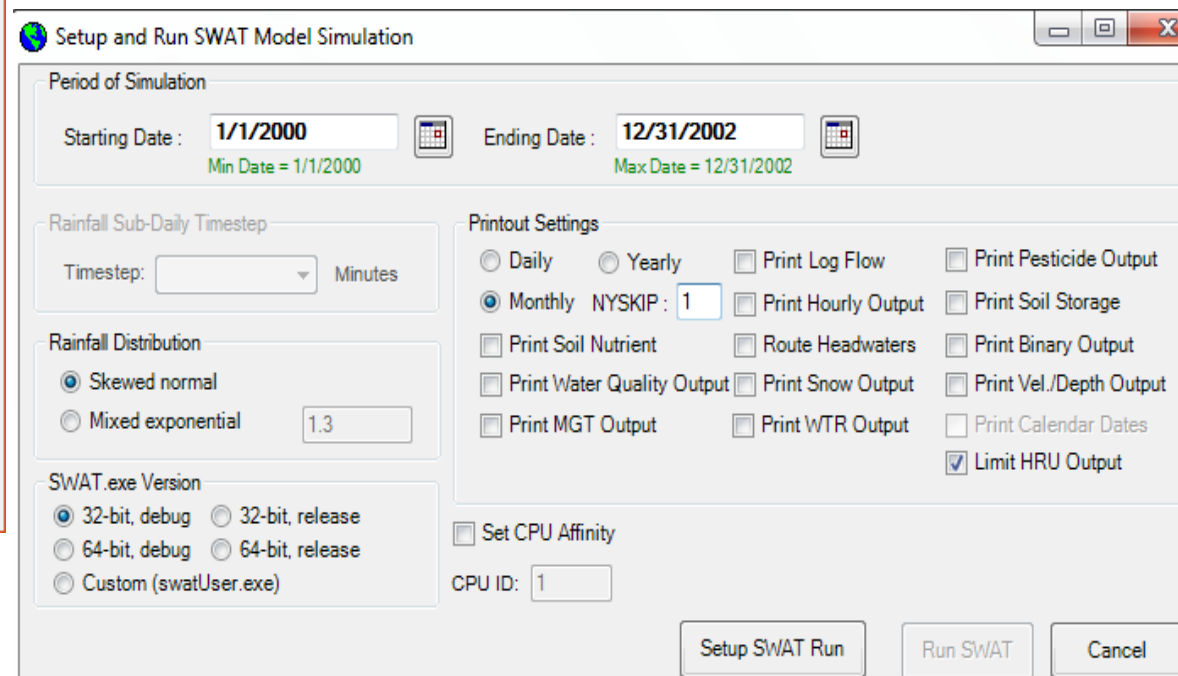
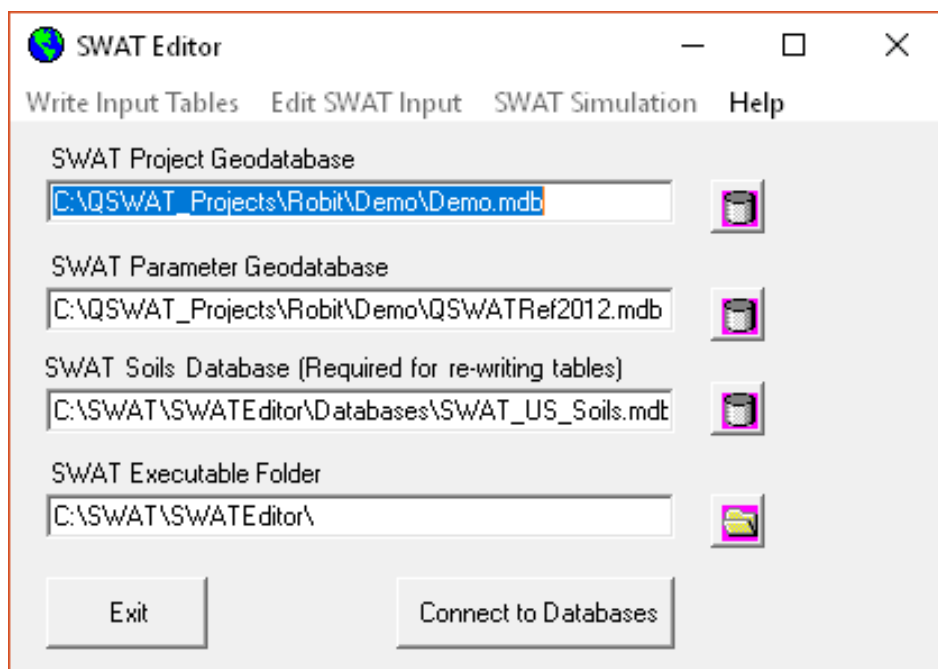




TRƯỜNG ĐẠI HỌC NÔNG LÂM TP. HỒ CHÍ MINH

KHOA MÔI TRƯỜNG & TÀI NGUYÊN | BỘ MÔN GIS & TÀI NGUYÊN

Chạy mô hình (QSWAT)



Nội dung thực hành

- ◆ Mở đồ án có sẵn (đã nhập dữ liệu thời tiết)
- ◆ Kết nối SWAT Editor với cơ sở dữ liệu của đồ án
- ◆ Chạy mô hình
- ◆ Cấu trúc dữ liệu đầu ra
- ◆ Đọc kết quả đầu ra
 - ◆ hru
 - ◆ sub
 - ◆ rch
- ◆ Kiểm tra kết quả đầu ra
 - ◆ Thủy văn
 - ◆ Xói mòn đất
 - ◆ Chu trình nitơ
 - ◆ Chu trình photpho
 - ◆ Sinh trưởng cây trồng
 - ◆ Tổn thất dinh dưỡng
 - ◆ Tóm tắt sử dụng đất/ lớp phủ đất
 - ◆ Quá trình trong dòng chảy
 - ◆ Điểm xả thải
 - ◆ Hồ chứa
- ◆ Lưu kịch bản chạy SWAT

Mở đồ án có sẵn (đã nhập dữ liệu thời tiết)

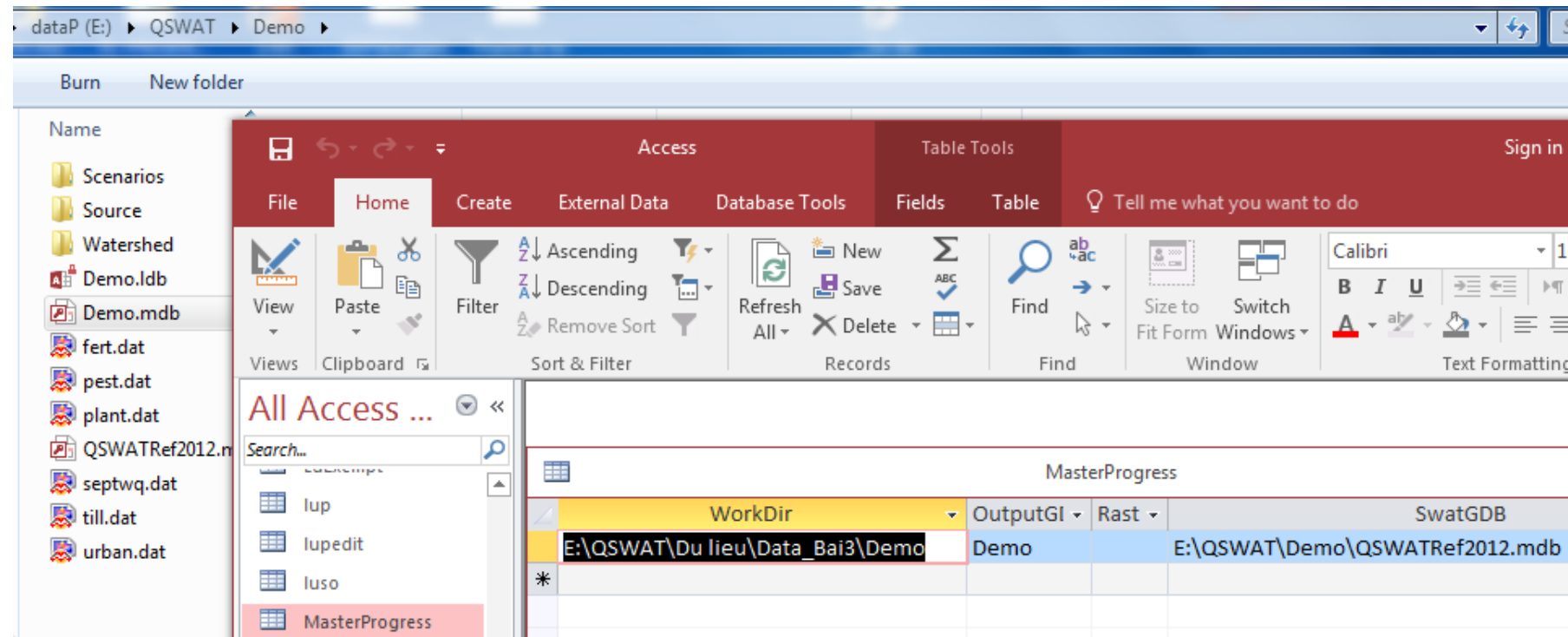
◆ Mở **Demo.mdb** của đồ án trong thư mục ...\Demo.

◆ Mở bảng **MasterProgress**, cập nhật hai cột sau:

◆ **WorkDir:** E:\QSWAT\Du lieu\Data_Bai4\Demo

◆ **SwatGDB:** E:\QSWAT\Demo\QSWATRef2012.mdb

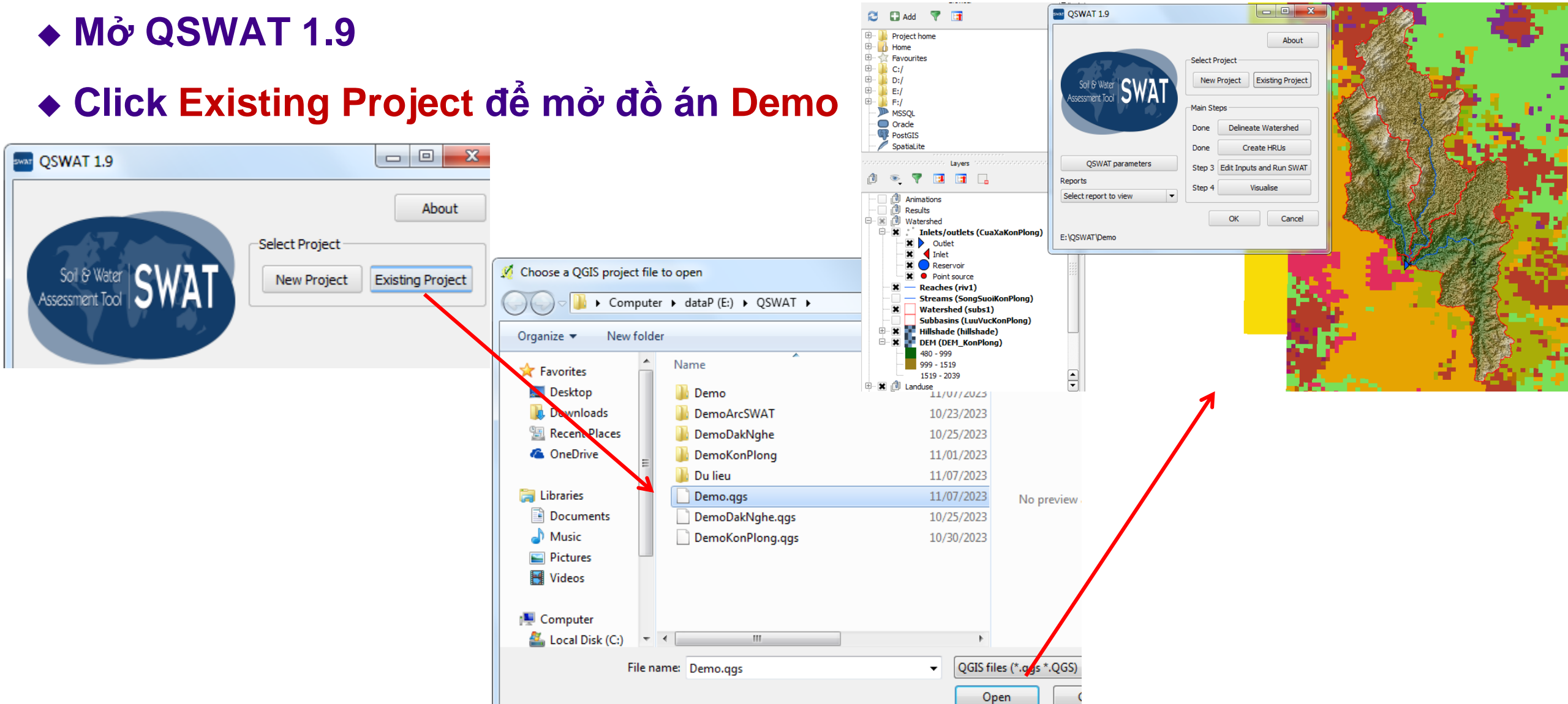
◆ Lưu lại chỉnh sửa.



Mở đồ án có sẵn (đã nhập dữ liệu thời tiết)

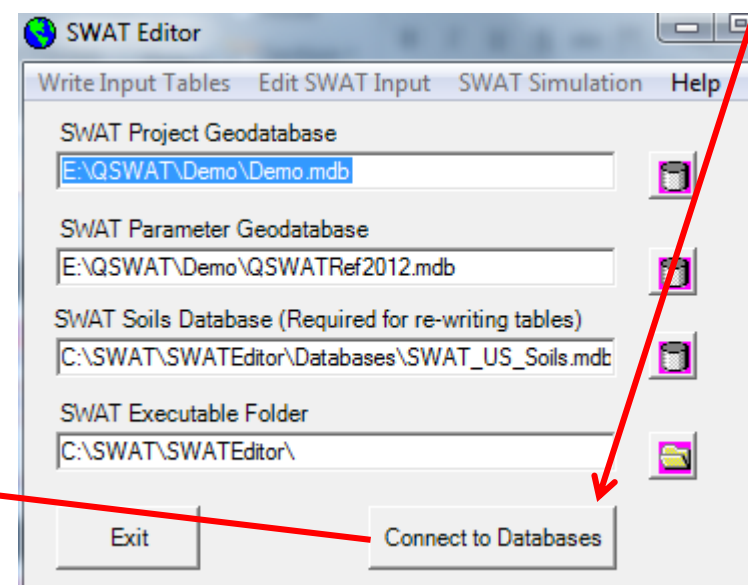
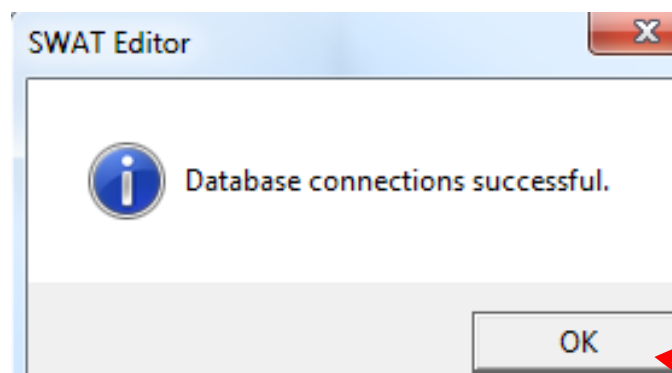
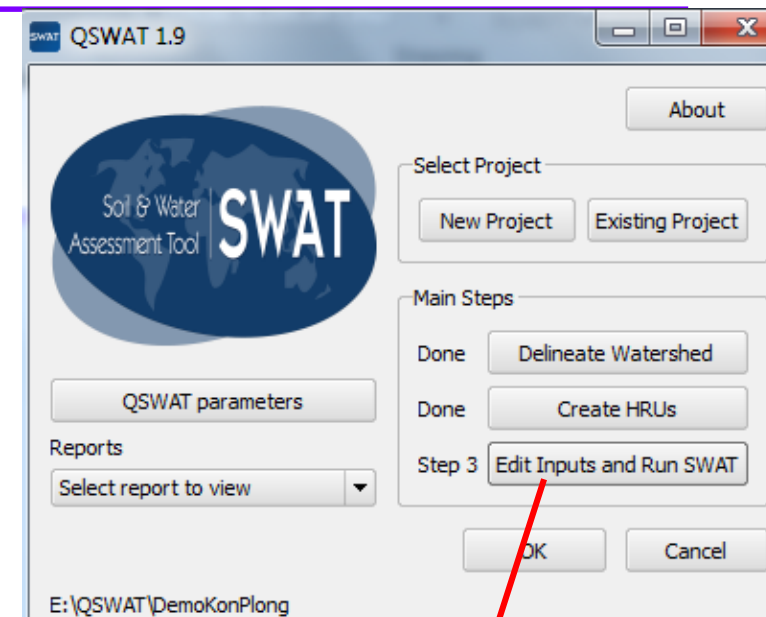
◆ Mở QSWAT 1.9

◆ Click **Existing Project** để mở đồ án Demo



Kết nối SWAT Editor với cơ sở dữ liệu của đồ án

- ◆ Click Edit Inputs and Run SWAT
- ◆ Click Connect to Databases



Chạy mô hình

◆ SWAT Simulation/ Run SWAT

◆ Thời kì mô phỏng (Period of Simulation)

- ◆ Starting/End Date: ngày bắt đầu/ kết thúc

◆ Phân bố mưa (Rainfall Distribution)

- ◆ Skewed normal: phân bố lệch
- ◆ Mixed exponential: phân bố hàm mũ

◆ Phiên bản SWAT (SWAT.exe Version)

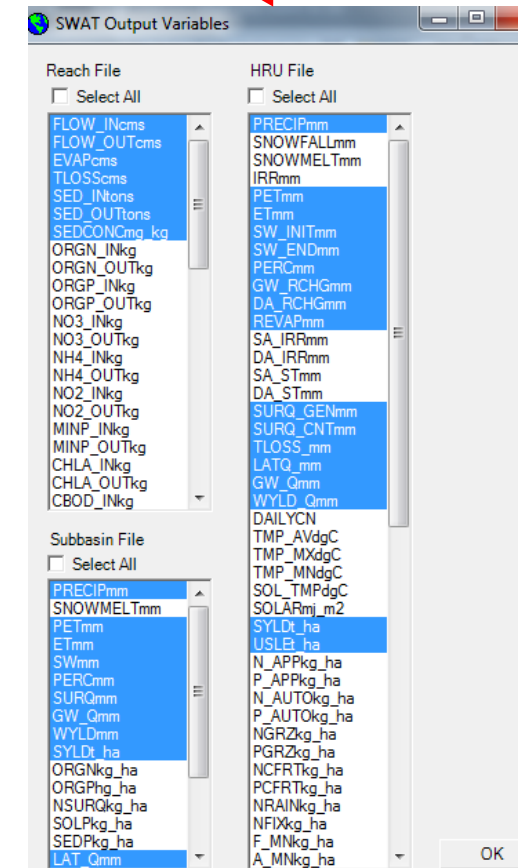
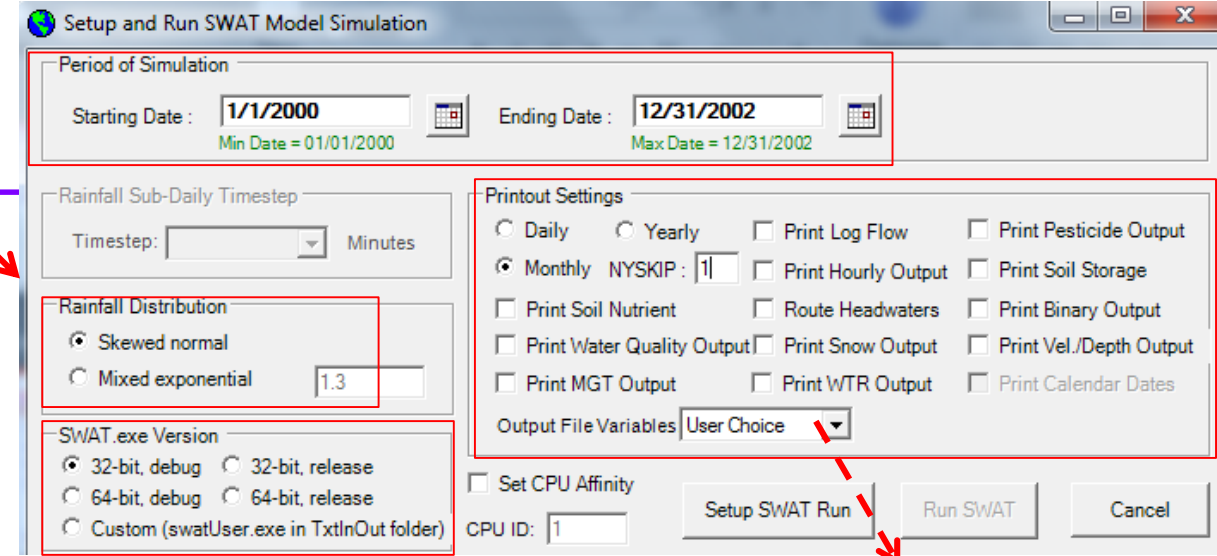
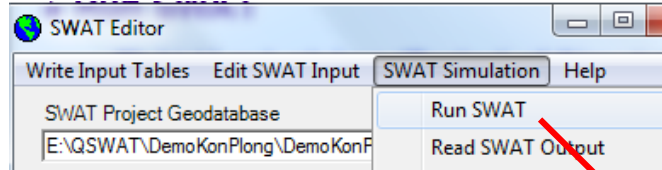
- ◆ debug/release/custom: in lỗi/ không in lỗi/ tùy biến

◆ Thiết lập in ấn (Printout Settings)

- ◆ Daily/Monthly/Yearly: tần suất ngày/ tháng/ năm
- ◆ NYSKIP: số năm không in đầu ra
- ◆ Output File Variables: Chọn biến đầu ra

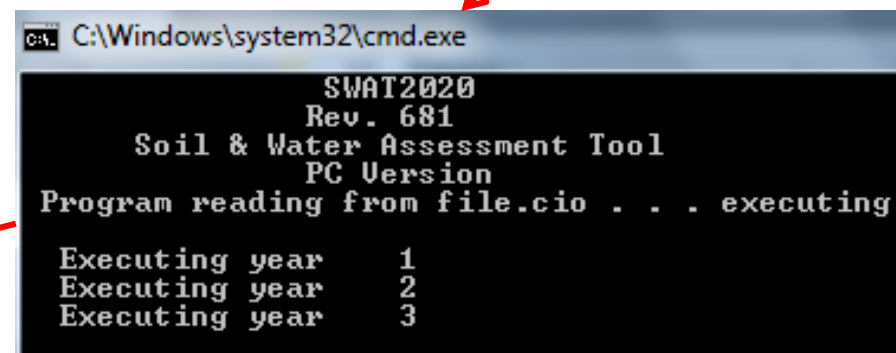
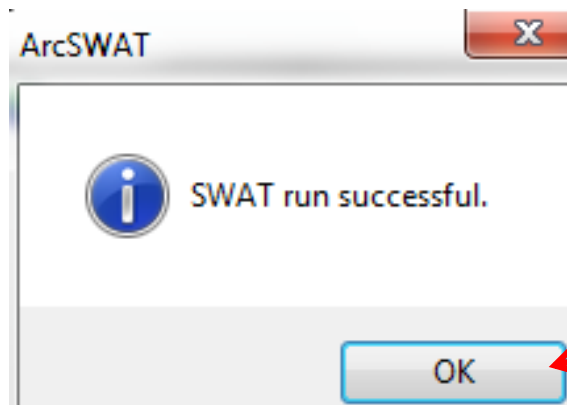
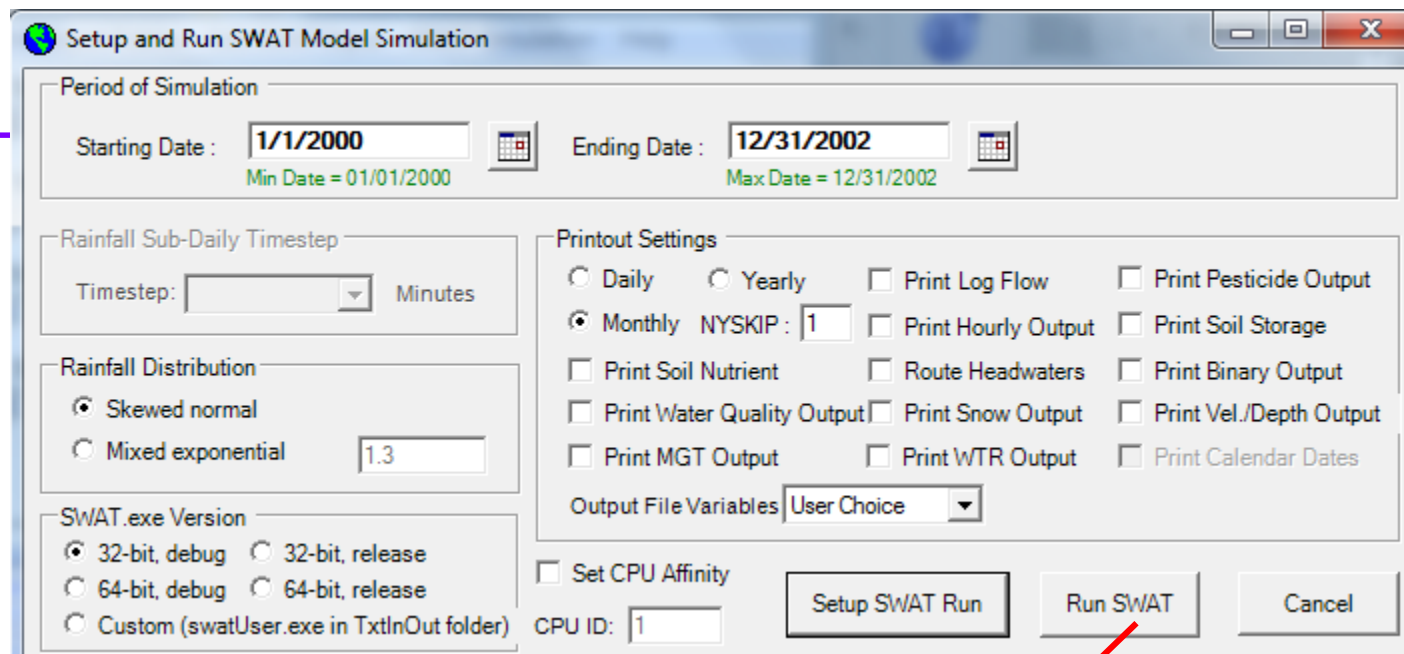
◆ Chia luồng áp lực CPU (Set CPU Affinity)

◆ Click **Setup SWAT Run**



Chạy mô hình

- ◆ Click Run SWAT.
- ◆ Đôi khi hoàn thành quá trình chạy mô hình, click OK.



Cấu trúc dữ liệu đầu ra

◆ Lưu vực

◆ Dòng chảy

◆ Tiểu lưu vực

◆ HRU

◆ Chuyên đề:

◆ Xói mòn/bồi lắng

◆ Hồ chứa

◆ Thuộc bảo vệ thực vật

◆ Sử dụng nước

◆ Ao, đất ngập nước

◆ Mực nước

◆ Tuyết

☒ output.sed ☒ output.snu

☒ output.rsv ☒ output.pot

☒ output.pst ☒ output.vel

☒ output.wtr ☒ output.wql

☒ output.swr ☒ output.mgt

☒ output.dep

☒ output.snw

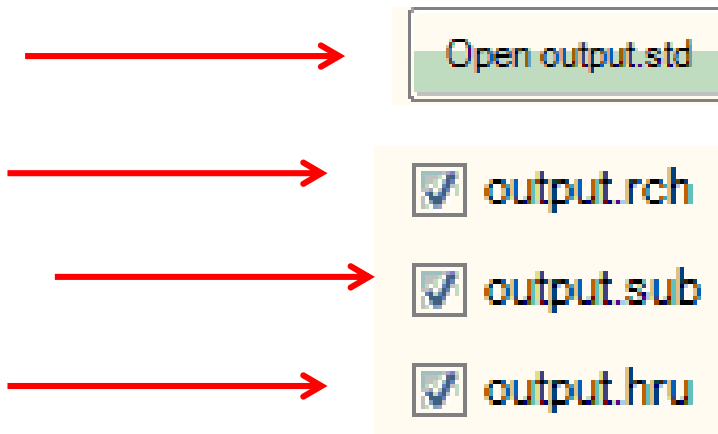
◆ Xác bã thực vật

◆ Ổ gà, hồ trứng

◆ Vận tốc dòng chảy

◆ Chất lượng nước

◆ Canh tác đất đai

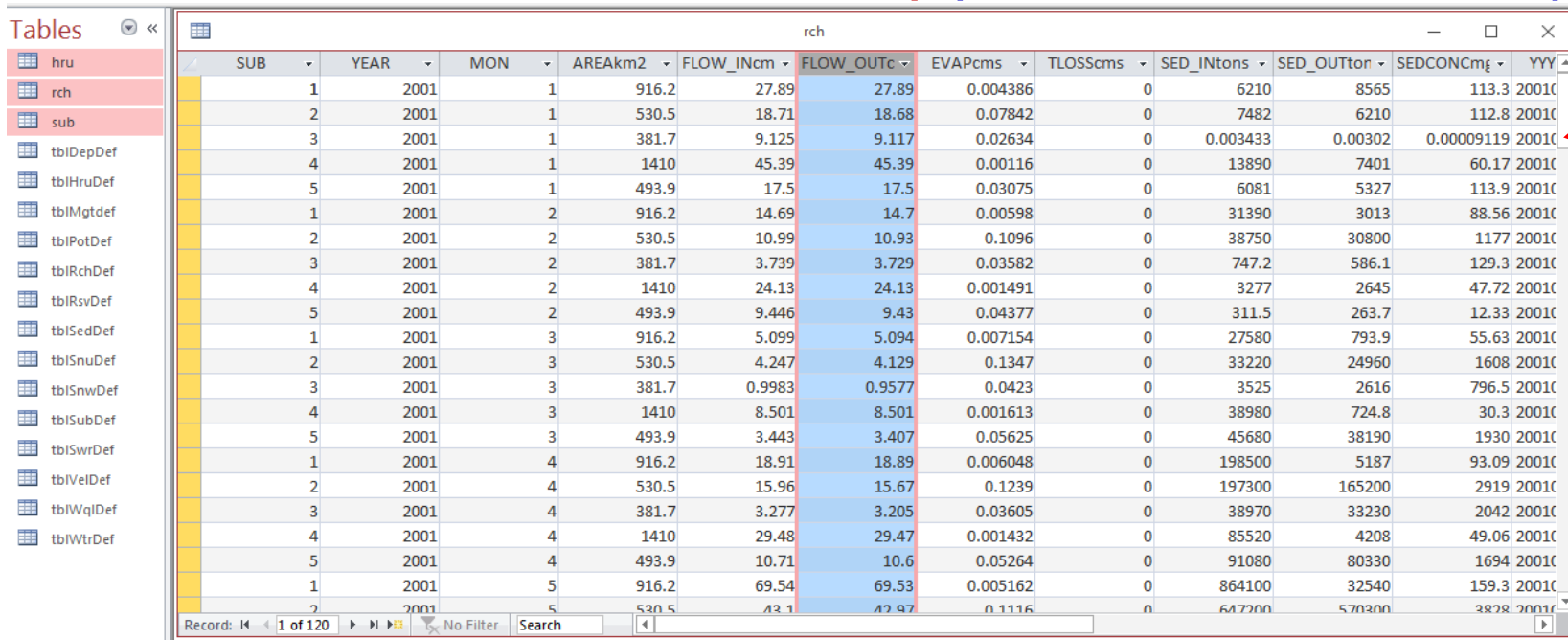


dataP (E:) > QSWAT > Demo > Scenarios > Default > TxtInOut		
Burn New folder		
Name	Date modified	Type
<input type="checkbox"/> file.cio	11/13/2023 4:58 PM	CIO File
<input type="checkbox"/> fin.fin	11/13/2023 5:00 PM	FIN File
<input checked="" type="checkbox"/> hru.dat	11/13/2023 5:00 PM	DAT File
<input type="checkbox"/> hyd.out	11/13/2023 5:00 PM	OUT File
<input type="checkbox"/> input.std	11/13/2023 5:00 PM	STD File
<input checked="" type="checkbox"/> lup.dat	11/13/2023 5:00 PM	DAT File
<input type="checkbox"/> output.hru	11/13/2023 5:00 PM	HRU File
<input type="checkbox"/> output.pst	11/13/2023 5:00 PM	PST File
<input type="checkbox"/> output.rch	11/13/2023 5:00 PM	RCH File
<input type="checkbox"/> output.rsv	11/13/2023 5:00 PM	RSV File
<input type="checkbox"/> output.sed	11/13/2023 5:00 PM	SED File
<input type="checkbox"/> output.std	11/13/2023 5:00 PM	STD File
<input type="checkbox"/> output.sub	11/13/2023 5:00 PM	SUB File

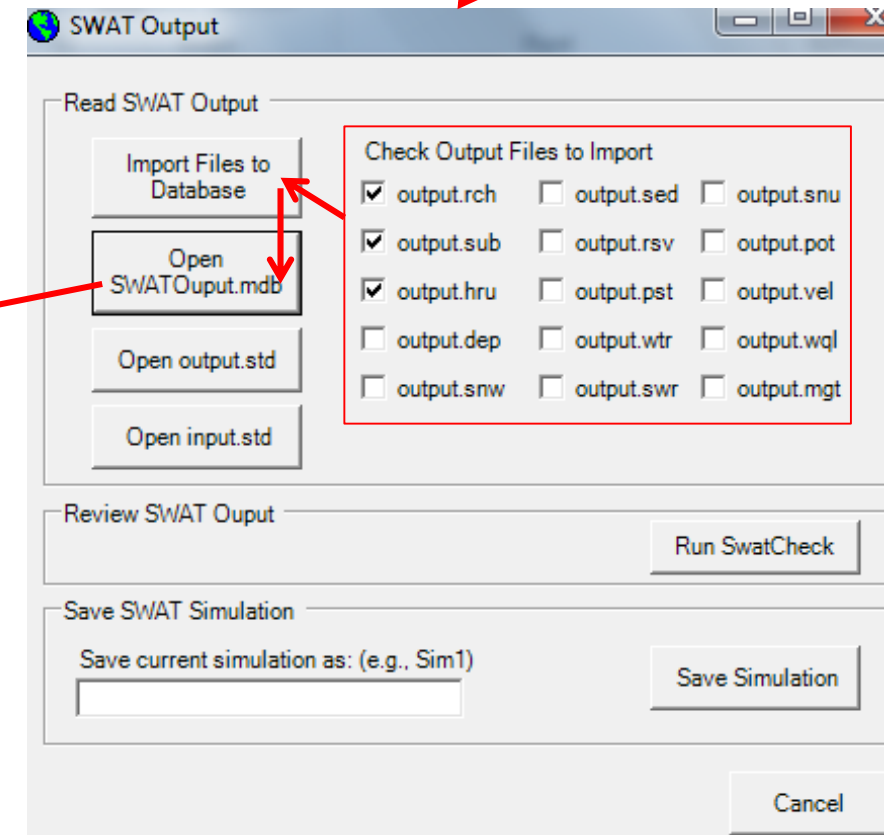
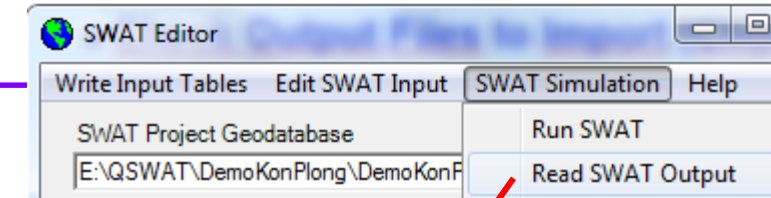
Đọc kết quả đầu ra

◆ SWAT Simulation/ Read SWAT Output

- ◆ Check Output Files to Import (Chọn tập tin đầu ra cần nhập)
- ◆ Import Files to Database (Nhập tập tin đầu ra vào cơ sở dữ liệu)
- ◆ Open SWATOutput.mdb (...\\DemoKonPlong\\Scenarios\\Default\\TablesOut) (Mở SWATOutput.mdb)



SUB	YEAR	MON	AREAkm2	FLOW_INcm	FLOW_OUTcm	EVAPcms	TLOSScms	SED_INtons	SED_OUTton	SEDCONCmg	YYYY
1	2001	1	916.2	27.89	27.89	0.004386	0	6210	8565	113.3	2001C
2	2001	1	530.5	18.71	18.68	0.07842	0	7482	6210	112.8	2001C
3	2001	1	381.7	9.125	9.117	0.02634	0	0.003433	0.00302	0.00009119	2001C
4	2001	1	1410	45.39	45.39	0.00116	0	13890	7401	60.17	2001C
5	2001	1	493.9	17.5	17.5	0.03075	0	6081	5327	113.9	2001C
1	2001	2	916.2	14.69	14.7	0.00598	0	31390	3013	88.56	2001C
2	2001	2	530.5	10.99	10.93	0.1096	0	38750	30800	1177	2001C
3	2001	2	381.7	3.739	3.729	0.03582	0	747.2	586.1	129.3	2001C
4	2001	2	1410	24.13	24.13	0.001491	0	3277	2645	47.72	2001C
5	2001	2	493.9	9.446	9.43	0.04377	0	311.5	263.7	12.33	2001C
1	2001	3	916.2	5.099	5.094	0.007154	0	27580	793.9	55.63	2001C
2	2001	3	530.5	4.247	4.129	0.1347	0	33220	24960	1608	2001C
3	2001	3	381.7	0.9983	0.9577	0.0423	0	3525	2616	796.5	2001C
4	2001	3	1410	8.501	8.501	0.001613	0	38980	724.8	30.3	2001C
5	2001	3	493.9	3.443	3.407	0.05625	0	45680	38190	1930	2001C
1	2001	4	916.2	18.91	18.89	0.006048	0	198500	5187	93.09	2001C
2	2001	4	530.5	15.96	15.67	0.1239	0	197300	165200	2919	2001C
3	2001	4	381.7	3.277	3.205	0.03605	0	38970	33230	2042	2001C
4	2001	4	1410	29.48	29.47	0.001432	0	85520	4208	49.06	2001C
5	2001	4	493.9	10.71	10.6	0.05264	0	91080	80330	1694	2001C
1	2001	5	916.2	69.54	69.53	0.005162	0	864100	32540	159.3	2001C
2	2001	5	530.5	43.1	43.97	0.1116	0	647200	570300	3828	2001C



Đọc kết quả đầu ra

◆ SWATOutput.mdb

◆ hru

tblHruDef	
Variable name	Definition
HRU	Hydrologic response unit number
SUB	Topographically-defined subbasin to which the HRU belongs.
MON	Daily time step: the julian date, Monthly time step: the month (1-12), Annual time step: 4-digit year, Average annual summary lines: number of years averaged together
AREA	Drainage area of the HRU (km2).
PRECIP	Total amount of precipitation falling on the HRU during time step (mm H2O).
PET	Potential evapotranspiration (mm H2O). Potential evapotranspiration from the HRU during the time step.
ET	Actual evapotranspiration (soil evaporation and plant transpiration) from the HRU during the time step (mm H2O).
SW_INIT	Soil water content (mm H2O). For daily output, this column provides the amount of water in soil profile at beginning of day. For monthly and annual output, this is the average soil water content for the time period. The amount of water in the soil profile at the beginning of the day is used to calculate daily curve number values.
SW_END	Soil water content (mm H2O). Amount of water in the soil profile at the end of the time period (day, month or year).
PERC	Water that percolates past the root zone during the time step (mm H2O). There is usually a lag between the time the water leaves the bottom of the root zone and reaches the shallow aquifer. Over a long period of time, this variable should equal groundwater recharge (PERC = GW_RCHG as time $\rightarrow \infty$).
GW_RCHG	Recharge entering aquifers during time step (total amount of water entering shallow and deep aquifers during time step) (mm H2O).
DA_RCHG	Deep aquifer recharge (mm H2O). The amount of water from the root zone that recharges the deep aquifer during the time step. (shallow aquifer recharge = GW_RCHG - DA_RCHG)
REVAP	Water in the shallow aquifer returning to the root zone in response to a moisture deficit during the time step (mm H2O). The variable also includes water uptake directly from the shallow aquifer by deep tree and shrub roots.
SURQ_GEN	Surface runoff generated in HRU during time step (mm H2O).
SURQ_CNT	Surface runoff contribution to streamflow in the main channel during time step (mm H2O).
TLOSS	Transmission losses (mm H2O). Water lost from tributary channels in the HRU via transmission through the bed. This water becomes recharge for the shallow aquifer during the time step. Net surface runoff contribution to the main channel streamflow is calculated by subtracting TLOSS from SURQ.
LATQ	Lateral flow contribution to streamflow (mm H2O). Water flowing laterally within the soil profile that enters the main channel during time step.
GW_Q	Groundwater contribution to streamflow (mm H2O). Water from the shallow aquifer that enters the main channel during the time step. Groundwater flow is also referred to as baseflow.
WYLD	Water yield (mm H2O). Total amount of water leaving the HRU and entering main channel during the time step. (WYLD = SURQ + LATQ + GWQ – TLOSS – pond abstractions)
SYLD	Sediment yield (metric tons/ha). Sediment from the HRU that is transported into the main channel during the time step.
USLE	Soil loss during the time step calculated with the USLE equation (metric tons/ha). This value is reported for comparison purposes only.

Đọc kết quả đầu ra

◆ SWATOutput.mdb

◆ sub

tblSubDef	
Variable name	Definition
SUB	Subbasin number.
MON	Daily time step: the julian date, Monthly time step: the month (1-12), Annual time step: 4-digit year, Average annual summary lines: number of years averaged together
AREA	Area of the subbasin (km2).
PRECIP	Total amount of precipitation falling on the subbasin during time step (mm H2O).
PET	Potential evapotranspiration from the subbasin during the time step (mm H2O).
ET	Actual evapotranspiration from the subbasin during the time step (mm).
SW	Soil water content (mm). Amount of water in the soil profile at the end of the time period.
PERC	Water that percolates past the root zone during the time step (mm). There is potentially a lag between the time the water leaves the bottom of the root zone and reaches the shallow aquifer. Over a long period of time, this variable should equal groundwater percolation.
SURQ	Surface runoff contribution to streamflow during time step (mm H2O).
GW_Q	Groundwater contribution to streamflow (mm). Water from the shallow aquifer that returns to the reach during the time step.
WYLD	Water yield (mm H2O). The net amount of water that leaves the subbasin and contributes to streamflow in the reach during the time step. (WYLD = SURQ + LATQ + GWQ – TLOSS – pond abstractions)
SYLD	Sediment yield (metric tons/ha). Sediment from the subbasin that is transported into the reach during the time step.
LATQ	Lateral flow contribution to streamflow during timestep (mm H2O)

Đọc kết quả đầu ra

◆ SWATOutput.mdb

◆ rch

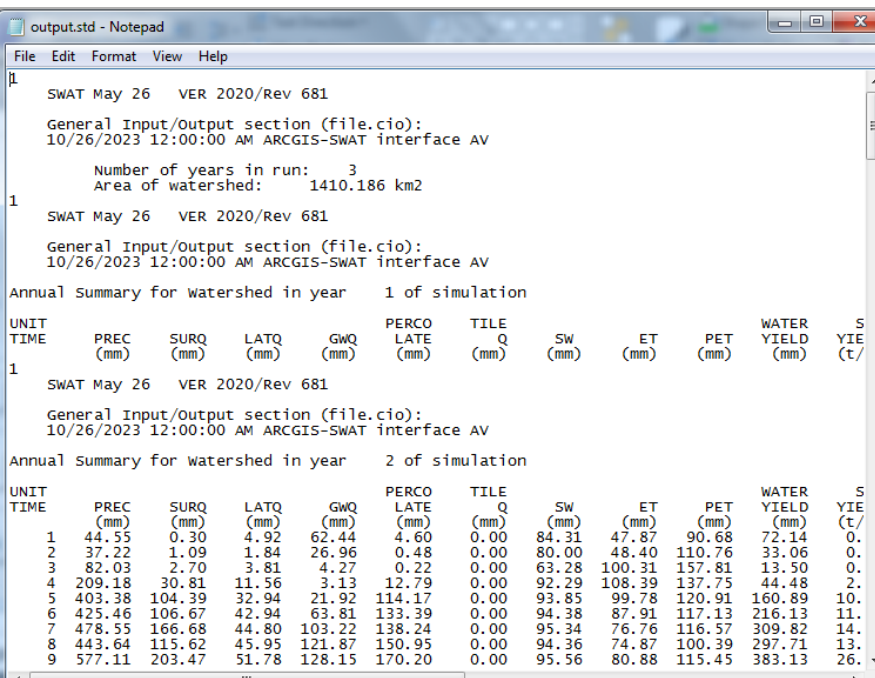
tblRchDef	
Variable name	Definition
RCH	Reach number.
MON	Daily time step: the julian date, Monthly time step: the month (1-12), Annual time step: 4-digit year, Average annual summary lines: number of years averaged together
AREA	Area drained by reach (km2).
FLOW_IN	Average daily streamflow into reach during time step (m3/s).
FLOW_OUT	Average daily streamflow out of reach during time step (m3/s).
EVAP	Average daily rate of water loss from reach by evaporation during time step (m3/s).
TLOSS	Average daily rate of water loss from reach by transmission through the streambed during time step (m3/s).
SED_IN	Sediment transported with water into reach during time step (metric tons).
SED_OUT	Sediment transported with water out of reach during time step (metric tons).
SEDCONC	Concentration of sediment in reach during time step (mg/L).

Đọc kết quả đầu ra

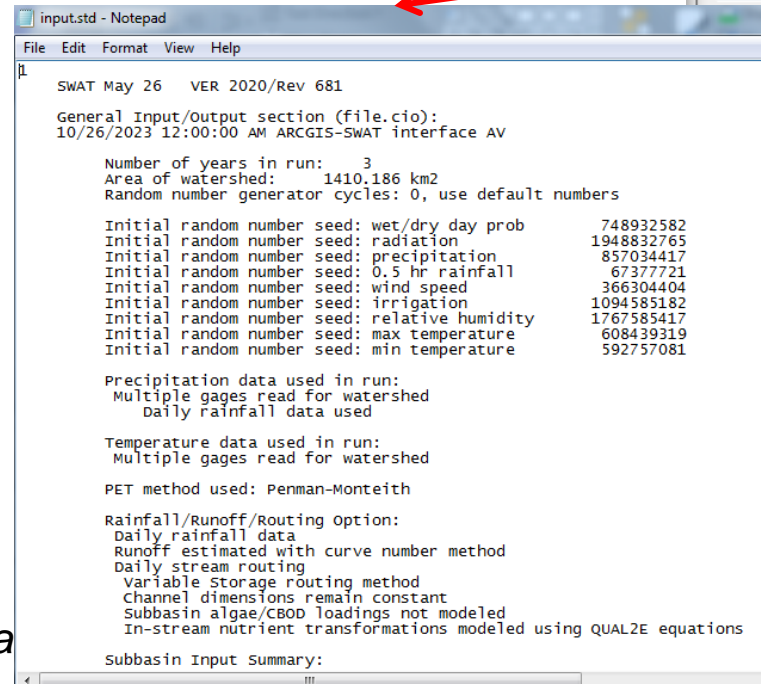
◆ Tập tin thống kê

◆ Open output.std (Mở tập tin thống kê đầu ra)

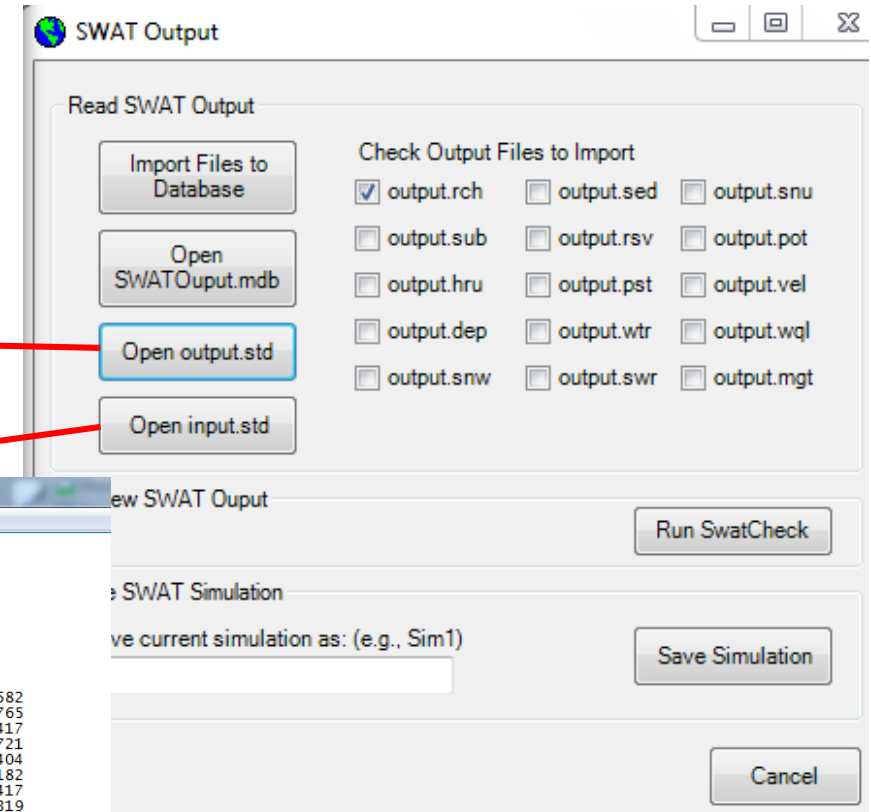
◆ Open input.std (Mở tập tin thống kê đầu vào)



```
SWAT May 26  VER 2020/Rev 681
General Input/output section (file.cio):
10/26/2023 12:00:00 AM ARCGIS-SWAT interface AV
Number of years in run: 3
Area of watershed: 1410.186 km2
SWAT May 26  VER 2020/Rev 681
General Input/output section (file.cio):
10/26/2023 12:00:00 AM ARCGIS-SWAT interface AV
Annual Summary for watershed in year 1 of simulation
UNIT TIME PREC (mm) SURQ (mm) LATQ (mm) GWQ (mm) PERCO LATE (mm) TILE Q (mm) SW (mm) ET (mm) PET (mm) WATER YIELD (mm) S YIE (t/ha)
1 SWAT May 26  VER 2020/Rev 681
General Input/output section (file.cio):
10/26/2023 12:00:00 AM ARCGIS-SWAT interface AV
Annual Summary for watershed in year 2 of simulation
UNIT TIME PREC (mm) SURQ (mm) LATQ (mm) GWQ (mm) PERCO LATE (mm) TILE Q (mm) SW (mm) ET (mm) PET (mm) WATER YIELD (mm) S YIE (t/ha)
1 44.55 0.30 4.92 62.44 4.60 0.00 84.31 47.87 90.68 72.14 0.
2 37.22 1.09 1.84 26.96 0.48 0.00 80.00 48.40 110.76 33.06 0.
3 82.03 2.70 3.81 4.27 0.22 0.00 63.28 100.31 157.81 13.50 0.
4 209.18 30.81 11.56 3.13 12.79 0.00 92.29 108.39 137.75 44.48 2.
5 403.38 104.39 32.94 21.92 114.17 0.00 93.85 99.78 120.91 160.89 10.
6 425.46 106.67 42.94 63.81 133.39 0.00 94.38 87.91 117.13 216.13 11.
7 478.55 166.68 44.80 103.22 138.24 0.00 95.34 76.76 116.57 309.82 14.
8 443.64 115.62 45.95 121.87 150.95 0.00 94.36 74.87 100.39 297.71 13.
9 577.11 203.47 51.78 128.15 170.20 0.00 95.56 80.88 115.45 383.13 26.
```



```
SWAT May 26  VER 2020/Rev 681
General Input/output section (file.cio):
10/26/2023 12:00:00 AM ARCGIS-SWAT interface AV
Number of years in run: 3
Area of watershed: 1410.186 km2
Random number generator cycles: 0, use default numbers
Initial random number seed: wet/dry day prob 748932582
Initial random number seed: radiation 1948832765
Initial random number seed: precipitation 857034417
Initial random number seed: 0.5 hr rainfall 67377721
Initial random number seed: wind speed 366304404
Initial random number seed: irrigation 1094585182
Initial random number seed: relative humidity 1767585417
Initial random number seed: max temperature 608439319
Initial random number seed: min temperature 592757081
Precipitation data used in run:
Multiple gages read for watershed
Daily rainfall data used
Temperature data used in run:
Multiple gages read for watershed
PET method used: Penman-Monteith
Rainfall/Runoff/ROUTING Option:
Daily rainfall data
Runoff estimated with curve number method
Daily stream routing
Variable storage routing method
Channel dimensions remain constant
Subbasin algae/CBOD loadings not modeled
In-stream nutrient transformations modeled using QUAL2E equations
Subbasin Input Summary:
```



output.std

Trung bình tháng,
năm của từng năm

General Input/Output section (file.cio):
11/13/2023 12:00:00 AM ARCGIS-SWAT interface AV

Annual Summary for Watershed in year 2 of simulation

UNIT TIME	PREC (mm)	SURQ (mm)	LATQ (mm)	GWQ (mm)	PERCO LATE (mm)	TILE Q (mm)	SW (mm)	ET (mm)	PET (mm)	WATER YIELD (mm)	SED YIELD (t/ha)	NO3 SURQ	NO3 LATQ	NO3 PERC	NO3 CROP	N ORGANIC	P SOLUBLE	P ORGANIC	P TILENO3
1	44.55	0.62	5.45	76.43	7.80	0.00	59.52	37.79	82.43	90.64	0.17	0.00	0.02	0.17	0.00	0.19	0.00	0.02	0.00
2	37.22	2.30	1.83	33.36	0.41	0.00	56.55	35.93	100.92	40.86	0.21	0.00	0.00	0.01	3.83	0.20	0.00	0.03	0.00
3	82.03	5.50	2.88	5.64	0.00	0.00	38.57	91.05	148.21	17.20	0.31	0.77	0.14	0.00	54.36	0.44	0.00	0.05	0.00
4	209.18	48.10	8.59	4.33	16.35	0.00	68.84	103.02	127.47	51.19	1.30	0.04	0.02	0.01	8.44	1.53	0.00	0.19	0.00
5	403.38	139.44	25.76	26.75	136.25	0.00	70.04	93.14	109.76	182.96	4.78	0.00	0.01	0.31	1.40	4.34	0.01	0.54	0.00
6	425.46	149.27	35.87	76.58	163.00	0.00	70.86	74.79	106.14	267.95	7.78	0.00	0.02	0.63	0.46	4.76	0.01	0.59	0.00
7	478.55	209.19	38.92	124.92	167.64	0.00	71.89	62.56	104.91	360.99	5.81	0.04	0.05	1.41	0.00	4.99	0.01	0.70	0.00
8	443.64	157.53	40.03	147.80	183.45	0.00	70.45	63.26	89.89	370.42	10.05	0.12	0.12	2.84	0.00	6.76	0.03	1.15	0.00
9	577.11	260.18	41.80	155.11	201.70	0.00	72.19	67.68	103.80	440.13	11.70	0.05	0.11	2.62	0.00	9.61	0.03	1.30	0.00
10	250.39	57.75	32.14	163.87	108.49	0.00	70.31	60.54	93.39	292.69	4.46	0.02	0.07	1.38	0.00	3.90	0.01	0.51	0.00
11	297.50	117.39	25.47	134.77	109.60	0.00	73.22	42.86	63.75	259.36	6.83	0.01	0.07	1.71	0.00	4.92	0.01	0.62	0.00
12	75.75	21.20	14.35	112.98	28.82	0.00	66.33	26.05	52.91	185.20	4.03	0.01	0.04	0.45	0.00	1.75	0.00	0.23	0.00
2001	3324.76	1168.47	273.08	1062.56	1123.51	0.00	66.33	758.66	1183.59	2559.59	57.44	1.06	0.68	11.53	68.48	43.40	0.11	5.93	0.00

Trung bình tháng
nhiều năm

AVE MONTHLY BASIN VALUES

MON	RAIN (MM)	SNOW FALL (MM)	SURF Q (MM)	LAT Q (MM)	WATER YIELD (MM)	ET (MM)	SED YIELD (T/HA)	PET (MM)
1	26.37	0.00	0.31	3.92	83.91	29.00	0.11	78.58
2	20.86	0.00	1.15	1.09	33.56	27.14	0.11	107.50
3	74.96	0.00	6.47	2.04	13.63	72.89	0.20	149.84
4	133.29	0.00	30.44	6.63	37.64	90.51	0.82	144.46
5	274.34	0.00	76.07	15.94	100.87	82.88	2.51	149.39
6	248.14	0.00	75.29	20.95	139.86	73.96	3.91	136.89
7	368.13	0.00	141.64	27.70	227.27	60.20	3.93	117.98
8	423.12	0.00	171.85	33.68	312.85	65.24	8.75	101.52
9	514.66	0.00	228.79	37.43	374.09	63.61	11.84	96.94
10	155.70	0.00	37.64	22.21	224.69	49.72	2.95	114.87
11	199.05	0.00	65.40	16.50	174.10	43.04	3.97	74.38
12	48.93	0.00	10.85	9.09	116.12	27.56	2.05	62.30

Trung bình
nhiều năm

General Input/Output section (file.cio):
11/13/2023 12:00:00 AM ARCGIS-SWAT interface AV

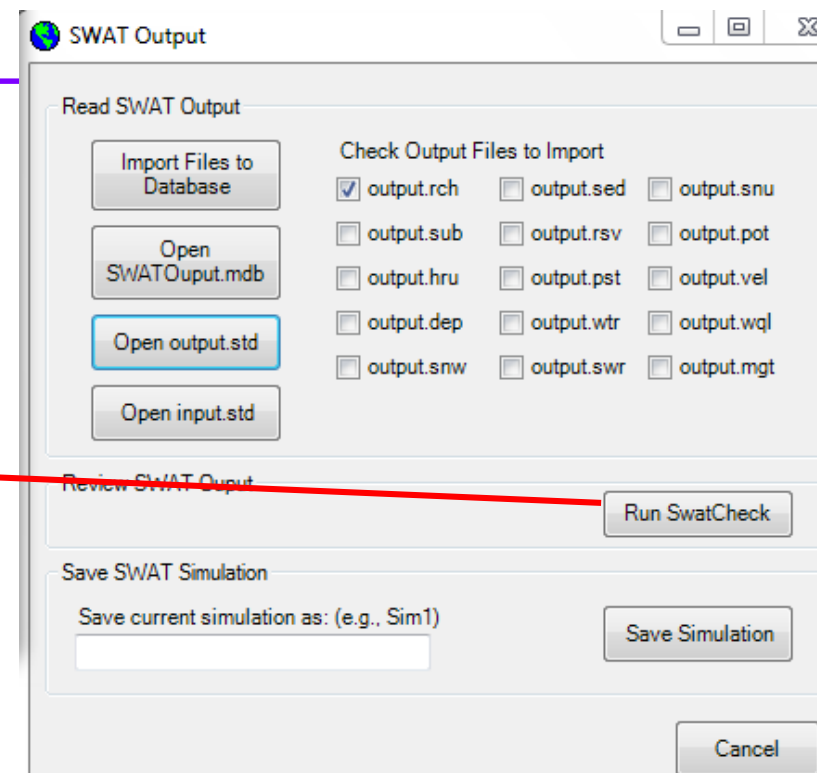
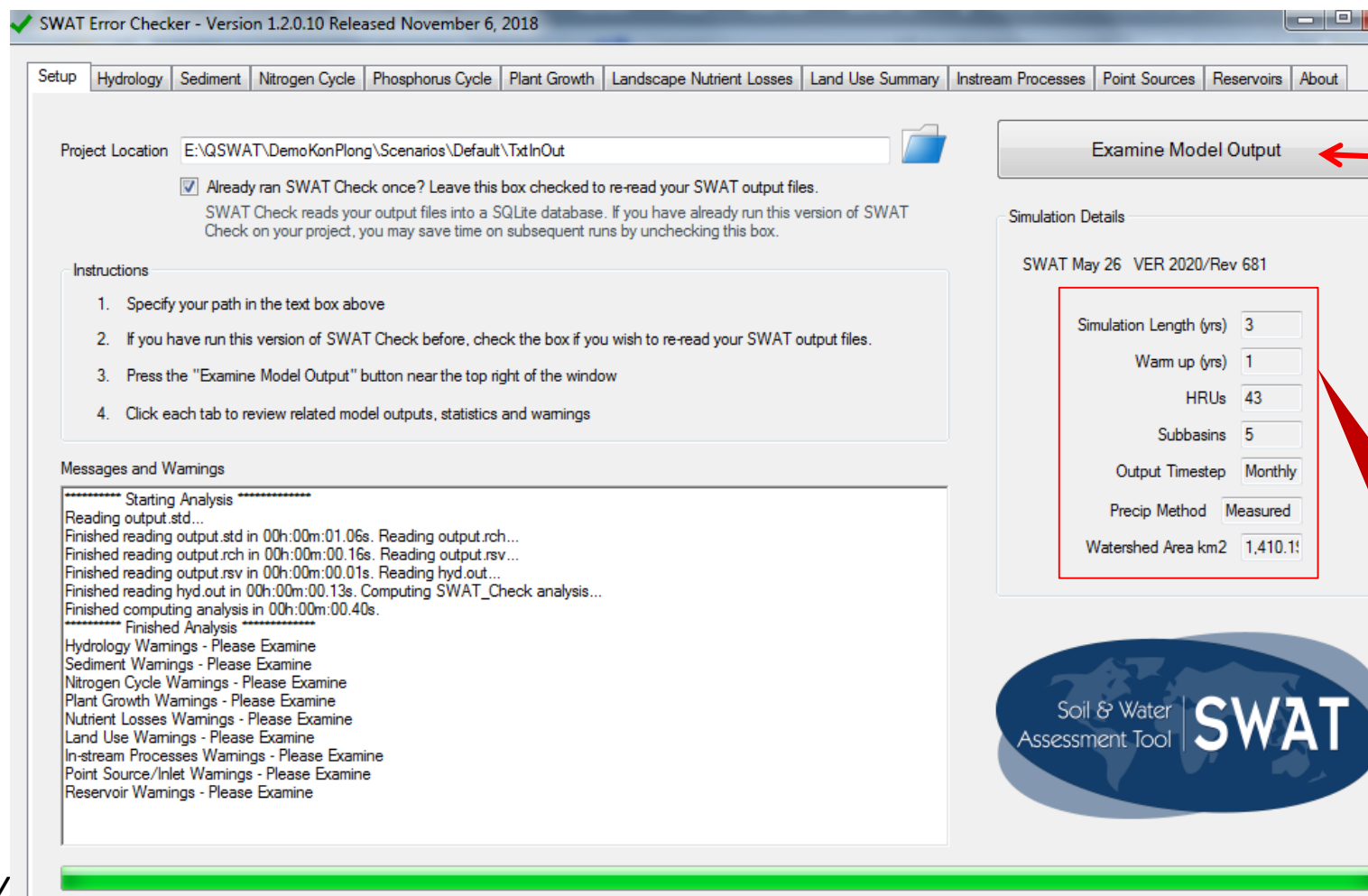
AVE ANNUAL BASIN VALUES

PRECIP = 2487.5 MM
 SNOW FALL = 0.00 MM
 SNOW MELT = 0.00 MM
 SUBLIMATION = 0.00 MM
 SURFACE RUNOFF Q = 845.90 MM
 LATERAL SOIL Q = 197.17 MM
 TILE Q = 0.00 MM
 GROUNDWATER (SHAL AQ) Q = 749.43 MM
 GROUNDWATER (DEEP AQ) Q = 44.60 MM
 REVAP (SHAL AQ => SOIL/PLANTS) = 26.69 MM
 DEEP AQ RECHARGE = 39.72 MM
 TOTAL AQ RECHARGE = 794.38 MM
 TOTAL WATER YLD = 1838.59 MM
 PERCOLATION OUT OF SOIL = 764.48 MM
 ET = 685.8 MM
 PET = 1334.6MM
 TRANSMISSION LOSSES = 0.00 MM
 SEPTIC INFLOW = 0.00 MM
 TOTAL SEDIMENT LOADING = 41.16 T/HA
 TILE FROM IMPOUNDED WATER = 0.000 (MM)
 EVAPORATION FROM IMPOUNDED WATER = 0.000 (MM)
 SEEPAGE INTO SOIL FROM IMPOUNDED WATER = 0.000 (MM)
 OVERFLOW FROM IMPOUNDED WATER = 0.000 (MM)

Kiểm tra kết quả đầu ra

◆ Run SwatCheck (Chạy SWAT Check)

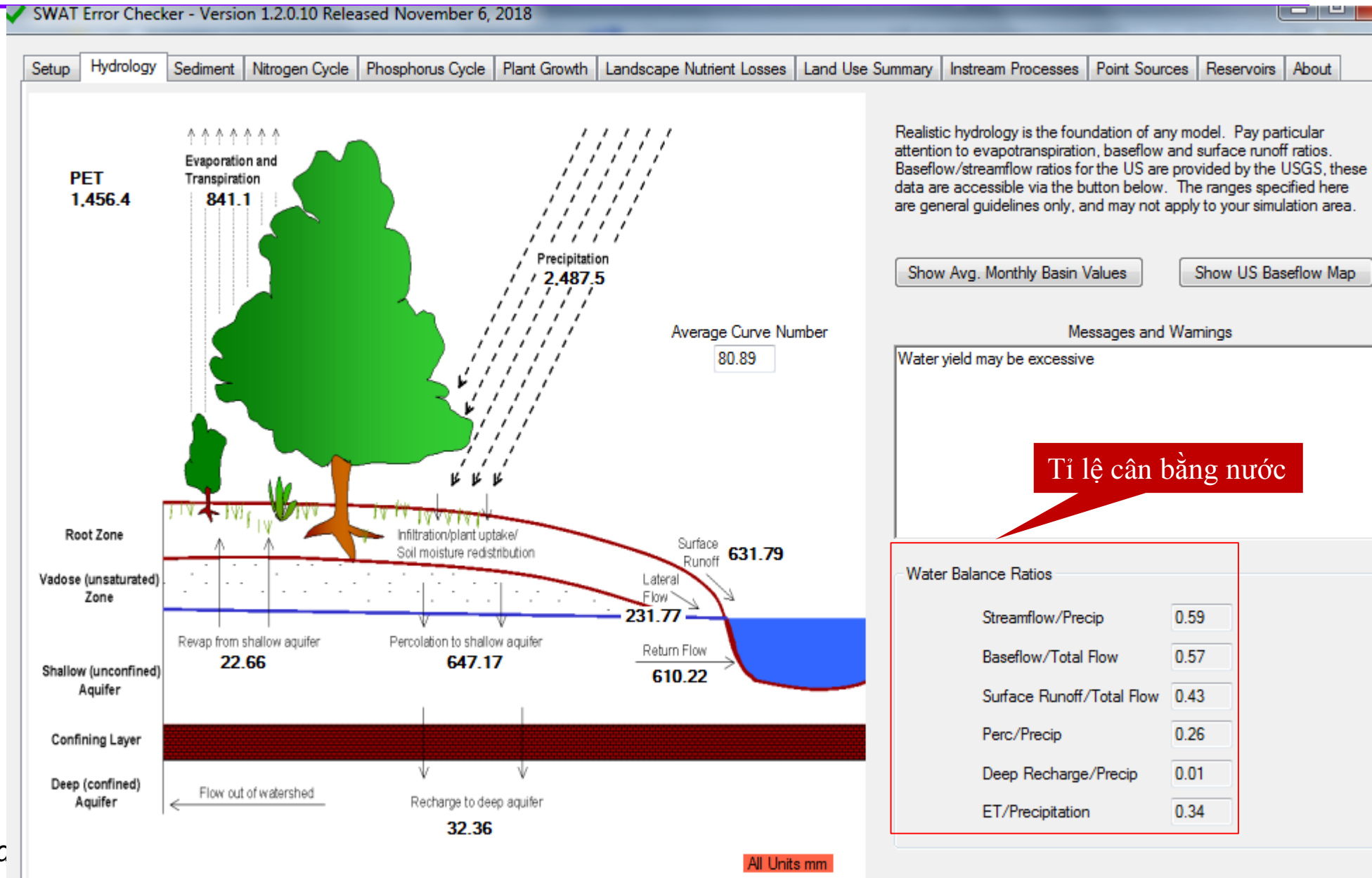
◆ Examine Model Output (Kiểm tra đầu ra của mô hình)



Số năm mô phỏng
Số năm không in đầu ra
Số HRU
Số tiểu lưu vực
Tần suất đầu ra
Số liệu mưa
Diện tích lưu vực

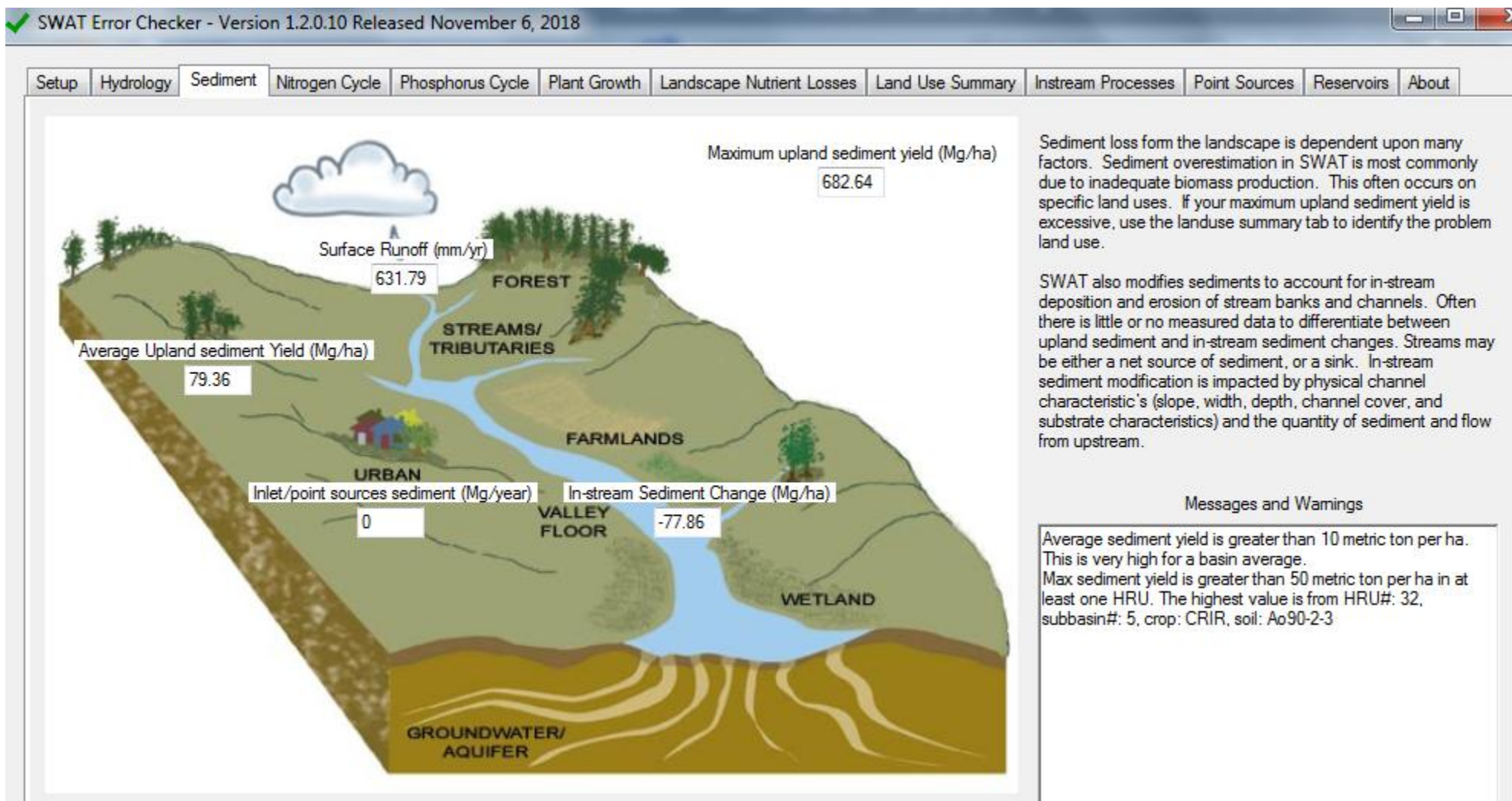
Kiểm tra kết quả đầu ra

Thủy văn



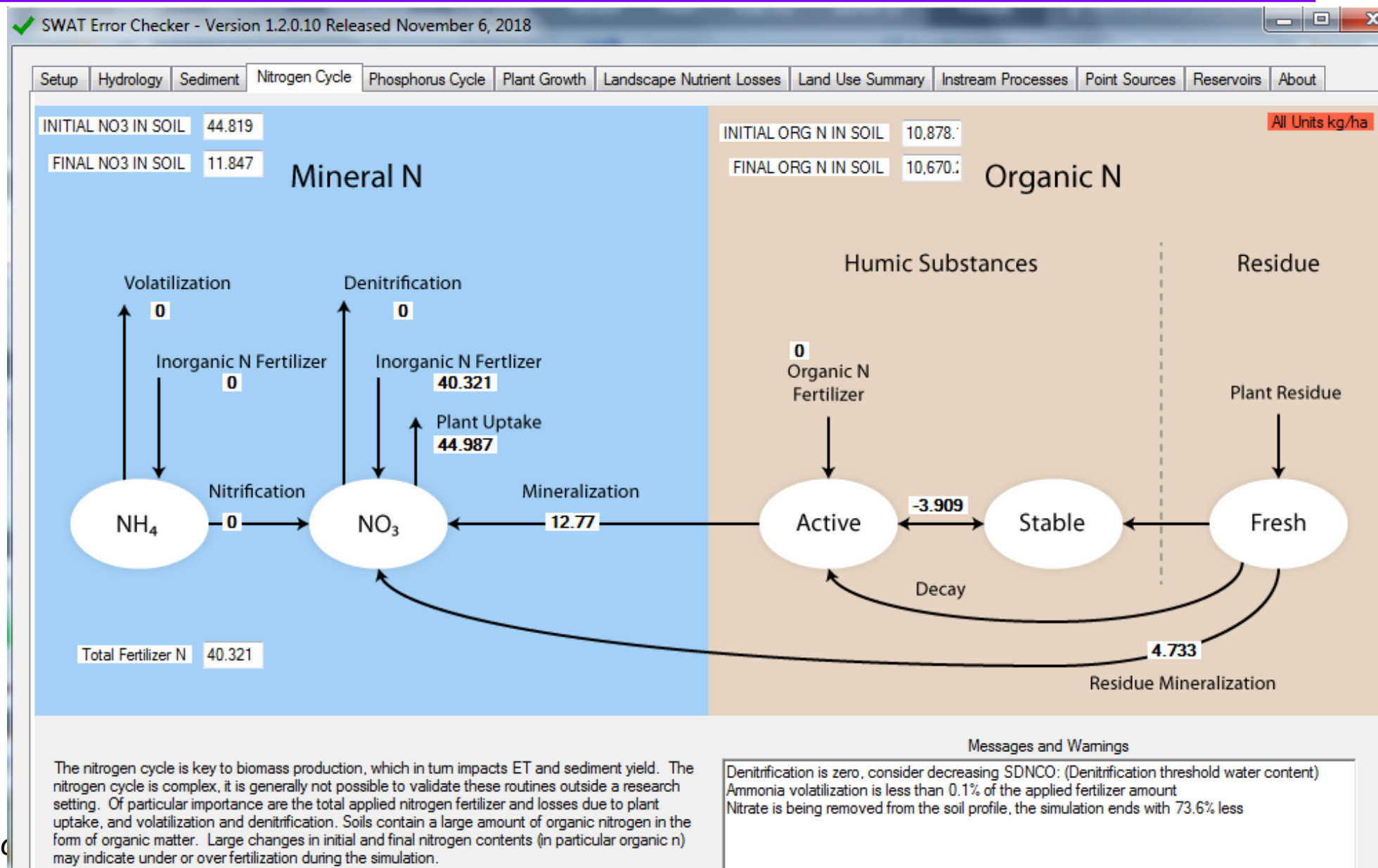
Kiểm tra kết quả đầu ra

◆ Xói mòn đất



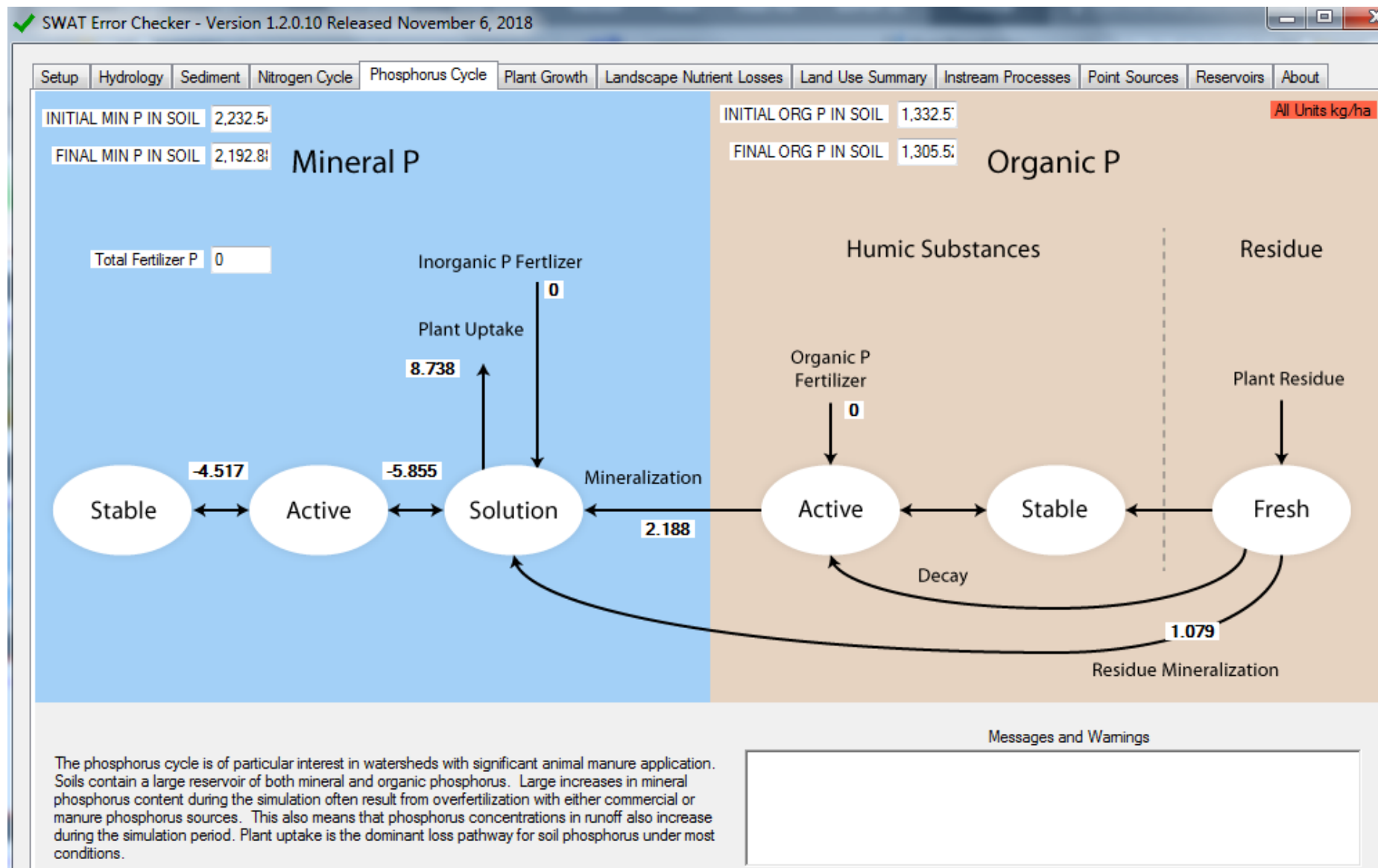
Kiểm tra kết quả đầu ra

◆ Chu trình nitơ



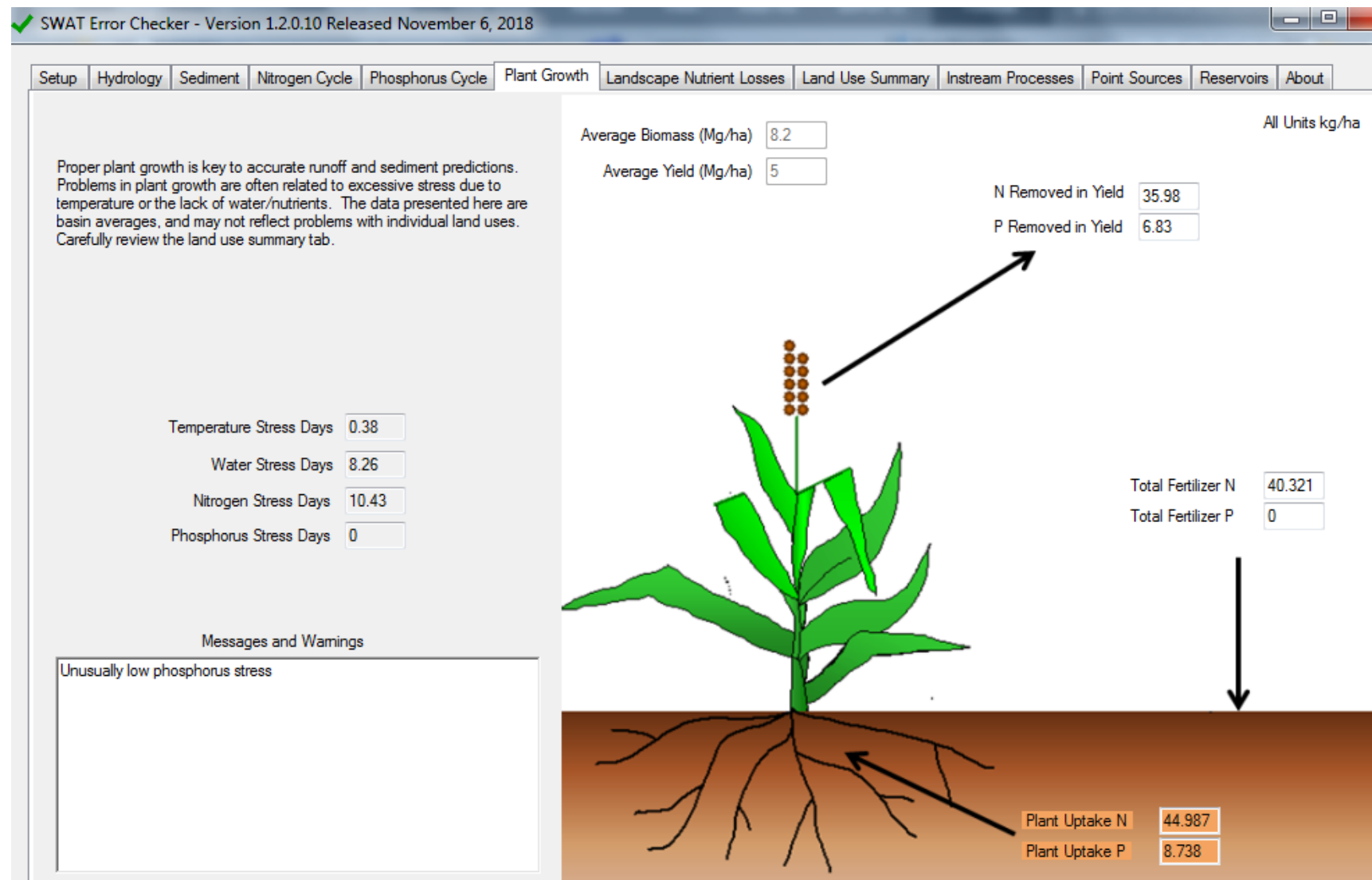
Kiểm tra kết quả đầu ra

◆ Chu trình photpho



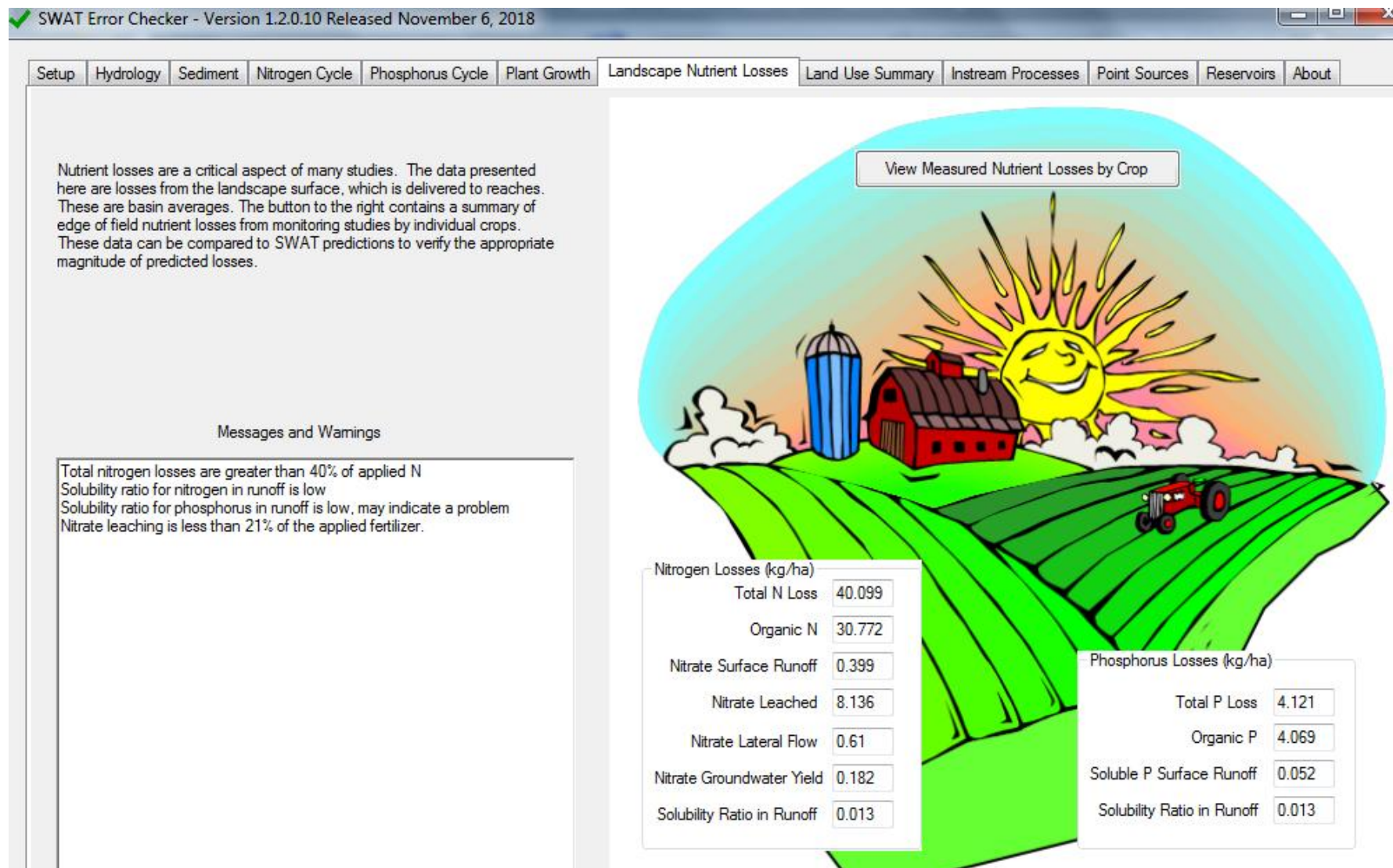
Kiểm tra kết quả đầu ra

◆ Sinh trưởng cây trồng



Kiểm tra kết quả đầu ra

◆ Tổng thất dinh dưỡng



Kiểm tra kết quả đầu ra

◆ Tóm tắt sử dụng đất/ lớp phủ đất

SWAT Error Checker - Version 1.2.0.10 Released November 6, 2018

Setup Hydrology Sediment Nitrogen Cycle Phosphorus Cycle Plant Growth Landscape Nutrient Losses **Land Use Summary** Instream Processes Point Sources Reservoirs About

Summary By Reported Landuse

	LULC	AREA km2	CN	AWC mm	USLE_LS	IRR mm	PREC mm	SURQ mm	GWQ mm	ET mm	SED th	NO3 kgh	ORGN
▶	CRIR	325.48	84.32	93.52	5.15	0.00	2,550.76	1,003.15	831.91	711.87	263.72	3.34	
	FODB	75.57	80.62	105.70	5.90	0.00	2,415.99	777.48	878.25	740.21	22.98	0.34	
	FOEB	315.11	75.20	93.14	6.59	0.00	2,408.56	591.37	1,096.61	704.40	60.58	0.42	
	FOMI	476.48	77.29	95.70	6.61	0.00	2,479.59	669.64	1,057.10	748.81	10.85	0.38	
	SAVA	0.88	76.50	160.00	2.86	0.00	2,381.84	606.47	975.46	777.13	196.05	0.18	
	WATR	216.75	92.00	93.56	5.15	0.00	2,550.70	0.00	0.00	1,472.40	0.00	0.00	

View HRU Level Warnings

Messages and Warnings

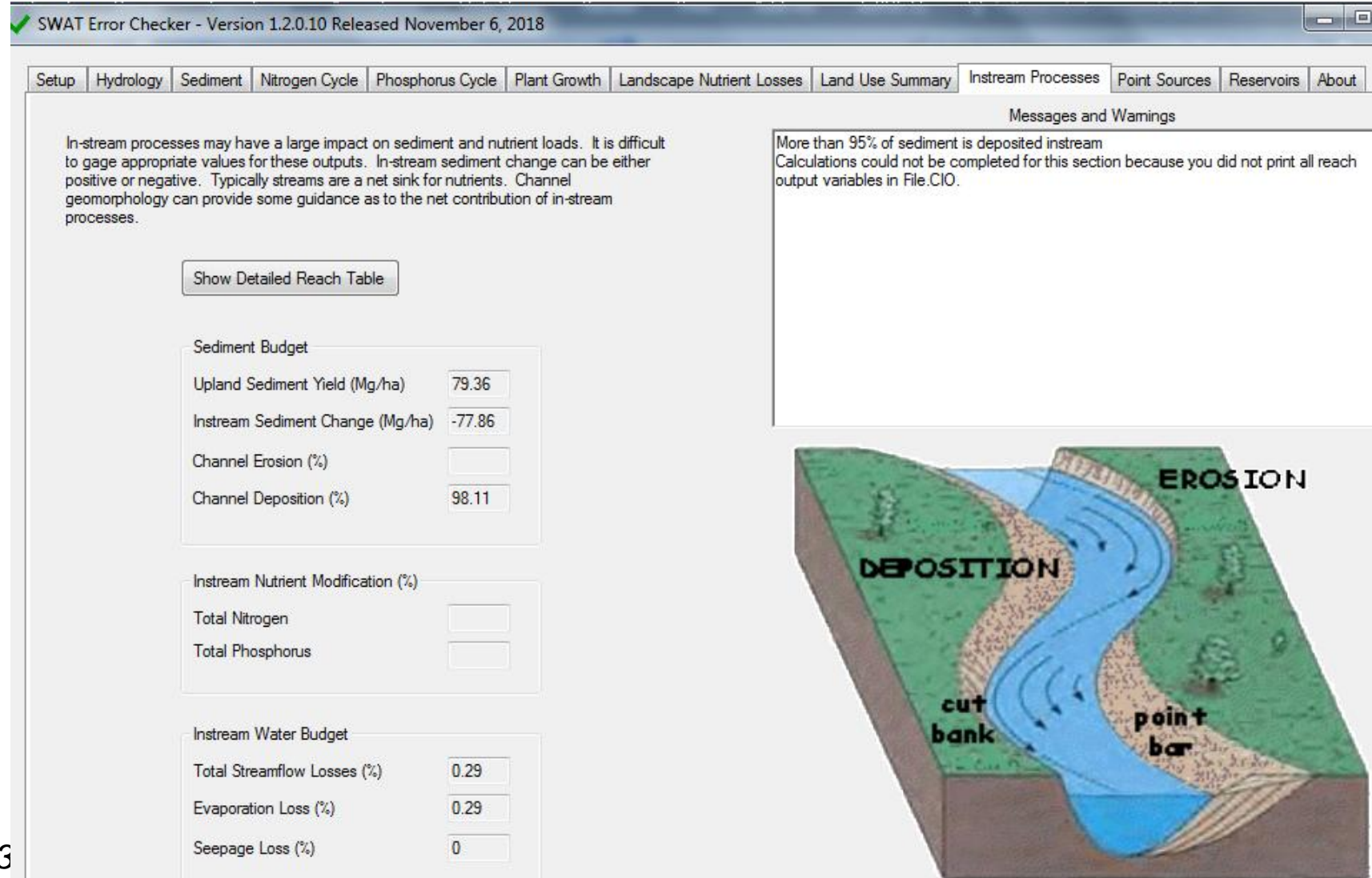
Model errors are often isolated to a particular land use type. If the land use is relatively minor, these issues may go unnoticed at the basin outlet during calibration. Often, these minor land uses are the focus of scenario development, and errors become apparent after the investment of much calibration effort.

The table above contains a few important predictions summarized by land use. These should be reviewed carefully. The button to the right provides HRU level warnings, these data are provided only to help isolate problem HRUs within a particular land use. We do not recommend that these data be used during routine checking of model output.

Crop CRIR: sediment yield may be too high
Crop CRIR: ET less than 31% of irrigation water + precip
Crop CRIR: surface runoff may be excessive
Crop FODB: sediment yield may be too high
Crop FODB: ET less than 31% of irrigation water + precip
Crop FODB: surface runoff may be excessive
Crop FOEB: sediment yield may be too high
Crop FOEB: ET less than 31% of irrigation water + precip
Crop FOMI: ET less than 31% of irrigation water + precip
Crop SAVA: sediment yield may be too high

Kiểm tra kết quả đầu ra

◆ Quá trình trong dòng chảy



Kiểm tra kết quả đầu ra

◆ Điểm xả thải

✓ SWAT Error Checker - Version 1.2.0.10 Released November 6, 2018


Setup Hydrology Sediment Nitrogen Cycle Phosphorus Cycle Plant Growth Landscape Nutrient Losses Land Use Summary Instream Processes Point Sources Reservoirs About

Point sources constantly discharge pollutants to streams. These are an optional feature in SWAT. These summaries are presented so that the relative contribution of these sources can be verified. Point sources contributions are so varied that there is no reasonable range which can be applied to all basins.

Total Subbasin Load		Total Point Source + Inlet Load		Load From Inlet+PS (%)	
Flow (cms)	83.91	Flow (cms)	0	Flow (%)	0
Sediment (Mg/yr)	12,918,021	Sediment (Mg/yr)	0	Sediment (%)	0
Nitrogen (kg/yr)	8,801,957.5	Nitrogen (kg/yr)	0	Nitrogen (%)	0
Phosphorus (kg/yr)	2,074,557.6	Phosphorus (kg/yr)	0	Phosphorus (%)	0

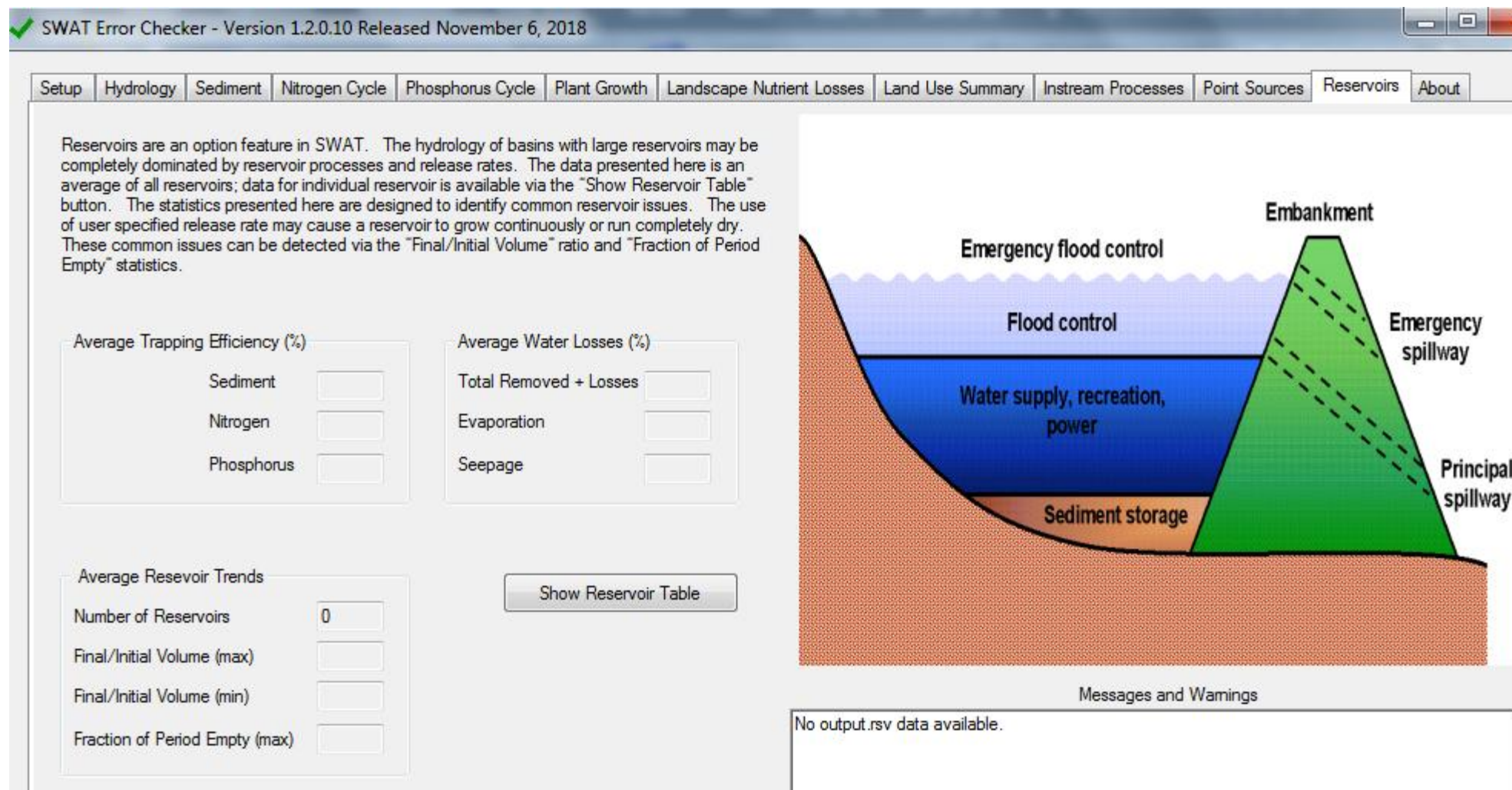
Messages and Warnings

Inlets/point source not present



Kiểm tra kết quả đầu ra

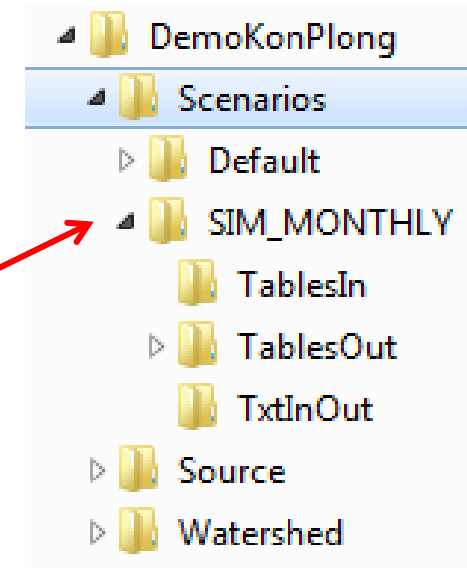
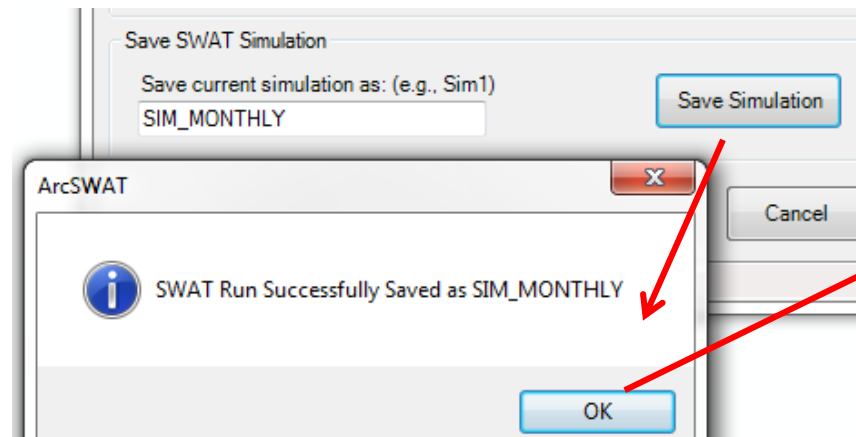
◆ Hồ chứa



Lưu kịch bản chạy SWAT

◆ Nhập tên kịch bản **SIM_MONTHLY**

◆ Click **Save Simulation**



Bảng đầu vào

Bảng đầu ra

Tập tin đầu vào, đầu ra

Bài tập kiểm tra

- ◆ Nhập lại số liệu thời tiết thành phần vào đồ án Demo sử dụng dữ liệu thời tiết trong thư mục **Data_Bai4\ThoiTiet_Kiem Tra**

- ◆ pcp*: lượng mưa

- ◆ tmp*: nhiệt độ không khí

- ◆ Chạy mô hình trong giai đoạn **1/1/2001 – 31/12/2002** với phân bố mưa là **Skewed normal**, in đầu ra theo **ngày**, **NYSKIP = 0**.

- ◆ Điền câu trả lời vào Google Form <https://forms.gle/NtJqnNFQJ68UwXt57> cho các câu hỏi sau:

1. Giá trị ET (mm) của HRU 4 thuộc tiểu lưu vực 4 trong ngày 02/01/2001 là bao nhiêu?

2. Giá trị lượng mưa (mm) của tiểu lưu vực 5 trong ngày 01/02/2001 là bao nhiêu?
3. Giá trị FLOW_OUT (m³/s) của dòng chảy thuộc tiểu lưu vực 3 trong ngày 31/12/2001 là bao nhiêu?
4. Giá trị SURQ (mm) trung bình năm 2001 trên lưu vực là bao nhiêu?
5. Giá trị SED YIELD (tấn/ha) trung bình tháng 10 trên lưu vực là bao nhiêu?
6. Giá trị GROUNDWATER (SHAL AQ) Q (mm) trung bình nhiều năm trên lưu vực là bao nhiêu?
7. Giá trị tỉ lệ Baseflow/Total Flow trên lưu vực là bao nhiêu?
8. Giá trị tải lượng bùn cát lớn nhất trên đất liền (tấn/ha) của lưu vực là bao nhiêu?