



1  
00:00:17,189 --> 00:00:14,870  
we live it every day

2  
00:00:19,590 --> 00:00:17,199  
it's in our veins

3  
00:00:22,150 --> 00:00:19,600  
it's under our feet

4  
00:00:25,269 --> 00:00:22,160  
it's in our meals

5  
00:00:28,470 --> 00:00:25,279  
it drives our storms

6  
00:00:30,630 --> 00:00:28,480  
it changes the course of history itself

7  
00:00:32,229 --> 00:00:30,640  
it's that water cycle we remember from

8  
00:00:35,110 --> 00:00:32,239  
elementary school

9  
00:00:37,750 --> 00:00:35,120  
this is the cycle of water

10  
00:00:40,150 --> 00:00:37,760  
by which all life survives

11  
00:00:42,630 --> 00:00:40,160  
but the picture is so much more varied

12  
00:00:45,110 --> 00:00:42,640  
so much more vital than a few arrows can

13  
00:00:47,110 --> 00:00:45,120

represent

14

00:00:50,470 --> 00:00:47,120

trying to measure that complexity from

15

00:00:52,709 --> 00:00:50,480

both earth and space is an infinite task

16

00:00:55,350 --> 00:00:52,719

but observations from nasa and many

17

00:00:57,350 --> 00:00:55,360

worldwide partners have led to quantum

18

00:00:59,349 --> 00:00:57,360

leaps in our understanding

19

00:01:01,270 --> 00:00:59,359

in the last 60 years we've seen a

20

00:01:04,070 --> 00:01:01,280

revolutionary change from relying

21

00:01:06,630 --> 00:01:04,080

principally on ground measurements

22

00:01:08,789 --> 00:01:06,640

to satellite observations of rainfall

23

00:01:12,230 --> 00:01:08,799

to worldwide measurements of rain and

24

00:01:14,710 --> 00:01:12,240

snowfall every half hour

25

00:01:16,870 --> 00:01:14,720

from space we can now monitor soil

26

00:01:19,109 --> 00:01:16,880

moisture every few days

27

00:01:21,190 --> 00:01:19,119

and detect changes in aquifers deep

28

00:01:23,510 --> 00:01:21,200

underground

29

00:01:25,749 --> 00:01:23,520

but we can't see every drop of water

30

00:01:27,510 --> 00:01:25,759

everywhere all the time

31

00:01:30,149 --> 00:01:27,520

and water issues are incredibly

32

00:01:32,390 --> 00:01:30,159

localized as unique as the landscapes

33

00:01:34,630 --> 00:01:32,400

the water flows over

34

00:01:37,510 --> 00:01:34,640

to fill in the gaps see the local

35

00:01:40,789 --> 00:01:37,520

picture and project into the future

36

00:01:42,630 --> 00:01:40,799

we use powerful computer models

37

00:01:45,030 --> 00:01:42,640

these models pull in an incredible

38

00:01:46,469 --> 00:01:45,040

amount of data like those daily scans of

39

00:01:48,310 --> 00:01:46,479

precipitation

40

00:01:50,230 --> 00:01:48,320

but also rely on our understanding of

41

00:01:53,749 --> 00:01:50,240

the planet from all those decades of

42

00:01:55,830 --> 00:01:53,759

ground-based hydrology and soil research

43

00:01:58,149 --> 00:01:55,840

in every corner of the earth these

44

00:02:00,069 --> 00:01:58,159

models help people understand critical

45

00:02:01,270 --> 00:02:00,079

issues like water availability for

46

00:02:03,749 --> 00:02:01,280

irrigation

47

00:02:07,510 --> 00:02:03,759

drought severity flood risk and the

48

00:02:09,270 --> 00:02:07,520

likelihood of crop failures and famine

49

00:02:11,270 --> 00:02:09,280

one of the trickiest parts is

50

00:02:13,750 --> 00:02:11,280

understanding how we impact the water

51  
00:02:16,229 --> 00:02:13,760  
cycle with the multitudes of water use

52  
00:02:18,470 --> 00:02:16,239  
decisions we make every day that lead to

53  
00:02:20,550 --> 00:02:18,480  
things like diverting surface water

54  
00:02:22,949 --> 00:02:20,560  
pumping from aquifers and changing our

55  
00:02:24,309 --> 00:02:22,959  
planet's climate in addition to

56  
00:02:26,550 --> 00:02:24,319  
collecting data and running

57  
00:02:29,110 --> 00:02:26,560  
sophisticated computer models

58  
00:02:31,270 --> 00:02:29,120  
nasa funds a robust set of projects to

59  
00:02:32,150 --> 00:02:31,280  
help water managers across the united

60  
00:02:34,790 --> 00:02:32,160  
states

61  
00:02:37,430 --> 00:02:34,800  
address their specific water issues from

62  
00:02:40,229 --> 00:02:37,440  
crop forecasts in the breadbasket to

63  
00:02:42,710 --> 00:02:40,239

snowpack in the mountains to flood risk

64

00:02:45,030 --> 00:02:42,720

from nearby rivers

65

00:02:47,430 --> 00:02:45,040

nasa's water observing fleet will expand

66

00:02:49,670 --> 00:02:47,440

in 2021 with a satellite that will

67

00:02:51,990 --> 00:02:49,680

collect data on surface water height and

68

00:02:53,750 --> 00:02:52,000

slope which will enable estimation of

69

00:02:56,070 --> 00:02:53,760

river flows

70

00:02:58,390 --> 00:02:56,080

with these observations we will be able

71

00:03:01,190 --> 00:02:58,400

to observe all major parts of the water

72

00:03:05,509 --> 00:03:01,200

cycle from space precipitation

73

00:03:07,509 --> 00:03:05,519

evaporation runoff and water storage

74

00:03:09,030 --> 00:03:07,519

our view of earth's water cycle will

75

00:03:11,030 --> 00:03:09,040

never be perfect

76

00:03:13,190 --> 00:03:11,040

never be complete

77

00:03:15,270 --> 00:03:13,200

but each advancement we make

78

00:03:16,470 --> 00:03:15,280

holds the promise of helping us prepare

79

00:03:19,350 --> 00:03:16,480

for the future

80

00:03:21,750 --> 00:03:19,360

avoid conflicts and mitigate disaster