2017 ROUNDTABLE ON DPRK AGRICULTURE

The Office of Agricultural Affairs
U.S. Embassy Seoul
September 6, 2017

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2017 ROUNDTABLE ON DPRK AGRICULTURE

Office of Agricultural Affairs
U.S. Embassy Seoul
September 6, 2017 (Wednesday)
Four Seasons Hotel

Schedule

Venue: Nuri Ballroom I, Four Seasons Hotel Seoul (6F)
Topic: DPRK Agriculture & Economy: Past, Present and Future

September 06, 2017 (Wednesday)

08:30	Registration (Coffee & Tea with refreshments)
08:50	Welcome by Ms. Amanda F. Hinkle, U.S. Embassy Agricultural Affairs Office
09:00	P1: "Marketization of DPRK Agricultural Sector (북한 농업부문의 시장화)" by Dr. So Young Kim/Senior Reporter of the Farmers Newspaper:
09:30	P2: "Building a Decision Support System for Monitoring Crop Conditions and Yields in DPRK" by Dr. Dath Mita, Senior Analyst, Office of Global Analysis, International Production Assessment Division, Foreign Agricultural Service, USDA
10:00	Coffee Break
10:20	P3: "Food security and Nutrition: WFP Food Assistance in DPR Korea" by Mr. Praveen Agrawal, WFP Country Director and Representative in Pyongyang
10:50	P4: "Achievement and Effect of Potato Project on North Korea" by Dr. Hyun-Mook Cho/Senior Researcher of RDA
11:20	General Discussion moderated by Dr. Tae Jin Kwon/Director of Center for North Korea & Northeast Asian Studies, GS&J
12:30	Lunch
2:00	Closing

Simultaneous interpretation will be provided.

Remarks by Amanda Hinkle, Acting Minister Counselor for Agriculture

I would like to extend a warm welcome to everyone attending USDA's 6th Annual DPRK Agriculture Situation Roundtable.

While much of the world associates North Korea with missile tests and the military security of the Korean peninsula, we are here today instead to discuss another important form of security in the DPRK—food security. Food security is best defined by the availability of food, access to food, utilization of food, and the stability of food access, availability, and utilization over time. By touching on aspects of these four pillars, our speakers will paint a broader picture of the complex and dynamic food security situation for the average citizen in North Korea.

Among the numerous research studies published by the U.S. Department of Agriculture (USDA), is a monthly estimate of the production, supply, demand, and trade flows of agricultural commodities around the world. Through this publication, the USDA emphasizes the importance of independent analysis in forming the macro picture of global food security. It is with that spirit that we look today at the food security situation in the DPRK.

I'm excited to introduce you to our speakers, who will share their research and unique perspectives with us. First, we will hear from Ms. So Young Kim, a Senior Reporter of the Farmers Newspaper, who will be sharing the results of her thesis on "Marketization of the DPRK Agricultural Sector" publicly for the first time. We are tremendously grateful that she has chosen our venue for this honor. Next, USDA's own Dr. Dath Mita will share his experience on "Building a Decision Support System for Monitoring Crop Conditions and Yields in the DPRK." Then, Mr. Praveen Agrawal, the newly positioned World Food Programme (WFP) Country Director and Representative in Pyongyang, will discuss food security, nutrition and WFP food assistance in the DPRK. Next, Dr. Hyun-Mook Cho, Senior Researcher at the Korean Rural Development Agency (RDA) will provide us with lessons learned from his experiences working on a potato project in North Korea. And finally, Dr. Tae Jin Kwon, Director of the Center for North Korea and Northeast Asian Studies, GS&J, will moderate a general discussion among all of the speakers and the audience.

But this would not truly be a Roundtable event without the participation of all of you, our distinguished guests in the audience today who hail from many diverse backgrounds, including from the private sector, trade associations, universities, research organizations, non-governmental organizations, as well as representatives from the U.S., Korean, and other governments. The best seminars are often defined by the caliber of questions and comments provided by the audience; and I ask that each of you challenge us with your ideas and input as we advance our discussion of these topics.

Again, thank you all for participating in the 6th Annual DPRK Agriculture Situation Roundtable. I will now hand over the microphone to our Master of Ceremonies, Mr. CHOI Sun Chul.

Thank you.

Biography of 2017 Roundtable on DPRK Agriculture

Dr. So Young Kim:

2002 – Present: Senior Reporter of the Farmers Newspaper (Nongmin Shinmoon)
2017 August: Earned PhD from University of North Korean Studies. (Thesis: Plan and Market in North Korea's Agriculture after the Economic Crisis)
2013 August: Earned Master Degree from University of North Korean Studies (Thesis: A Study On North Korean Farmers' Features After ' the Arduous March'-Focusing on the Short Stories in Joesun Literature from 2000 to 2013)
2002 February: Bachelor of English Literature and Sociology from Yonsei University.

Dath K. Mita, PhD:

Title: Senior Global Crop Analyst, Technical Lead and Satellite Imagery Archive Manager, Office of Global Analysis, Foreign Agricultural Service, USDA.
Education: Earned PhD and Master of Science (MSc) degrees in Natural Resources Management from North Dakota State University (1995-2006) with emphasis in Landscape Ecosystems Modeling, Geospatial Modelling & Mapping Agricultural Systems and Wetlands, and GIS-Remote Sensing of Agriculture and Vegetation. Bachelor of Science degree (BSc) in Agricultural Sciences at the University of Malawi, Africa
Current Lead Responsibilities: Over 9 years of experience as regional agricultural crop analyst for South Asia (Australia, India, Pakistan, Nepal, Bangladesh, Sri Lanka), and currently responsible for East Asia (China, Japan, South Korea, North Korea, Taiwan). Primary responsibilities include providing near-real-time agricultural information including agricultural production systems analysis, crop conditions, in-season crop production forecasts, and end-of-season estimates. The information is provided to the USDA's World Agriculture Outlook Board (WAOB) on a monthly basis. Also serve as a Technical Lead responsible for enhancing the science and technology capacity in satellite remote sensing and global crop assessment and monitoring as well as the management of USDA's Satellite Imagery Archives.
Prior professional engagements include (1) **Research Associate** at the University of Mississippi GeoInformatics Center (2006-2008), conducted research involving the integration and applications of NASA research results into operational natural resources management models; (2) **GIS-Remote Sensing Specialist** (2000-2005) for North Dakota State University and North Dakota Agricultural Statistics Service, conducting state-wide annual land cover/use classification and change detection for the development of crop statistics and estimates, provided GIS-remote sensing technical support to faculty, staff, and students; (3) Served as a **Land Resources Conservation and Evaluation Officer** for the Ministry of Agriculture, in Malawi-Africa (1988-1995).

PRAVEEN KUMAR AGRAWAL

NATIONALITY : Indian
GENDER : Male
DATE OF BIRTH : 6 February 1962
MARITAL STATUS : Married
LANGUAGES
English (excellent), Spanish (excellent), Italian (good), French (basic) and Hindi (mother tongue)
EDUCATION
1985 – 1986 Master of Science in Business Administration Boston University, Boston, U.S.A.
1980 – 1983 Bachelor of Arts, Economics University of Michigan, Ann Arbor, U.S.A.
1976 – 1980 Brighton College, Brighton, UK
SUMMARY OF EXPERIENCE
May 2013 to present **World Food Programme,** Makati, Philippines
WFP Representative and Country Director - Philippines
Responsible for the leadership and advocacy of corporate and Country Strategies, as well as, the resourcing and delivery of WFP programmes and activities;
Ensured timely and effective responses to complex extremely volatile situations including climatic shocks with rapidly changing needs and high risks for emergencies. Additionally, ensured that WFP is well paced to meet changing food security and nutrition needs

Actively worked with government agencies to build knowledge and capacity to meet food assistance needs within the country – working the full continuum from Emergencies to Transition to Development

Feb 2007 to May 2013 **World Food Programme,** Bogota, Colombia

WFP Representative and Country Director - Colombia

Responsible for the leadership and advocacy of corporate and Country Strategies, as well as, the resourcing and delivery of WFP programmes and activities; Ensured timely and effective responses to complex extremely volatile situations including climatic shocks with rapidly changing needs and high risks for emergencies. Additionally, ensured that WFP is well paced to meet changing food security and nutrition needs. Actively worked with government agencies to build knowledge and capacity to meet food assistance needs within the country – working the full continuum from Emergencies to Transition to Development

Aug 2003 to Jan 2007 **World Food Programme,** Rome, Italy

Senior Donor Relations Officer

Responsible for leading the relationship and ensuring a strong partnership between the WFP and the governments of Italy, Spain, Russian Federation, Portugal, San Marino, and the Holy See; Liaison Officer for fund raising in Latin America and the Caribbean as well as the Gulf and Middle East countries; Responsible for fundraising, contribution negotiation and management, and identification of new funding opportunities.

Aug 2000 to Aug 2003 **World Food Programme,** Phnom Penh, Cambodia

Deputy Country Director

Responsible for one of the largest UN aid programme in Cambodia covering emergency relief, reinstallation, nutritional support, vulnerable group feeding, and recovery/rehabilitation; Responsible for defining programme strategy, leading co-ordination with other UN agencies and NGOs, steering WFP's programme from relief to post-conflict recovery. Managed and supervised a wide range of programme, finance, administrative, logistics, and public relations activities as Deputy Country Director; Co-Chair of the United Nations Development Assistance Framework (UNDAF) Monitoring group, and as such, responsible for the definition and formulation of inter-agency strategic and operational framework. Headed and established the Public Relations unit responsible for raising awareness on WFP activities.

Feb 1995 to Aug 2000 **World Food Programme,** Rome Italy

Programme Officer

Responsible for Programming, Resource and Contribution Management of the Protracted Relief and Recovery Operations worldwide; Provided support to WFP country offices in relation to the funding of operations and in ensuring their food pipelines; Responsible for the design of the new Programming function in WFP's new information system – WINGS.

Feb 1993 to Feb 1995 **World Food Programme,** Bogotá, Colombia

Programme Officer

Headed the largest WFP operation in the country – US$16M; Responsible for the programming and implementation of the operation; Served as the direct counterpart for the government and
co-chaired with FINAGRO, the credit committee for the approval of micro-credit projects.

Jan 1989 to Feb 1993 **World Food Programme,** La Paz, Bolivia

Programme Officer

Headed the largest WFP operation against the Chagas Disease; Responsible for the programming and implementation of the operation; Served as the direct counterpart for the government and established the first nationwide unit responsible for the eradication of the disease; Assisted in converting WFP operation into a National Priority Programme.

Jul 1988 to Dec 1988 **International Fund for Agricultural Development (IFAD)**
Rome, Italy

Consultant, Information Management

Responsible for the identification of information system needs for Project Management; Served as liaison between the regional divisions and the Information Management Service.

Jan 1984 to Dec 1984 **Inter-American Institute for Cooperation in Agriculture (IICA)**
San Jose, Costa Rica

Economic and Financial Analyst

Jointly responsible for the preparation of economic and financial analysis of agricultural projects presented to the Inter-American Development Bank (IDB) for financing.

Dr. Hyun-Mook Cho

Sex : Male
Address: 10-1, Yongjigakgil 8, Kangneung, Kangwon-do, Korea

Education

- Post Doc. Wageninggen Univ. Netherlands
- Ph.D. Dongguk University, Korea

Job Experience

- 2015-Present President of Korea Potato Research Association
- 2012-2014 Director of KOPIA-Ethiopia center
  (Korea Program on International Agriculture, KOPIA)
- 2008-2012 Director General of Highland Agriculture
  Research Institute(NARI), Rural Development Administration(RDA)
- 2005-2008 Director of Potato Research Division
- 2002-2005 International Scientist, International Potato Center(CIP)
- 1990-2001 Team leader of Potato Breeding Lab.

International Projects Involved

- 2012-2014 Potato Project on Ethiopia
- 2007-2012 Potato Project on Algeria
- 2008-2010 Potato Project on Viet Nam
- 2000-2009 Potato Project on North Korea

Dr. Tae Jin Kwon

Status Citizen of the Republic of Korea

Education

Ph.D. in Agricultural Economics May 1993
Washington State University, Pullman, WA, U.S.A
Field: Production Economics, Farm Management, Resource Economics, and Applied Econometrics.
Dissertation: Bioeconomic Decision Rules for Weed Management in Wheat, Barley, and Peas: An Econometric Approach.

M.A. in Economics, Aug. 1985.
Seoul National University, Seoul, Korea
Field: Farm Management and Production Economics.
Thesis: Economies of Size in Paddy-rice Production

B.S. in Agronomy, Feb. 1980.
Seoul National University, Seoul, Korea

Professional Experience

Present Director, Global Rural Development Center, GS&J Institute
Director, Center for North Korean and Northeast Asian Studies, GS&J Institute
Executive Committee Member, North Korean Policy Forum
Previous Vice President, Korea Rural Economic Institute (KREI)
Director, Global Agricultural Cooperation Center, KREI
Visiting Scholar, Washington State University
Adjunct Professor, Washington State University

Other Experience

Present Advisory Committee Member for Korea Meteorological Administration
Committee Member, Gyounggi-do Inter-Korean Cooperation Council
Member, Inter-Korean Agricultural Cooperation Committee at NAFF
Consulting activities for NGOs(World Vision, Korean Sharing Movement etc.)

Publications

Strategies for Agricultural Reform Process in North Korea and Inter-Korean Cooperation, Korea Rural Economic Institute, 2004

A Study on Agricultural Development Cooperation between Two Koreas, Korea Rural Economic Institute, 2007
Integration between Overseas Agricultural Development and Global Agricultural Cooperation, Korea Rural Economic Institute, 2010
Study on the Governmental System for Unification of Korean Peninsula, Seoul National University, 2012.
Analysis of Major Factors Affecting Trade between North Korea and China, Korea Development Institute, 2013
The Optimal Farm Size for Overseas Agricultural Development in the Region of Far-East and South-East Asia, 2014
Impact Analysis of Urban Agriculture on Agriculture and Rural Community, Rural Development Administration, GS&J Institute, 2015
Assessment of 2016 North Korean Economy, Korea Institute for Industrial Economics and Trade, 2017

북한 농업부문의 시장화

-협동농장과 장마당을 중심으로

2017. 9. 6.

김 소 영

목 차

Ⅰ. 연구 방법

▪ **농촌 출신 및 농업 관련 직업에 종사한 북한이탈주민 50명 심층면접**

- 면접조사 기간(2016년 1월 ~ 2017년 3월)

※ 현재 3만 1,000여명의 남한 입국 전체 북한이탈주민 가운데 농촌 출신은 매우 적음

▪ **북한 안팎의 각종 문헌 분석 병행**

- 대북소식지, 국제기구 자료 등

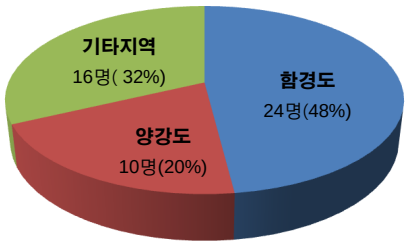
※ 북한경제 연구자료 확보의 어려움

면담 대상자의 인구사회학적 구성

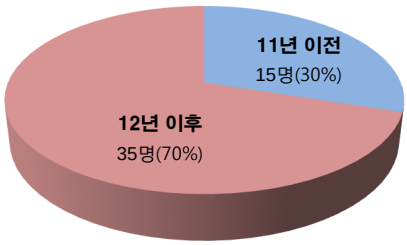
구 분		응 답 자 수 (명)	비율(%)
출신 지역	함경도	24	48
	양강도	10	20
	기타지역	16	32
성별	남성	18	35
	여성	32	65
연령	20대	4	8
	30대	5	10
	40대	22	44
	50대	12	24
	60대 이상	7	14
직업(공식)	농업 관련	25	50
	비(非) 농업 관련	25	50
탈북 시기	2011년 이전	15	30
	2012년 이후	35	70
당원 여부	당원	19	38
	비당원	31	62

면담 대상자의 인구사회학적 구성

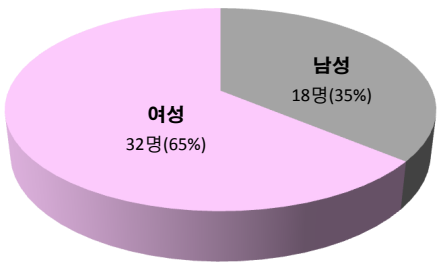
출신지역



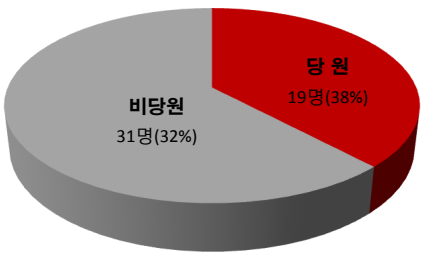
탈북시기



성 별



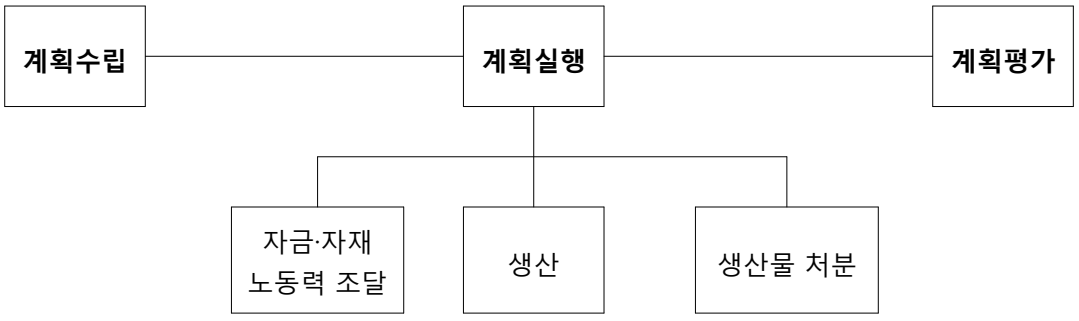
당원여부



Ⅱ. 북한 농업부문 시장화의 동학

협동농장의 계획 수행 과정

▪ 협동농장의 계획수행 전 과정을 계획수립 – 계획실행 – 계획평가 단계로 나눠 단계별 협동농장의 행태를 추적



▪ **계획화 체계가 부분적으로 와해되고 있음**

- 계획수립 및 계획평가 단계에서는 미시적 변화만 나타날 뿐 명령식 계획경제의 틀 유지

- 계획실행 단계에서는 당국과 상급기관의 사실상 방임 하에 협동농장이 거의 자력으로 문제를 해결하고 있음

☞ 자금·자재·노동력 등 생산요소를 확보하고 농산물을 생산하여 처분하는 과정에서 시장과 적극적으로 연계함으로써 계획을 수행

▪ **중장기적으로 계획화 체계는 서서히 무너지고 있음**

계획수립 및 평가 단계에서의 농장부문의 특징

▪ **계획수립 및 계획평가 단계에서 명령식 계획경제의 틀 유지되는 것은 기업부문과 큰 차이**

► **공장부문**

① 1993년 전후로 각 기업이 자체의 능력과 자재상황을 고려하여 수행하고 계획당국은 이를 대체적으로 수용

② 계획수립 관련 자율성 대폭 신장 : 액상계획이 주된 지표로 인정, 품목선택권 확대

③ 기업의 요구에 의해 수시로 계획 수정

④ 계획수립 과정에서의 기업 발언권 강화 : 항의와 이의 제기 적극

⑤ 계획평가는 형식으로만 존재

계획수립 및 평가 단계에서의 농장부문의 특징

► **농장부문**

① 상급기관의 의지가 일방적으로 관철

② 계획수립 관련 자율성 미미 : 농업생산계획에서 액상계획은 부차적 존재, 선언적 의미에서의 품종선택권 부여

③ 국가알곡생산계획은 법적구속력 있어 계획 설정 후 수정 불가능

④ 계획수립 과정에서의 농장 발언권 미약 : 항의와 이의 제기 소극

⑤ 계획평가 상대적으로 강고

자금 조달 : 외부와의 거래를 통해 스스로 해결

① 외부로부터의 자금 차용

② 시장으로의 생산물 불법 판매 및 영농자재 '되거리'

③ 8·3입금조, 특수목적 입금조, 더벌이조 등 운영

④ 농장 비경지·경지의 불법 임대

⑤ 농장 명의 대여를 통한 개인 영업활동 허용

⑥ 농장 생산수단 밀매

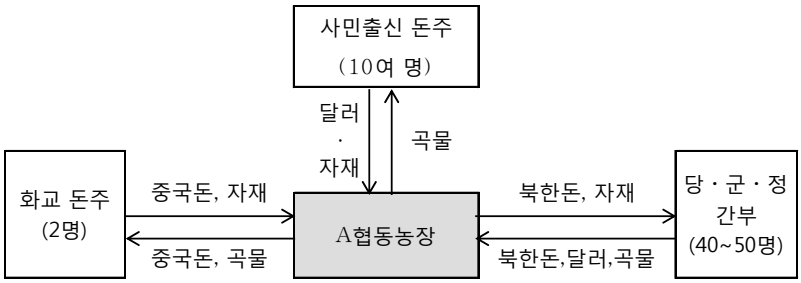
⑦ 기타

① 외부로부터의 자금 차용

- 협동농장은 필요 자금의 상당 부분을 융통기간 1년 이하의 단기 사금융을 통해 조달

- 다양한 상행위로 부를 축적한 개인 또는 기관기업소로부터 봄철에 자금을 빌려 농업생산활동 및 농장 운영에 사용한 뒤 가을철에 현물 또는 현금으로 갚는 것 일반화

▪ 농업생산용 자금(자재 구입용 자금)



▪ 농장운영용 자금

- 규모(소액), 대상(도시 중산층 및 기관기업소), 형태(현물 위주), 주체(작업반 차원) 등에서 상이하나 계획 밖의 영역에서 차용하는 것은 동일

⑤ 농장 명의 대여를 통한 개인 영업활동 허용

(2015년 함경북도 온성군의 A협동농장의 사례)

- 정미기계 보유 화교를 농장 적에 옮기고 그의 정미기계 또한 농장 소유 생산수단으로 변경 등록한 뒤 영업활동 허용. 해당 화교는 농장에서 다량의 쌀을 안정적으로 도정해 함경북도 청진 등 인근 대도시에 차량 유통 판매하고 농장에는 명의 대여료 격으로 얼마간의 돈을 납부

- 기관단체의 명의를 빌린 개인 영업활동은 수산업, 광업, 수공업, 상업, 서비스업, 운수업 등에서 활발한 것으로, 잘 관찰되지 않던 농업부문에서도 등장해 주목

자재 조달 : 계획 밖 영역에서 대부분 조달

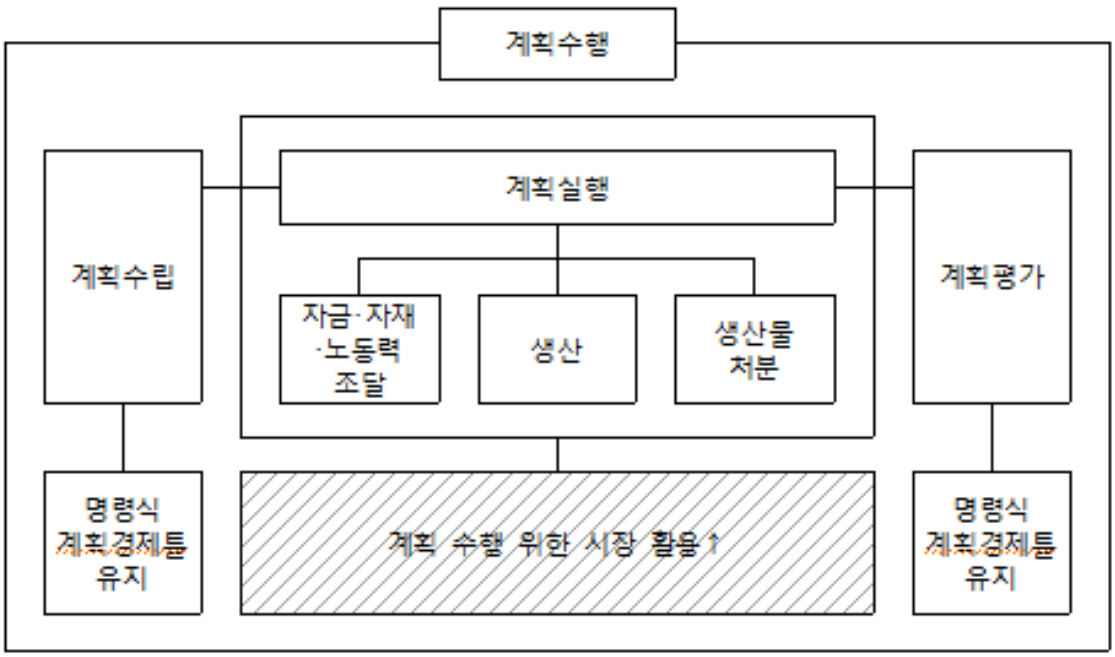
▪ **대안의 사업체계 파행으로 국가공급체계로부터의 조달은 대폭 위축**

- 도 ↔ 협동농장 간 직거래 확산
- 자재공급기관 ↔ 자재생산기관 간 행표 거래 형해화
- 협동농장 ↔ 자재공급기관 간 이중결제 및 담합 심화
- 협동농장관리위원회 ↔ 작업반 또는 분조 간 물량 부풀리기 일상화

▪ **시장화 진전으로 국가공급체계 밖에서의 조달은 대폭 확대**

- 외상 구입(자재대금 후불)
- 직접 구입
- 물물교환
- 밀수
- 경지 및 비경지 불법 임대

< 북한 농업부문 계획화 체계의 부분적 와해 >



▪ **경제위기 이전엔 존재하지 않았거나 미약했던 농업관련 제반시장이 탄생·발전**

- **농산물 소비재시장** : 곡물시장, 채소시장, 축산물시장, 과일시장

- **농업 및 비농업 생산재시장** : 영농자재 시장, 식품원료 및 식자재시장

● **시장화 진전으로 인한 도시의 구매력 향상에 따라 다양한 먹을거리에 대한 수요가 증가 하면서 과거 자가소비 하기 위해 생산하던 농산물을 남에게 팔기 위한 '상품'으로 인식하고, 그러한 수요를 겨냥해 농산물을 시장에 공급하는 형태로 농업생산이 변모**

● **농촌의 구매력 증가로 영농자재 시장의 수요와 공급이 확대**

● **제반시장들은 수요와 공급에 따라 가격을 형성하고 유통구조가 점차 복잡해짐**

농산물 소비재시장의 탄생·발전

1. 곡물시장

▪ **수요의 변화 : 구매력 향상에 따른 주식용 곡물의 수요 변화**

① 쌀 수요의 증가와 옥수수 수요의 감소

< 한 끼 밥에 들어가는 곡물의 구성 >

구 분	2012년	2013년	2014년	2015년	2016년
거의 입쌀	35.7	36.8	41.5	61.4	60.1
입쌀 위주, 강냉이 섞음	-	-	-	13.8	8
입쌀과 강냉이 반반	24.6	25.6	16.3	9	10.1
강냉이 위주, 입쌀 섞음 (12~14년은 '입쌀과 강냉이 3:7')	13.5	15	12.2	5.5	10.1
거의 강냉이	26.2	22.6	29.9	10.3	11.6

자료: 장용석 외,『북한 사회변동 2015: 시장화, 정보화, 사회분화』(2016), 39쪽.

농산물 소비재시장의 탄생·발전

② 쌀 품종 수요 차등화

북한에서도 잘 사는 사람은 쌀을 골라 먹는단 말이예요. 이제는 볶음 찹쌀이라나 이런 것도 (시장에) 들어오고. 쌀도 여러 가지가 있죠. 고장별로 쌀이 다른 것도 있고. 여기(남한)처럼 어느 고장의 쌀이 더 좋은 거 그런 게 있죠. 그 다음에 찹쌀이 많이 섞인 쌀이 있고. 찹쌀도 찹쌀 따로 있지만, 입쌀에 찹쌀 기운이 많이 섞인 게 있단 말이예요. 벼 종류가 여러 가지니까.

농장에서는 수확이 많은 종자를 심는데 대체로 그 쌀은 찰기가 좀 적고 밥을 해도 풀기가 적고. 그런데 그런 쌀은 개인들은 안 먹죠. 이제 떡이나 하던지 가공하는 사람들이 그걸 사거든요. 양꺼리 많이 불어나고 하니까. 그러나 밥을 먹는 사람들은 찹쌀을 많이 섞죠. 공찰, 그걸 공찰이라고 하는데 그런 쌀을 먹죠. 그러니까 농장은 생산량이 많은 걸 심으라 하지만 시장 내에선 여자들은 비싸도 좋은 쌀을 먹죠.

(2015년 탈북 40씨)

'중국쌀', '중국햇쌀', '중국찹쌀', '조선햇쌀', '열두삼천리쌀' …
'현미', '밭벼', '검은 찹쌀' … (2015년 양강도 혜산 종합시장 5곳)

'황해도쌀', '재령쌀', '최상쌀', '딱딱 마른 쌀' … (2000년대 중반)

농산물 소비재시장의 탄생발전

3. 축산물시장

▪ **수요의 변화 : 도시 가구의 고기 섭취 크게 증가**

< 북한 주민의 고기 섭취 횟수(2012~2016년) >

구 분	2012년	2013년	2014년	2015년	2016년
거의 매일	3.2	4.5	3.4	22.6	13
일주일에 1~2회	21.6	23.3	24.8	30.8	37.7
합계	24.8	27.8	28.2	53.4	50.7
한달에 1~2회	46.4	45.1	43	35.6	35.5
일년에 1~2회	27.2	27.1	27.5	10.3	12.3

자료 : 장용석 외(2016).

농산물 소비재시장의 탄생·발전

2. 축산물시장

▪ **공급의 변화 : 개인축산의 활성화, 돼지 중심의 공급**

- 시장에서 거래되는 육류의 80~90%는 개인이 사육한 것

- 개인축산은 경제위기 직후 생계형 내지 자가소비 목적의 가내축산으로 출발하였으나, 최근 축종에 따라서 상업형 내지 기업형으로 변모하면서 국가에 일정한 보수를 바치고 운영하는 전문 축산기업 형태의 개인 축산업자도 등장

농업 및 비농업 생산재시장의 탄생·발전

3. 영농자재시장

▪ **수요의 변화**

- 동일 자재라도 쓰임새 변화하거나 넓어짐
  예: 박막- 협동농장 벼 모판 조성 → 개인 텃밭 채소 온실 조성
  양강도 혜산의 온실채소 재배 사례

- 자재의 없던 수요가 새롭게 생겨남
  예: 겨울딸기 모종, 포장재 및 포장용기
  평남 안주·덕천·순천의 겨울딸기 재배 사례

▪ **시장의 자기조직화가 점진적으로 진행**

- 경제위기 이후 북한 농업분야 제반시장들의 태동에는 협동농장의 계획 수행을 위한 시장 의존 또는 활용이 크게 작용하였으나, 시간이 지나면서 시장 자체가 스스로 진화해 작동하는 형태를 보임

▪ **시장의 자기조직화를 가속화하는 요인(결과)**

- 농장 안팎의 분권화 확대
  - ① 상급기관에 대한 농장의 의사결정권한 증대
  - ② 작업반·분조 등 직접생산단위의 자율성 확대
- 농업부문 액상계획의 존재와 활용 (ex. 채소, 축산 등 非곡물)
- 농장원간 소득격차 발생 (ex. 가내축산 부업)
- 입지에 따른 농장의 유형화 (ex. 도시근교형, 국경인접형 등)

Ⅲ. 북한 농업부문 시장화의 특성

1. 영세자급농에서 상업영농으로의 점진적 이행

- 농업생산이 자가소비 위주의 영세농에서 상업영농으로 변모
- 개발도상국 경제에서 출현하는 농업근대화의 초기 양상과 유사

2. 시장을 매개로 한 농촌과 도시의 직접적 연계

- 국가를 매개로 한 농촌과 도시의 간접 연계에서 시장을 매개로 농촌과 도시의 직접 연계로 변화
- 시장화에 일시 후행하던 농촌이 도시의 수요를 겨냥한 농업생산에 본격 나서게 됨

3. 선(先) 소비재- 후(後) 생산재 시장의 발달

- 농산물 소비재시장이 먼저 성장하고 농업 생산재시장이 나중 성장
- 생산물 처분의 길이 넓어지면서 생산재 시장의 발달조건인 현금 보유가 가능해졌기 때문

4. 주식에서 부식 및 기호성 먹을거리로의 순차적 발달

- 북한 농산물 소비재시장도 곡물 → 고기 → 과일시장 등 식품경제 발달의 보편적 경로 밟음

5. 농촌 간 격차 확대

- 새로운 양상의 농촌 간 격차 발생
- 과거 '평야와 산간' 혹은 '남쪽과 북쪽'으로 단순 이원적이었던 전통적 격차가 시장 연계활동 기회의 많고 적음에 따른 격차로 변모

Ⅵ. 북한 농업부문 시장화의 미래

1. 북한 농업부문 시장화의 촉진요인

- 계획경제의 전반적 약화
- 중국과의 교역 확대
- 시장화 진전에 따른 구매력의 전반적 향상
- 교통과 통신의 발달
- 시장에 대한 당국의 실용주의적 태도
  (ex. 김정은 시대의 시장 활용 기조)
- 시장화로부터 체득한 개인들의 실리추구적인 영농의욕의 증가

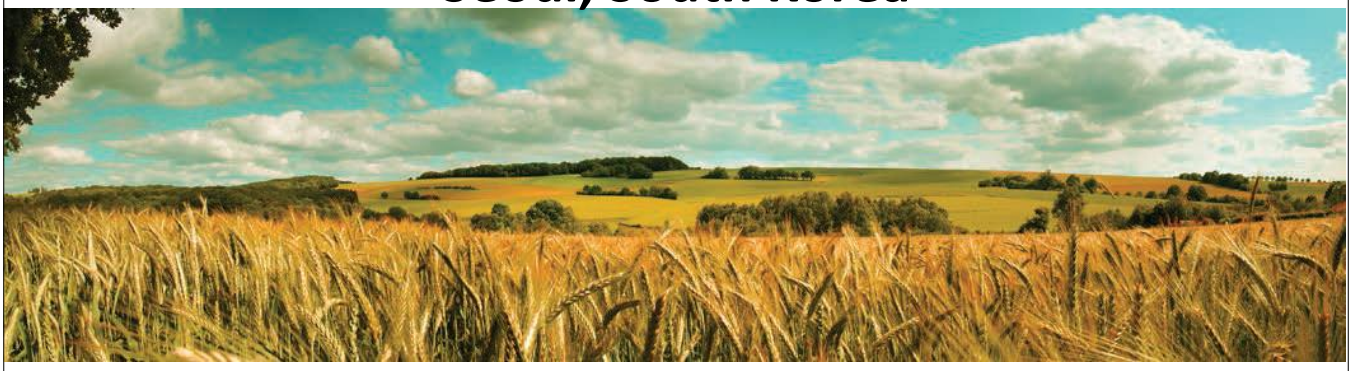
2. 북한 농업부문 시장화의 제약요인

- 시장에 대한 낮은 제도화
- 농업부문 계획화 체계를 유지하고자 하는 당국의 일관된 태도
- 농업부문에 대한 조세·준조세의 과도한 징수
  (ex. 인민군대 돼지고기 지원과제, 소토지 땅세 등)
- 민간에 의해 형성된 시장질서에 편승해 수익을 흡수하는 국가의 행태
  (ex. 최근의 식품공장 설립과 제품 출시 동향)
- 농업 연관산업의 전반적 파괴

감사합니다

North Korea Crop Monitoring and Production Forecasting

DPRK Roundtable Conference, September 2017
Seoul, South Korea



Dath K. Mita, PhD
Office of Global Analysis (OGA)
Foreign Agriculture Service (FAS)
United States Department of Agriculture (USDA)

USDA Foreign Agricultural Service Office of Global Analysis IPA Division

Presentation Outline

1. USDA Economic Information System
2. Crop Monitoring and Forecasting Strategies
3. 2017 DPRK Crop Conditions
4. Discussion

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Agricultural Commodities Inventory: Value & Benefits to Citizens and Society

- **Policy Decisions**
- **Management-Business Decisions**
  - US farmers
  - Commodity brokers, national/international agencies
- **Agricultural Commodities Global Trading Prices**
  - depend largely on seasonal production levels
  - Monthly forecasts, day/time reliable publication
- **International Humanitarian Agencies**
  - organizing emergency response and food aid interventions

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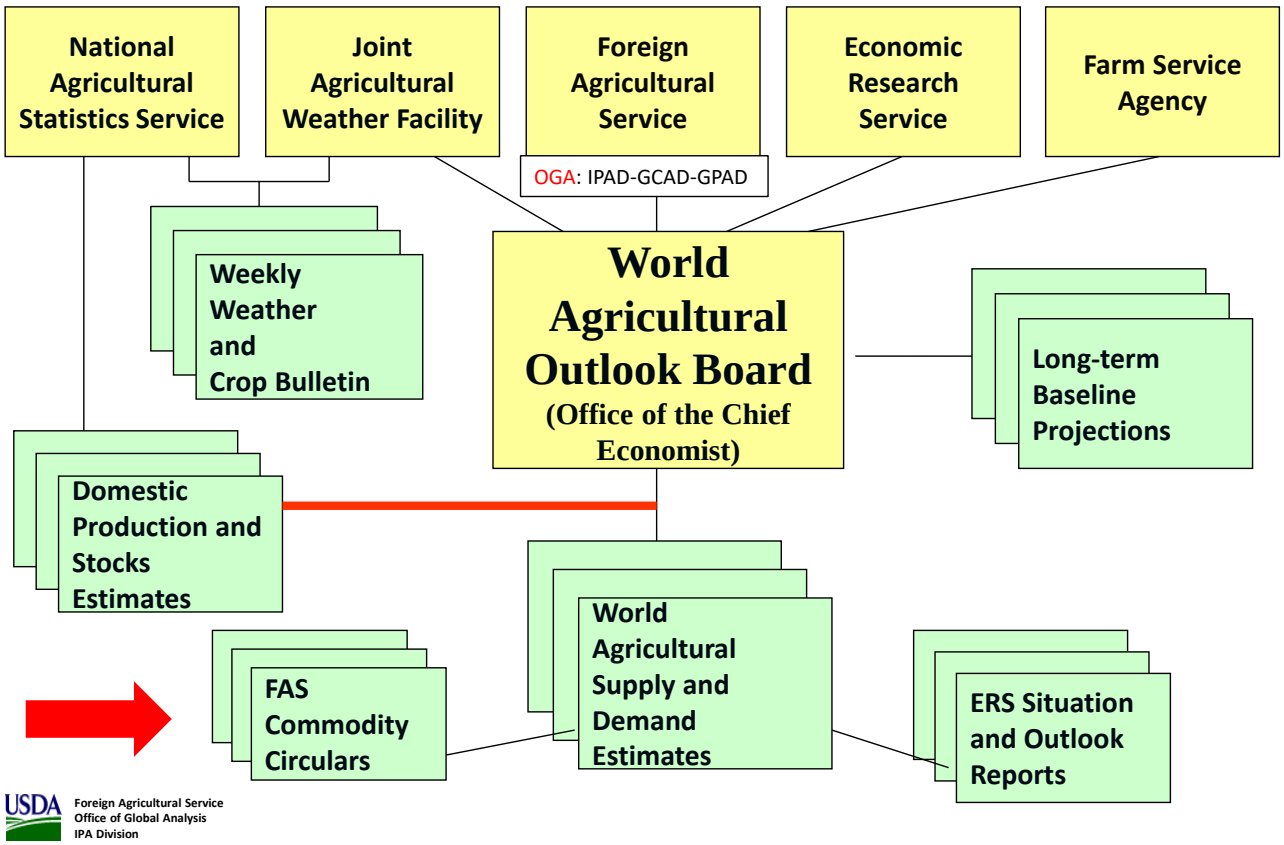
USDA's Economic Information System

4



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Foreign Country Commodity Balance Sheets

SUPPLY = DEMAND

Beginning Stocks + **Production** + Imports = Exports + Domestic Use + Ending Stocks

- Beginning Stocks → Private (On-farm) (Pipeline); Government
- **Production** → **Area & Yield**
- Imports → Commercial; Concessional
- Exports
- Domestic Use → Feed; Residual; Food, Seed, Industrial

WAOB Chaired Meetings:
Cotton, Oilseeds, Rice, Wheat, Coarse Grains

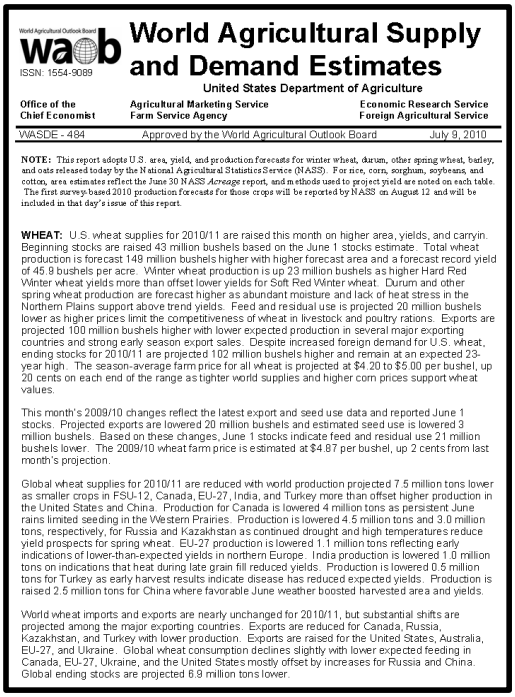
Participating agencies: WAOB, ERS, JAWF, FAS

Output: WASDE Report

USDA Foreign Agricultural Service
Office of Global Analysis
IPA Division

Output: Reports and Production Supply and Distribution (PSD) database

- **Principal Federal Economic Indicators: WASDE, FAS & NASS**
- **PSD Online http://apps.fas.usda.gov/psdonline/psdhome.aspx**
- **Part of Data.gov http://www.data.gov/**



World Agricultural Outlook Board
waob
ISSN: 1554-9089

World Agricultural Supply and Demand Estimates

United States Department of Agriculture

Office of the Chief Economist	Agricultural Marketing Service Farm Service Agency	Economic Research Service Foreign Agricultural Service

WASDE - 484 | Approved by the World Agricultural Outlook Board | July 9, 2010

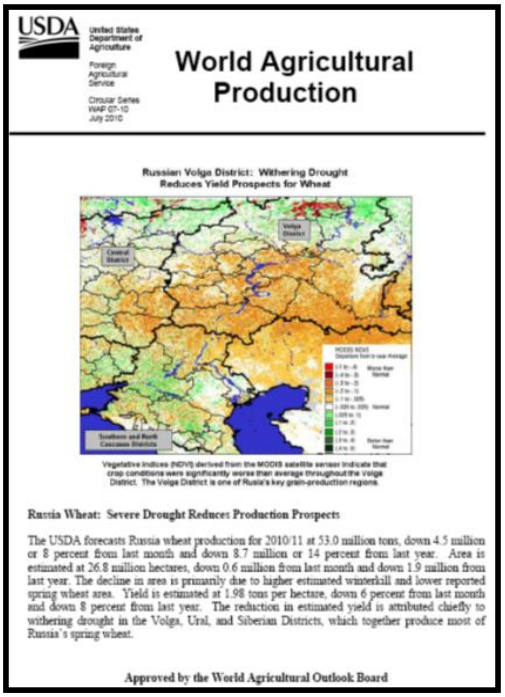
NOTE: This report adopts U.S. area, yield, and production forecasts for winter wheat, durum, other spring wheat, barley, and oats released today by the National Agricultural Statistics Service (NASS). For rice, corn, sorghum, soybeans, and cotton, area estimates reflect the June 30 NASS *Acreage* report, and methods used to project yield are noted on each table. The first survey-based 2010 production forecasts for those crops will be reported by NASS on August 12 and will be included in that day's issue of this report.

WHEAT: U.S. wheat supplies for 2010/11 are raised this month on higher area, yields, and carryin. Beginning stocks are raised 43 million bushels based on the June 1 stocks estimate. Total wheat production is forecast 148 million bushels higher with higher forecast area and a forecast record yield of 45.9 bushels per acre. Winter wheat production is up 23 million bushels as higher Hard Red Winter wheat yields more than offset lower yields for Soft Red Winter wheat. Durum and other spring wheat production are forecast higher as abundant moisture and lack of heat stress in the Northern Plains support above trend yields. Feed and residual use is projected 20 million bushels lower as higher prices limit the competitiveness of wheat in livestock and poultry rations. Exports are projected 100 million bushels higher with lower expected production in several major exporting countries and strong early season export sales. Despite increased foreign demand for U.S. wheat, ending stocks for 2010/11 are projected 102 million bushels higher and remain at an expected 23-year high. The season-average farm price for all wheat is projected at $4.20 to $5.00 per bushel, up 20 cents on each end of the range as tighter world supplies and higher corn prices support wheat values.

This month's 2009/10 changes reflect the latest export and seed use data and reported June 1 stocks. Projected exports are lowered 20 million bushels and estimated seed use is lowered 3 million bushels. Based on these changes, June 1 stocks indicate feed and residual use 21 million bushels lower. The 2009/10 wheat farm price is estimated at $4.87 per bushel, up 2 cents from last month's projection.

Global wheat supplies for 2010/11 are reduced with world production projected 7.5 million tons lower as smaller crops in FSU-12, Canada, EU-27, India, and Turkey more than offset higher production in the United States and China. Production for Canada is lowered 4 million tons as persistent June rains limited seeding in the Western Prairies. Production is lowered 4.5 million tons and 3.0 million tons, respectively, for Russia and Kazakhstan as continued drought and high temperatures reduce yield prospects for spring wheat. EU-27 production is lowered 1.1 million tons reflecting early indications of lower-than-expected yields in northern Europe. India production is lowered 1.0 million tons on indications that heat during late grain fill reduced yields. Production is lowered 0.5 million tons for Turkey as early harvest results indicate disease has reduced expected yields. Production is raised 2.5 million tons for China where favorable June weather boosted harvested area and yields.

World wheat imports and exports are nearly unchanged for 2010/11, but substantial shifts are projected among the major exporting countries. Exports are reduced for Canada, Russia, Kazakhstan, and Turkey with lower production. Exports are raised for the United States, Australia, EU-27, and Ukraine. Global wheat consumption declines slightly with lower expected feeding in Canada, EU-27, Ukraine, and the United States mostly offset by increases for Russia and China. Global ending stocks are projected 6.9 million tons lower.



USDA United States Department of Agriculture
Foreign Agricultural Service
Circular Series WAP 07-10
July 2010

World Agricultural Production

Russian Volga District: Withering Drought Reduces Yield Prospects for Wheat

Vegetative indices (NDVI) derived from the MODIS satellite sensor indicate that crop conditions were significantly worse than average throughout the Volga District. The Volga District is one of Russia's key grain-production regions.

Russia Wheat: Severe Drought Reduces Production Prospects

The USDA forecasts Russia wheat production for 2010/11 at 53.0 million tons, down 4.5 million or 8 percent from last month and down 8.7 million or 14 percent from last year. Area is estimated at 26.8 million hectares, down 0.6 million from last month and down 1.9 million from last year. The decline in area is primarily due to higher estimated winterkill and lower reported spring wheat area. Yield is estimated at 1.98 tons per hectare, down 6 percent from last month and down 8 percent from last year. The reduction in estimated yield is attributed chiefly to withering drought in the Volga, Ural, and Siberian Districts, which together produce most of Russia's spring wheat.

Approved by the World Agricultural Outlook Board

USDA Foreign Agricultural Service
Office of Global Analysis
IPA Division

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2. **Crop Monitoring and Forecasting Strategies**

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USDA Foreign Agricultural Service
Office of Global Analysis
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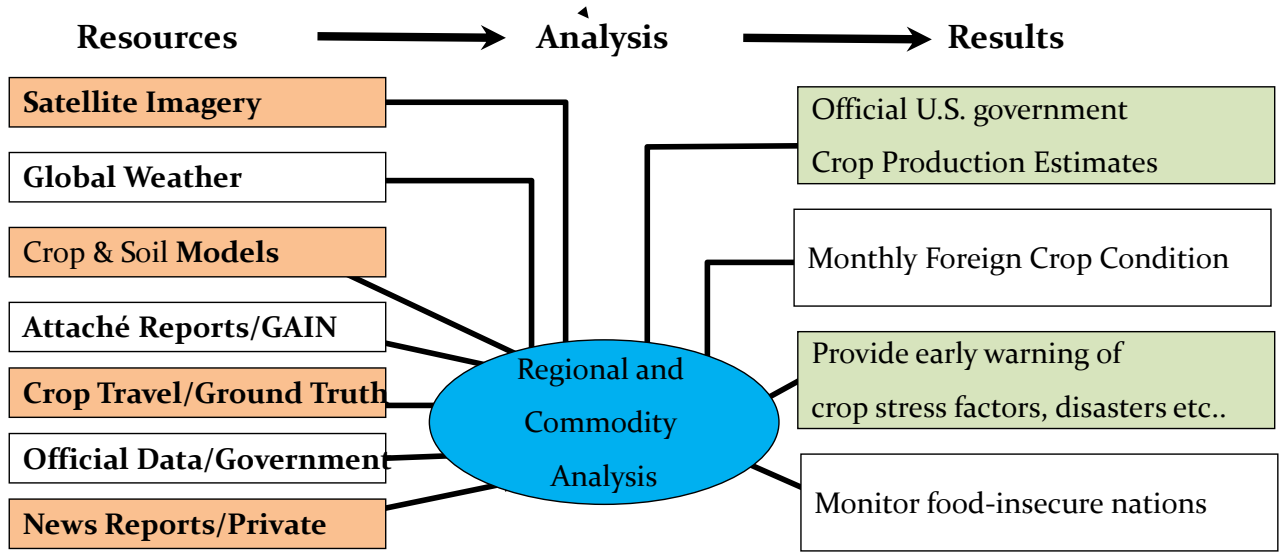
Each Month USDA FAS Provides Crop Condition Assessment, Monitoring and Crop Estimates

- 17 Global Agricultural Commodities
- 167 Countries
- 1020 Country-Crop Pairs (e.g. North Korea-Rice, Australia-Wheat)
- 3 attributes: Area, Yield and Production

FAS IPAD Operational Approach of Global Crop Assessment and Monitoring



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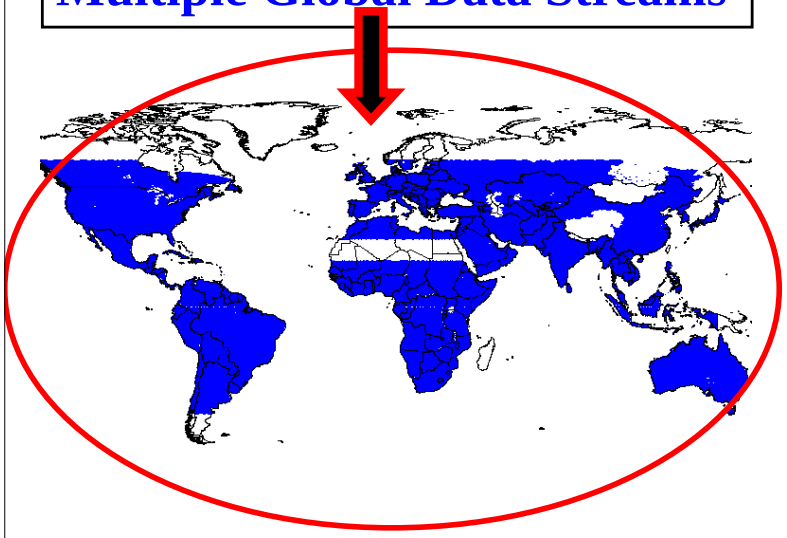
Crop Assessment Database System

Multiple Global Data Streams

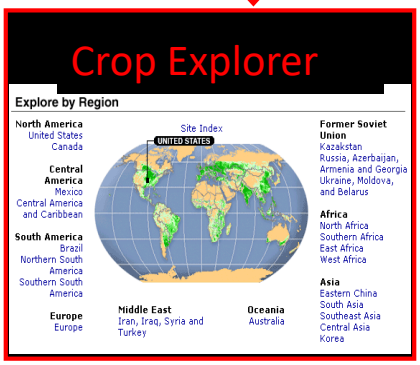


Crop Condition Data Retrieval and Evaluation (CADRE)
Database Management Systems (DBMS)

Integrated Db

ORACLE Database

To Portal

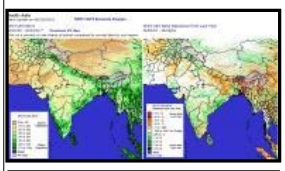


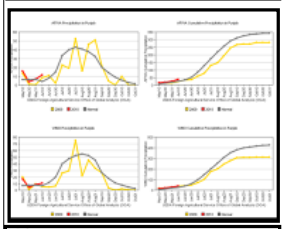
Data Visualization Tool = Crop Explorer Web Application

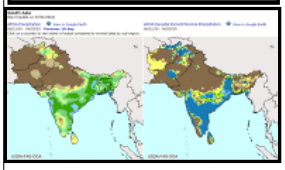
USDA/FAS/OGA/IPAD

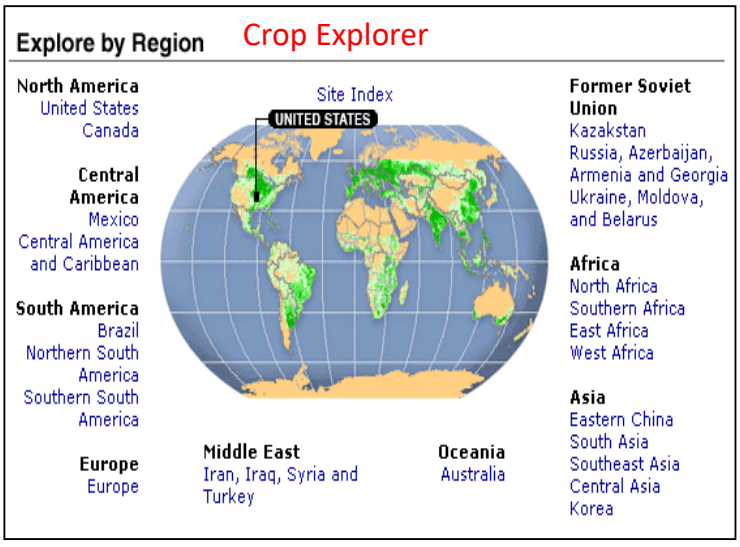
Crop Explorer: Your Data Visualization Tool

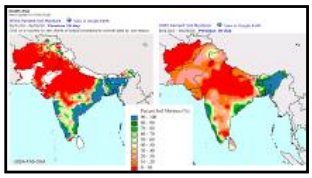
Automatic: *"Crop Explorer"* products are displayed on the Internet every 10-days and for summer/winter growing seasons

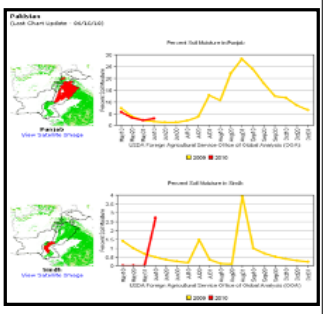












Vegetation Health Change | Crop Stress | Temperatures | Cumulative Precipitation

Reservoir Level | Precipitation | Vegetation Index | Soil Moisture

http://www.pecad.fas.usda.gov/cropexplorer/

NASA Satellites Used by FAS-OGA/IPA

FAS uses data from 8 out of 18 of NASA's Earth Observing fleet. FAS uses additional satellites from ESA, ISRO and private orgs.

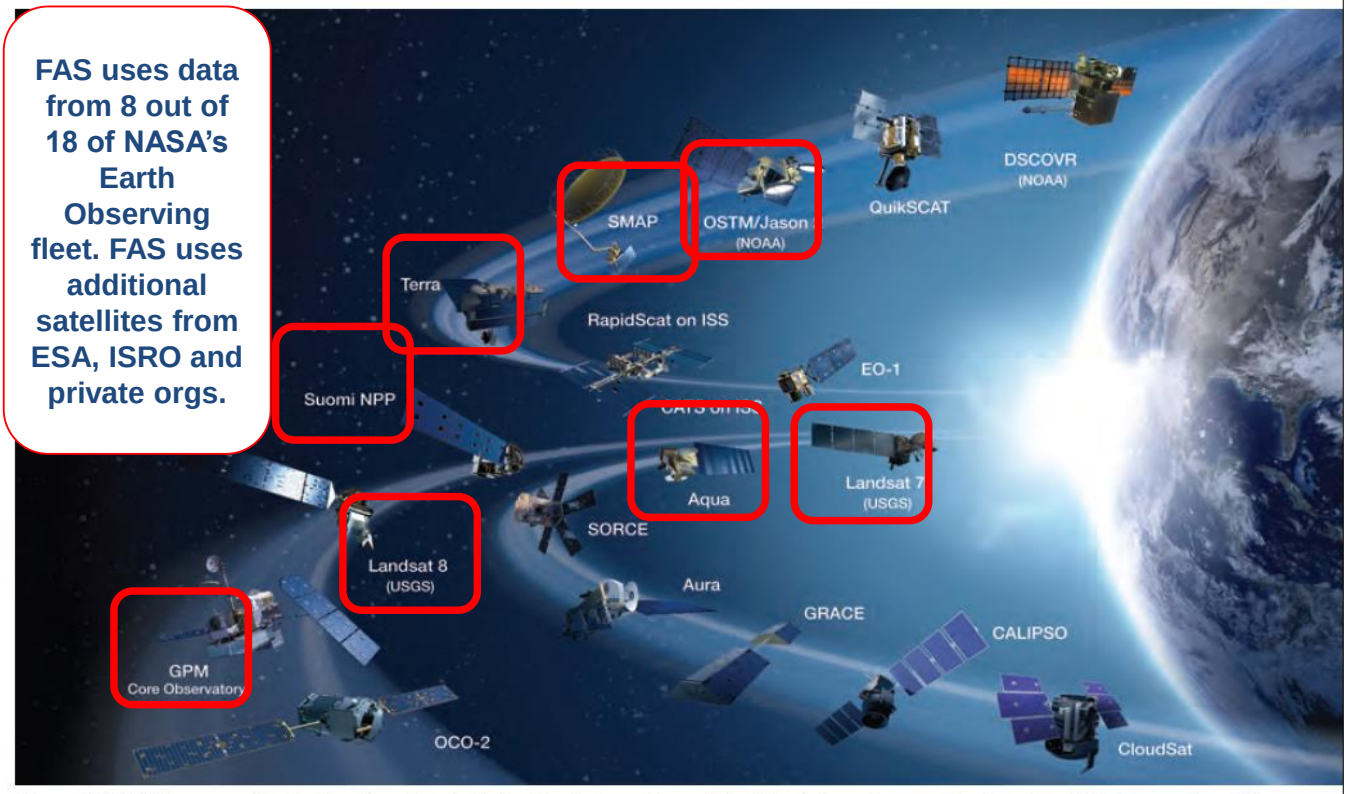


Figure 1. NASA's current Earth-observing fleet includes 20 missions. Out of the 20 missions, 2 are payloads onboard the International Space Station (ISS)—the Rapid Scatterometer (RapidScat) and Clouds Aerosol Transport System (CATS) missions. This leaves 18 free-flying missions. Note: This diagram does not represent the actual orbital tracks of each mission or the actual groupings of satellites. * TCTE is a separate NOAA payload onboard the U.S. Air Force's Space Test Program Satellite (STPSat)-3 **Image credit:** NASA

Presentation Outline

1. USDA Economic Information System
2. Crop Monitoring and Forecasting Strategies
3. 2017 DPRK Crop Conditions
4. Discussion

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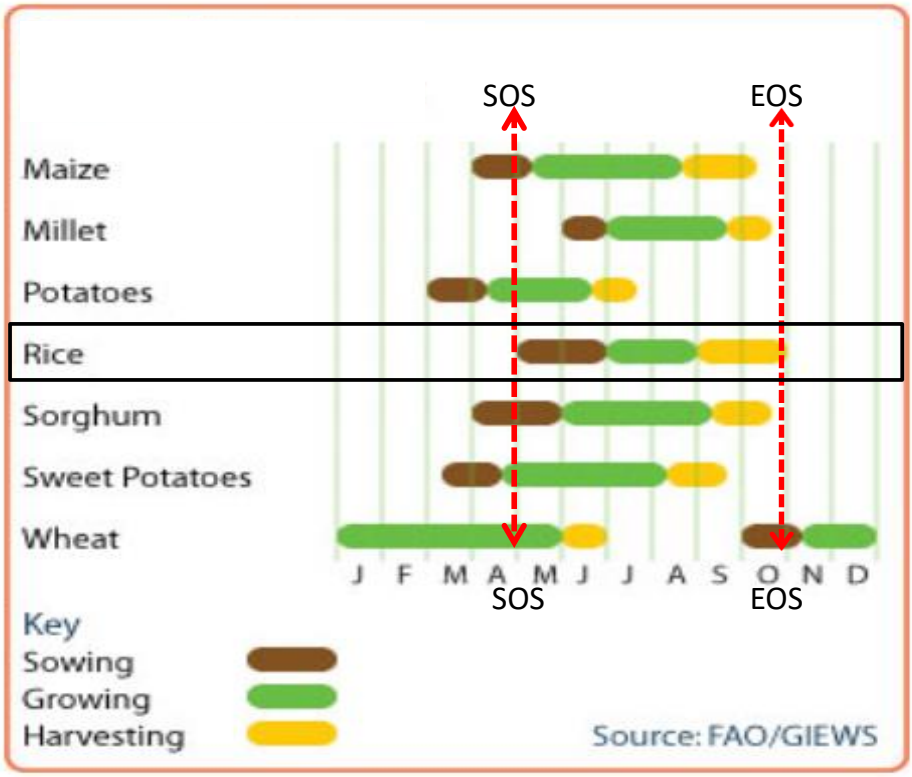
North Korea Crop Calendar



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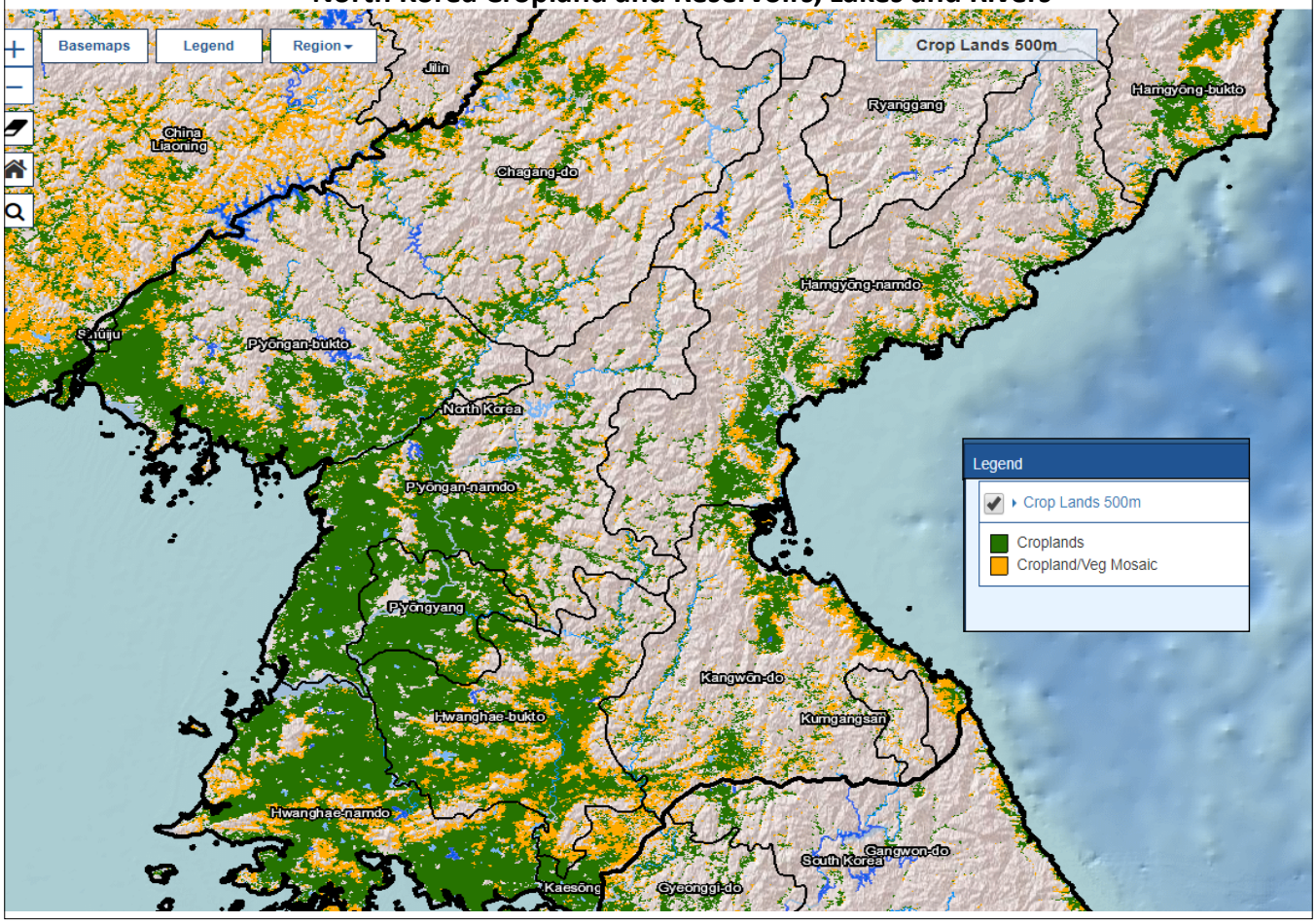
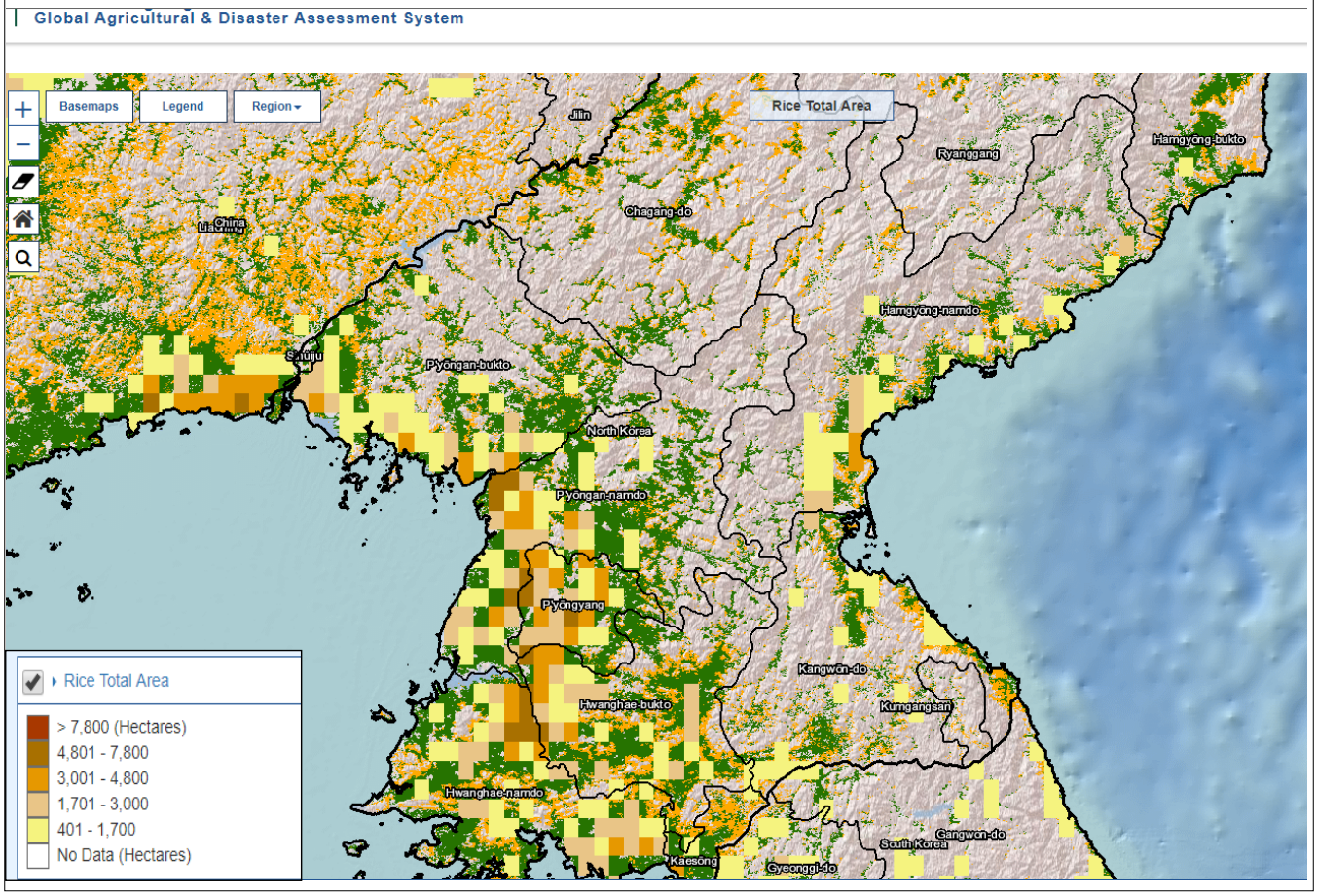
Global Agricultural & Disaster Assessment System

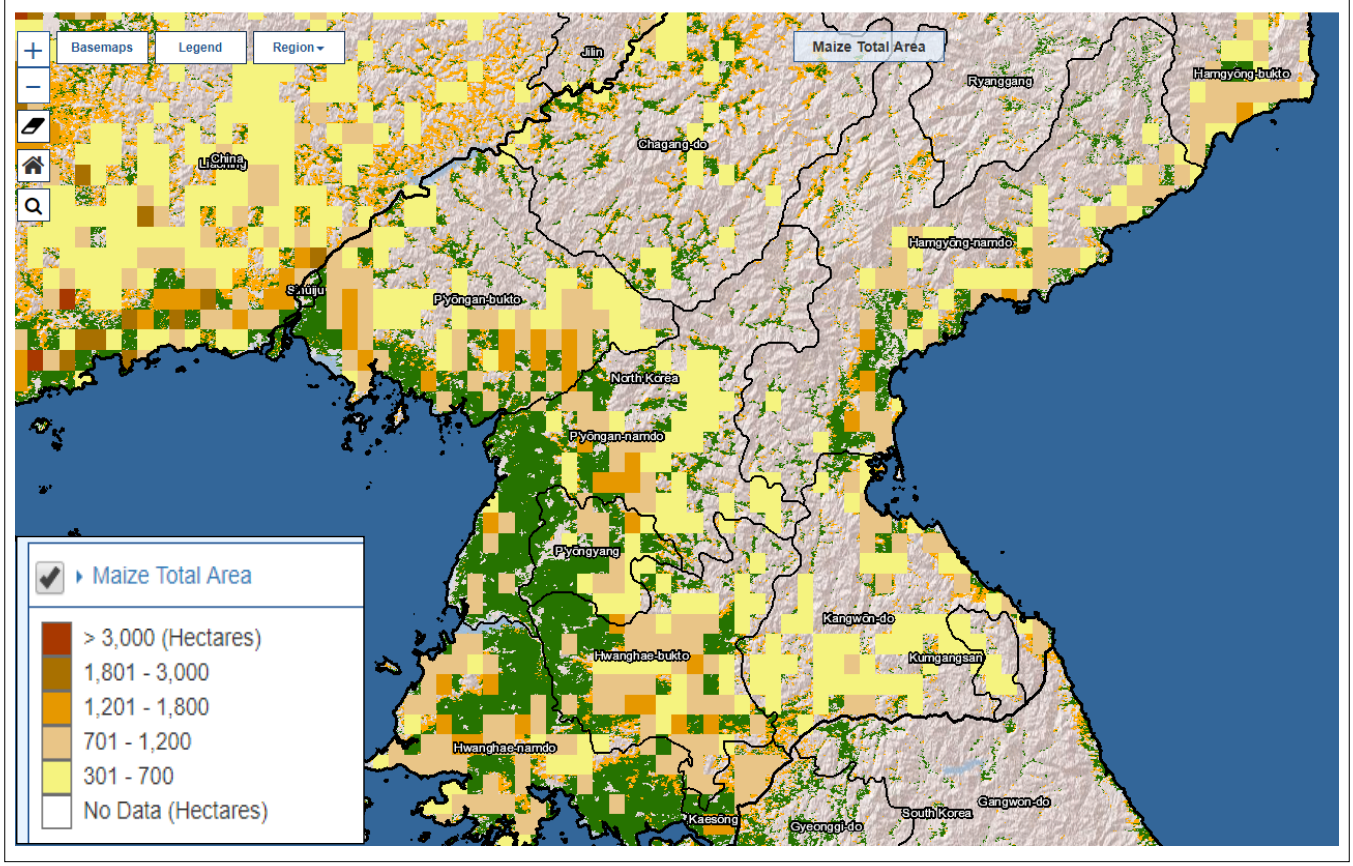
North Korea Cropland and Reservoirs, Lakes and Rivers

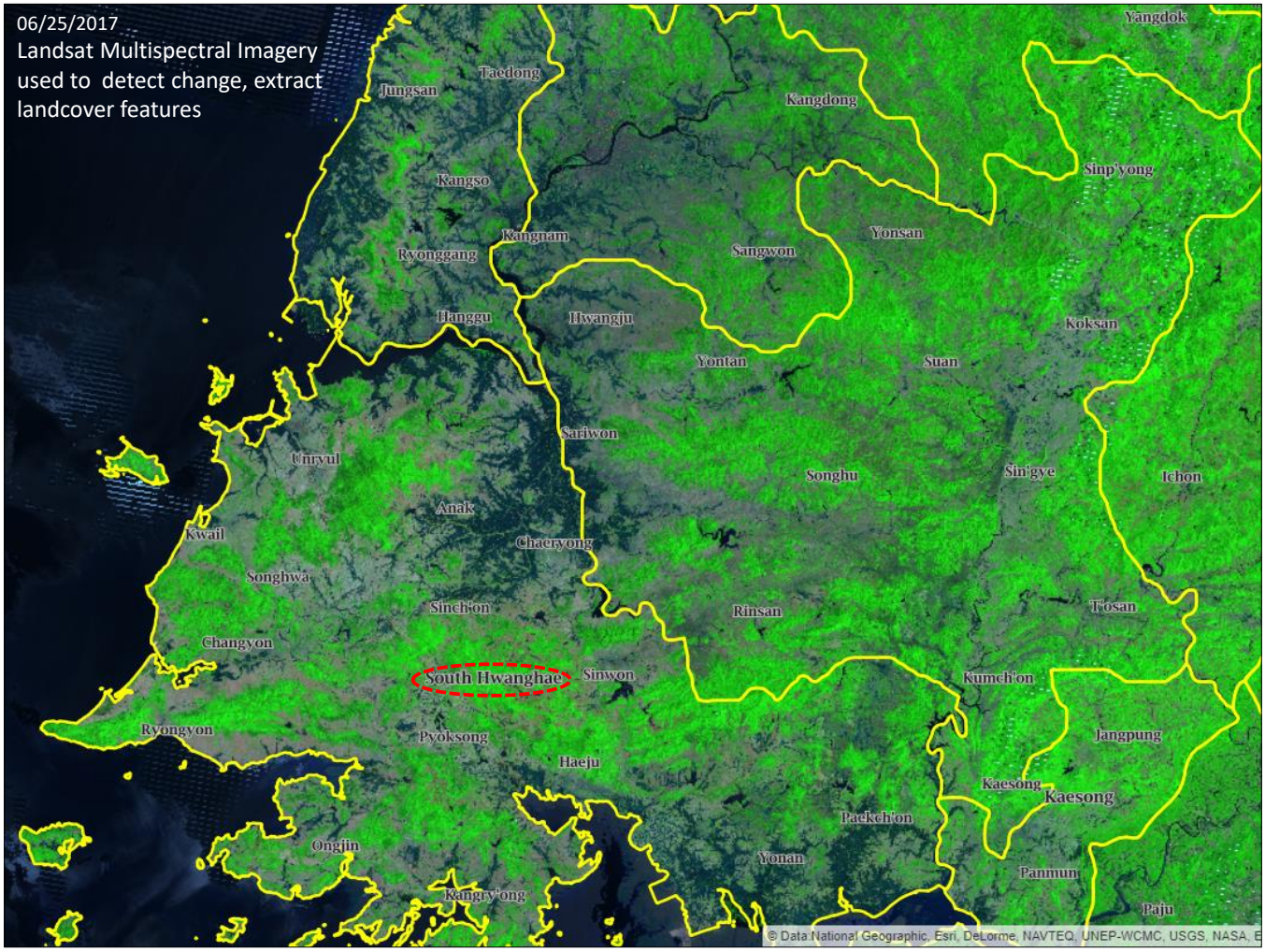


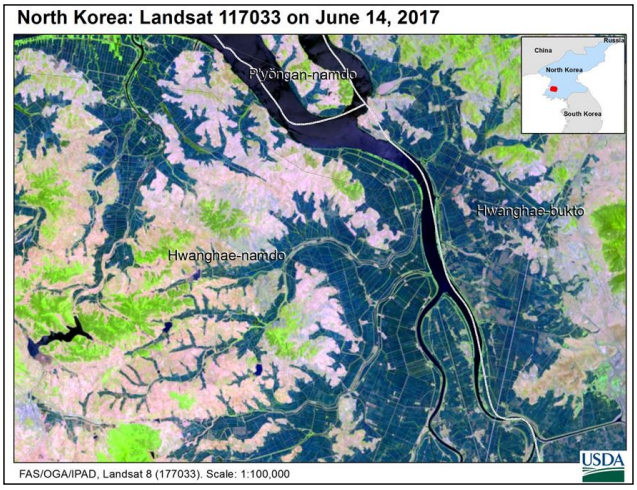
North Korea Rice Cultivation Intensity, IFPRI 10km

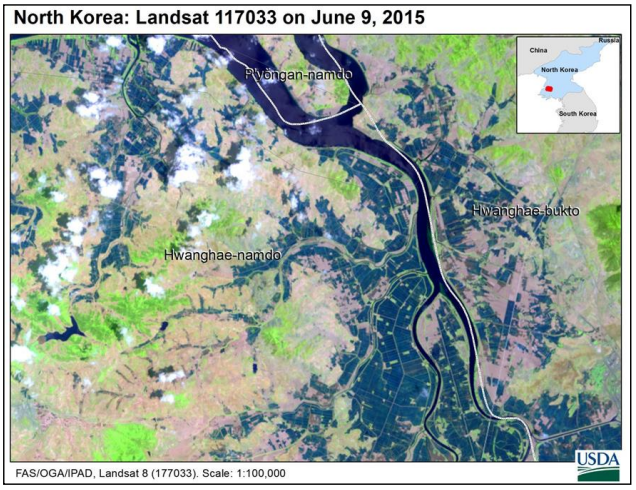


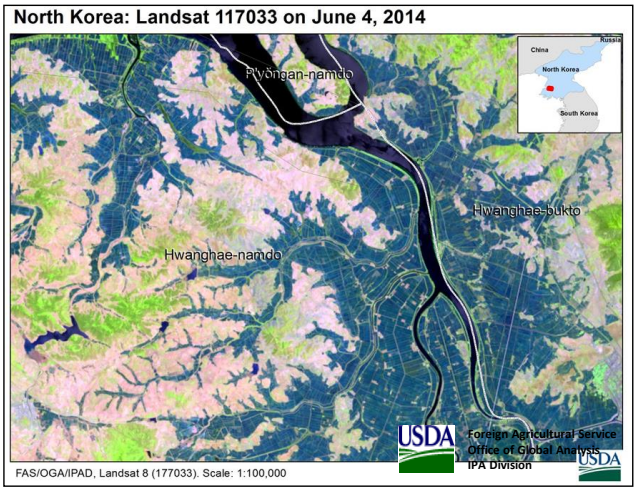
North Korea Maize (Corn) Cultivation, IFPRI 10km











Landsat 8 Satellite Image, June 14, 2017 shows upland and irrigated rice/paddy fields (shades of dark), based on identification of pre-planting flooded fields. 2017 and 2016 show similar flooding pattern

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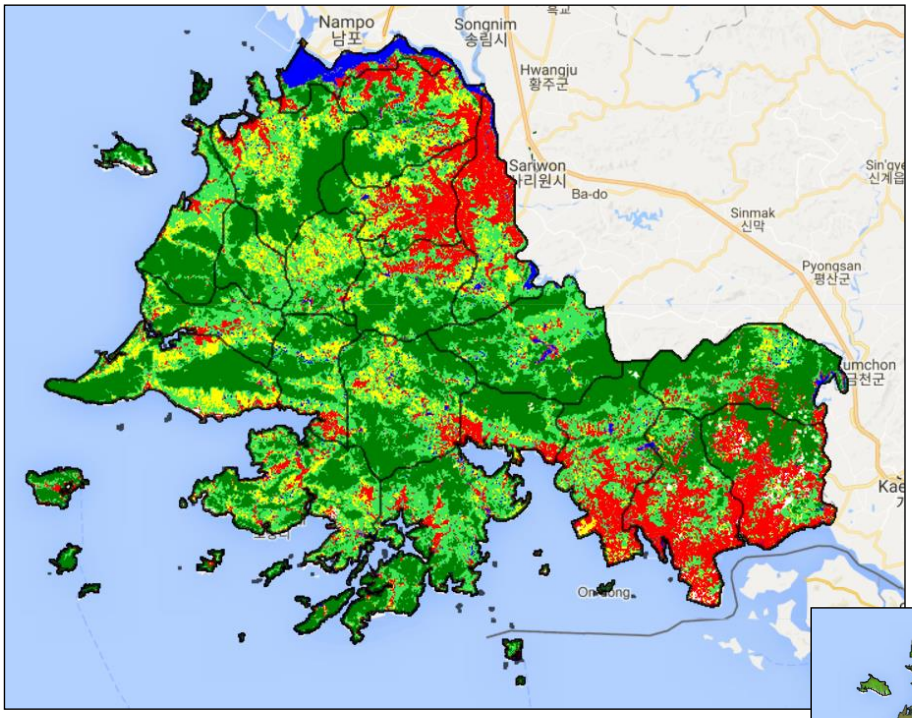
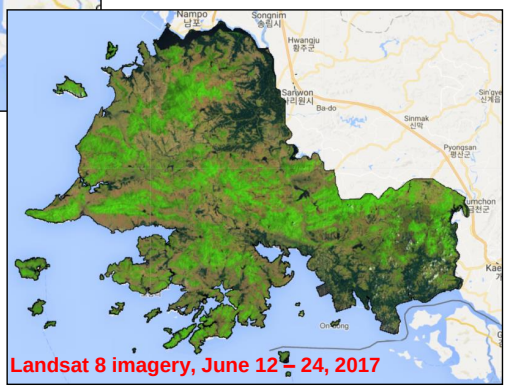
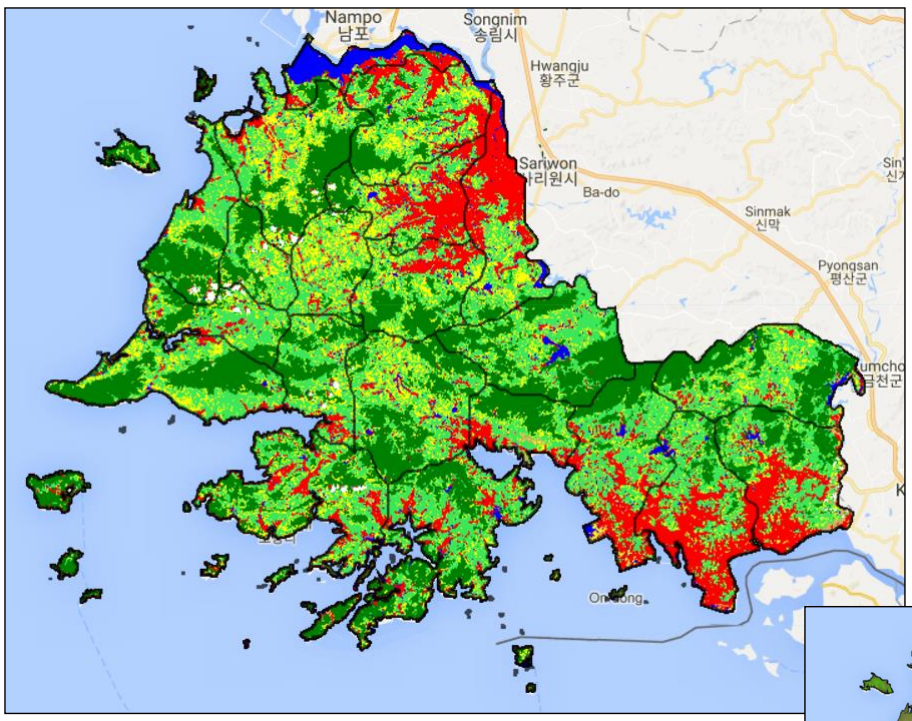
IPA Division



Rice
Water
Dense Vegetation
Cropland
Baresoil
Clouds
Cloud shadows



Hwanghaenam Province
2017 Rice Classification
Area:153,781 Hectares (380,000 Acres)



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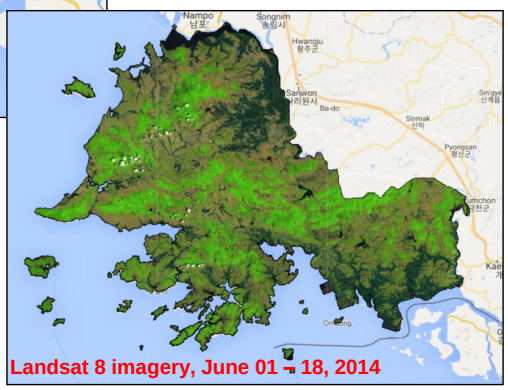
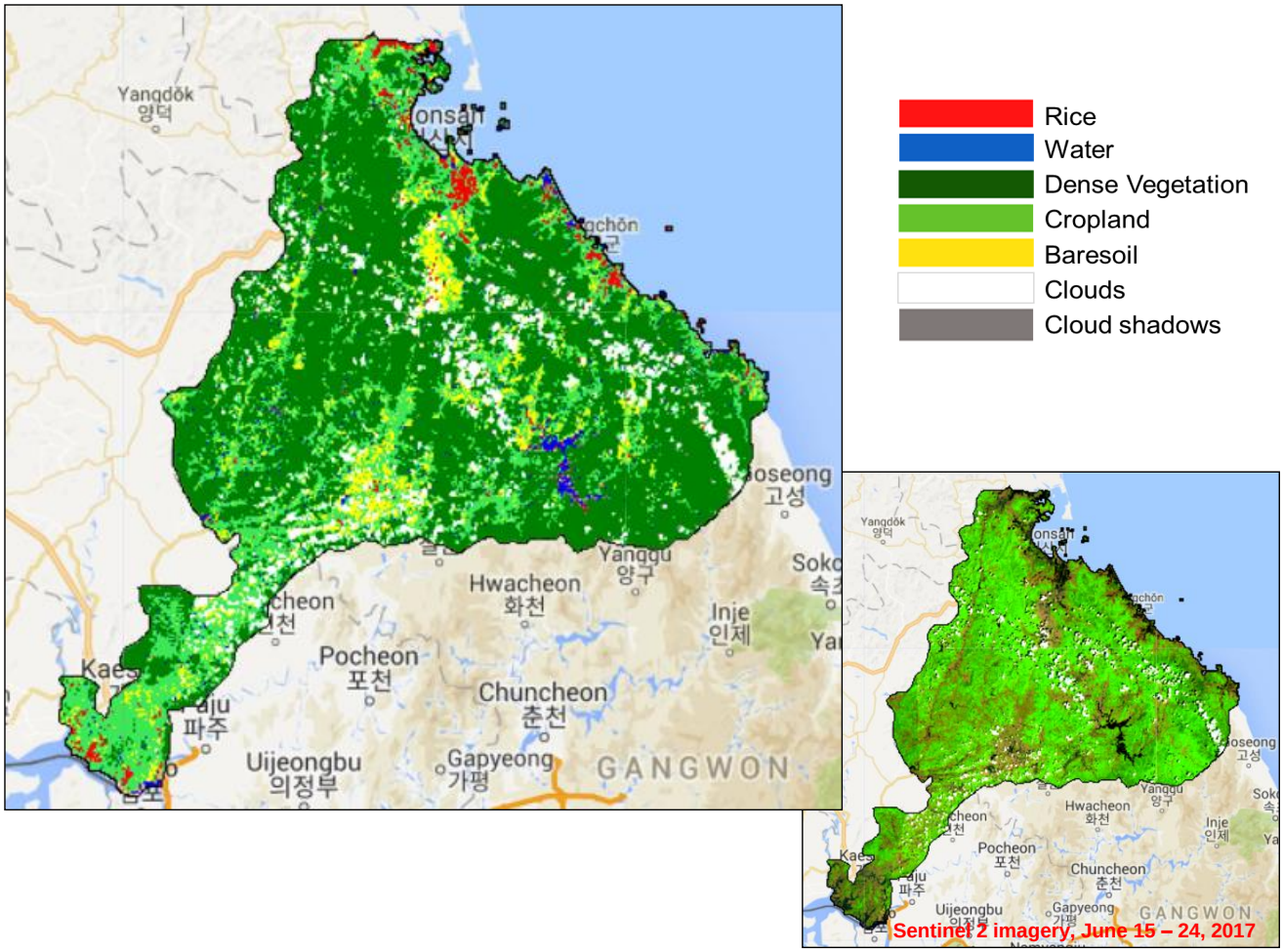


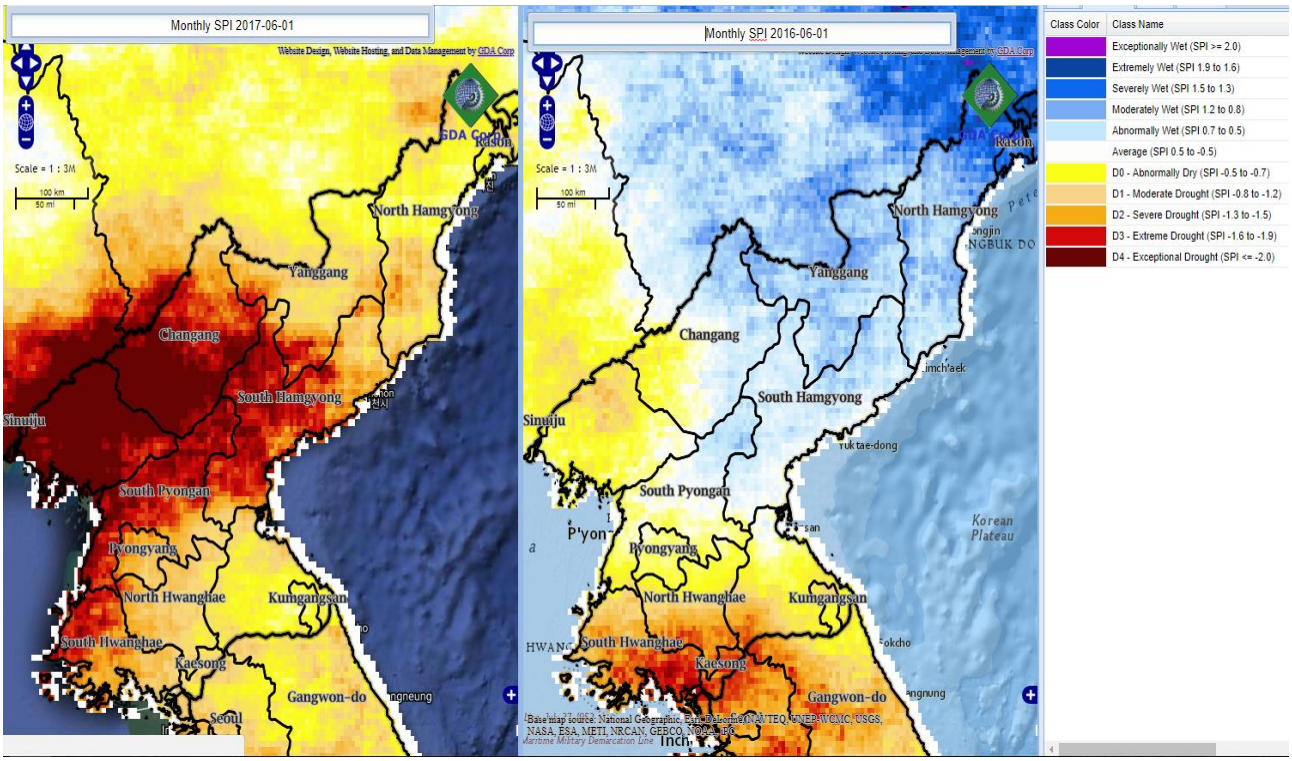
Hwanghaenam Province
2014 Rice Classification
Area:165,922 Hectares (410,000 Acres)



North Korea CHIRPS

[Climate Hazard Infra Red Precipitation-Stations]

Monthly SPI (Standard Precipitation Index) on **June 2017** vs. **2016**



Early Crop Growth/Development

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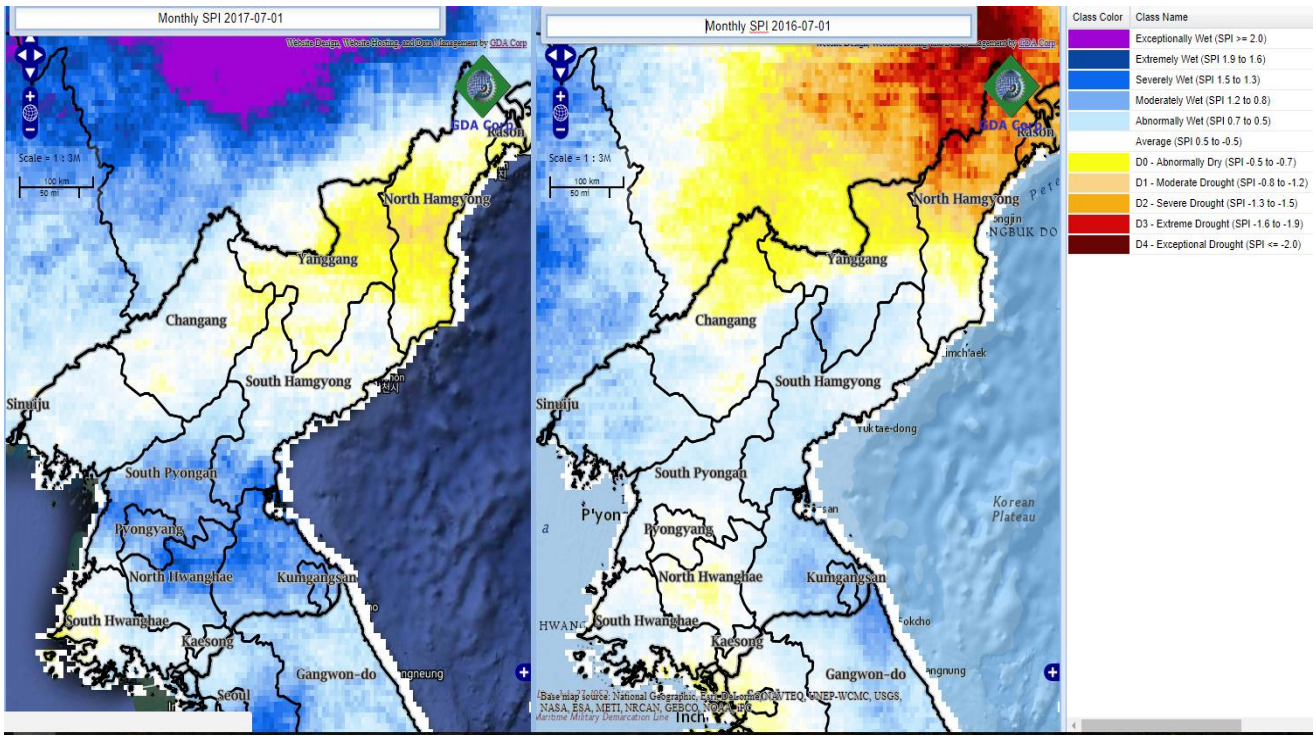
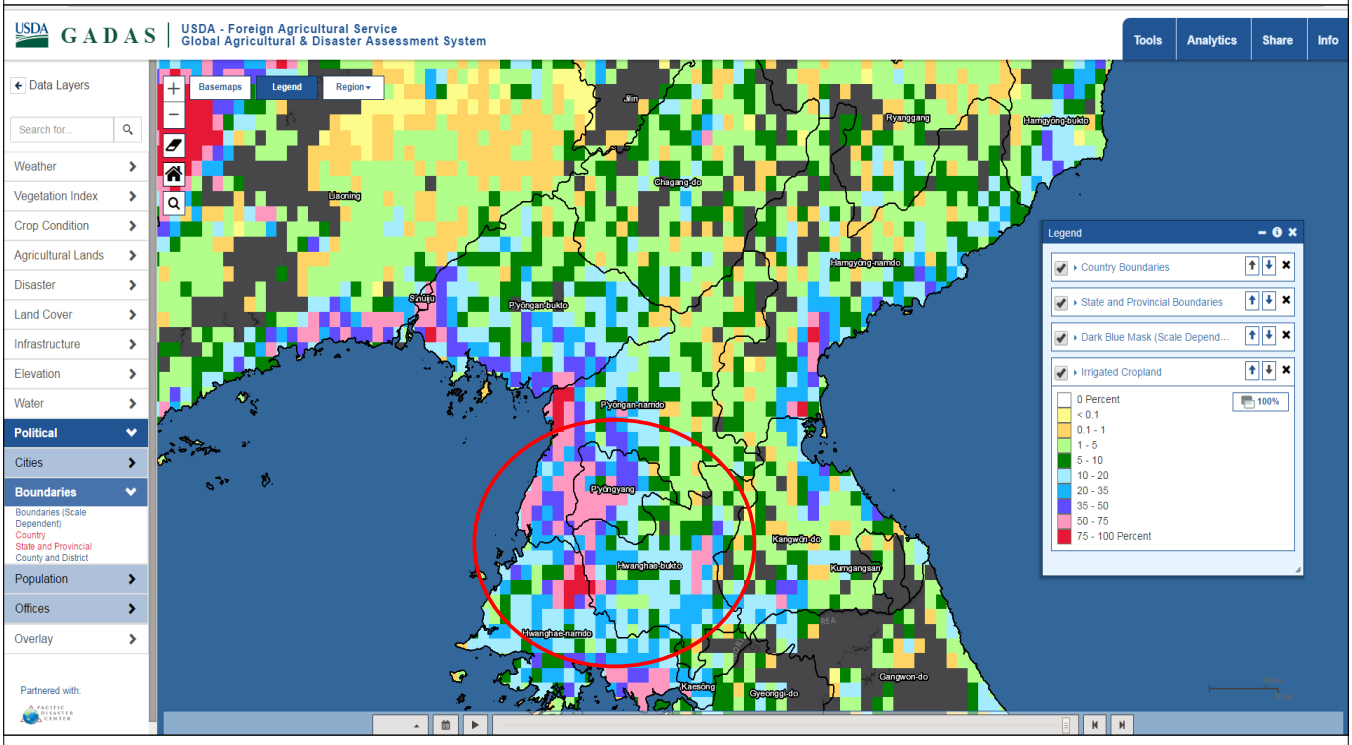
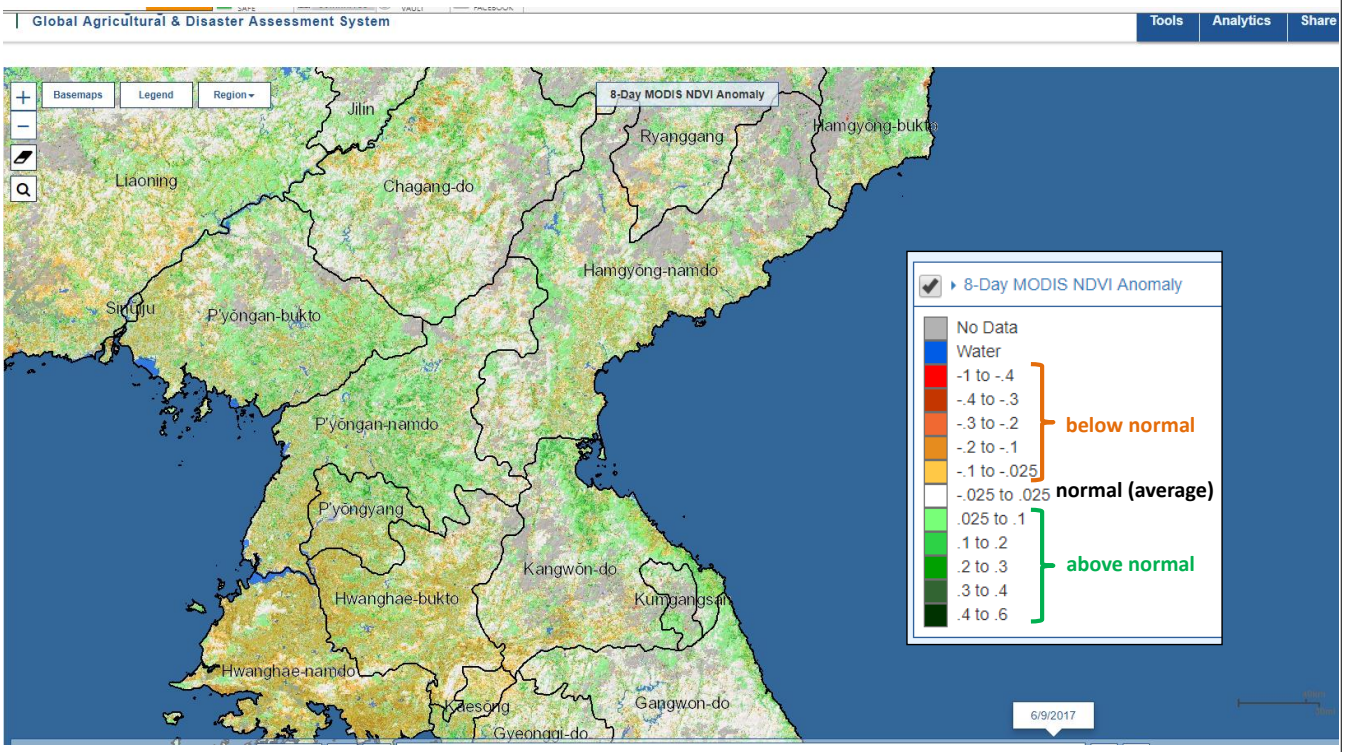


Early Crop Growth/Development

North Korea Irrigated Cropland: (drought mitigating factor??)

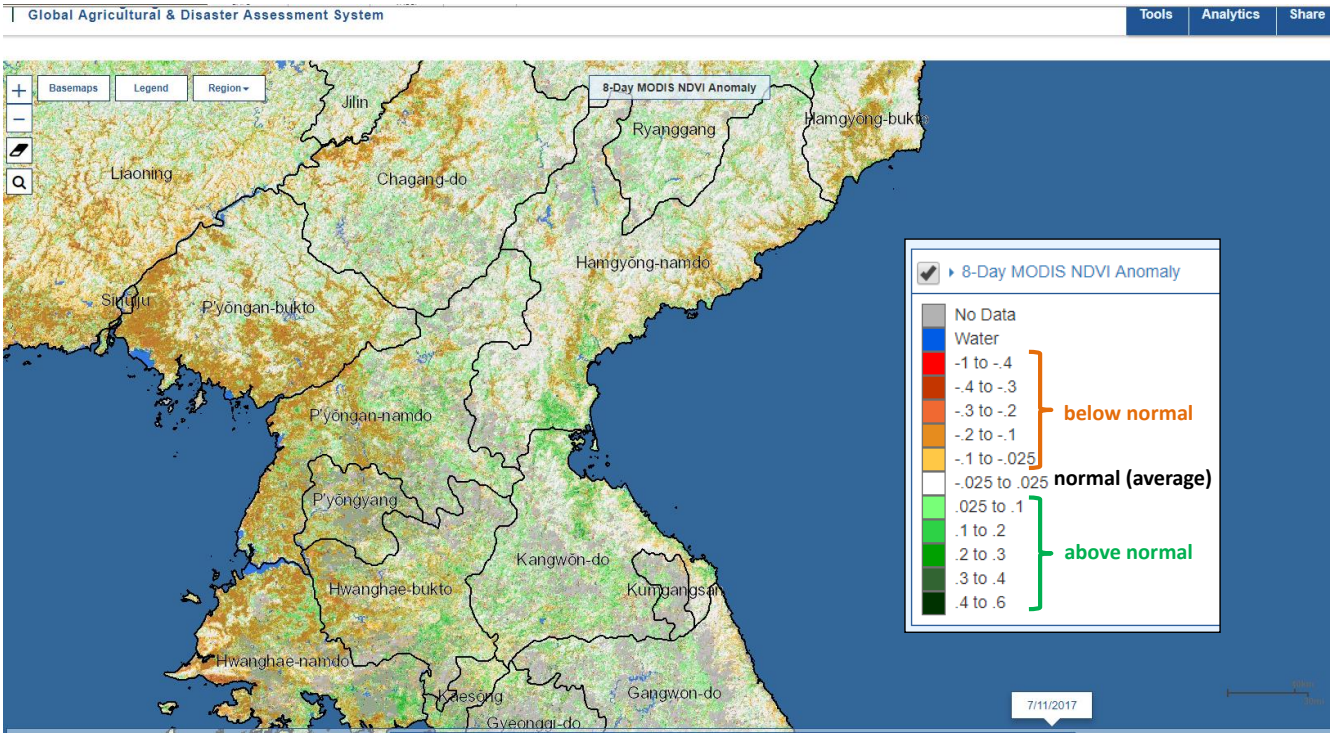


Normalized Difference Vegetation Index (NDVI) Anomaly, June 9, 2017



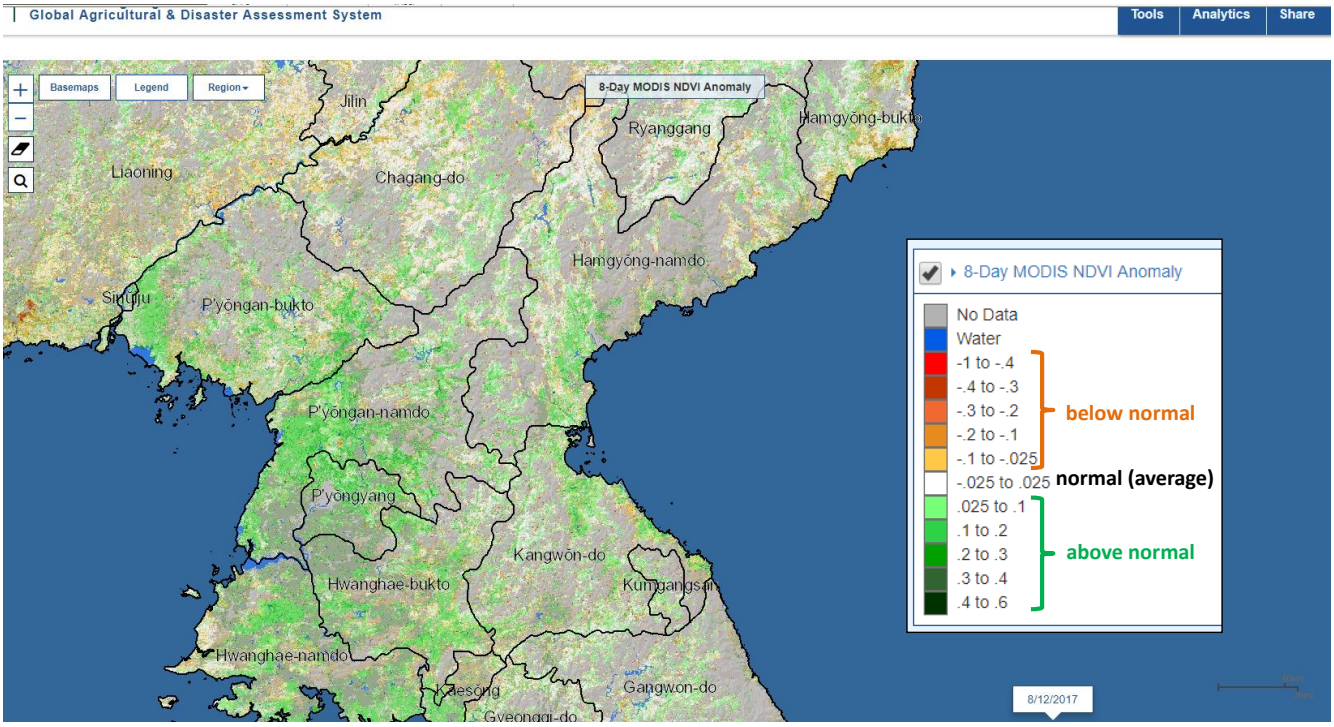
Crop Stage: Rice early growth

Normalized Difference Vegetation Index (NDVI) Anomaly, July 11, 2017



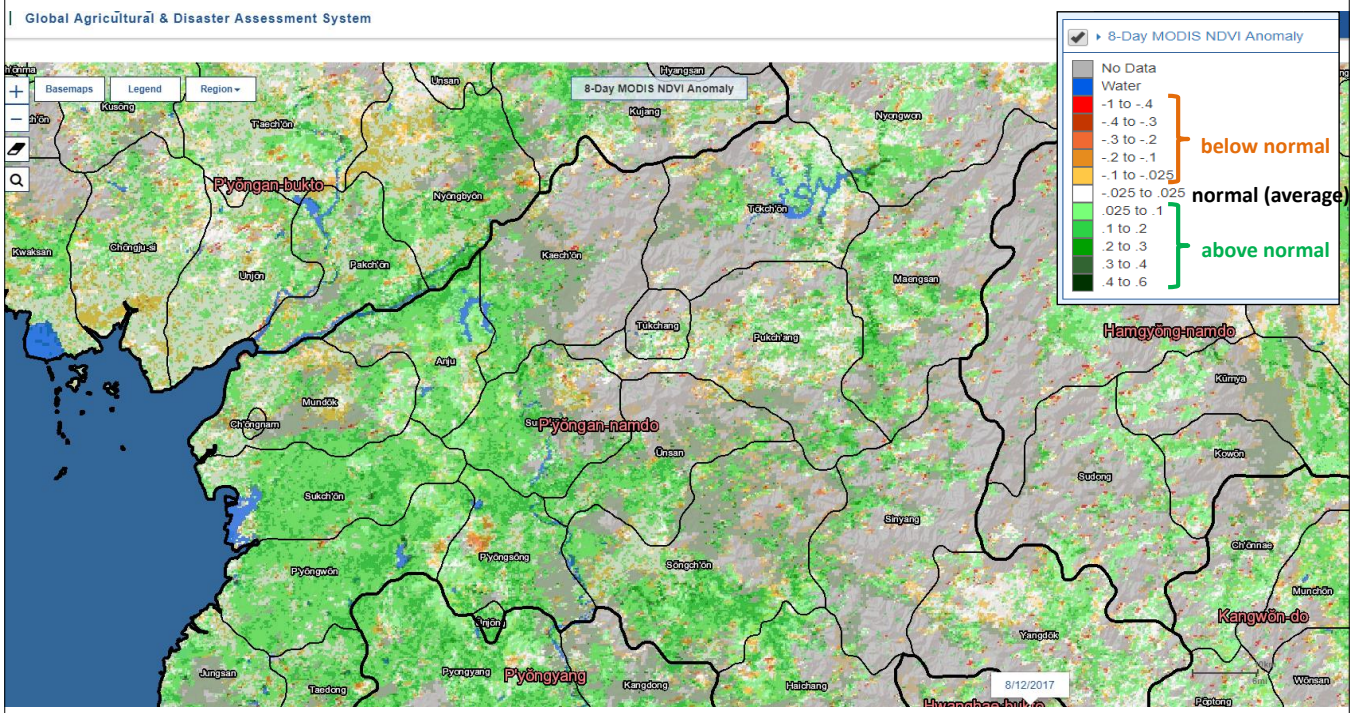
Crop Stage: Rice growth and development

Normalized Difference Vegetation Index (NDVI) Anomaly, August 12, 2017

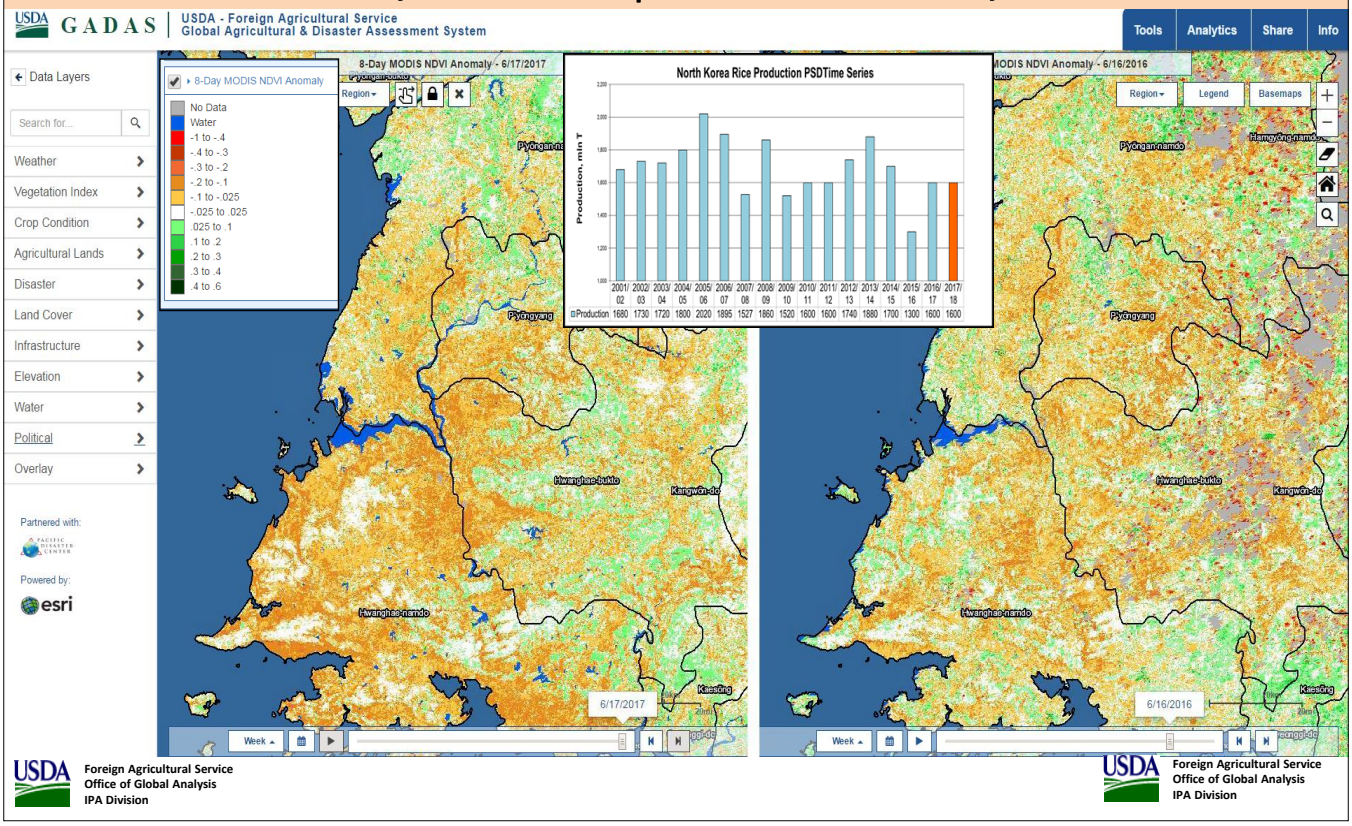


Crop Stage: Rice advanced maturity

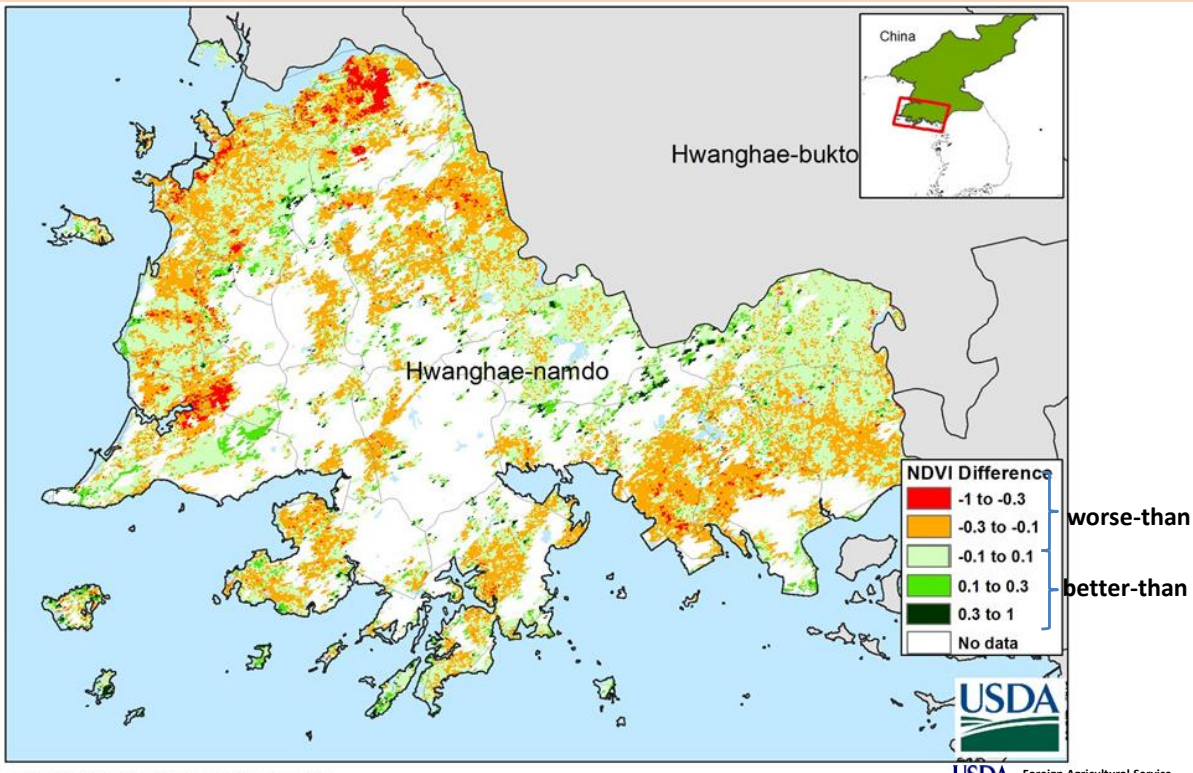
Normalized Difference Vegetation Index (NDVI) Anomaly, August 12, 2017



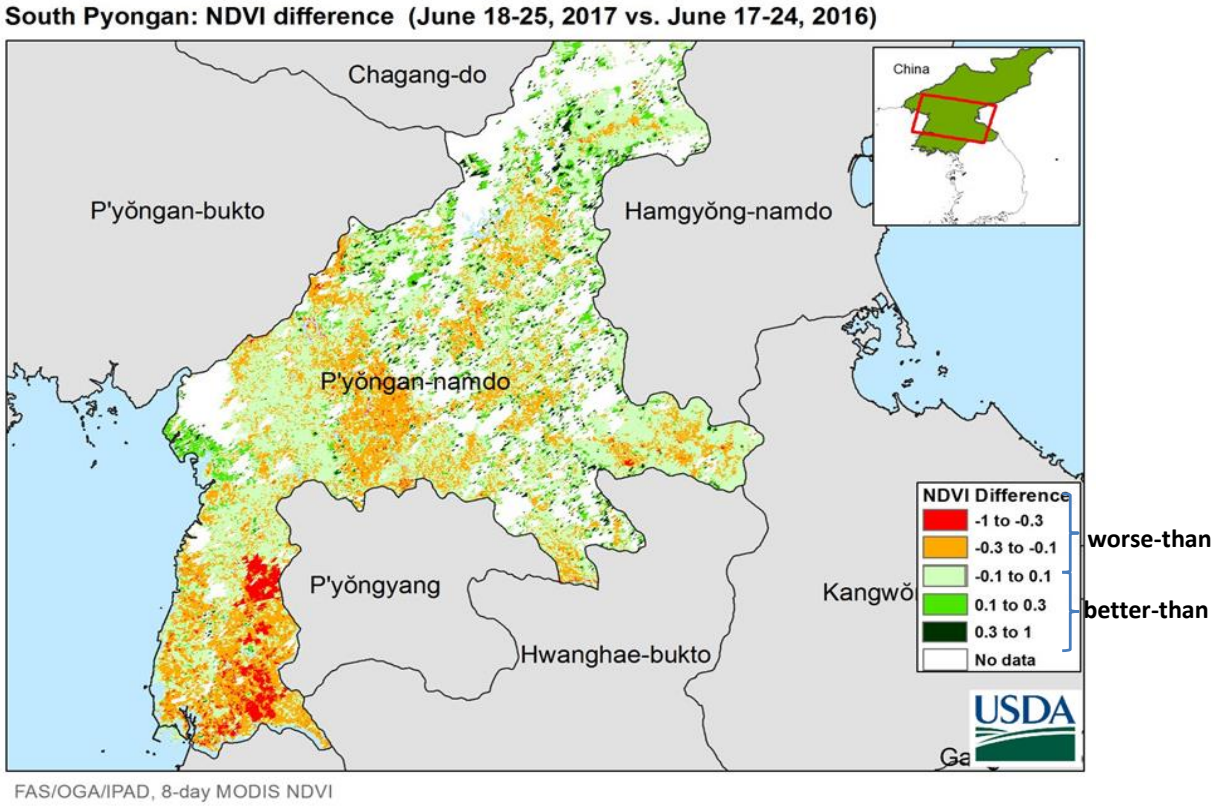
Crop Monitoring and Production Forecasting
8-Day MODIS **NDV I Anomaly** Profiles,
June 17, 2017 compared to **June 16, 2016**



Crop Monitoring and Production Forecasting:
Hwanghae-namdo 8-Day MODIS **NDV I Difference** Profiles,
June 2017 compared to **June 2016**

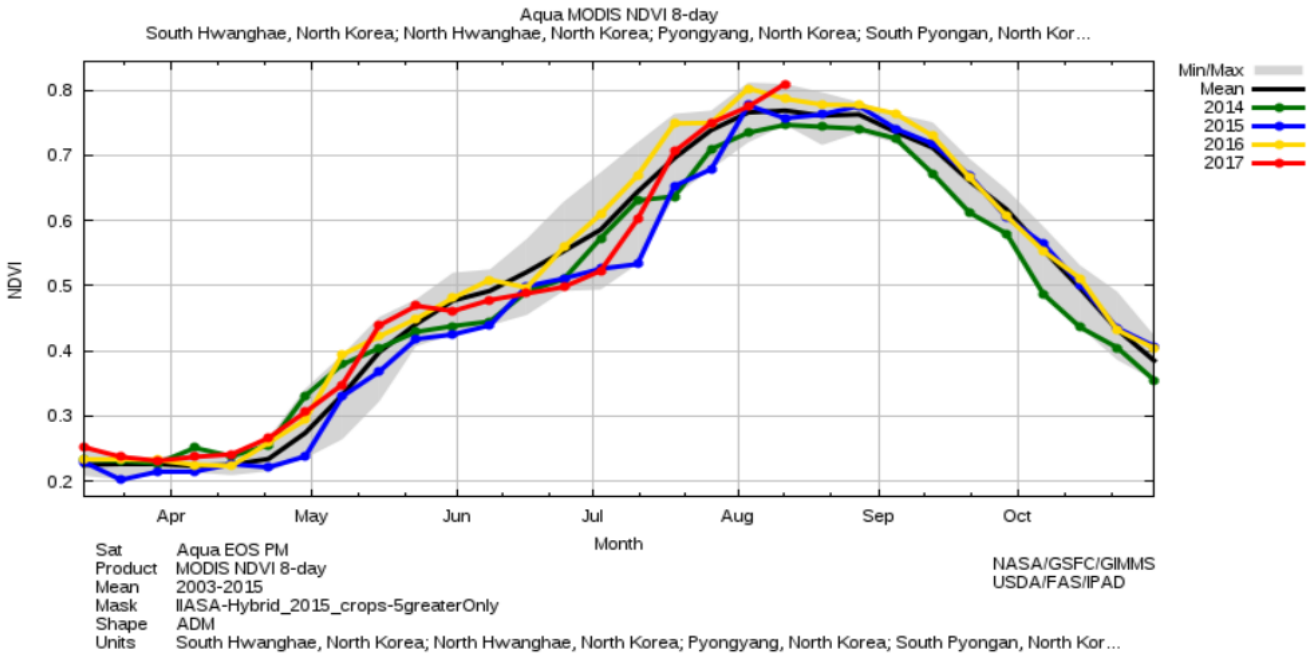


Crop Monitoring and Production Forecasting: **Pyongan-namdo** 8-Day MODIS **NDV I Difference** Profiles, **June 2017** compared to **June 2016**



The vegetation indices profiles give a complete picture of the crop development during the season, and is compared with previous seasons and long-term average

Plot 1. IPAD Time Series



The time series vegetation indices profiles are also used to derive indicators such as Start, Peak, End and Length-of-Crop-Season. Anomalies in the timing of these indicators are used in evaluation/estimation of yield variation

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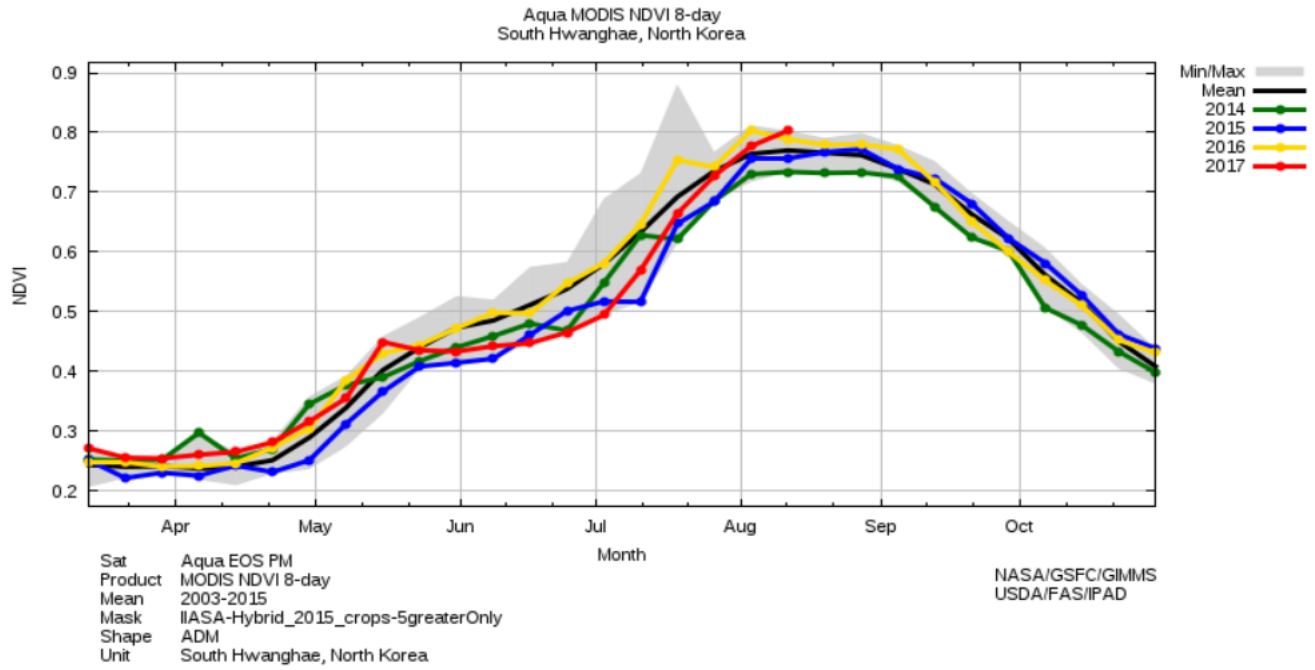

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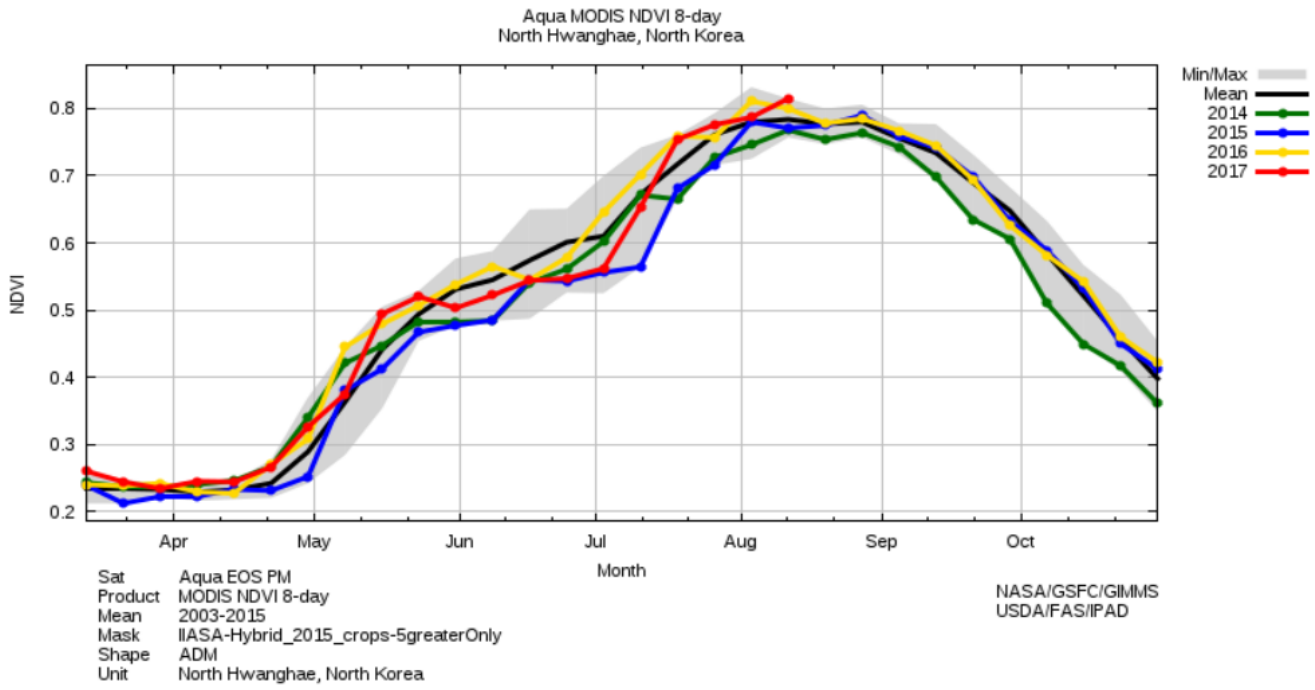

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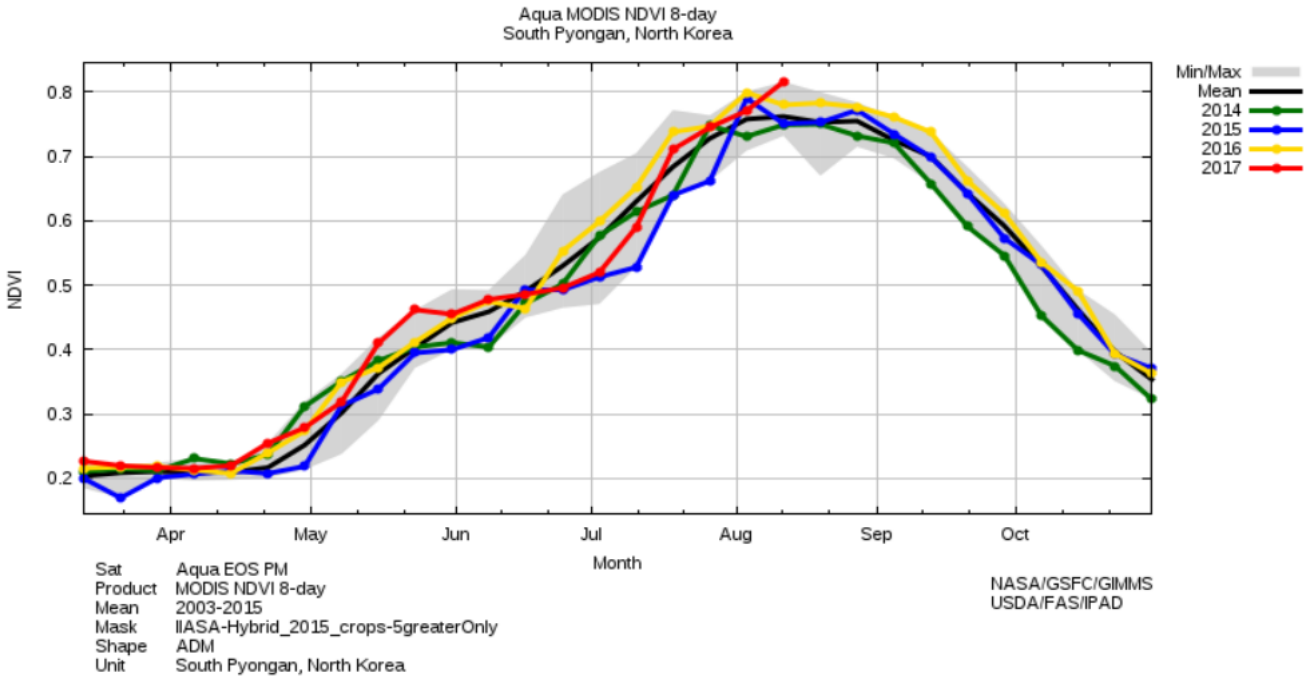

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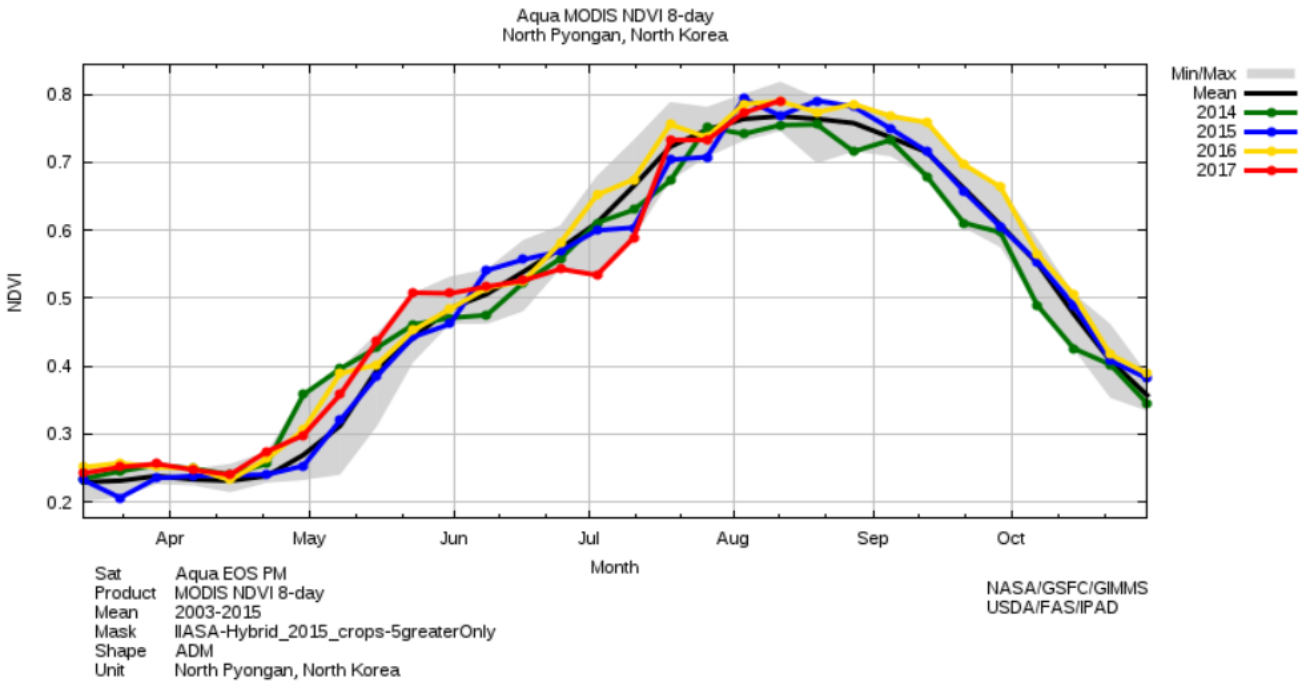

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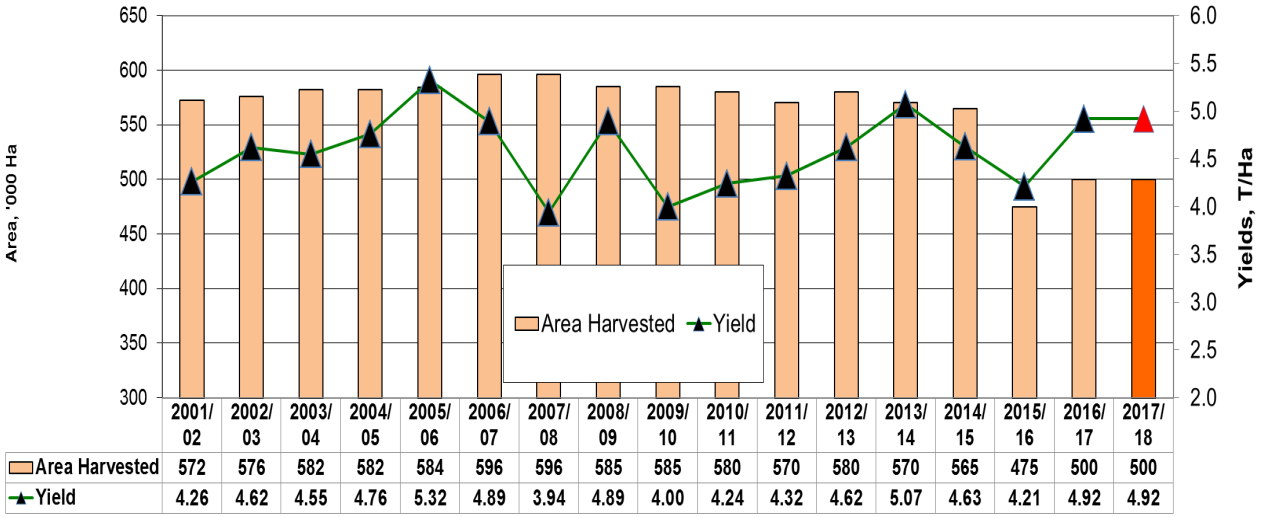
North Korea Rice Yield and Area Time Series

2017/18 Forecast based on Area and NDVI (Yield proxy) Profiles



	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Area Harvested	572	576	582	582	584	596	596	585	585	580	570	580	570	565	475	500	500
Yield	4.26	4.62	4.55	4.76	5.32	4.89	3.94	4.89	4.00	4.24	4.32	4.62	5.07	4.63	4.21	4.92	4.92

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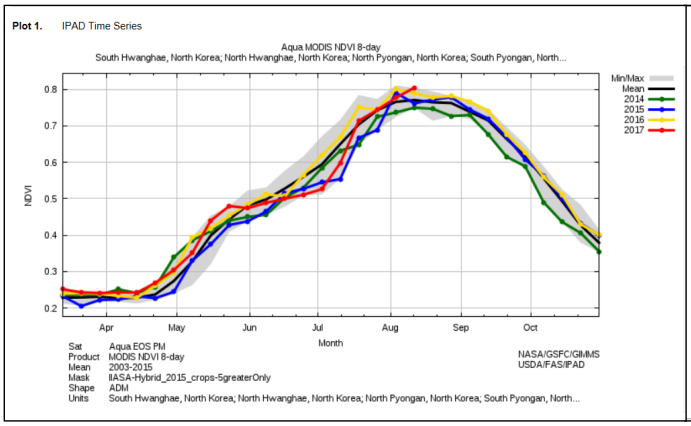
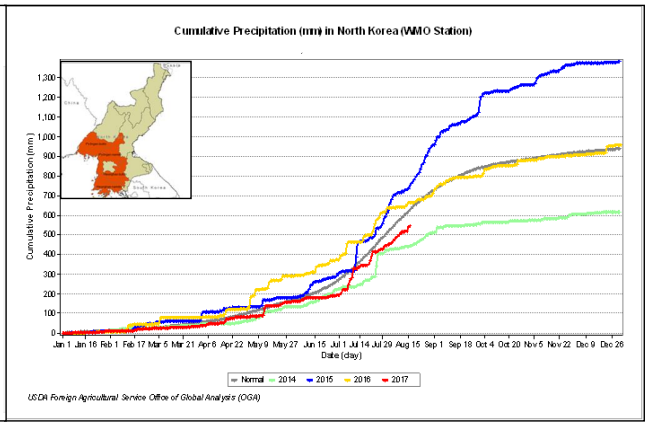
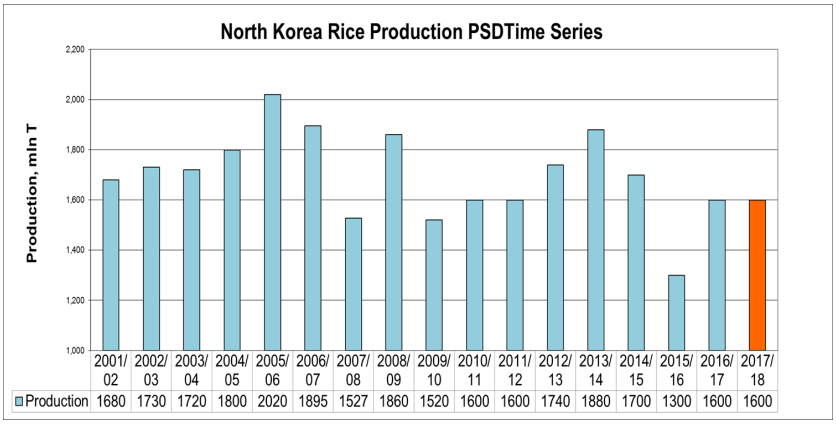
In most situations a major NDVI anomaly is explained by a similar rainfall anomaly, but it is not always the case. In such cases temporal rainfall and other non-rainfall related factors influencing the NDVI are taken into consideration.







	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
Production	1680	1730	1720	1800	2020	1895	1527	1860	1520	1600	1600	1740	1880	1700	1300	1600	1600

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T h a n k s

Questions & Comments

Dath K. Mita, PhD
Office of Global Analysis (OGA)
Foreign Agriculture Service (FAS)
United States Department of Agriculture (USDA)

USDA Foreign Agricultural Service
Office of Global Analysis
IPA Division

USDA Foreign Agricultural Service
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Food security and Nutrition:
WFP Food Assistance in DPR Korea

Praveen Agrawal,
WFP Representative in DPR Korea

6 September 2017 | Seoul, Republic of Korea

WFP
World Food Programme
wfp.org

WFP
wfp.org

1

Food Availability, Access & Utilization

Context

- **18 million** people, out of a total of 24.8 million, **do not eat a sufficiently diverse diet.**
- **28% children** under 5 are stunted in DPR Korea. (**25.4 %** in WFP-assisted nurseries)
- **Not enough food** is produced to feed the population. The total deficit in 2016-17 food supply is **963 469 mt.**
- **Droughts, typhoons and floods** threaten livelihoods, agricultural production and infrastructure **every year.**

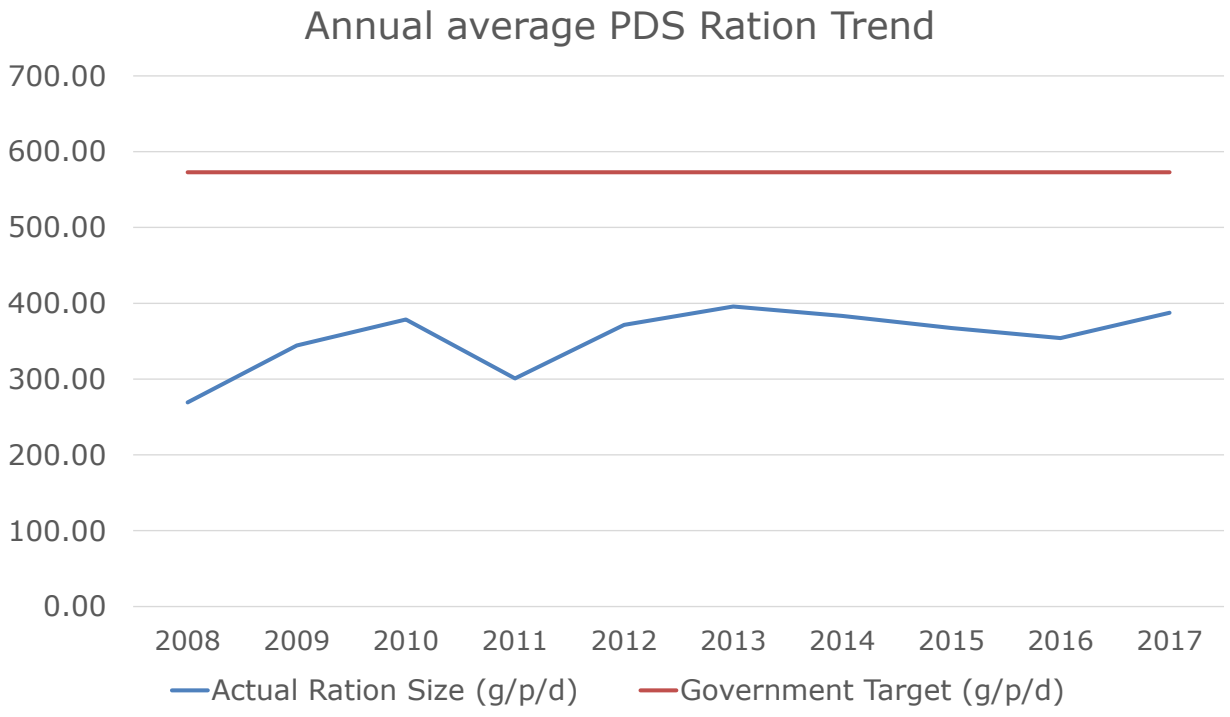
Drought 2017

- A **shortage of rain** in DPR Korea (DPRK) between January and June 2017 created **abnormally dry conditions** in the **south-western provinces**.
- These areas usually **produce 43 percent of food for Public Distribution System**.
- The impact of the drought on **total food production is still not known**.
- The timing of the dry period and associated high temperatures **will presumably reduce the yield of the main crops** to be harvested in October.

Drought 2017: Impact on food security

- Up to **70 percent** of the population is dependent on the **Public Distribution System** for **food rations**.
- Any **reduction in agricultural production** is likely to **negatively impact** on people's **food security and nutrition**, with children the most vulnerable.
- PDS ration has been **reduced** to **300 grams** per person per day **in July 2017** from **400 grams** per person in previous months.
- In August, **US$2.5 million** grant was confirmed from **CERF** to provide **nutrition support** to **186,012** women and children in **23 drought affected counties**.

Public Distribution System (PDS)



2 WFP in DPR Korea

Protracted Relief & Recovery Operation 900207(Jul '16 to Dec '17)

- Planned beneficiaries: **1.7 million**
- Total budget: **US$ 76 million**
- Priority focus on **nutrition** of young children & pregnant and lactating women (first 1000 days of life)
- Food for Disaster Risk Reduction component
- Geographic coverage: **60 counties** in **9 provinces**
- Monitoring conditions - **"No access no assistance"**

Nutrition Assistance

Children receive fortified foods through institutions.

Pregnant women and nursing mothers receive fortified foods through PDS.

Type of WFP supported Institutions: Nurseries, Kindergartens, orphanages, Hospitals (Pediatric wards)

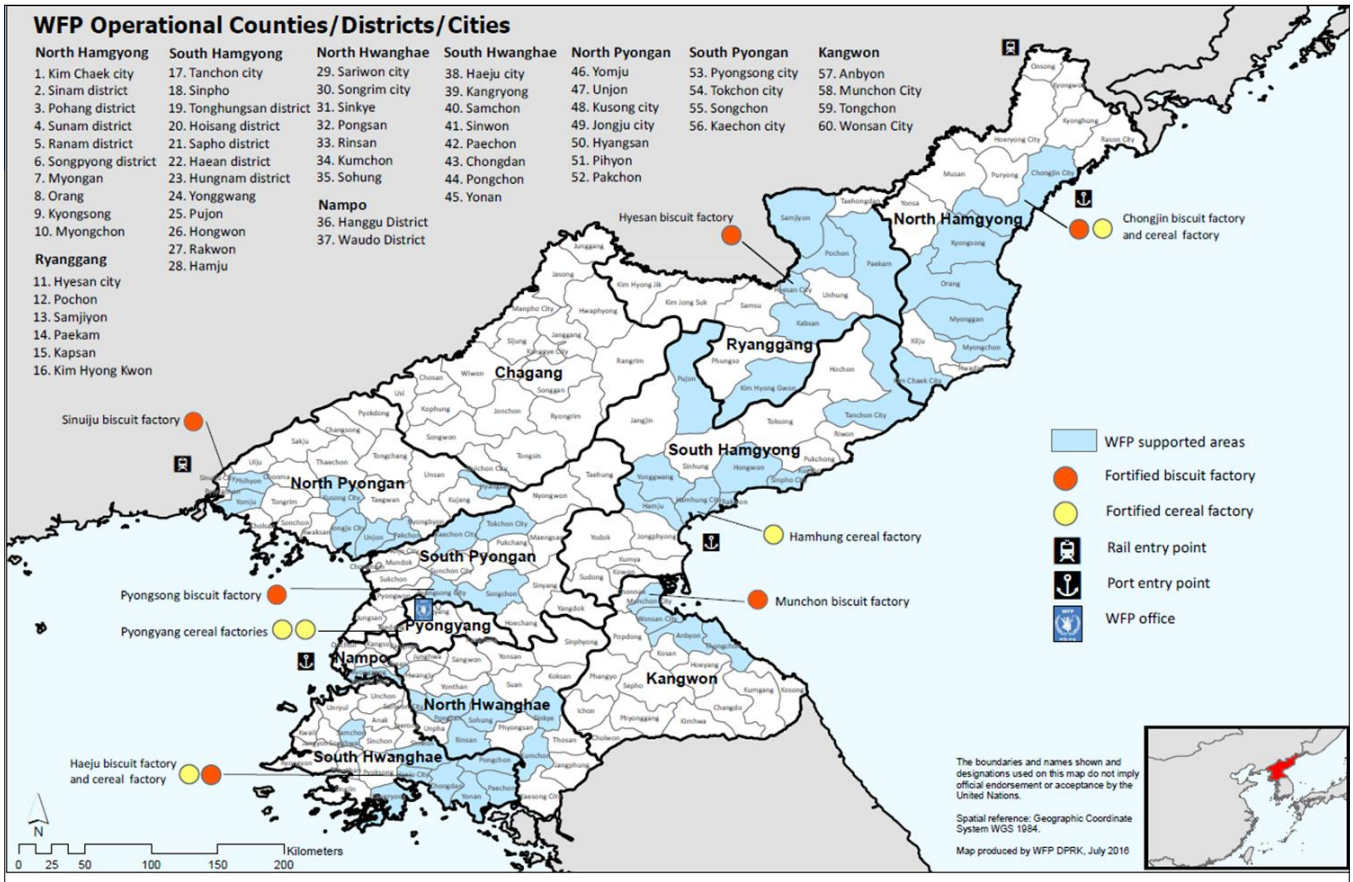
Local production of fortified foods

Supplementary Feeding

Food for Disaster Risk Reduction component

- **Tree planting** in upstream areas
- **Terracing and agroforestry** in mid-hills
- **Disaster risk management** in downstream areas

Agroforestry project



- **60 / 210 counties and 9 / 11 provinces**
- **11 local factories producing fortified cereals and fortified biscuits**

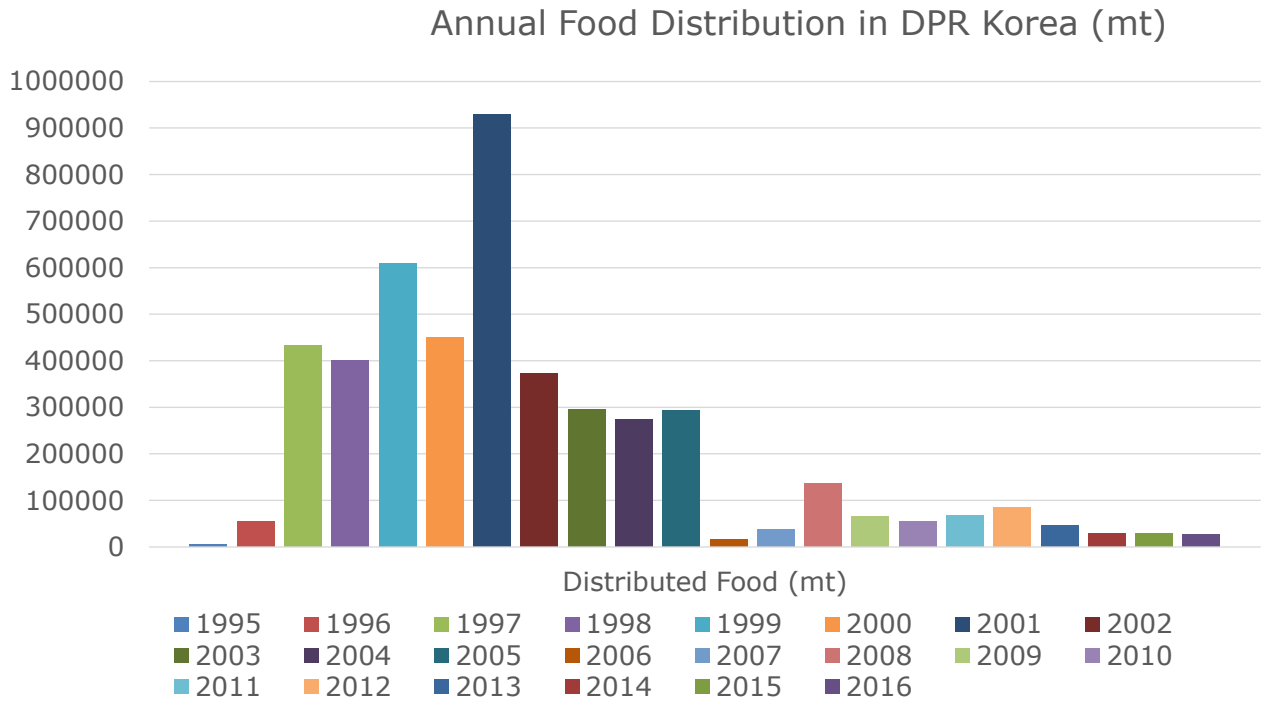
Access and monitoring (July 2016 – June 2017)

"No Access No Assistance"

- WFP has access to **all its operational areas (60 counties / 9 provinces)** for regular monitoring visits

- **1,473** monitoring visits to beneficiary institutions, households, FDRR sites and LFPs
- Average number monitoring visits: **123 /month**

WFP food assistance in DPR Korea 1995-2016



Transitional - Interim Country Strategic Plan (Jan-Dec 2018)

SR 2. No one suffers from malnutrition *(SDG 2.2)*	SR 1. Everyone has access to food *(SDG 2.1)*	SR 1. Everyone has access to food *(SDG 2.1)*
SO 1. Children and pregnant and lactating women in DPRK have improved nutrition by 2030	**SO 2.** Vulnerable people in disaster-prone areas have access to food all year round	**SO 3.** Crisis affected people in DPRK have access to food all year round
RESILIENCE BUILDING		CRISIS RESPONSE

Planned beneficiaries: 800,000 Total budget: US$ 52.64 million

Challenges

- At **least 6 months lead time** for international procurement and local food production.
- Decline in **humanitarian funding.**
- **Access to information** still remains a challenge.
- Interruptions in banking channel due to sanctions.

Conclusion

- WFP supports more than **650,000 vulnerable women and children** every month who are in dire need of nutrition assistance.
- It is essential to continue this **humanitarian assistance** in DPR Korea to **save lives of millions of children**.
- WFP appeals to the **donors** for their **firm commitments** to support WFP's operations in DPR Korea.

Achievements & Impacts of Potato Project in North Korea

- On Experience & Future Consideration -

CHO Hyun-Mook

Highland Agriculture Research Institute
Rural Development Administration

Contents

Background

2017 Roundtable

GREAT FAMINE




More than 200 million people died in N. Korea during Great Hunger

Declare "Potato Kingdom"

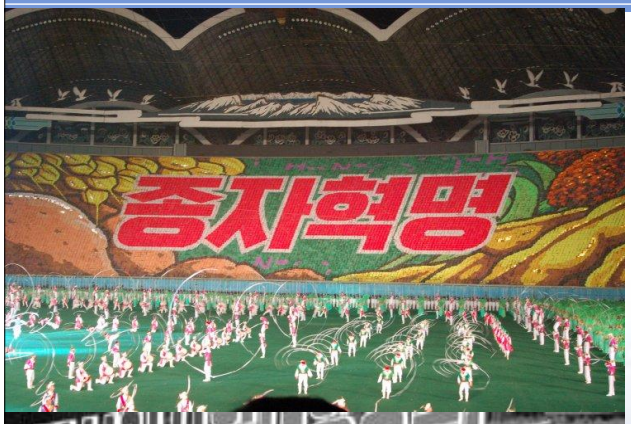
2017 Roundtable

1995 : Visit of Daehongdan
- Declare
"Potato Kingdom" in Asia

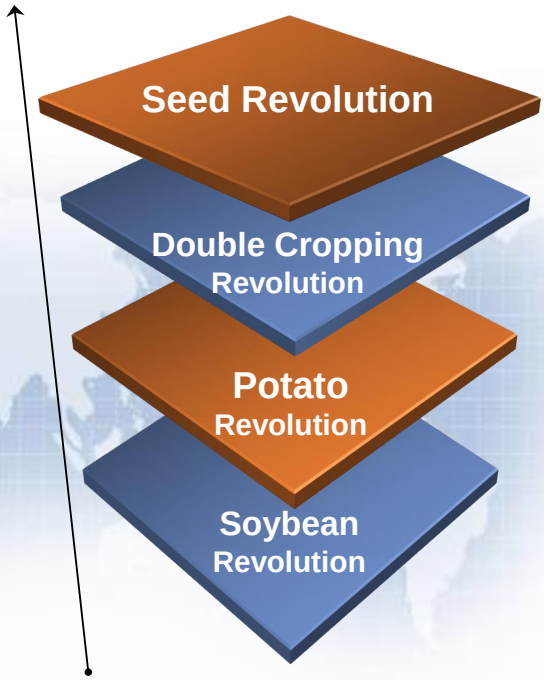
1998 : Establish
"Daehongdan Potato Institute"
as a **"Potato Commander"**

Potato Value in North Korea

4 Revolution in Agri-policy



2017 Roundtable



Preparation of Potato Fields

Contents

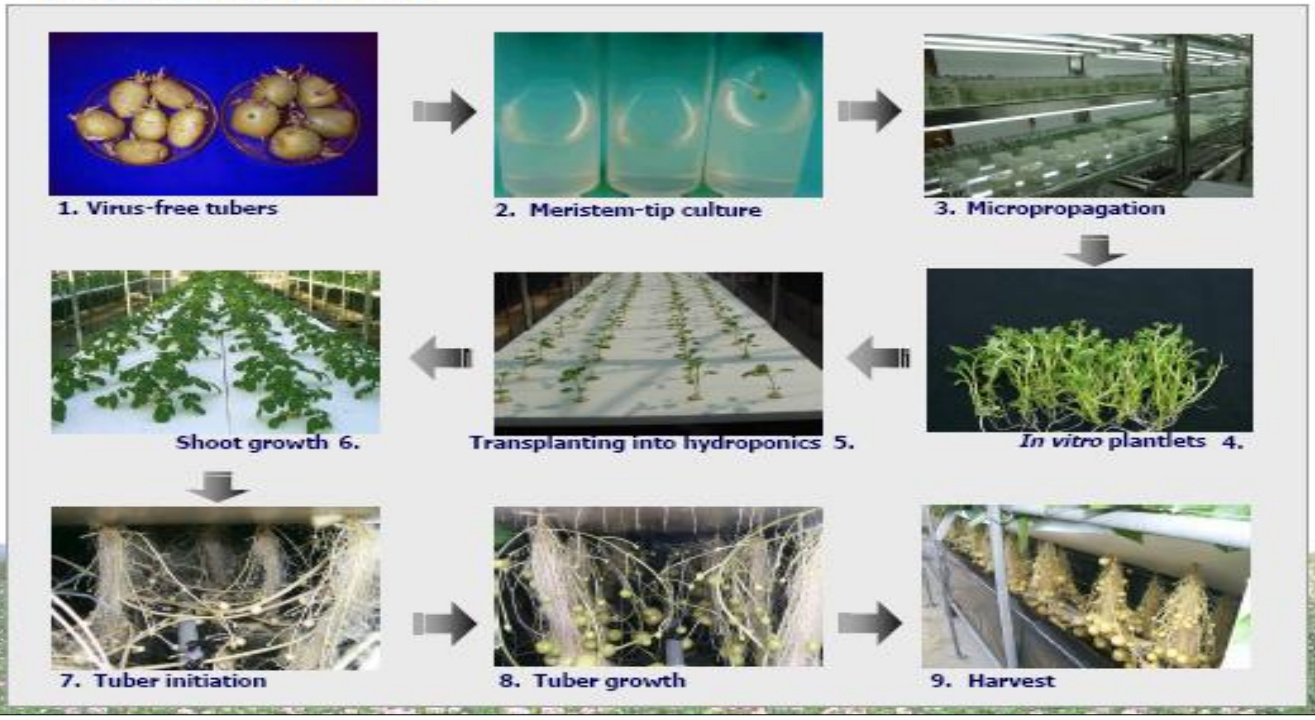
2017 Roundtable

1. Seed Production System

2017 Roundtable

Model Technology developed by NIHA

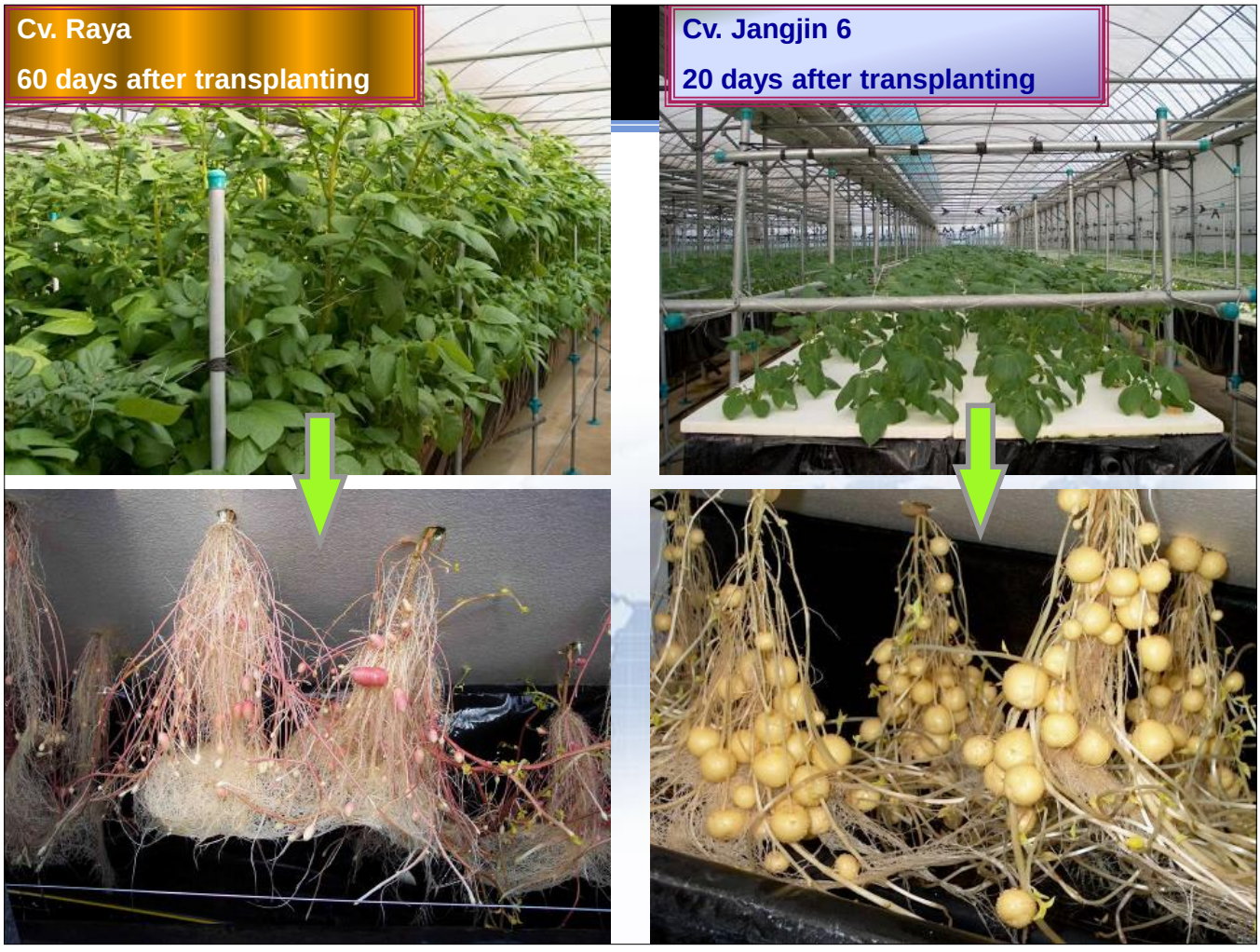
Development of hydroponic cultivation system for seed potato production
· small tubers by hydroponic system (G0) → net-house culture (G1~G3) → field (G4) → farmer's
· Patent no 137877 (1995)



Establishment of potato laboratory *(2000)*

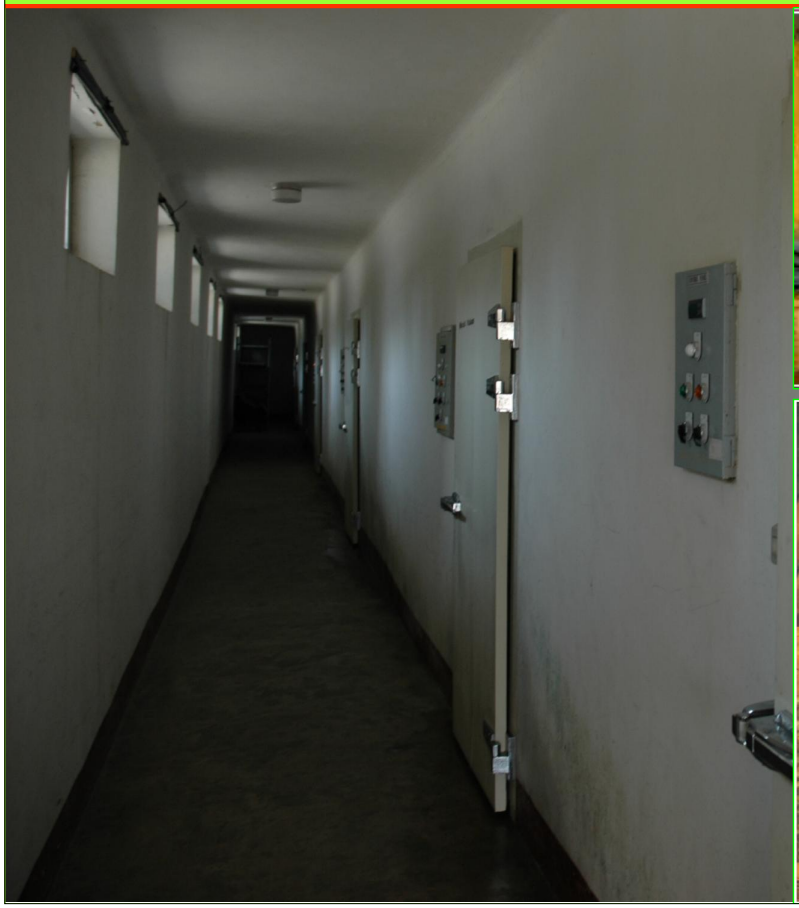
Hydroponic system in Pyongyang


13.10.2009 10:03
Growth of potato seedlings after 65 days of transplanting


Cv. Raya
60 days after transplanting
Cv. Jangjin 6
20 days after transplanting

Mass Production of Mini-tubers of Potatoes

Storage of harvested Mini-tubers of Potatoes



Instruction of National leader

Arirang Festival

Visit of Kim Jung-Il

Regional sites of seed potato complex

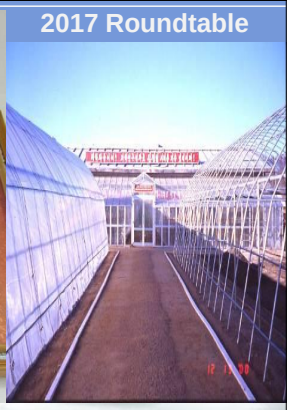
2017 Roundtable

Hydroponic system in Harmheung

Hydroponic system in Baecheon

Hydroponic system in Jungjoo

Hydroponic system in Daehongdan



Production capacity of hydroponic seed potato

2017 Roundtable

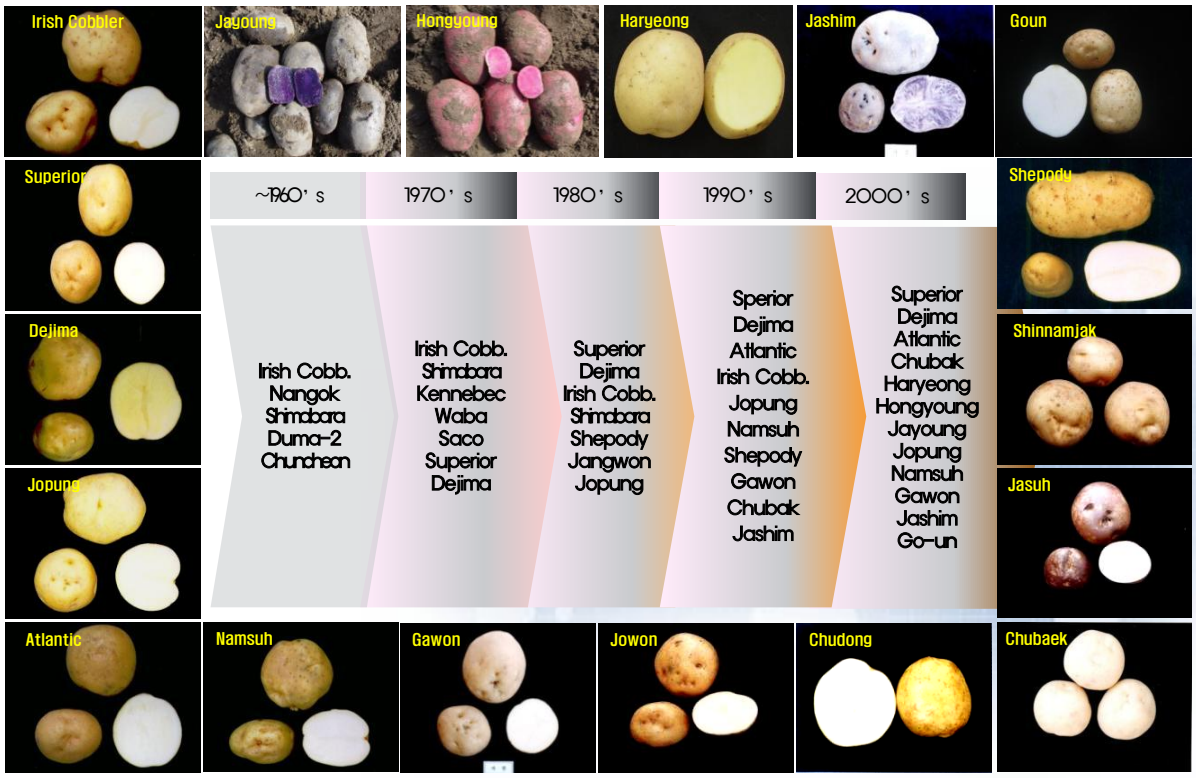
(Report of North Korea, 2009)

Region	Scale (m^2)	Production (000, No. of tubers)		Total	Target area
		Spring	Fall		
Pyongyang	10,000	5200	2500	7700	Central lowland
Daehongdan	2,200	-	2200	2200	North highland
Jungjoo	3,300	2000	800	2800	North-West
Harmheung	3,300	1800	800	2600	North-East
Baecheon	3,300	-	1500	1500	South
Sub-Total	22,100	9000	7800	1,6800	

2. Development of potato variety

2017 Roundtable

Potato varieties of S. Korea



Evaluation & Selection of Potato Varieties

2017 Roundtable

Cultivation method	Variety	2007	2008	2009	Average	Rate(%)
Natural	Jowon	28.8	23.3	22.4	24.8	107.8
	Gahwang	18.8	22.7	20.6	20.7	90.0
	Chubak	28.9	23.1	16.9	23.0	100
	Chugang	-	24.6	22.5	23.6	102.6
	Chudong	17.5	24.4	18.1	20.0	87.1
	Jopung	-	18.6	18.6	18.6	80.9
Mulching	Jowon	30.5	20.3	27.3	26.0	102.0
	Gahwang	8.1	23.4	26.1	25.9	101.6
	Chubak	27.0	23.0	2.5	25.5	100
	Chugang	-	22.0	23.9	23.0	90.2
	Chudong	28.0	24.9	17.8	23.6	92.5

Selection of Double Cropping Potato Variety

First S. Korea potato variety **"Chubak"** registered as a national variety for N. Korea

Double cropping variety with very earliness

3. Improvement of cultural practices

2017 Roundtable

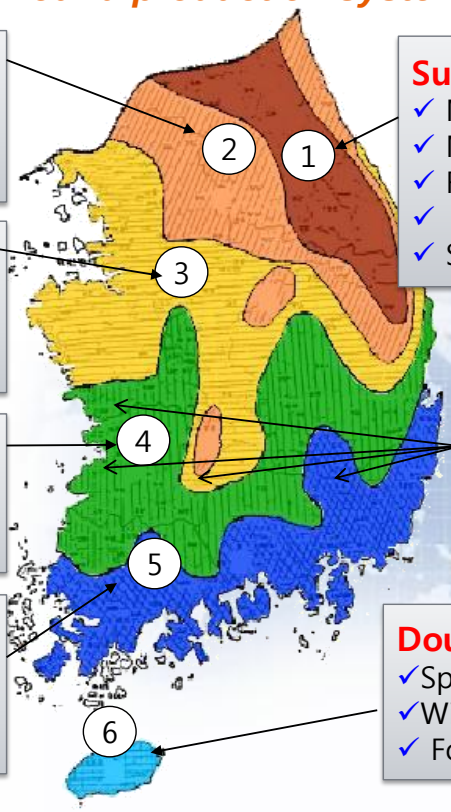
Model of year round production system

Late spring season
- ✓ Season : Apr.~ Aug.
- ✓ For processing & fresh market

Spring season
- ✓ Season : Mar.~ Jul.
- ✓ For processing & fresh market

Early spring season
- ✓Season : Mar.~ Jun.
- ✓ For processing & fresh market

Double cropping Area
- ✓Spring : Feb.~ May
- ✓Fall : Aug. ~ Nov.
- ✓ For fresh market



Summer Season
- ✓ Mt. area : 600~900m alt.
- ✓ Main area for seed potato
- ✓ For chip processing & fresh
- ✓ market for winter season
- ✓ Season : May~ Sep.

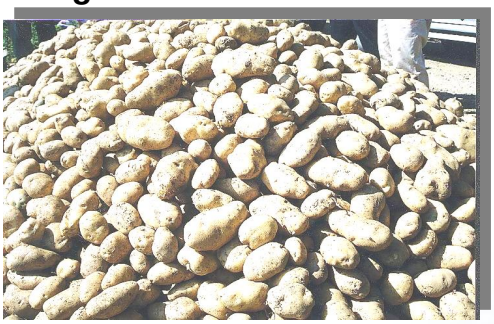
Winter cropping
- ✓plastic film greenhouse
- ✓Season : Oct.~ May
- ✓ For fresh market
- ✓ profitable cropping

Double cropping Area
- ✓Spring : Feb.~ May
- ✓Winter : Sep.~ Mar.
- ✓ For fresh market

Application of improved cultivation methods

2017 Roundtable

Cutting Method of Seed Potatoes



Optimum Planting Density & Mulching Methods

4. Disease & Pest Management

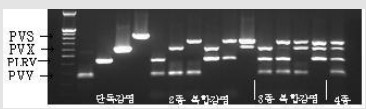
2017 Roundtable

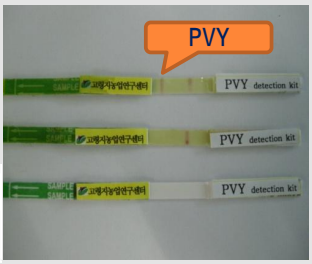
Establishment of Diagnosis System of Potato Viruses

- Tissue culture : ELISA, PCR
- Hydroponics : Visual & ELISA
- Nethouse : Visual & ELISA
- Field : Visual Inspection

Rapid & simple diagnosis system

☐ Development of virus diagnosis kit





< Virus diagnosis Kit> <Field diagnosis kit>

- First world patented technology
- Diagnosis time :
  Two days → Three hours

Effective Production of high quality Seed Potatoes

Establishment of Inspection System of Potato Viruses

5. Exchange of Crop Germplasm

2017 Roundtable

First crop germplasm exchange after Korean war in 2009

Genetic Resources Management

➲ Pyongyang Institute of Crop Germplasm Management

- Collection, evaluation & conservation of crop genetic resources
- Storage capacity
  - -5℃ Low temp. storage : 20m²
  - Room temp. storage : 20m²
  - Stored accessions : 50,000

Design drawing of Germplasm Institute

6. Human Capacity Building

Participants:

1. Cho Kwang Ryong
2. Kim Song Man
3. Kim Mun Il
4. Kim Gyong Il
5. Rim Yong Bok
6. Ryang Chang Hyok
7. Choi Jong Un
8. Ri Kum Sun
9. O Myong Hwa
10. Ju Un Suk
11. Kang Chol
12. Jong Chol

Figure 1. List of participants in the Training Course on Virus Detection Technology, held in the Academy of Agricultural Sciences (Pyongyang, D.P.R.K.) from 28 Sep. 2004 to 05 Oct. 2004

Transfer of Target Technology & Knowledge through Systematic Training Program

Figure 2. Theoretical (A & B) and practical (C & D) classes were given to participants during the Training Course in Pyongyang, DPRK.

Knowledge Sharing through Academic Activities

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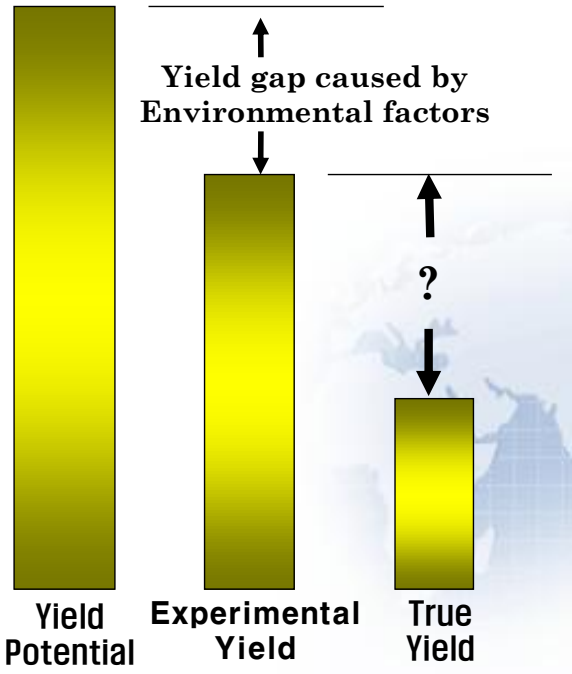
Technical factors for successful project

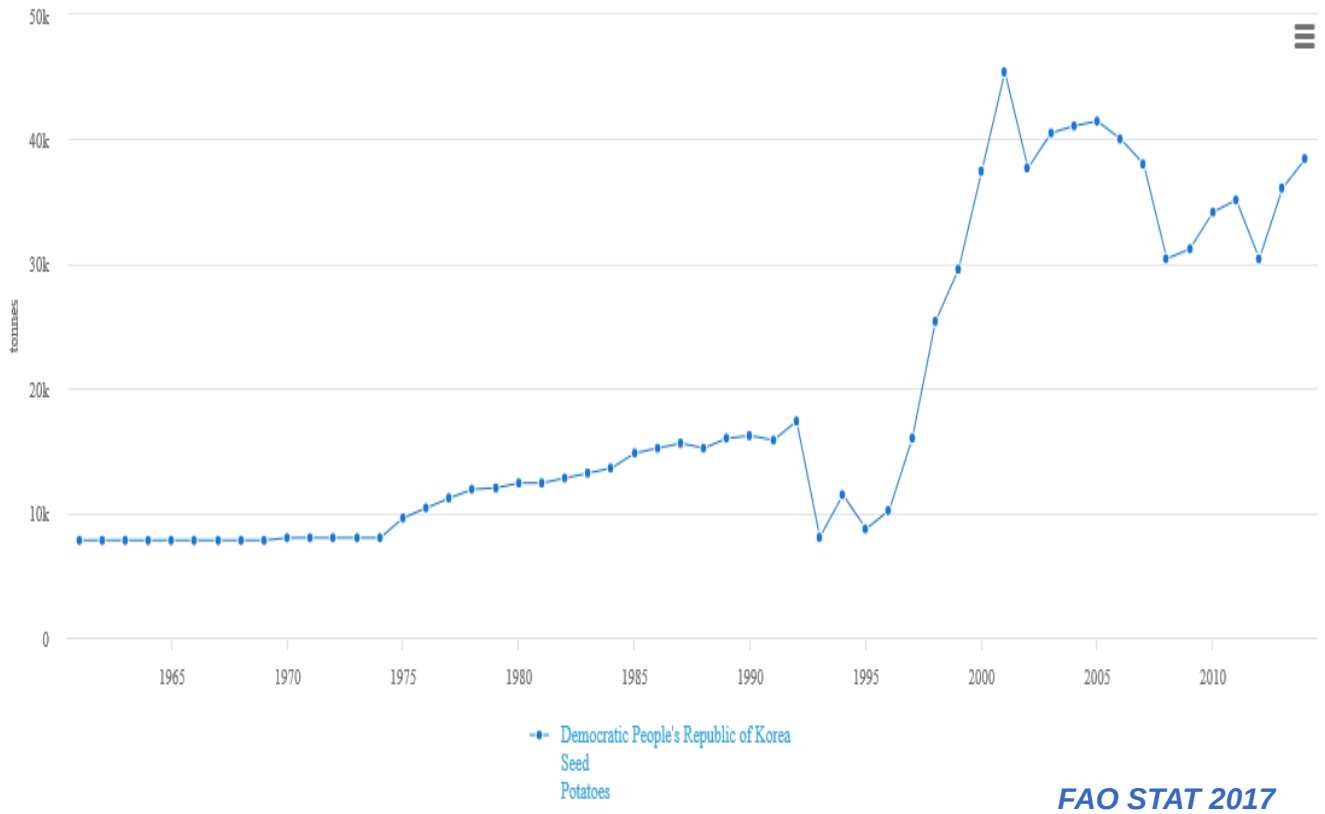


Technical Factors
- Variety
- Seed
- Cultural Practices
- Disease & Pest Control
- Human Capacity Building

Social Economy Factors
- Unstable Price
- Inadequate Support
- Unforeseeable Policy
- Social Environment

Change of potato seed production

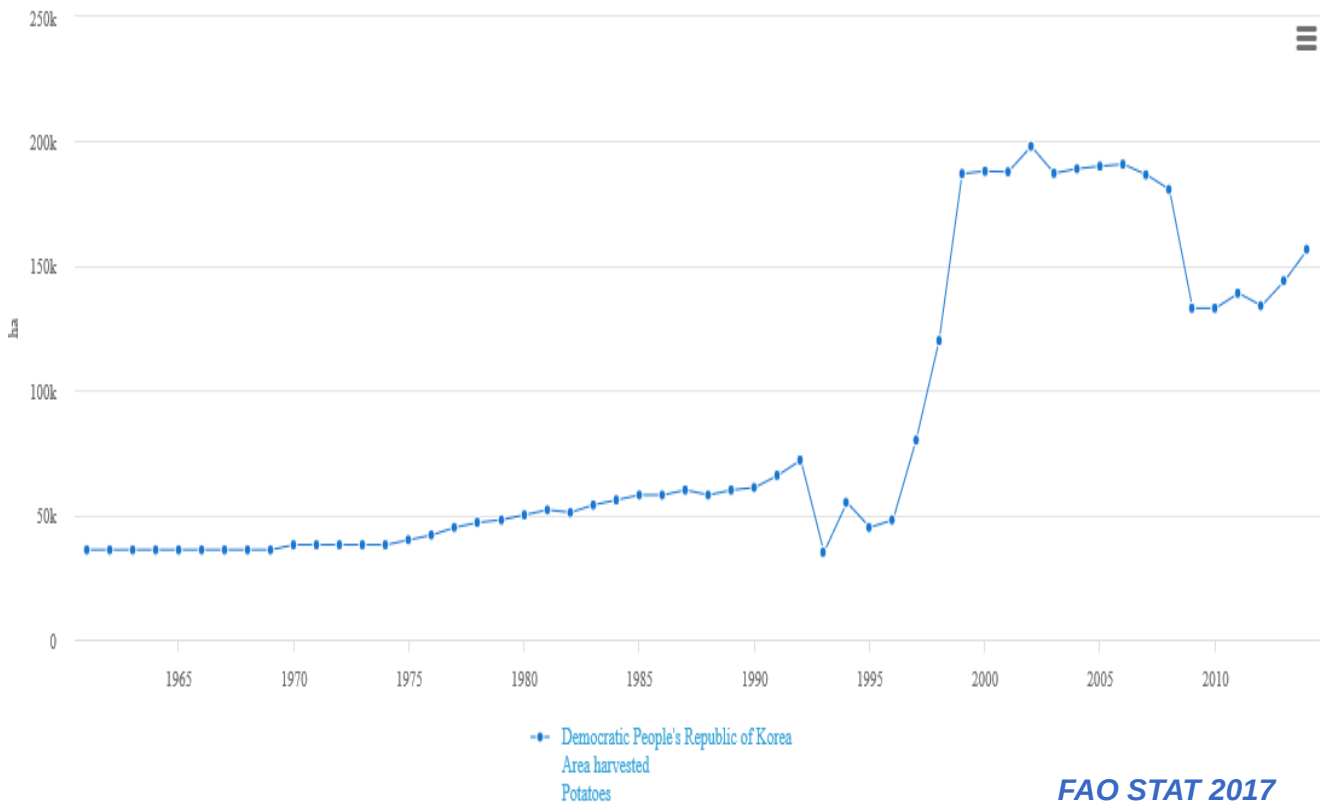
2017 Roundtable



FAO STAT 2017

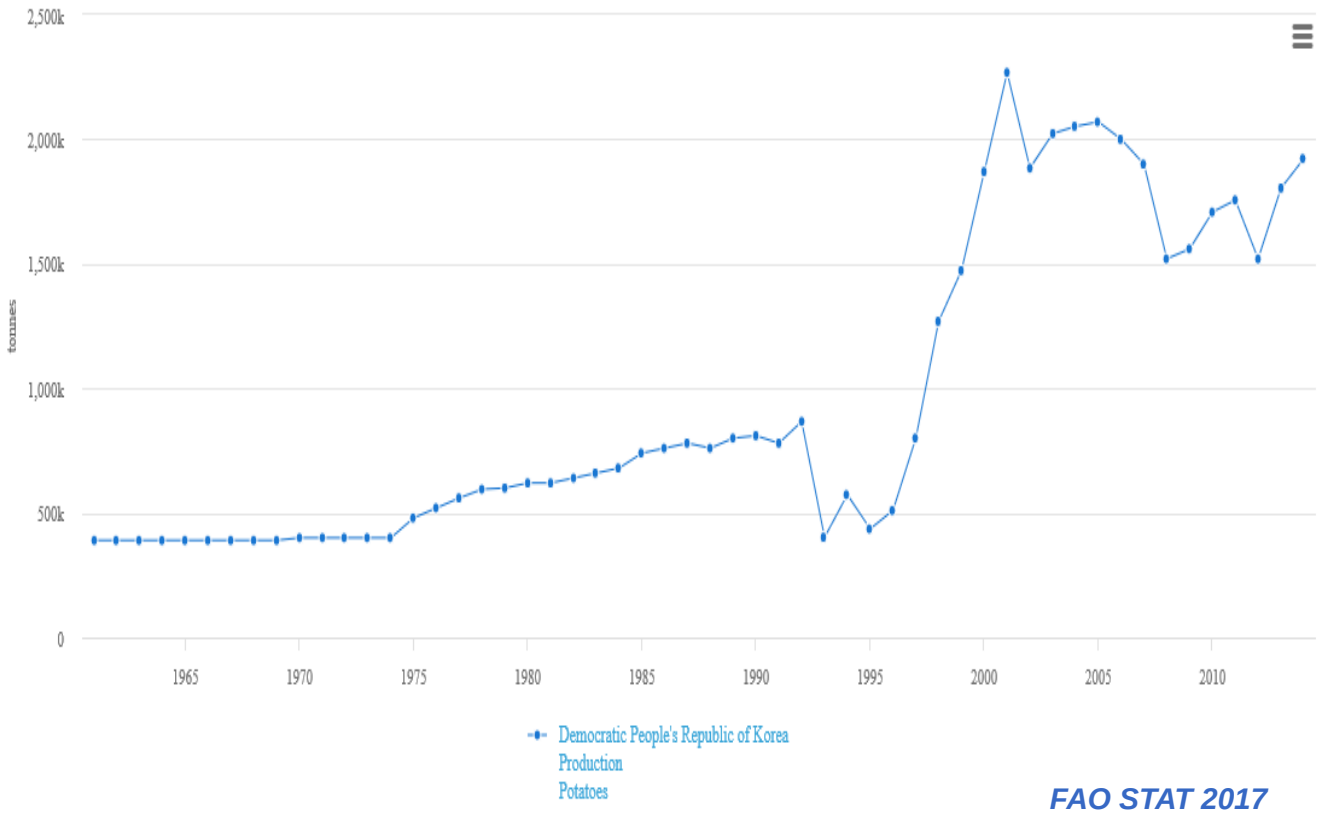
Change of potato cultivation area

2017 Roundtable



FAO STAT 2017

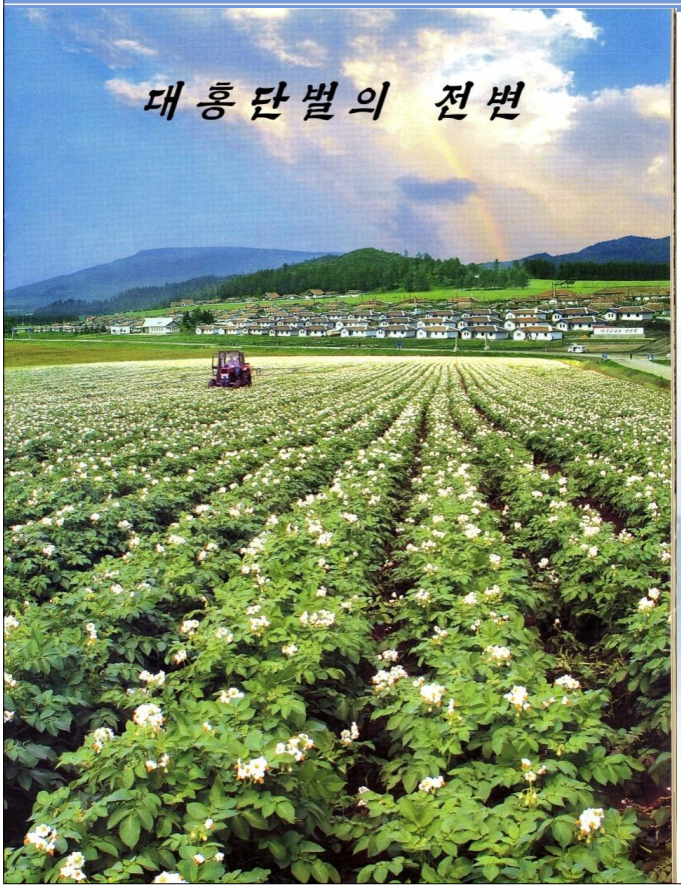
Change of total production of potato



FAO STAT 2017

Potato Revolution

2017 Roundtable



Report from DPRK Government

2017 Roundtable

➢ **Celebrate 10th anniversary of**

"Revolution in potato farming"


로동신문
조선로동당 중앙위원회 기관지

고전적로작 《감자농사에서 혁명을 일으킬데 대하여》를 발표하신 10돐기념 중앙보고회 진행

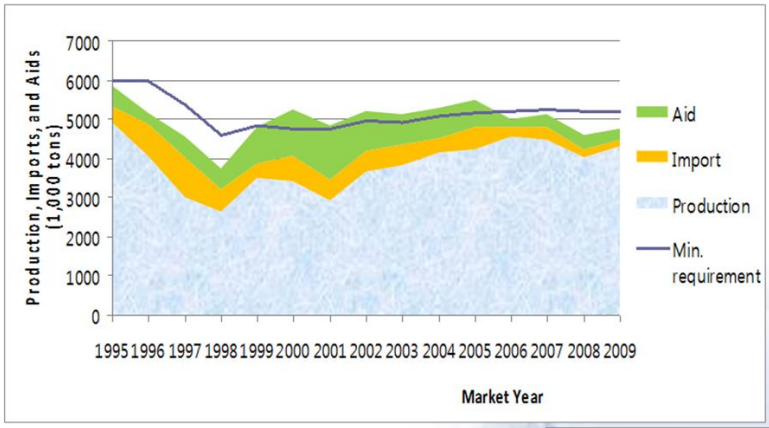
Potato promotion by government leaders

The DPRK is the second country in the history of the potato where the leader of the government has very actively promoted potatoes

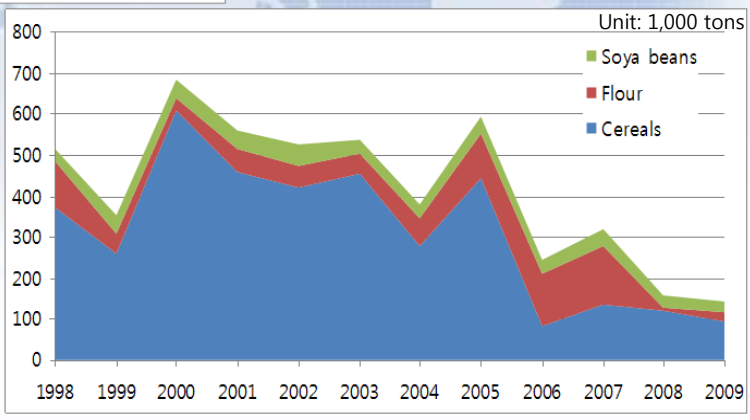
(Prussia under Frederick the Great [1740-1786] was the first).

International Potato Center(CIP)

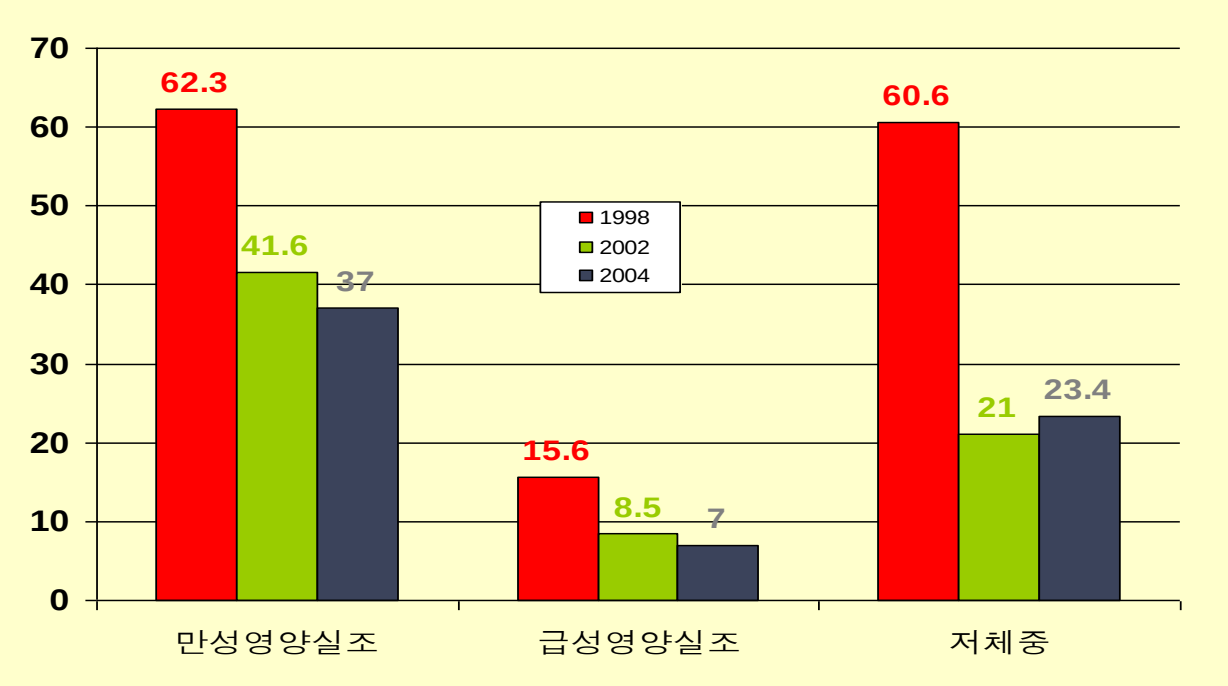
Impact on Food Economy in N. Korea



Production, Import & Aids 0f agriculture products In N. Korea (Kwon,2010)



Import trends of food products in N. Korea (Kwon,2010)



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Linkage of successful factors of project

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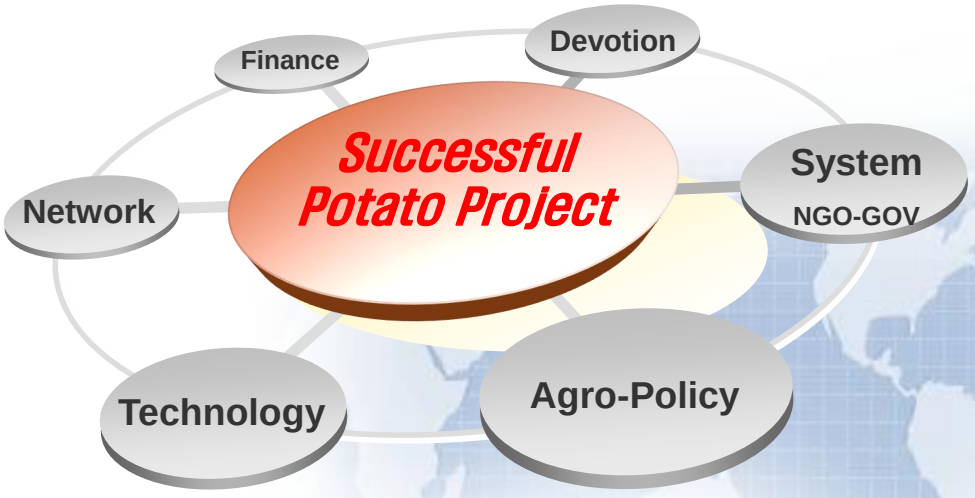
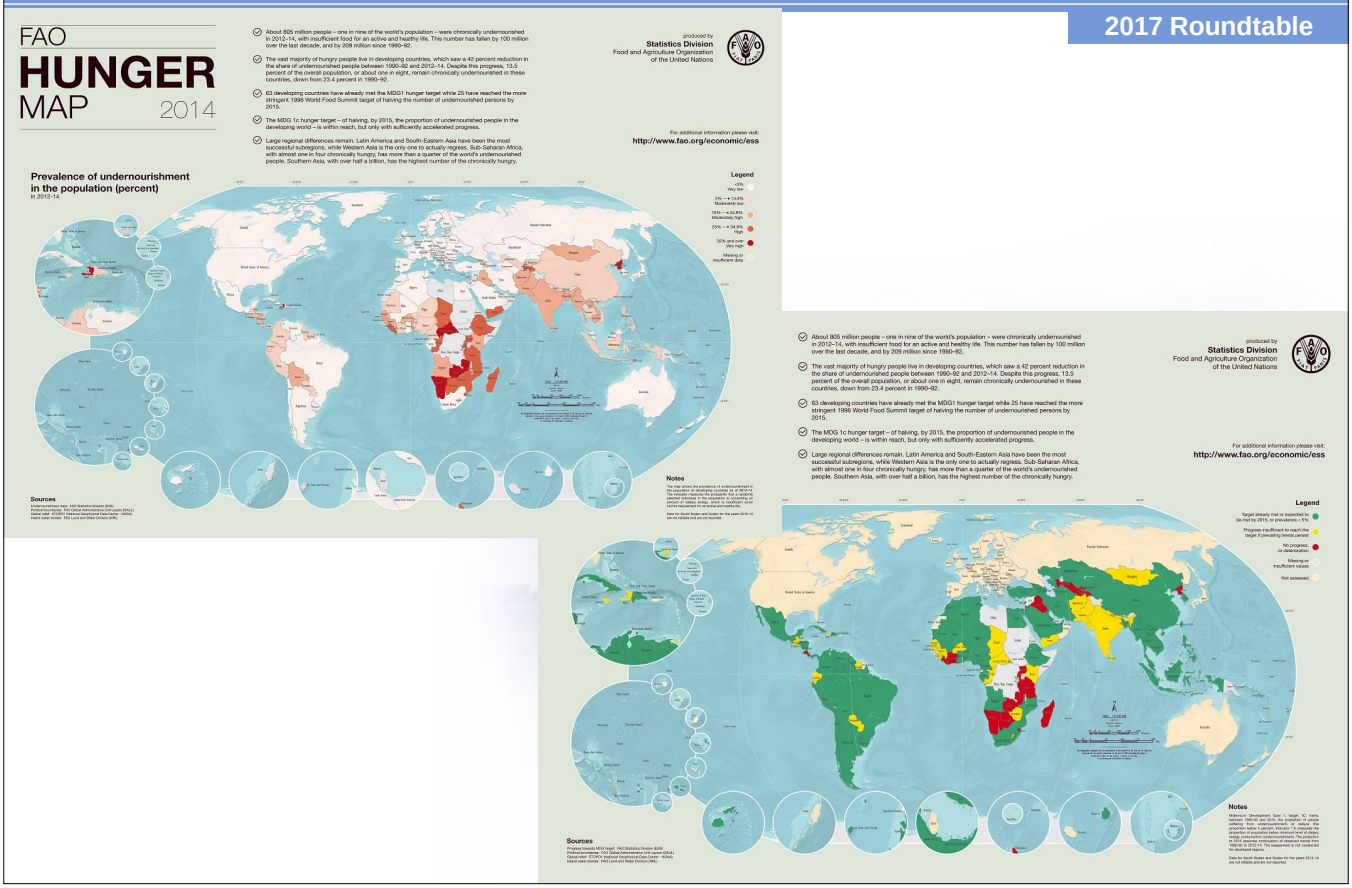


But still... Future Requirements

2017 Roundtable




We can make a potato world together!
Thank you!