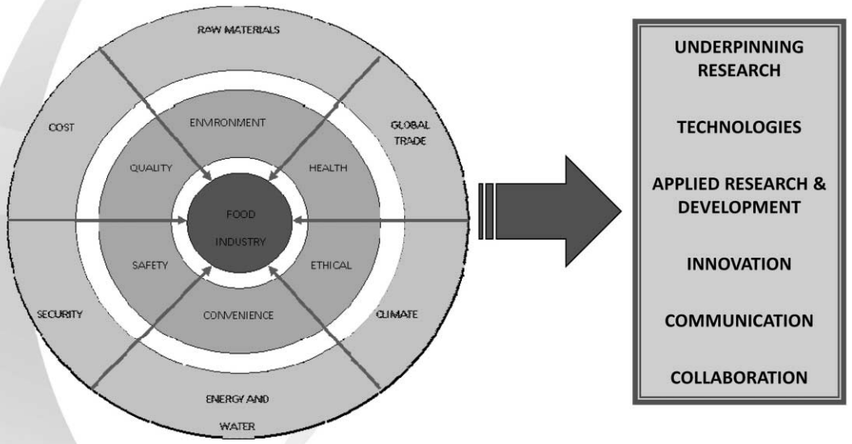
Drivers – convergence



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Needs

- **Consumer research** - attitudes, eating habits, choice and preference
- **Mechanistic understanding** - of quality and raw material functionality – nature, formation, e.g. in process, breakdown
- **Raw materials** – new sources, type and characterisation
- **Improved processes** - to reduce inputs, energy and impact and cope with variable raw materials – type and control, storage and transport
- **Link between diet and health and food** – better understanding
- **Novel products and packaging** - to meet consumer needs
- **Shelf life** - extension and waste minimisation
- **Hazard and risk** - detection and management for food safety issues
- **Effective communication and collaboration** - horizon scanning

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Bringing needs and technology together

Appropriate technology must be:

Matched to need –

otherwise need unlikely to be met fully

Exploited across needs –

otherwise insufficient critical mass to support technology

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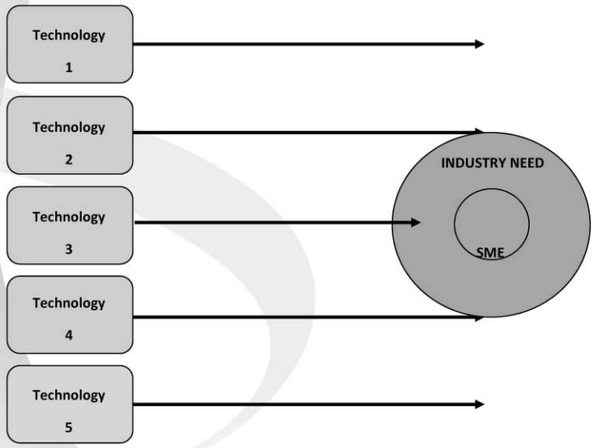
What and where? | Drivers | Needs | Bringing together | Technologies | Considerations

Bringing needs and technology together – technology matched to need



Multidisciplinary approach is required to meet most innovation needs

Novel technologies are often difficult for companies to assimilate; particularly SMEs - barrier to open innovation

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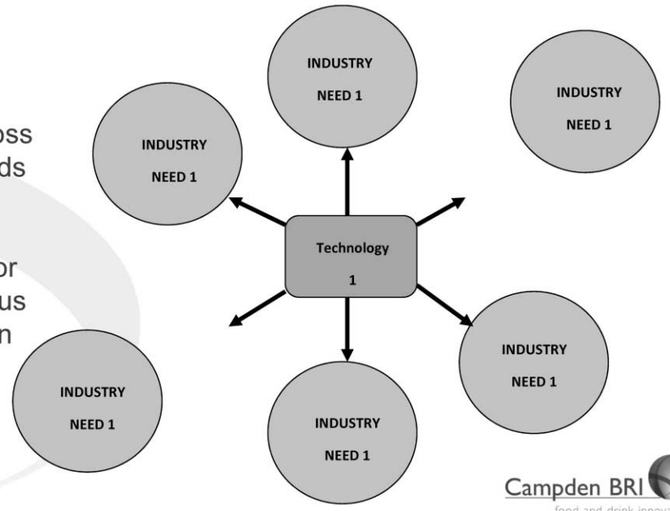
What and where? | Drivers | Needs | Bringing together | Technologies | Considerations

Bringing needs and technology together – technology exploited

Technologies applicable across a range of needs and industries.

Critical mass for technology focus and exploitation



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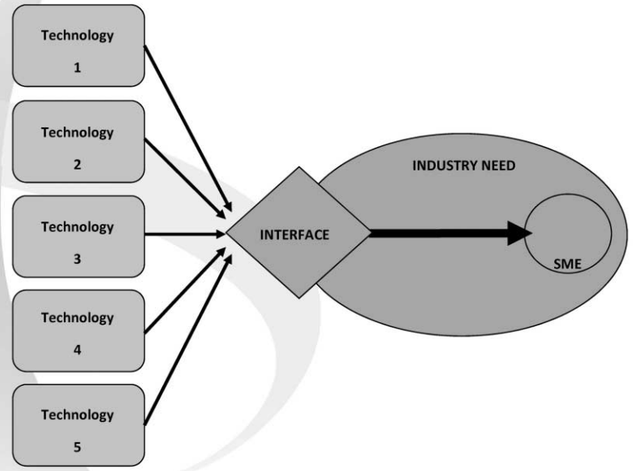
What and where? | Drivers | Needs | Bringing together | Technologies | Considerations

Bringing needs and technology together



Interface to ensure translation and application of new technologies.

Important to have interface organisation or role

Within company
Within cluster
External company

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What and where? | Drivers | Needs | Bringing together | Technologies | Considerations

Convergent technologies

- Technologies that have the capability to address several strands of development and enable broad areas of innovation

Some examples:

- Predictive or systems biology
- Genetic engineering
- Process engineering – novel process technologies
- Nanotechnology

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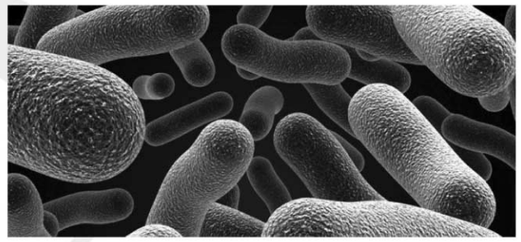
Predictive or systems biology

- Uses information on all processes and interactions within a biological system to predict how that system will behave.



For example predictive microbiology

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Predictive or systems biology

- Relies on extensive models

  Data from practical studies

  Range of "omic" technologies

Genomics – study of the genome (DNA sequencing)
Transcriptomics – study of gene expression (mRNA)
Metabolomics – study of metabolites (formation/fate)
Proteomics – study of proteins (structure and function)
Bioinformatics – application of computing to biological data
e.g. used in personalised foods

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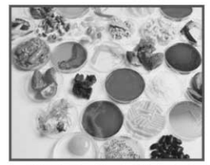
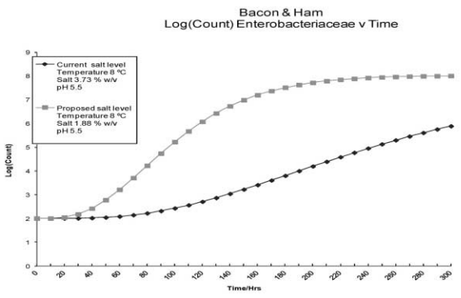
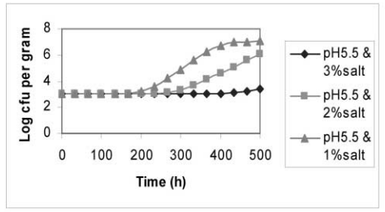
Predictive or systems biology

- Predictive microbiology





Effect of salt on c. Botulinum growth



Valuable as rapid screening for new formulation development

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Predictive or systems biology

- Personalised foods

  Foods designed and developed to meet the specific needs of an individual consumer based on their genetics (inherited or SNPs)

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Predictive or systems biology

- Personalised foods

Wide range of diseases, intolerances and preferences linked to diet and genetics

e.g. Lactose intolerance, PKU, astringency

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Predictive or systems biology

- Personalised foods

Convergent research needs in:

1. Understanding the link between genetics and need
2. Characterising individuals
3. Instilling unique properties into the food

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Genetic engineering

- Significant area for future innovation

Raw material availability (tolerance) and quality (functional trait)

Convergent research/development needs in:

1. Understanding the role of the trait – benefit, function
2. Elucidating the link between trait and genetics
3. Understanding the link between environment and expression
4. Methods of modifying the organism
5. Managing consumer attitudes

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food and drink innovation

Process engineering – Novel processes

- A means of allowing flexibility, quality differentiation, efficiency and economy

www.campden.co.uk/new-technologies.htm

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food and drink innovation

Process engineering – Novel processes

Alternative thermal

- Microwave (e.g. MATS)
- Ohmic Heating
- Ultrasound assisted
- Pressure Assisted Thermal Sterilisation (PATS)
- Various systems designed for low aw products e.g. Revtech, CCP, safesteril

'Non-thermal'

- High pressure pasteurisation
- Pulsed electric field
- Plasma processing
- Ozone (washing and in-pack)
- Electrolysed water
- Pulsed light
- Dense phase CO2
- UV liquid processing
- Irradiation

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food and drink innovation

What and where? | Drivers | Needs | Bringing together | Technologies | Considerations

Process engineering – Novel processes – examples

- High pressure processing

Extremely high hydrostatic pressure (150 – 700 MPa)

Benefits

- Product quality improvements
- Retention of functional components
- Protein modification
- Niche specialist applications

Possible limitations

- Shelf-life
- Throughput
- Cost

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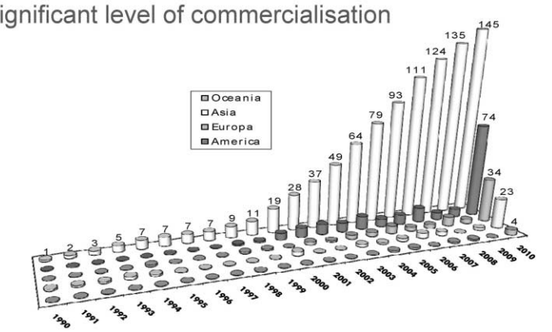
food and drink innovation

What and where? | Drivers | Needs | Bringing together | Technologies | Considerations

Process engineering – Novel processes – examples

- High pressure processing

Significant level of commercialisation



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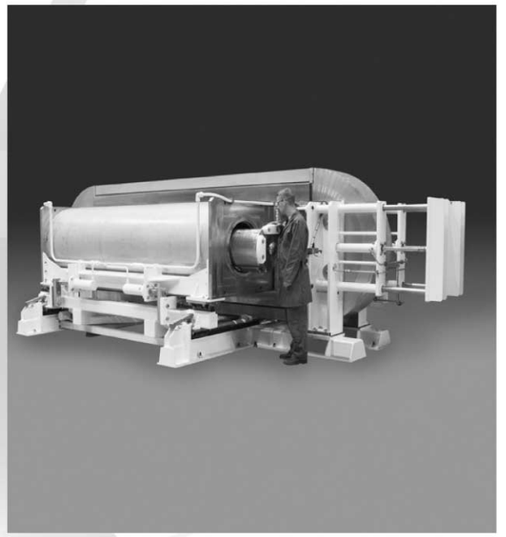
food and drink innovation

What and where? | Drivers | Needs | Bringing together | Technologies | Considerations

High pressure processing



Images courtesy of Carole Tonello, NC Hyperbaric

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food and drink innovation

Process engineering – Novel processes – examples

Pasteurisation of low A_w products

Steam sterilisation – kills vegetative pathogens reduces spore count

Dry materials such as uncooked nuts, seeds, spices and dry ingredients

100 – 400Kg /hr

e.g. Revtech, CCP, safesteril

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food and drink innovation

Pasteurisation of low Aw products

Steam can be introduced into the heating coil, typically in the first few loops of the spiral.
The steam can be superheated to 180°C. After steam injection the heated pipe can be used to remove residual moisture.

Benefits

Low energy use

Continuous process

Avoids use of fumigants or irradiation

Easy operation and cleaning

Retains quality

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food and drink innovation

Nanotechnology

- Technology of very small materials (one dimension < 100nm)
- At these sizes the physical and chemical properties of materials change significantly

Melting point	Magnetic properties	Strength
Conductivity	Appearance	Purity
Reactivity	Biological significance	

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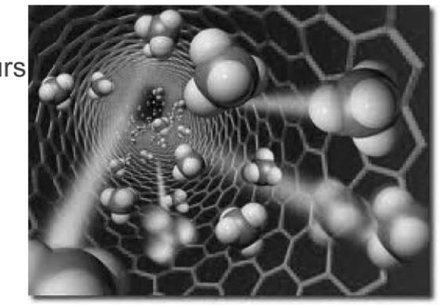
food and drink innovation

Nanotechnology - applications

- Stabilisation and targeted release - agrochemicals, nutrients, flavours
- Surfaces - catalytic, antimicrobial, self-cleaning or self-healing
- Packaging – barrier, active, strength
- Analysis - sensors, detectors, isolation and concentration



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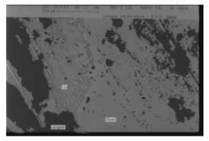
Nanotechnology - examples



- Silver nano-coating

  Silver known to be antibacterial for many years – widely used in medicine

  Ionic form may be toxic to animals

  In nano form bacterial potency typically increased by 40 times

- Applications on a wide range of material

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food and drink innovation

Nanotechnology – example (NanoAg)

Food containers

Plastic and paper bags

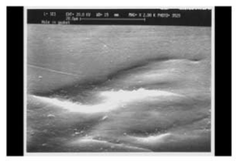
Crates in poultry factories

Cutting boards

Kitchen and factory utensils

Refrigerators

Odour removal



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food and drink innovation

Final comments

Convergence is in several forms

- Drivers converging on industry
- Convergent needs of industry
- Technologies need to converge to address these needs
- Convergent technologies need to be applied across several needs

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food and drink innovation

Final comments

Industry needs to collaborate and communicate

Industry, particularly SMEs need support in technology transfer

Several technologies are now available to help

Application of innovation must be done carefully to retain the acceptance and approval of consumers

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food and drink innovation

SPEECH II

Win-win Strategy for Corporates and Food Clusters

An excellent test bed for our future food ideas

Lötta Torner
(CEO, Skåne Food Innovation Network, Sweden)

주제강연 II

기업과 클러스터의 상생 방안

미래식품 관련 아이디어의 훌륭한 시험무대

로타 토너 *(스웨덴 스코네푸드혁신네트워크 CEO)*

Speaker's Brief CV

Name	Lotta Törner	
Nationality	Sweden	
Current Position	CEO	
Organization	Skåne Food Innovation Network	
Education	1980 ~ 1981	Information and journalist programme, Skurup College of Further (Folkhögskola)
	1981 ~ 1985	Various courses in economics at the University of Lund
Professional Experiences	2009 ~	CEO of the Skåne Food Innovation Network
	2007 ~ 2008	Operational Manager of the Skåne Food innovation Network
	1995 ~ 2006	Skånemejerier, Staff Information
	1989 ~ 1995	Investment AB Cardo, Staff Information, Malmö
	1987 ~ 1989	EF Education, Marketing Department, Malmö
	1985 ~ 1987	Tetra Pak, Information Department, Lund
	1980 ~ 1985	Sydsvenskan and Arbetet newspapers, temporary journalist position

연사 이력

이름	로타 토너	
국적	스웨덴	
직책	CEO	
소속	스코네푸드혁신네트워크 (Skåne Food Innovation Network)	
학력	1980 ~ 1981	Skurup시민대학(Skurup Folkhögskola) 언론정보 프로그램
	1981 ~ 1985	룬트대학교(Lund University) 경제학 과정
경력	2009 ~	스코네푸드혁신네트워크 CEO
	2007 ~ 2008	스코네푸드혁신네트워크 운영총괄
	1995 ~ 2006	Skånemejerier(스케네유제품회사) 홍보담당
	1989 ~ 1995	카르도(Investment AB Cardo) 홍보담당, 스웨덴 말뫼(Malmö)
	1987 ~ 1989	이에프교육(EF Education) 마케팅부, 스웨덴 말뫼
	1985 ~ 1987	테트라팩(Tetra Pak) 홍보부, 스웨덴 룬트
	1980 ~ 1985	Sydsvenskan신문과 Arbetet신문 객원기자 활동

Abstract

An excellent test bed for our future food ideas

Swedish industrial landscape is changing. From raw materials and heavy industries over to knowledge based industries. But innovation in larger companies is insufficient. Several companies are know down-sizing their R&D function. We need a new innovation model. A more long term approach founded on cooperation. Between big and small entities. Between ALL the innovation actors in the industry.

Swedish food industry with it's base in the south of Sweden could very well be on to something interesting in it's present way of cooperating and working with innovation. The food companies has traditionally had less R&D but more of triple helix corporation than other industries. And through Skåne Food Innovation Network new models for cooperation are constantly formed.

The fact that Sweden do not have a strong food culture of it's own and no large food export creates interesting possibilities for Sweden as a global test bed for the food ideas of the future.

An industry used to shorter lead times and a "fastest to market wins"-approach paired with a "first mover" mentality in the market - with well-educated, curious consumers considering themselves as healthier and more conscious than others - Sweden has all the prerequisites to be a global test bed for future food ideas.

요약

미래식품 관련 아이디어의 훌륭한 시험무대

스웨덴 산업환경은 원자재와 중공업 중심에서 지식기반산업 중심으로 변하고 있다. 하지만 대기업에서 충분한 혁신이 일어나지 않으며 여러 기업이 R&D기능을 줄이고 있다고 알려져 있다. 대기업과 중소기업 간이나 산업 내 모든 혁신주체 간의 협력을 바탕으로 더 장기적인 관점에서 새로운 혁신모델을 구축할 필요가 있다.

스웨덴 남부지방을 중심으로 하는 스웨덴 식품산업에서는 협력과 혁신활동이 이루어지는 현재방식에서 흥미로운 점을 발견할 수 있다.

식품기업은 전통적으로 타 산업에 비해 R&D가 부족한 분야였지만 삼자 협력이 뛰어난 분야이다. 또한 스케네식품혁신네트워크에서는 새로운 협력모델을 꾸준히 개발하고 있다.

스웨덴에는 스웨덴만의 강력한 식품문화도 없고 대규모 식품수출기업도 없기에 스웨덴을 미래 식품관련 아이디어의 세계적인 시험무대로 만드는데 필요한 기회를 얻기 힘들 것이다.

그러나 스웨덴 식품산업은 리드타임(Lead-time)이 짧고 "선발업체"를 중시하고 "가장 빨리 시장에 상품을 내놓는 기업이 이긴다"는 생각에 근거한 접근방식을 취하고 자신을 남들보다 더 건강하고 더 신중하다고 여기는 호기심 많고 잘 교육받은 소비자가 있기 때문에 미래 식품관련 아이디어를 시험해볼 수 있는 글로벌 시험무대로서의 전제조건을 모두 갖췄다고 말할 수 있다.

Shaping our future food & culinary experiences

Lotta Törner – CEO, Skåne Food Innovation Network

Skåne Food Innovation Network

A transformation is on it's way in Sweden

- Heavy Industry
  Long patents, slow trends
- Knowledge based industry
- R&D moves out!
  To few innovations in to large companies
- The time of patents is over!
  Time for long term development
- We need a new innovation model!

Skåne Food Innovation Network

Sweden – small but beautiful!

- Large country, small population
- Historical exporter of timber, paper, metals
- Industrial country with large company groups - SKF, Volvo, SCA, ASEA, TetraPak etc
- Lately also a knowledge based industry nation – Skype, Voddler, Spotify, Ericsson
- High level of education

Skåne Food Innovation Network

From mines and timber to a global test bed

Swedish food industry is on to something

- Traditionally less R&D, more triple helix corporation
- Shorter lead times, fastest to market wins
- No strong food culture, no large food export
- A first mover nation, curious and considering itself as healthier and more conscious than others

All the prerequisites for a global test bed

Skåne Food Innovation Network

Skåne Food Innovation Network in a nutshell

The natural hub of Northern Europe's sharpest food cluster

Skåne Food Innovation Network

Functional Food "started here"…

- ProViva
- Oatly
- PrimaLiv
- Reuteri
- Becel
- BioGaia
- Indevex
- Concellae

Skåne Food Innovation Network

Skåne is food!

- Food industry turnover in Skåne: 20 billion Euro
- Skåne: 50 % of Swedish food production
- The majority of R&D for Swedish food industry is located in Skåne

You find the entire value chain in Skåne!

Skåne Food Innovation Network

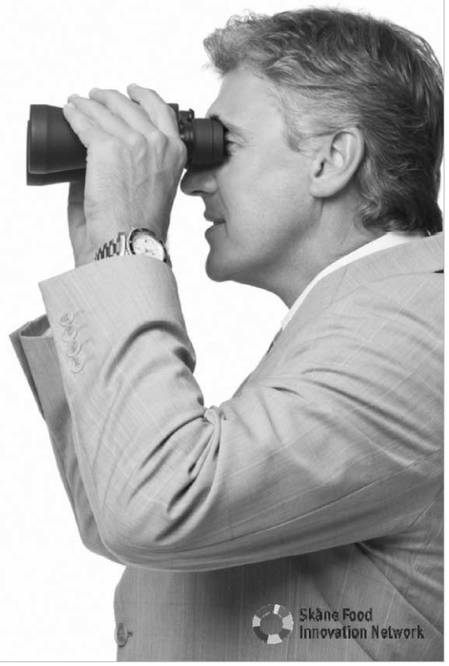
Vision

Shaping our future food & culinary experiences

Business Idea

To be the best network for co-operation between competences developing the food and culinary sectors

To create unique meeting-points, break barriers and make the unexpected happen



Skåne Food Innovation Network

44 partners Triple Helix **Innovation pilots**

Business driven

70+ members

5 activity areas **Open Innovation**

3 international partners (Korea, Norway, Chile)

8 trainees – 800 wanting to be ... **10+ networks**

500+ participants in activities

From 1 to 23 million SEK in 9 years

Skåne Food Innovation Network

We are a partner to the food business!

A unique **CEO Network** secure comitment on the right level

5 well defined activity areas

1 well-oiled hub with network that makes a difference

Skåne Food Innovation Network

Strong partners support our model!

Agencies, organizations, **educational institutions** in our partner network

Skåne Food Innovation Network

A unique cluster initiative?

Hardly. But unique methods to succeed!

Skåne Food Innovation Network

The first success story!

Skåne Food Innovation Network

A brave and visionary Board of Directors

Daring to look beyond the obvious ”low hanging fruit”

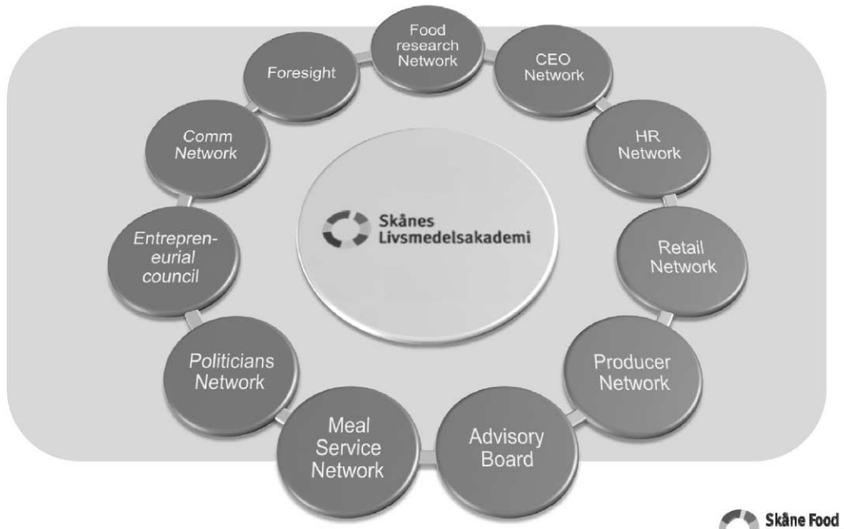
Skåne Food Innovation Network

A different way to organize ourselves ...

Good combination of talents, good mix of backgrounds

Skåne Food Innovation Network

Our networks makes the difference!



Skåne Food Innovation Network

Local heritage, national role, European presence

- We work, implement and develop our ideas, pilots and networks **locally**
- Our prestige projects have **national** attention
- With a strong track record we now have a **national role** in bidding for a food kic
- We benchmark and interact with fellow cluster organisations in **Europe** and **elsewhere**

FUNDACIONCHILE · Hedmark Kunnskapspark · FOODPOLIS · european food alliance

Skåne Food Innovation Network

Lessons learned in leading by networks

- Building durable networks takes time. Patience.
- Use participants to build the agenda
- Use existing networks to interact with
- Manage participants different level of comitment
- End-user prespective

Skåne Food Innovation Network

Beyond best practice …

Open innovation environment, networks, inclusive approach, innovation pilots ...

- Our models work
- Several new assignments based on our approach
- Increasing interest from various stakeholders to learn from us

Our approach defines the future mission

Skåne Food Innovation Network

The Anatomy of our Innovation model

Foresight – Guilds – Pilots – System Innovation

Skåne Food Innovation Network

The SFIN Innovation Guild Model

A tried and proven model for systemic meetings

1. The story. Real, personal, thoughtful and applicable. Based on an end-user perspective.

2. Clarifying questions from the participants (no reflections).

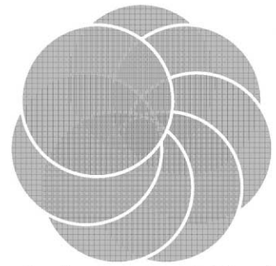
3. Actual patterns/choices identified. Consequenses of choices made.

4. Alternative patterns/choices identified. Different outcome had other choices been made?

5. What can we learn from the patterns and choices that we saw in the story? Joint discussion.

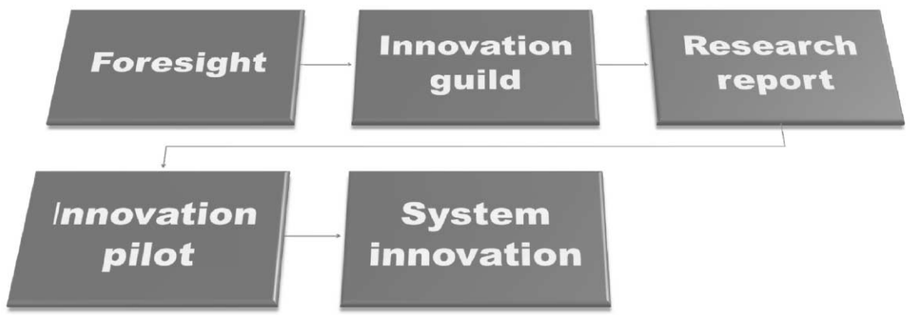
6. Theme identification. Groups are formed around themes that have the greatest potential for innovation.

7. Action plan. How do we proceed? A plan to build bridges across the weaknesses, develop ideas and identify joint ventures.



Skåne Food Innovation Network

The anatomy of our innovation model



Skåne Food Innovation Network

A model built on open innovation

- Including rather than excluding approach
- Accustomed to setting up and running innovative pilots with a number of actors in the system involved
- A successful system innovation affect the existing order, and several companies and organizations will have a positive effect of the change
- *3 exciting pilots going on right now ...*

Skåne Food Innovation Network

Innovation pilot I:
Good meals in hospitals

At the request of Region Skåne

Skåne Food Innovation Network

Innovation pilot II:
Good meals for seniors

Skåne Food Innovation Network

Innovation pilot III:
Locally produced, easily accessible

Skåne Food Innovation Network

Some final thoughts ...

Communication, what's next, final words

Skåne Food Innovation Network

Some final words ...

- Cooperation must add value for all involved
- Create and show good examples
- Provide the arenas – horisontal and vertical
- Support and commitment from industry
- **Don't hold on to the ideas, hold on to the initiative!**

Skåne Food Innovation Network

SPEECH III

Globalisation and Cluster of Convergence of Domestic Food Technology

Future directions for the food industry: what will the industry at home and abroad look like in the future?

Dong-Hwa Shin
(Chair, Food Industry Promotion Committee)

주제강연 III

국내 식품융복합 기술의 세계화와 클러스터

국내 · 외 식품산업의 조망 및 향후 지향 방향

신동화 *(식품산업진흥심의회 위원장)*

Speaker's Brief CV

Name	Dong-hwa Shin	
Nationality	Republic of Korea	
Current Position	Chair	
Organization	Food Industry Promotion Committee	
Education	1977 ~ 1981 PhD degree in engineering, Dongguk University	
Degrees Awarded	1977 ~ 1981 PhD degree in engineering, Dongguk University	
Awards and Scholarships	President's Agricultural Technology Award Academic Award of the Korean Society of Food Science and Technology (KoSFoST, 2003)	
Professional Experiences	Feb 2010 ~	President of Korea Food Safety Association
	Sep 2008~	Director of Shing Dong Hwa Food Research Center
	Dec 2008~	President of Korean Sauce Recipe Research Society
	Feb 2009~	Chair of Food Industry Promotion Committee (Ministry for Food, Agriculture, Forestry, and Fisheries)
	Sep 2010~	Chair of Food Additive Subcommittee of Food Hygiene Council (KFDA)
	Apr 2009~Aug 2010	Chair of Food Hygiene Council (KFDA)
	Jan 1, 2005~Dec 31, 2006	President of the Korean Society of Food Hygiene and Safety
	Nov 19, 2004~	Member of the Korean Academy of Science and Technology
	Jan 1, 2002~Dec 31, 2002	President of KoSFoST
	Apr 13, 1988~Aug 31, 2008	Professor of food engineering major, Department of Applied Biological Engineering, ChonBuk National University (currently, honorary professor)

연사 이력

이름	신동화	
국적	대한민국	
직책	위원장	
소속	식품산업진흥심의회	
학력	1977 ~ 1981 동국대학교 대학원 공학박사	
학위	1977 ~ 1981 동국대학교 대학원 공학박사	
수상/표창	농업기술 포장(대통령) 한국식품과학회 학술상(2003)	
경력	2010. 02-현재	(사)한국식품안전협회 회장
	2008. 09-현재	신동화식품연구소 소장
	2008. 12-현재	(사)한국장류기술연구회 회장
	2009. 02-현재	식품산업진흥위원회 위원장(농림수산식품부)
	2010. 09-현재	식품위생심의위원회 식품첨가물 분과위원장(식약청)
	2009. 04-2010. 08	식품위생심의위원회 위원장(식품의약품안전청)
	2005. 1. 1-2006. 12. 31	(사)한국식품위생안전성학회 회장
	2004. 11. 19-현재	(사)한국과학기술한림원 정회원
	2002. 1. 1-2002. 12. 31	(사)한국식품과학회 회장
	1988. 4. 13 -2008. 8.31	전북대학교 응용생물공학부 식품공학전공 교수 (현 명예교수)

Abstract

Future directions for the food industry: what will the industry at home and abroad look like in the future?

The food industry has now reached a critical juncture where it needs to converge or put together a broad range of adjacent industries and needs to take the lead in acquiring food security and sovereignty.

The economic size of the industry stands at KRW 257.3 trillion, or USD 229.3 billion, if it includes food-related industries such as food ingredients, distribution, and dining. The industry is no less important than national defense since it is both a major manufacturing industry and an essential to life industry. Now its contribution to Korea's exports is also on the rise, expanding its boundaries beyond the domestic market. Particularly the dining industry is now positioning itself as one of the key manufacturing sectors as it grows together with the food industry.

In recent years, the domestic food market has been saturated because of changing social conditions such as population loss and aging. Under these circumstances it is necessary to come up with diversified ideas, for example, securing a bigger market by expanding exports if we want to tackle these trends. Export conditions for Korean food products are favorable. The size of the global food market now exceeds four trillion dollars with high annual growth rates. Thus we might be able to further develop and expand the food industry into a new frontier depending on our efforts.

The Korean government is also pursuing policies to secure food safety, export food, and develop the industry together with agriculture and fishing. We need to properly respond to the national policies while examining and implementing different ideas, which can put the industry one notch higher. We also need to brace for a saturated food market in Korea. To do so, we need to find ways to secure competitive local food ingredients, come up with concrete ways to expand and diversify food exports, develop export items with business potential, and thoroughly research and develop ways of increasing value added. Especially it is necessary to link the dwindling first industry, including agriculture, with the second or third industries like processing and distribution in order to extract it from the difficult situation. To this end, the nation shall set up a nationwide support system and review necessary support measures in a specific and practical manner. The Korean food globalization project and the national food cluster project are timely to promote the food industry. These measures deserve nationwide attention and food experts and related institutions need to gather their wisdom.

Developing food-related industries requires adequate talent, R&D support, vibrant back-up industries such as food packaging and machinery while it also asks for strong marketing and information collection, analysis, and provision.

요약

국내 · 외 식품산업의 조망 및 향후 지향 방향

식품산업은 이제 여러 관련 산업과 폭넓게 연계하여 융 · 복합산업으로 육성해야 할 시점에 와 있으며 식량안보와 식량주권을 확보하는데 주도적 역할을 해야 한다.

전체적으로 우리나라의 식품원료를 포함한 외식 등 식품관련 산업 및 유통을 포함한 경제규모는 규모는 257.3조원으로 주요 제조업이면서 생명산업으로 국가의 국방에 버금가는 주요 분야이면서 이제 내수산업의 범주를 넘어 수출 기여도도 상승하는 추세를 보이고 있다. 특히 식품산업과 함께 외식산업은 동반 성장하고 있어 국가의 중요한 제조업 중 한 분야를 이루고 있다.

근래 국내 식품산업은 우리 사회 여건 변화, 즉 인구 감소, 노령화 등의 이유로 내수시장이 포화되고 있는 경향을 보여 이를 해결하기 위해서는 수출 확대를 통한 식장 확보 등 다각적인 노력이 필요한 시기이다. 우리 식품의 수출 여건을 볼 때 세계 식품시장은 4조불을 넘어서고 있어서 매년 그 성장률도 높은 경향을 보이고 있기 때문에 우리 노력 여하에 따라서는 새로운 분야에서 식품산업육성 계기를 마련 할 수 있는 기회를 맞고 있다.

우리 국가적으로도 안전식품공급, 식품산업의 수출 산업화, 식품산업과 농어업의 연계 발전 정책을 추진하고 있는바 국가 시책에 부응하면서 우리 식품산업을 한 단계 발전시킬 수 있는 발안을 다각적으로 검토하고 실행 할 시점에 와 있다. 포화되는 국내 시장을 대비하여 경쟁력 있는 국산원료의 확보 방법을 구상하고 구체적인 식품류의 수출 확대 방안, 그리고 수출 다변화를 꾀해야 할 것이며 기업성 있는 수출 품목의 개발, 그리고 부가가치를 높일 수 있는 방안 등이 면밀히 연구, 개발 되어야 한다. 특히 어려움을 겪고 있는 농업 등 1차 산업을 가공 유통 등 2차 및 3차 산업과 연계하여 활로를 찾는 방안이 구체적으로 도출되어야 한다. 이를 위하여 국가적 지원 체제를 구축하고 필요한 지원이 구체적이고 실용적인 측면에서 검토 되어야 할 것이다. 특히 한식세계화 사업, 국가식품클러스터의 육성 사업 등은 식품산업 육성을 위한 시의 적절한 사업으로 이에 대한 국가적 관심과 관련 기관, 전문가들의 지혜가 모아져야 할 시점이다.

식품관련 산업육성에는 필요 인력의 확보, 연구지원, 포장, 기계등 관련 지원산업의 육성과 함께 마케팅 분야, 정보 수집, 분석, 제공 등도 함께 검토되어야 한다.

국내 · 외 식품산업의 조망 및 향후 지향 방향

2012年 2月21日

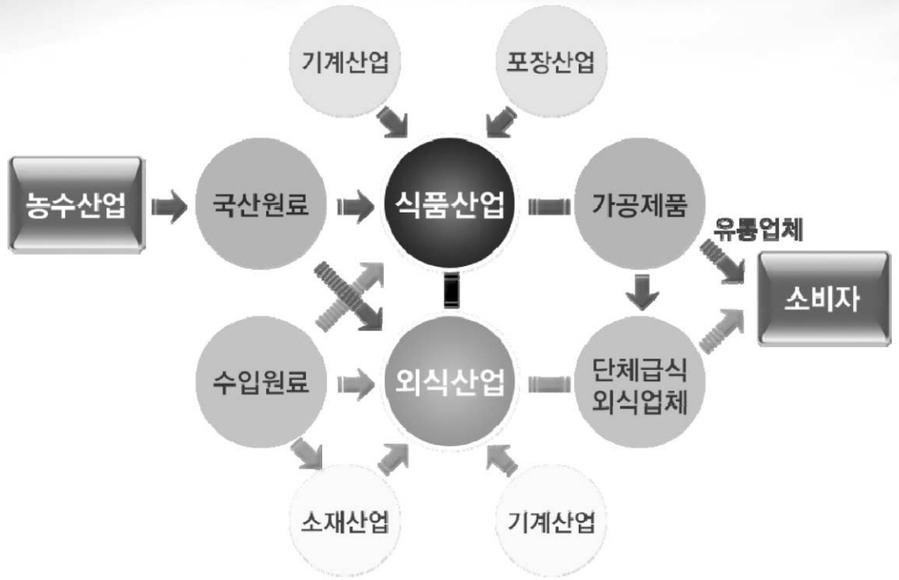
신 동 화

발표 내용

Ⅰ 식품산업의 연계구도

3

1. 식품 산업의 연계구도



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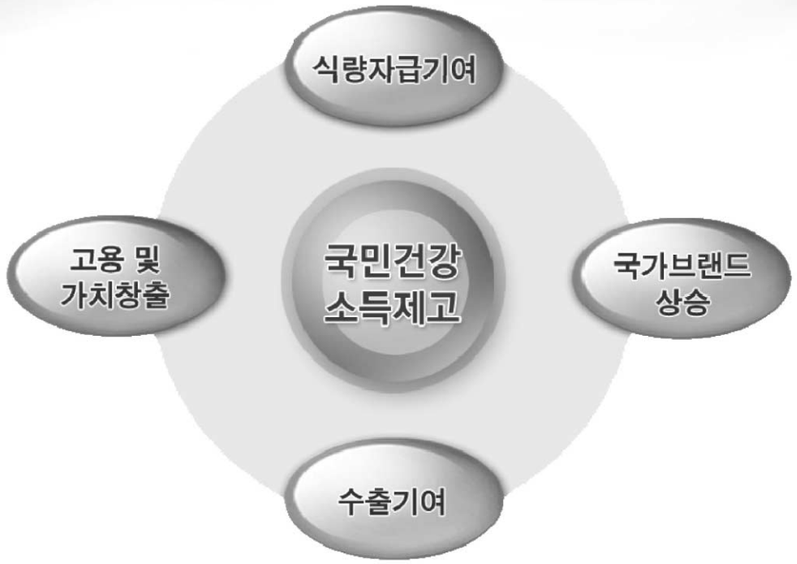
2. 광의의 식품산업 연계 분야

식품, 외식, 유통(식품 도소매업 외) 산업규모: 257.3 조원 으로 추정
(2009, 담배 소도매 업체 외)

식품 산업의 가치 창출



Ⅱ 국내외 식품산업현황(국내)

국내제조업 대비 식품산업 비중 : 2001~2010

(단위 : 10억원, %)

연 도	제조업 GDP	국내총생산 (GDP)	식품산업 총 생산액	제조업 GDP 대비	GDP 대비
2002	167,192	720,539	35,388	21.17	4.91
2004	205,826	826,893	30,045	14.60	3.63
2006	220,940	908,744	32,695	14.80	3.60
2008	258,638	1,023,938	36,650	14.17	3.58
2010	323,050	1,172,803	34,548	10.69	2.95

주) 1. 국내 총 생산량(명목) 및 제조업 GDP, 한국은행(2011. 5)
2. 2010 축산물 가공품 비포함
3. 식품 및 식품 첨가물 생산실적(식약청, 2010)

식품산업, 외식업, 농림업 비교

* 농업인구 감소: 306만 3000명(2010)→296만 5000명(2011), 전년대비 3.4% 감소, 전체인구대비 5.9%

(단위 : %)

구 분	'00	'05	'06	'07	'08	'09	'10p
GDP	8.6	4.0	5.2	5.1	2.3	0.3	6.2
농림어업	1.1	1.3	1.5	4.0	5.6	3.2	-4.3
음식료품 · 담배제조업	7.0	-3.1	-0.4	1.8	1.2	-3.2	3.5
음식점 · 숙박업	5.5	-0.7	2.5	4.8	2.1	-1.0	0.7

* 경제성장률 : 실질부가가치 전년대비 증감률

매출액 규모별 업체현황

구 분	업체수	점유율(%)		매출액(천원)	점유율(%)	
계	17,341	100.00		34,676,328,367	100.00	
1억 원 미만	9,639	55.59		226,597,951	0.65	
1-5억 원	3,736	21.54	82.92	909,022,154	2.62	7.36
5-10억 원	1,379	7.95		982,798,696	2.83	
10-20억 원	1,004	5.79		1,419,679,614	4.09	
20-50억 원	870	5.02		2,719,963,237	7.84	
50-100억 원	367	2.12		2,549,439,166	7.35	
100-300억 원	220	1.27		3,610,405,568	10.41	
300-500억 원	40	0.23		1,518,904,871	4.38	
500-1,000억 원	35	0.20		2,526,087,706	7.28	
1,000-2,000억 원	24	0.14		3,456,194,413	9.97	
2,000-5,000억 원	17	0.10		4,837,627,022	13.95	
5,000억 원- 1조 원	7	0.04		4,714,289,364	13.60	
1조 원 이상	3(15)	0.02		5,205,318,605	15.01	

주) 1. 법인업체수로 집계
2. 축산물가공품, 건강기능성식품은 제외 ( ): 2010

사업자 규모별(종업원) 업체현황

구 분	업체수	점유율(%)		매출액(천원)	점유율(%)	
계	17,341	100.00		34,676,328,367	100.00	
1-4인	9,958	57.42		989,383,014	2.85	
5-10인	3,440	19.84	88.19	1,622,425,307	4.68	13.85
11-20인	1,895	10.93		2,191,393,517	6.32	
21-30인	719	4.15		1,687,925,049	4.87	
31-50인	648	3.74		2,597,792,299	7.94	
51-80인	280	1.61		2,082,354,203	6.01	
81-100인	97	0.56		1,080,321,117	3.12	
101-150인	133	0.77		2,306,732,135	6.65	
151-200인	57	0.33		2,516,456,803	7.26	
201-300인	54	0.31		1,731,439,191	4.99	
301-500인	31	0.18		4,028,387,587	11.62	
501-1,000인	20	0.12		6,068,187,948	17.50	
1,001인 이상	9	0.05		5,773,530,197	16.65	

주) 1. 법인업체수로 집계
2. 축산물가공품, 건강기능성식품은 제외

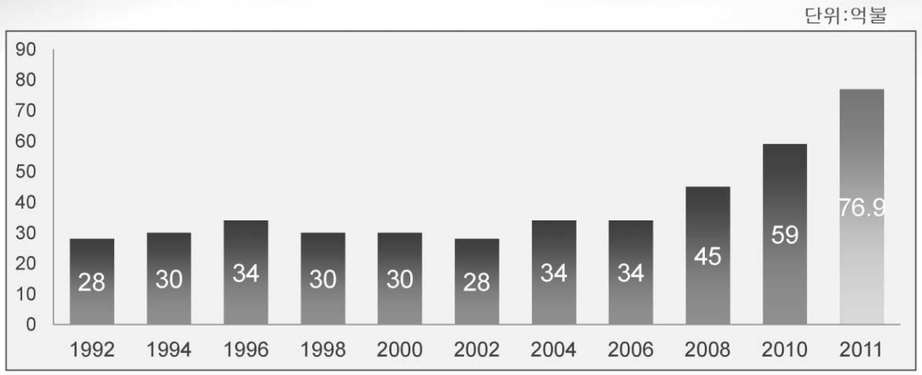
연도별 농식품 수출입 현황

(단위 : 백만 달러,, %)

구 분	'00	'02	'04	'06	'08	'10
○ 농식품 수출액	3,012.4	2,801.3	3,365.2	3,394.8	4,496.5	5,880.0
(국가전체수출대비)	1.7	1.7	1.3	1.0	1.1	1.3
- 농림축산물	1,531.9	1,639.3	2,085.0	2,304.4	3,048.2	4,081.8
- 수산물	1,503.3	1,161.3	1,280.2	1,090.4	1,448.3	1,798.1
○ 농식품 수입액	98,18.5	11,471.5	13,484.1	16,100.9	23,198.6	25,787.2
(국가전체수입대비)	6.1	7.5	6.0	5.2	5.3	6.1
- 농림축산물	8,450.2	9,584.3	11,204.8	13,327.3	20,120.4	22,329.9
- 수산물	1,385.0	1,887.2	2,264.2	2,773.6	3,078.3	3,457.3

자료: 2010 농수산물유통공사 농림수산식품 수출입동향 및 통계

연도별 농식품 수출입 현황



연도별 농림수산식품 수출액 추이

※ 최근 10년간 농산물 수출 증가율 7.62%/연평균
농림업 생산 증가율 2.91%

2.6배

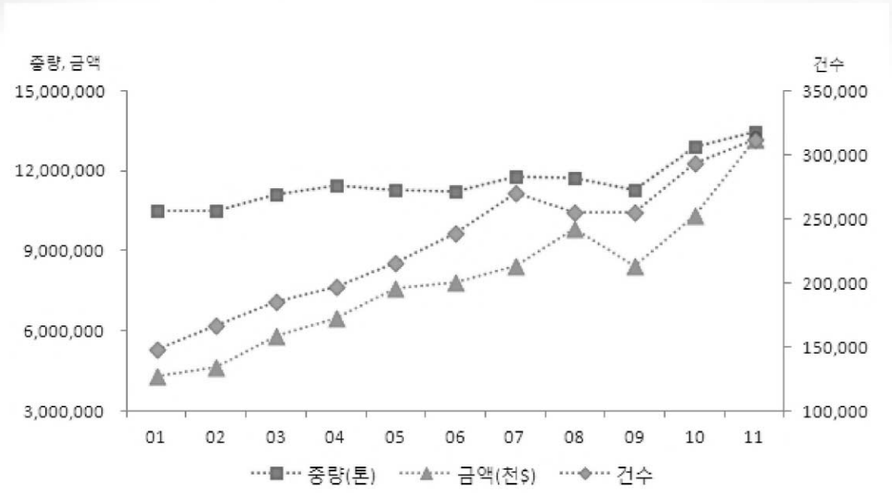
2010년 주요 교역 국가

(단위 : 백만달러)

'10년 수출 상위국가	1. 일본	2. 중국	3. 미국	4. 홍콩	5. 러시아
	1,882.6	787.4	518.8	243.7	235.7
'10년 수입 상위국가	1. 미국	2. 중국	3. 호주	4. 브라질	5. 캐나다
	5,959.7	4,323.2	2,212.7	1,518.4	1,062.8

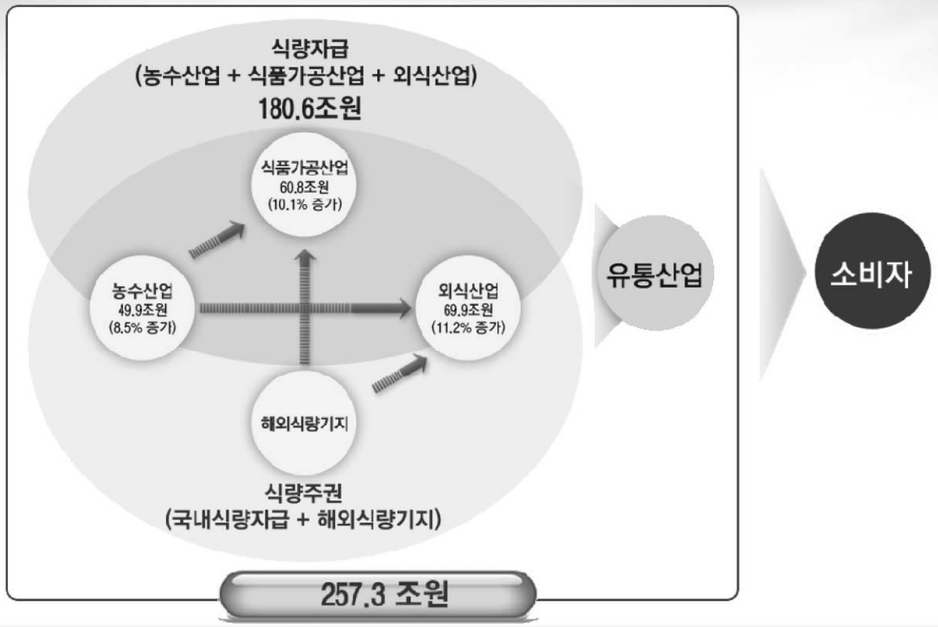
주) 2010년 농수산물유통공사 농림수산식품 수출입동향 및 통계

. 연도별 (2001.-2011) 식품 수입 현황(건수, 중량, 금액)



2001: 42.8억 달러 → 2011:132.0 억달러 (208% 증가)
(식약청 보도자료, 2012. 02.10.)

식품관련 산업의 규모



Ⅱ 국내·외 식품산업현황(국외)

전세계 식품시장 규모(대륙 별)

(단위 : 10억 달러, %)

구 분	'07	'08	'09	'10	'11	'12	'13	'14
○ 세계식품시장	4,639.9	4,793.5	4,931.7	5,089.7	5,259.5	5,440.0	5,631.5	5,834.0
	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
- 유럽	1,987.4	2,027.4	2,058.0	2,096.3	2,137.8	2,181.5	2,227.5	2,275.3
	(42.8)	(42.3)	(41.7)	(41.2)	(40.6)	(40.1)	(39.6)	(39.0)
- 아시아-태평양	1,288.4	1,361.3	1,430.3	1,509.5	1,595.5	1,687.7	1,787.0	1,893.9
	(27.8)	(28.4)	(29.0)	(29.7)	(30.3)	(31.0)	(31.7)	(32.5)
- 북미	816.7	837.6	852.7	869.3	886.9	905.9	925.8	946.1
	(17.6)	(17.5)	(17.3)	(17.1)	(16.9)	(16.7)	(16.4)	(16.2)
- 중남미	429.3	443.8	461.8	480.0	498.9	518.6	539.0	560.2
	(9.3)	(9.3)	(9.4)	(9.4)	(9.5)	(9.5)	(9.6)	(9.6)
- 중동-아프리카	118.2	123.4	128.8	134.5	140.3	146.2	152.3	158.5
	(2.5)	(2.6)	(2.6)	(2.6)	(2.7)	(2.7)	(2.7)	(2.7)

★ 출처 : '11.4월 Datamonitor(www.datamonitor.com, 영국 리서처&컨설팅 기관)
Food, Alcoholic beverages, Non-alcoholic beverages, Tobacco 합계. 2010~2014년은 추정치

세계 농식품 시장규모

세계 가공식품 시장규모 현황 및 전망

(단위 : 억 달러, %)

구분	2006	2007	2008	2009	2010	2011	2012	2013	2014	연평균 성장률 (06~14)
가공식품 세계시장	2조 4390	2조 5300	2조 6270	2조 7250	2조 8300	2조 9390	3조 540	3조 1740	3조 2970	5.2
전년대비 증가율	3.6	3.7	3.8	3.7	3.9	-	-	-	-	

※ 2009~2010년 데이터는 연간 추정치를 이용한 자료임(자료 : 한국보건산업진흥원)

중국 : 5,000억불, 일본 4,000억불 추정
인도 : 13.2조 루피(295조원)-매년 10%이상 증가

국가별 식품 교역액 순위(2009년)

(단위 : 백만 달러)

	국 가 명	식품 수입액	식품 수출액	식품 교역 액
1	미 국	80,046.4	76,587.0	156,633.4
2	독 일	66,168.0	60,413.1	126,581.1
3	프 랑 스	46,597.0	56,601.1	103,198.1
4	네 델 란 드	31,161.0	49,940.3	81,101.3
5	영 국	49,897.0	22,898.9	72,795.9
6	이 태 리	37,457.0	30,529.9	67,986.9
7	벨 기 에	29,742.0	34,206.7	63,948.7
8	스 페 인	23,968.0	28,101.6	52,069.6
9	중 국	16,749.9	34,154.0	50,903.9
10	캐 나 다	23,881.6	26,464.0	50,345.6
…	…	…	…	…
28	한 국	13,590.5	4,191.0	17,781.5

자료 : Euromonitor International Marketing Data and Statistics 2011.
Euromonitor European Marketing Data and Statistics 2011.

글로벌 식품기업(Forbes 선정)

(단위 : 십억 달러)

부문 내 순위	전체순위	기 업 명	국 가	매출액	이익
1	26	Nestle	Switzerland	112.0	36.7
2	86	Pepsi Co	United States	57.8	6.3
3	91	Coca-Cola	United States	35.1	11.8
4	96	Anheuser-Busch	Belgium	36.8	4.1
5	103	Unilever	Netherlands	59.3	5.7
6	105	Kraft Foods	United States	49.2	4.1
7	108	Tesco	United Kingdom	79.6	3.5
8	153	Philip Morris International	United States	27.2	7.3
9	159	British Amer Tobacco	United Kingdom	23.2	4.5
10	181	McDonald`s	United States	24.1	5
…	…	…	…	…	…
93	1444	KT&G	South Korea	3	0.9
…	…	…	…	…	…
107	1714	CJ	South Korea	8.3	0.2

자료 : Forbes, Global 2000 Leading Companies 중 식품(Beverage, Food Processing, Food Retail, Restaurant, Tobacco)부문 순위는 Sales, Profits, Assets, Market Value를 모두 고려하여 2,000 기업을 랭크, 가중방법은 비공개
* 부문 내 순위 : 식품 부문 내 순위 / 전체순위 : 전 산업 카테고리 내 순위(2,000개 사 중 순위)

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Ⅲ 식품산업의 지향 방향

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국가 3대 전략 및 주요 정책과제

안전 농식품 공급	식품산업 수출산업화	식품산업과 농어업 연계발전
✓ 농수산식품 안전관리 강화 ✓ 농수산 식품 인증, 표시 제도 개선 ✓ 전통 식생활 문화 교육, 홍보 강화	✓ 식품 R&D 확대 등 투자 활성화 ✓ 식품클러스터 조성 확대 ✓ 전통식품산업화 농식품 수출확대 및 한식 세계화	✓ 식재료 산업 활성화 (산지, 소비자 연결) ✓ 생산자 참여형 농식품 기업 지원 Local Food 운동

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국내 식품산업 여건 변화

➢ **국민소득 증가로 건강과 식품에 지대한 관심**
- 식품과 건강의 연계
- 식품을 통한 장수 욕구 증대

➢ **현정부의 강력한 의지**
- 농업의 성장동력으로 식품산업 인식
- 농수산 식품부 발족으로 식품산업육성 의지 표명

➢ **국내 식품시장 성장 둔화**
- 시장의 포화 경향 뚜렷
- 출산율 저하, 노령 인구 증가

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포화시장에 대비(1)

➢ **현 가공식품 내수 시장규모는 포화 경향이 뚜렷**
- 시장규모 정체, 가치 향상의 한계 극복
- 업체간 경쟁 심화 및 경영 악화 대비

➢ **인구증가세의 둔화 및 노령화로 수요 정체**
- 내수 산업의 성장 둔화 예상, 성장 방안 구축

➢ **국외 원자재 및 국산 원료 가격 상승**
- 제조원가 상승 및 수출 경쟁력 저하 대비책 강구

➢ **새로운 상품 판로 개척이 절박한 시점임**
- 신상품 및 가치향상 필요

포화시장에 대비(2)

➢ **수출 확대 방안 수립**
- 수출선의 다변화
  - 일본, 중국, 미국시장 편중에서 중동시장 확대 필요
  - 세계 무스림 인구 16억
    Halal food 시장 6,600억불(2010년)
  - 인도 시장 규모 13.2조 루피(295조원)

➢ **한식세계화에 박차**
- 완제품 수출 우선에서 식자재 수출로 전환
- 막걸리, 김치 등 현지 plant 및 기술 수출로 방향 전환 준비
- 한식당 확대, 고급화 및 현지화 촉진

포화시장에 대비(3)

➢ **수입원료를 이용한 가치 향상 상품개발**
- 수입원료의 거점확보 및 역수출 활성화
- 국산원료와 연계, 각종 수출 상품화 촉진
- 중국 및 일본시장의 맞춤형 제품 생산 및 수출
- 기능성식품의 과학화로 고부가가치 제품생산 유도

➢ **전통식품의 차별화 전략수립 및 수출확대**
- 비교 경쟁력 있는 분야
- 국외 한상 조직을 최대한 활용
- 품질 고급화 및 규격화로 세계적 인식 제고

세계 식량자원 수요 예측

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농업생산과 식품가공·외식 산업의 상생 방안

- 원료 없이 식품가공 및 외식 산업 존립은 불가능
- 자국 원료를 1 차적인 식품산업의 기반으로 활용
- 외식산업과 전통식품원료는 국산 비중이 가장 높음
  - 사용 원료 비중 국산: 70.5%, 수입:29.5%
- 원료의 수입은 불가피하나 부가가치 향상 방안 마련 필요

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원료조달의 방안(1)

➢ **원료 생산 구조의 변화 모색**

- 대량생산 곡물 위주에서 가격 비교우위인 곡물로 전환
- 원료의 차이에 따른 국제 경쟁력 확보 필요

➢ **원료 생산을 위한 국내생산 기반 확충**

- 가공식품은 생산비 중 원재료비가 60% 내외
- 가격 경쟁력 있는 국내 생산가능 원료의 발굴 노력 필요
- 논의 다용도 활용(콩, 잡곡 등)
- 유휴 농지 활용(겨울 중) – 보리, 밀

원료조달의 방안(2)

➢ **수입원료의 대체 수단 강구**

- 사료 작물의 생산 확대 방안 수립
- 해외 곡물재배, 수입 방법 저극 검토
- 원료의 수입 체계 재정비 필요 (수입원, 집하 방법 등)

➢ **육종을 통한 원료 부가가치 향상**

- 세계는 육종의 치열한 경쟁장으로 변하고 있음
- 특정 성분, 가공적성 등 우수 고유 품종 육종 시급
- 종자 확보에 의한 원료 품징의 비교 우위 확보 절실

향후 제품개발 및 산업 지원 분야(1)

- **차별화 제품 및 기술 활용**
  - 명품화 추진– 술, 장류, 김치, 인삼 등
  - 가공 기술의 최적화 첨단화– 기술의 융 복합
- **소비자 지향 상품의 개발**
  - 어울림식품(fusion food)의 확대– 국내외
  - 맞춤형 식품개발– 치료식, 질병 예방식
- **외식산업과 연계 제품 개발**
  - 식품소재의 공급 시스템 구축(반가공 제품)
  - 절임 등 반가공제품류(동남아에도 적용 가능)

향후 제품개발 및 산업 지원 분야(2)

- **발효식품의 개발 및 생산 활성화**
  - 차별화, 기술 집약 제품으로 가치 향상
  - 특수 원료 생산 등 관련산업으로 확산 가능
- **식품 소재류 생산 활성화**
  - 외식용 각종 편의 제품 개발(수출 제품 포함)
  - 안전성, 편의성 확보 필수
- **식품가공 폐기물의 활용 분야**
  - 세계적인 환경 문제와 연계됨
  - 확보된 처리 기술, 해외 수출 가능성 높음(과채류, 육류 등)

향후 제품개발 및 산업 지원 분야(3)

- **원부재료 및 전통식품의 규격화 계속 추진**
  - 농축수산물의 규격화로 제품 표준화 가능
  - 전통식품의 수출 활성화를 위한 규격화 계속 추진
    (CODEX 규격: 김치, 고추장, 된장, 인삼 등 에서 더 확대 추진)
- **관련 산업과 연계 활성화 필수**
  - 식품가공 기계산업의 지원, 육성
  - 다양한 기능성 포장재 개발
    (Smart package, sensing 포장제 등)

국내 식품산업의 지향 방향

- **부가가치 향상에 주력**
  - -네슬레 등 글로벌 기업의 영업 이익율: 12-18%
  - -국내 기업 영업 이익율: 7% 내외
- **차별화 제품의 생산 유도**
  - -Me too 제품으로는 한계
  - -원료의 차별화, 가공 방법의 차별화 필요
- **융 복합 시스템 구축 필요**
  - -학문의 융복합(농학, 의학, 사회과학)
  - -타 산업과 연계 활성화(기계, 전자, 나노 등)

식품·외식산업의 지원 분야

인력 육성	연구 개발	관련산업지원
실무연구개발	안전성 확보	포장
기능인 육성	신제품 개발	기계
마케팅	기능성 확보	유통

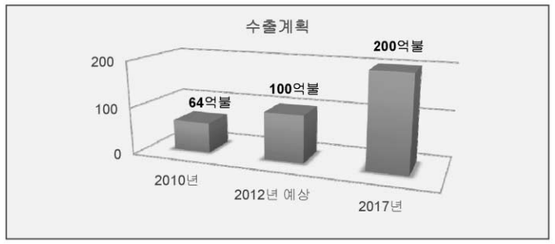
Ⅳ 식품클러스터의 이해

국가 식품클러스터의 기본 구상

- 국내외 연구기관, 대학을 유치, R&DC의 활성화
- 선진 기술 개발 및 전수로 기업 경쟁력 제고
- 지역 특화 식품산업과 연계, 동반 육성
- 수출지향적 기반 구축
- 기업 지원 시스템의 획기적 구축
  - 폐수, 폐기물 처리, - 저장 유통 시설 확보
  - 안전성 확보 지원, - 맞춤형 인력 공급

국가식품 Cluster의 의미

- 산업화 과정 중 소외 되었던 농업과 식품산업의 동반 성장 가능 기회
- 국내 식품산업이 세계시장 진입 활성화 호기로 활용(국내시장 포화에 대처)



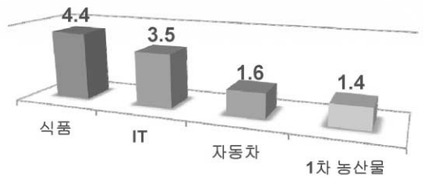
- 식품 수출단지로 특화 가능성 확인
- 동남아 식품산업의 허브로 육성 가능

국가식품 Cluster의 육성 방향

- 국내 식품시장 포화에 대비한 국내 식품산업의 활로 개척 첨병 역
- 가공수출 특화 기업단지로 육성
- 내수 시장을 넘어 수출을 통한 활로 개척의 모범 사례 구축
  - CJ 매출액 3조 6,000억 원(수출비중 6.5%)
- 수출 능력이 있는 글로벌 기업과 M&A 추진 및 유치
- 원료생산 및 수·출입 가능 새만금 단지와 연계로 효율성 제고
- 기 구상한 안전센터등 6개 지원 시설과 2단계 지원시설, 즉 발효식품연구소, 국제식생활 연구소, 디자인센터 등도 구축 필요

세계 식품시장과 여건 1 (Dator monitor사)

- 2010년 세계 주요산업 시장 현황(단위 : 조$)



- 아세아지역 식품시장 규모 1조 5,000억원
  - 세계시장의 36.9% → 성장률 4.9%
- 서울기점 반경 2,000km에 마닐라 등 11개 메가 시티 존재(15억 인구)
  - 이 지역에 7,300억 $의 농식품시장 형성

세계 식품시장과 여건 2 (Dator monitor사)

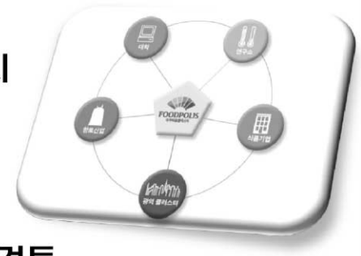
- 2020년 세계인구 76억 7,000만 명
  - 식품시장 6조 4,000억 원
- 세계 식량수요 2030년 50% 증가 → 2050년 2배로 증가
- 아시아권 1인당 소득 1만 5,000$ 이상
  - 5억 3,200만 명(중국인 1억 5,000만 명)
- 아시아는 식품산업 의 성장 가능성 가장 높은 지역

중국의 시장

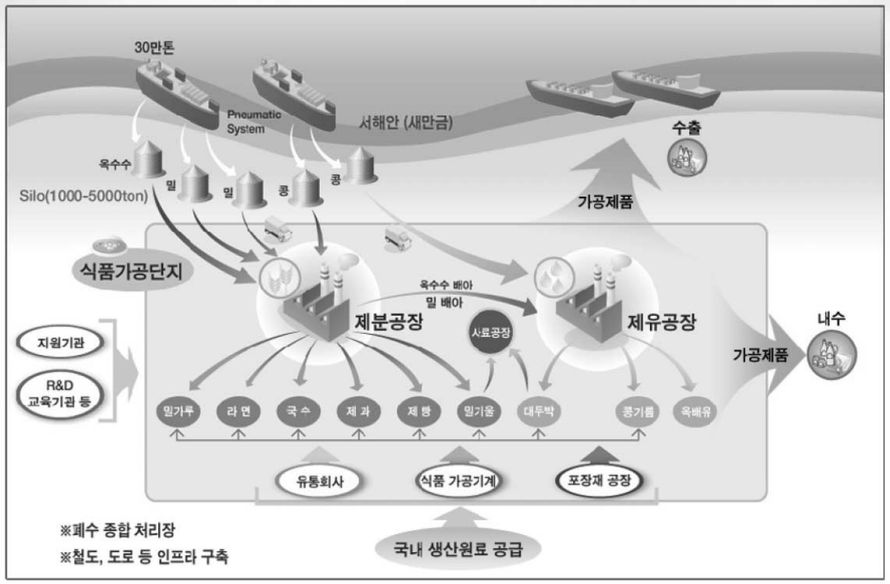
- 중국의 곡물 소비량 급격히 증가 추세
- 곡류수요 급증, 수입으로 대체 불가피
- 육류, 유제품 소비증자와 소비식품 고급화 가속
- 한국 농식품의 중국수입시장 비중 0.57%(3억$ 수준) – 일본 4억$ 수준
- 중국이 한국에 수출하는 비중
  - 1995년 4.7% → 2008년 12.2%

검토사항

- 중국과 일본 수입 농식품의 품목 철저한 분석
- 국내 1차 및 수입원료 이용에 의한 공략 가능 가공 품목의 선정
- 선정 품목의 생산, 판매 가능 글로벌 기업 접촉
- 연구기관 등 지원기관의 명확한 역할 제시
- 기반시설의 확보와 활용 범위 제시
- 수입원료와 국산원료의 이용 조화, 철저 검토



수입 곡류 활용 복합가공, 수출 연계 클러스터(예)



기 대 효 과

- 식품 관련산업과 1차 산업의 동반 성장 기대
- 국내 식품산업의 국제화 촉진 계기
- 식품산업의 새로운 활로 개척
- 동남아 식품 산업 허브로 도약 기반 구축
- 성공한 아시아의 Food Cluster로 정착

결 론

- 1차 산업인 농업과 식품산업의 연계, 발전 전략 수립 필요
- 포화되고 있는 식품산업의 활로 개척을 위한 외국 시장 확보 절실- 중국, 일본 시장 및 새로운 시장 공략 방법 구상
- 특화원료를 이용한 식품의 개발 촉진 및 수출 상품화 유도
- 식품클러스터로 산업간 상생 방안 마련 및 특화 기반 구축
- 중소 기업과 대기업의 공생 방안 수립 절실