RockSpawn Mod
Manual

RockSpawn Mod

Background
When I was a boy, we practically lived on a 'rock pile.' Perhaps to keep his five boys busy, my father had us pick up a lot of rocks around our home. Digging post holes for fences was particularly challenging. The farm I later worked on to earn money for college was also on a 'rock pile.' Every time the cultivator or chisel was pulled over the ground, it seemed to pull up more rocks hidden under the surface. Big rocks, little rocks, medium-sized rocks. Rocks are tough on machinery, and too many of them in a given area meant that planting of the seed was hindered. And so they were picked up. Some we picked up by hand, some we picked up by machine (such as with the front end loader of a tractor, or specialized 'rock picking' equipment that 'swept' them up from the soil), some we blew to bits with dynamite... and some were so big they were left alone, and we farmed around them. In remembrance of the hard work of those days, I wanted to create a mod that "digs up" rocks during the plowing/cultivation process.

Rock Spawning
This particular script is a global specialization designed for plows and cultivators enabling them to "dig up" or rather, to "spawn" rocks. The mod will insert itself into ALL plows and cultivators in the game, including properly set up mods of the same. Properly set up, the mod will also insert itself into "ripper" tillage tools (more on this later). The mod also comes with a pack of 15 different rocks that will spawn from this activity in a range of shapes, sizes, and textures.

Important: To use the mod, all you need to do is place it into your mods folder. In most cases, the script will take care of the rest.

Rock Spawning Equipment – Setup and Specifications
There are primarily two, and sometimes three, tools in game that will spawn rocks:

- Plows
- Cultivators
- Rippers

Rock spawning occurs with each tool slightly differently. In practical terms, the map surface is flat, albeit textured to look as realistic as possible. Equipment running over the top of the map surface is pressed tightly to it. In real life, rocks would be tugged from the earth by a cultivator tine or the share of the plow. Mimicking this in-game, rocks will spawn as closely to the tool as possible.

For cultivators and rippers, rocks will spawn along its back edge. For plows, rocks will spawn just behind the bar holding each plow share. On occasion a rock will hit the equipment, but the script is otherwise designed to avoid this as much as possible.

The script works well with all stock equipment that comes with the game. It should also work well with modded plows, cultivators, and rippers. However, the modded tools need to be set up identically to how the stock game equipment is set up, or there may be problems. The following is technical in nature, but these are the specific requirements of each tool, the markers the script looks for in the xml file to determine how and where to spawn rocks:

Plows	Cultivators	Rippers
`ploughTurnSound`	`aiLeftMarker`	NO `ploughTurnSound`
`startIndex`	`aiRightMarker`	`aiLeftMarker`
`aiBackMarker`	`aiBackMarker`	`aiRightMarker`
		`aiBackMarker`

The items above are specific reference points on the tools by which this script calculates where to spawn a rock. In addition, the game engine typically treats 'ripper' mods the same as plows, for all intents and purposes. To differentiate them for rock spawning purposes (which it has to do because of their different shapes), the script searches for one critical difference it should have from the plow: a sound file for turning the plow. A ripper should not need such a sound, and therefore this sound should not be in its xml file.

Important: If you have a ripper mod, you will need to ensure it does not have the `ploughTurnSound` in its xml file, or else your ripper will spawn rocks underneath it, and only on one side.

Mod Features
The script contains the following features:

- Input Bindings – Certain regions of the planet will have a large number of rocks beneath the soil. Other regions will have none. To take this difference into account, an input binding was created to toggle between various levels of rock spawning. The initial binding is **LEFT-ALT-R** (can be changed in the game settings). There are six different rock spawning levels, which appear in-game as follows:

	Desired Number of Rocks to Spawn in WB Field # 16	**Rocks Spawned per Hectare**
o Rock Digging: OFF	0	0
o Rock Digging: Level 1 (Low) <Default>	4	1
o Rock Digging: Level 2	8	3
o Rock Digging: Level 3 (Medium)	16	6
o Rock Digging: Level 4	32	12
o Rock Digging: Level 5 (High)	64	23

  The left column shows the various input bindings, with Level 1 being the default rock spawning level. The middle column shows the approximate number of rocks that would be

spawned in field # 16 of the Westbridge map at each level. The right column shows the approximate number of rocks that will be spawned per hectare at each level.

- Hired Workers – If the tool is set up to spawn rocks (ie, by input binding), rocks will continue to spawn while a hired worker plows or cultivates. However, the level of rock spawning activity can't be changed while the hired worker is activated.

  Important: If you wish to change the rock spawning level, halt the hired worker first.

- Interactivity with Damage Mod – Each rock is a physics object in the game, no different from any other hard object, such as a building, tree, or vehicle. If the rock tangles with the equipment during the spawning process, or if you run vehicles or implements into the rocks, damage may result.

- Spawning beneath map surface cleanup – In real life, rocks do not instantly appear on the surface during plowing or cultivation. Rather, during tillage, the plow or cultivator "lifts" the rock from beneath the soil to the surface. Every attempt was made to mimic this process, though there are limitations with the game engine, and certainly with my skills. The rocks will spawn partially beneath the soil. Most of them will immediately come to the surface, but occasionally, a rock will slip below the surface and be lost.

  Under the map surface a rock would continue to fall. Given enough rocks in a falling position, game resources would be wasted, calculating physics information on rocks never seen in the game. Accordingly, the script checks all rocks at the time of loading and saving. If any are noted to be below the map surface, the rocks are deleted at these times.

- Fluctuating Value of Rocks – Each rock has a given `fillType` and `fillLevel`. They also have a third value, `rockValueScale` for an added measure, though it hasn't been used. The value of the rocks fluctuates in-game similar to prices for other commodities.

  If they do not already exist in the map, the script registers two new `fillTypes`, rock and gold. Rock and gold are given initial market values of 0.055 and 765,000 per liter, respectively.

  Important: If a player wishes to see the market value of rocks or gold in-game, he would be advised to add both rock and gold `fillTypes` to a particular selling point, even if rocks cannot be literally disposed of there.

- Multiplayer Compatible – Significant effort was expended to ensure that the spawning of rocks works in a multiplayer environment as well as it does in a single player environment.

The Rocks
Rocks were initially considered 'bales' by the game engine. But in the end, a new class of 'rock' objects was created. While patterned after the bale, they are unique to themselves as rock objects, and no longer interact with bale equipment.

All fifteen rocks that come with the mod are pictured below:
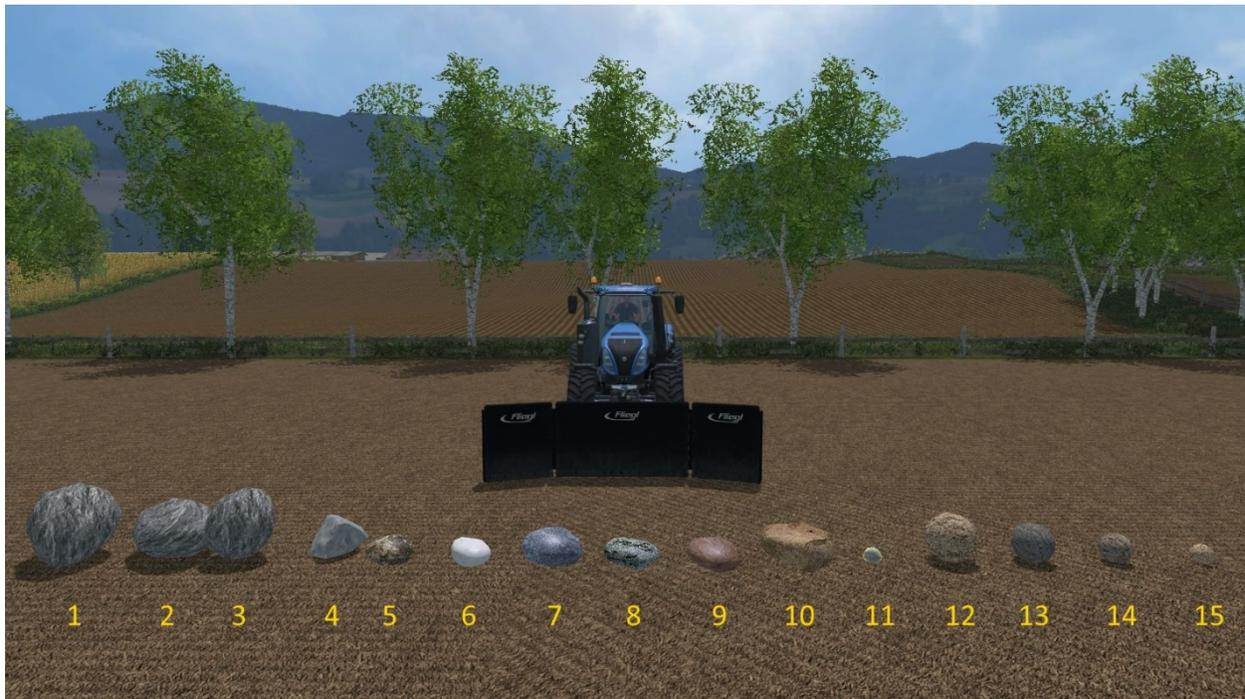
The basic characteristics of each rock are as follows:

Rock File Name	fillType	Mass in kg	Mass in kg/liter	fillLevel in Liters
1 Giants_FieldRock01	rock	936	2.5	370
2 Giants_FieldRock02	rock	710	2.5	280
3 Giants_FieldRock03	rock	524	2.5	210
4 Giants_rock1	rock	140	2.5	60
5 TyroSmith_Rock1	rock	108	2.5	40
6 TyroSmith_Rock2	rock	80	2.5	30
7 TyroSmith_Rock3	rock	224	2.5	90
8 TyroSmith_Rock4	rock	118	2.5	50
9 TyroSmith_Rock5	rock	132	2.5	50
10 TyroSmith_Rock6	rock	350	2.5	140
11 Giants_FieldRock01g	gold	8	19.3	0.4
12 Benw11_Rock1	rock	216	2.5	90
13 Benw11_Rock2	rock	110	2.5	40
14 Benw11_Rock3	rock	46	2.5	20
15 Benw11_Rock4	rock	14	2.5	10

It may be of interest to know that the physics settings of the rocks have been altered in the Giants Editor. The main purpose for this was to keep rocks from rolling as much on hills, where it is presumed that soft soil would keep them more in place. In the Giants Editor, static and dynamic friction are both set to 0.5. Linear and angular damping at set at 0.65 and 1, respectively.

How to Dispose of Rocks

All rocks may be disposed of at the same place where bales are sold, the "bale destroyer trigger." Map designers/scripters may design their own disposal triggers to handle rock objects if they wish, but the script currently provides for rock disposal along with bales.

Rock Handling Equipment

While installation of this mod is easy and a player can use it almost immediately in-game, it is recommended that consideration be given to additional mods that may be helpful (and needed) to handle the rocks once spawned. Farming Simulator 2015 currently does not have a trailer into which rocks may be placed. The closest it has would be the orange Fliegl Lowloader, which will not be effective hauling rocks. The front loader, wheel loader, and telehandler loader may be used to lift rocks. These may also be used to transport rocks to the disposal point, but additional mods are advised to assist in the process. Some suggestions follow. Be forewarned, some of these mods have errors, and their appearance on this page is a suggestion only, not necessarily an endorsement.

- Trailers
  - Mendele Kipper - http://www.modhoster.com/mods/mengele-kipper--2

  - Fliegl Wood Trailer – http://lsmod2015.com/fliegl-wood-trailers/

This is a trailer pack. This trailer is stable, the other is not. You have been warned. ☺

- o Fliegl TMK 266 Trailer - http://www.modhoster.com/mods/fliegl-tmk-266--3

- o Brantner Stick Trailer - http://fs-uk.com/mods/view/35366

- Front Loader Tools
  - o In-game buckets and forks may be used to handle rocks (as shown in other pictures herein).
  - o Rock Grapple (part of Skidsteer Package) - http://fs-uk.com/mods/view/37710

o Mafokri Stone Grip - http://www.modhoster.com/mods/mafokri-stone-grip-2400

This 'stone grip' appears to be decorative only. The rocks in it are fixed into position. Nor does it reach all the way to the ground so as to pick up another rock.

o Silage Blade - http://www.farmingmods2015.com/silage-plow-v1-0-fs-2015/

- Bulldozers
  o Caterpillar D6 Bulldozer - http://www.modhoster.com/mods/caterpillar-d6-bulldozer

- Other
  - Push Object Mod - http://www.modhoster.com/mods/push-object


    It is occasionally more challenging to pick up rocks using the bucket loader for the tractors and telehandlers versus the wheel loader. Having the push mod in one's folder allows one to push the rocks directly into one's bucket.

Mod Customization

In the event changes are desired to this mod, a few considerations follow. It is presumed to be known that the mod must first be unzipped before any changes can be made.

- Rock i3d Files
  - User Attributes – Each rock is structured similarly when opened in the Giant's Editor.
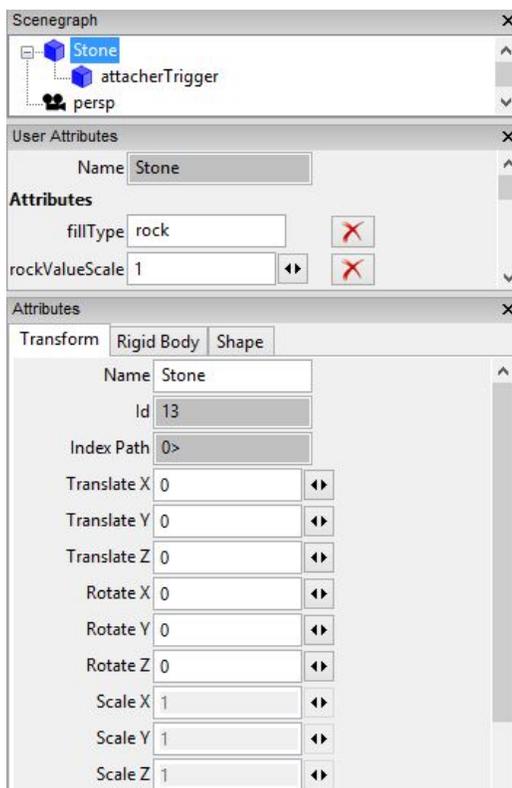
    The `fillType` and `rockValueScale` may be changed to whatever you wish. One caveat: Changes to the `fillType` will require the `fillType` to be registered in the map. Currently the script registers two `fillTypes` already: rock and gold. Changes to the `rockValueScale` will have a direct impact on the value of the rocks/gold when sold. A value of 2, for example, will double the amount received.

o Resizing – Rocks may be resized through scaling if the player wishes to have them either smaller or larger. Changes to the rock's scale is made in the Attributes section of GE (see picture above). Sometimes the scale value is grayed out and may not be changed in the editor. In this case, the scale value may be edited in Notepad ++. Near the bottom of the i3d file in Notepad ++, the scale may be inserted as follows (see red text). Replace the # symbols with the scale of your choice along the X, Y, and Z axes, separating each by a space.

```
<Shape shapeId="1" name="Stone" scale="# # #" ... />
```

Save the file with your change, then re-open it in GE. Your new scale should now be reflected, but to keep it, you must 'freeze transformations' in GE to rescale X, Y, and Z back to 1.

- Rock Table
  o More Rocks – The RockSpawn.lua file (lines 17-34) contains a table that identifies rocks for the script to spawn. It shows the file location followed by each rock's specific fillLevel:

```
-- Rock i3d files
RockSpawn.RockFiles = {
    {"Rocks/Giants_FieldRock01.i3d", fillLevel = 370},
    {"Rocks/Giants_FieldRock02.i3d", fillLevel = 280},
    {"Rocks/Giants_FieldRock03.i3d", fillLevel = 210},
    {"Rocks/Giants_rock1.i3d", fillLevel = 60},
    {"Rocks/TyroSmith_Rock1.i3d", fillLevel = 40},
    {"Rocks/TyroSmith_Rock2.i3d", fillLevel = 30},
    {"Rocks/TyroSmith_Rock3.i3d", fillLevel = 90},
    {"Rocks/TyroSmith_Rock4.i3d", fillLevel = 50},
    {"Rocks/TyroSmith_Rock5.i3d", fillLevel = 50},
    {"Rocks/TyroSmith_Rock6.i3d", fillLevel = 140},
    {"Rocks/Benw11_Rock1.i3d", fillLevel = 90},
    {"Rocks/Benw11_Rock2.i3d", fillLevel = 40},
    {"Rocks/Benw11_Rock3.i3d", fillLevel = 20},
    {"Rocks/Benw11_Rock4.i3d", fillLevel = 10},
    {"Rocks/Giants_FieldRock01g.i3d", fillLevel = 0.4},
};
```

This table may be easily edited. You may delete any rocks you wish, one of which appears on each line. Just ensure that the syntax remains intact (ie, {} brackets around each rock and its related fillLevel, and a comma between each). You may change the fillLevel if you wish. You can also add additional rocks to the table, as many as you wish. Again, just ensure they are added with similar syntax to what is shown. Also note: The last rock in this list is a 'special' rock, the gold rock. The script identifies the last rock in the table as a 'special' rock to be spawned only rarely, about once every 1,400 times (depending on the number of other rocks in the table, multiplied by 100).

- More Rocks – Additional rocks may be found on the internet through sites containing 3d artwork. In putting together this manual, I did note that additional rocks were available already for Farming Simulator at the following links:
    - Landscape Rocks: http://www.farmingsimulator-mods.info/load/maps/objects/rocks_for_landscape_v_1_0/47-1-0-3417
    - Landscape Stones: http://www.modhoster.com/mods/stones

- Input Binding Table

  Within the `RockSpawn.lua` file (lines 38-46) is a table containing spawning frequency information for each input binding level:

```
-- Input Binding for Rock Spawning Levels
RockSpawn.RockLevels = {
    {rlevel = 0, rMinDistance = 0, rMaxDistance = 0},
    {rlevel = 1, rMinDistance = 284.4, rMaxDistance = 853.1},
    {rlevel = 2, rMinDistance = 142.2, rMaxDistance = 426.5},
    {rlevel = 3, rMinDistance = 71.1, rMaxDistance = 213.3},
    {rlevel = 4, rMinDistance = 35.5, rMaxDistance = 106.6},
    {rlevel = 5, rMinDistance = 17.8, rMaxDistance = 53.3},
};
```

  The term `rlevel` refers to the particular input binding. The input binding for 0 is the "off" position, meaning that no rocks will spawn on this setting. The additional `rlevels` represent each input binding level. The term `rMinDistance` and `rMaxDistance` refers to the minimum and maximum rock spawning distance for a particular input binding. The script will calculate a random distance <u>between</u> these two distances at which to spawn the next rock for a particular input binding. The distances are measured in meters and result (on average) in the rocks per hectare figures presented in the table on page 3 of this manual.

  Changes to this table are limited to the `rMinDistance` and `rMaxDistances`, and <u>only</u> those for `rlevels` 1 through 5. No other changes should be made to this table. In general, the greater the distances put in here, the fewer rocks will be spawned. Conversely, smaller distances mean that more rocks will be spawned.

- Default Implement Width

  The script is designed such that, regardless of the width of the plow or cultivator used, the same amount of rocks will spawn over a given area. As such, the script keys its calculations from a tillage implement 'default width.' This is found in the RockSpawn.lua file (lines 50-51):

```
-- Rock spawn distances
RockSpawn.DEFAULT_WIDTH = 12;
```

  Any default width could have been chosen, but the calculations in the script are keyed off of a 12 meter width. You may change this if you wish; decreases to the amount will lead to increased rock spawning, and increases to the amount will lead to decreased rock spawning.

- Relative Value of `fillTypes`

  The `addSpecialization.lua` script file includes a snippet of code to register two new `fillTypes`, rock and gold. These are presented in a table within this script on lines 12-16:

  ```lua
  -- New fillTypes to add.
  newFillTypes = {
      {name = "rock", price = 0.0550, mass = 0.0025},
      {name = "gold", price = 75000, mass = 0.0193},
  };
  ```

  Additional `fillTypes` (that's `fillTypes`, NOT `fruitTypes`) could be added here, by creating additional entries to this table. If you choose to do this, please ensure you also have a hud file created for each additional entry and place it in the Huds directory within the mod. The syntax expected by the code for the hud file name is `xxx_hud.dds`, where xxx is the name of the new `fillType`. The script will also cross-check entries to this table with what is already registered in the map so as to avoid doubling-up.

  You may also change the basic `price` and `mass` levels of each `fillType` if you wish. `Price` is measured in "money" (in each respective currency) per liter. The `mass` information is measured in metric tons per liter. The `mass` information was based on the best available research at the time this mod was created, as was the `price` for rock. The `price` information for gold is purposefully high, but does not assume that the particular rock is "solid" gold.

- Other Objects

  As one might imagine, almost any object contained in an i3d file may be spawned in the field during the tillage process. I confined this particular script to rocks only. However, it wouldn't take much to add sticks, small logs, trash, or other debris to the list of i3d files above.

Important: If you are playing Farming Simulator in a multiplayer environment, then changes you make to the mod as discussed in this section will change the hash value of the resultant zip file for the mod. You must ensure that those you play Farming Simulator with also have a copy of the mod with your changes incorporated, or you will be unable to play in a multiplayer environment with them.

Important: While you are free to make whatever edits you wish to this mod, unless you have skills with scripting or with the Giant's Editor, we would not recommend any changes beyond the above, or even at all.

Conclusion

I hope you enjoy using this mod as much as I enjoyed making it! Just remember that every rock that gets dug up… needs to get picked up!

Credits

I'm grateful, and deeply humbled by the encouragement, assistance, and technical help I received while creating this mod. While I wished to have a mod that spawned field rocks during the plowing/cultivation process, I also wanted to have the means to learn scripting of Farming Simulator. This project provided ample learning opportunity, though it scarcely scratches the surface of the world of scripting. There is much more to learn!

A text file is included with the mod that spells out the credits in detail. I want to specially acknowledge and thank two individuals also here, without whose help this mod would never have come to be:

- **Xentro**
- **Marxtai**

In the early stages of coding, Marxtai taught me how to take my script in-game and get it working, so that I knew the game engine was "talking" to it. Xentro is my scripting mentor, and an amazing person, patiently handling every single question, and knowing just how to push me as a student of scripting. Gentlemen – I'm most grateful!

Contact Information

- Release Site: http://fs-uk.com/mods
- WIP Thread: http://fs-uk.com/forum/index.php?topic=181168.0
- Email Address: akuenzi@gmail.com